STATE OF NEW HAMPSHIRE

BEFORE THE

PUBLIC UTILITIES COMMISSION

Docket No. DE-10-195

DIRECT TESTIMONY OF

JOHN DALTON

ON BEHALF OF CONCORD STEAM CORPORATION

Petition for Approval of a Power Purchase Agreement
Between Public Service Company of New Hampshire and
Laidlaw Berlin BioPower, LLC.

December 17, 2010

I. INTRODUCTION

Q. Please state your name, business address, and the nature of your business.

A. My name is John Dalton. I am President of Power Advisory LLC (Power Advisory). My business address is 706 West Street, Carlisle, Massachusetts.

Power Advisory is a management consulting firm focusing on the electricity sector and specializing in electricity market analysis and strategy, power procurement, energy policy development, and electricity project feasibility assessment.

Power Advisory's clients include power planning and procurement agencies, regulatory agencies, generation project developers, and electric utilities.

Q. On whose behalf are you testifying in this proceeding?

A. I have prepared this testimony on behalf of the Concord Steam Corporation (Concord Steam), a wood-fired district-heating plant that serves the downtown area in Concord, New Hampshire. Concord Steam has been developing a wood-fired combined heat and power plant in Concord since 2007 (Concord Power and Steam). Concord Steam indicates that this project has secured all the necessary environmental permits and secured financing commitments for the vast majority of the required investment capital.

Q. What is the purpose of your testimony?

A. I have been asked by Concord Steam to review the Power Purchase Agreement (PPA) between Public Service Company of New Hampshire (PSNH) and Laidlaw Berlin BioPower, Inc. (Laidlaw) filed with the New Hampshire Public Utilities Commission (NHPUC or Commission) and assess whether it satisfies the criteria outlined by RSA Chapter 362:F-9 for determining whether a PPA is in the "public interest".

II. PROFESSIONAL BACKGROUND

Q. What is your professional and academic background?

A. I have over 25 years of experience providing energy market analysis, electricity policy analysis and development, power procurement and contracting support, generation project evaluation, and strategy development. My professional experience includes the following:

- Evaluation and analysis of electricity markets and the competitive position of generation technologies and projects within these markets.
- Development and oversight of numerous electricity market price forecasts across North America, including forecasts for the Independent System Operator of New England (ISO-NE) market in which PSNH participates. These price forecasts were used to support generation project development efforts, project financings, regulatory policies, and power procurement efforts.
- I have reviewed numerous electric utility avoided cost estimates and advised clients on the reasonableness of these estimates and the methodologies for developing them.
- Development of detailed financial pro formas for numerous generation projects employing a wide range of technologies to assess the projects' financial feasibility and economic value.

- I have assisted clients in drafting long-term power purchase agreements with appropriate allocations of project risks and contract terms to enable project financing and development, while maintaining appropriate incentives for efficient project operation. I have led the negotiations of power purchase agreements. I have extensive experience with the development of competitive bidding processes for conventional fossil, cogeneration, and renewable generation technologies and the development of successful proposals in response to such processes.
- I have served as a consultant to the electricity sector for over 20 years with various firms and served as an economist with the Massachusetts Energy Facilities Siting Council where I reviewed electric utility demand forecasts and supply plans and applications for the construction of new energy facilities.
- I served as an economist with the Massachusetts Department of Environmental Protection where I assisted with the costing of emission control initiatives that were targeted at electric utilities and major industrial facilities.
- I have testified in a number of proceedings across North America on issues ranging from the need for new electric generating facilities, standard offer programs for the procurement of renewable energy and capacity, electric utilities' competitive procurement programs, wholesale electricity market prices, transmission pricing policy, and the likely competitiveness of wholesale power markets.

- In 2009, I testified on behalf of the Vermont Public Service Board (Board) as an independent expert regarding the renewable generation technology cost, performance, tax and financing assumptions that were to be used by the Board to make the final price determinations for the Vermont Standard Offer Program.

My academic experience includes a Bachelor of Arts in Economics from Brown University and a Masters of Business Administration from Boston University. I have also and have taken courses in resource planning methods and regional planning at the Massachusetts Institute of Technology and Boston University. My curriculum vitae is attached as Exhibit JCD-1.

III. SUMMARY OF DIRECT TESTIMONY

Q. What is the focus of your direct testimony in this proceeding?

A. My testimony reviews the pricing for the different products provided by the Laidlaw Project (Project) relative to current and anticipated future market prices for these products and assesses whether the prices appear to be above market. I find that the pricing for the three separate electricity products sold to PSNH under the Laidlaw PPA are $453 million above anticipated future market prices for these products on a cumulative basis.

PSNH did not use a competitive solicitation or any formal market test to assess the reasonableness of its pricing. I therefore evaluated the Laidlaw PPA pricing relative to that outlined in a term sheet submitted by Concord Steam and Power to PSNH. My analysis indicates that the pricing offered by the Laidlaw PPA is 13% higher on a net present value basis than reflected in Concord Steam and Power's term sheet. In addition,

I evaluated the Project's after tax return on equity as a second test of the reasonableness of the pricing offered. My analysis indicates that the Project would earn a 46.2% after tax return on equity. I estimate that an after tax return on equity of 12 to 16% is appropriate for a project with a long-term PPA, with the low end of this range appropriate for the Laidlaw Project given its limited fuel price risk.

Finally, I assess the degree to which the Laidlaw PPA conforms to the five criteria outlined in Section II of RSA 362:F-9 that are considered by the Commission when evaluating whether a PPA is in the public interest. I find that the Laidlaw PPA is contrary to four of these five criteria.

IV. REVIEW OF THE LAIDLAW PPA

Q. Could you briefly review the Laidlaw Project.

A. The Laidlaw Project is 70 MW (gross) generating station that will burn biomass in a fluidized bed boiler. The Project is located in Berlin, New Hampshire at the site of the former Fraser Paper Pulp mill.

Q. Could you please summarize the basic terms of the PPA.

A. The PPA represents a 20-year agreement from the in-service date for the sale of energy, capacity and New Hampshire Class I RECs produced by the Project to PSNH. Under the terms of the PPA, the Laidlaw Project will sell to PSNH all of the electricity products produced by the facility. Separate pricing is outlined in the PPA for three distinct electricity products: (1) energy; (2) capacity; and (3) New Hampshire Class I Renewable Energy Certificates. To reflect the potential value of other electricity products for which there isn't currently value, in the PPA the pricing for energy is characterized as energy

and other products (referred to as energy and other products in this Testimony), except capacity and New Hampshire Class I RECs.

PSNH is seeking approval from the Commission to pass these costs through to its default energy service customers.

The PPA also provides an option to PSNH to purchase the Project at the end of the 20-year PPA term based on fair market value. The ultimate purchase price that would be paid by PSNH under this provision is reduced by the above market energy payments for the Project output over the twenty-year contract term. This element of the PPA is referred to as the Cumulative Reduction. I offer some comments on the Cumulative Reduction later in my testimony.

Q. Under the PPA how are the prices established for energy and other products, capacity, and New Hampshire Class I RECs?

A. Section 6.1.2 of the PPA specifies the prices that would apply for these products after the in-service date. For sales of energy and other products, Laidlaw receives a biomass indexed price for energy. The base energy price (from the in-service date until the start of the first full calendar quarter) is $83/MWh of which $61.2/MWh (the fuel portion), derived by multiplying 1.8 tons per MWh, which is the assumed project energy conversion factor, by $34/ton of biomass. In future periods this fuel portion varies in proportion to the price for biomass fuel at PSNH's Schiller Station in Portsmouth compared to a base price for such fuel of $34/ton.

For the capacity provided by the facility, Laidlaw receives $4.25/kW-month for the first five operating years. For each subsequent operating year, the capacity price

increases by $0.15/kW-month, such that the price for capacity in the sixth operating year would be $4.40/kW-month.

For the NH Class I RECs produced, Laidlaw receives 80% of the Alternative Compliance Payment (ACP) provided under RSA Chapter 362-F. For operating years six through ten, Laidlaw receives 75% of the ACP; 70% of the ACP for operating years eleven through fifteen; and 50% of the ACP for the remainder of the contract term. Under RSA Chapter 362-F, the ACP increases with the rate of escalation in the Consumer Price Index.

Q. How did you evaluate the degree to which the total price paid by PSNH's customers for the Laidlaw Project for the three electricity products would likely exceed their total market value?

A. My analysis is presented in Exhibit JCD-2 and indicates that the cumulative above market payments for the Project relative to PSNH's Low Market Case for energy and RECs is $453 million over the 20-year contract term. This includes the savings provided by the Project from 2020 to 2033 when the PPA price for capacity is forecast to be below the market price. Details regarding the assumptions that underlie this analysis are provided in Section VI of my Testimony below.

Q. Do you believe that PPA pricing should be below expected market prices?

A. Not always. For example, in the current economic and financial climate it is clear that most renewable energy project developers need long-term Power Purchase Agreements to finance projects. If New Hampshire and other New England state's RPS targets are to be met, then buyers need to enter into long-term PPAs. Therefore, it is

appropriate for electric utilities, such as PSNH, to enter into such PPAs to meet their future requirements for energy, capacity and RECs.

However, my analysis shows that there will be a significant cost impact from a PPA with Laidlaw and PSNH has not demonstrated that it properly managed these rate impacts to its customers. Specifically, the Laidlaw PPA does not represent an efficient and cost effective alternative which properly balances costs, value and project risks. While determining this proper balance can be difficult, the evidence clearly indicates the Laidlaw Project PPA does not represent such an efficient and cost effective alternative.

The most effective way for PSNH to make such a showing is to use a competitive bidding process where PPAs are awarded to the proposal(s) that best satisfies the evaluation criteria outlined in the request for proposals. As acknowledged by PSNH Witness Gary A. Long, the interest by renewable energy project developers in long-term PPAs is very high. (Docket DE-10-195, Direct Testimony of Gary A. Long, p. 5) This interest is also demonstrated by the recent RFP issued by the Massachusetts local distribution companies, including PSNH's affiliate Western Massachusetts Electric Company. While results are not available, an earlier RFP that was only open to Massachusetts projects and as a result would draw less market interest received 52 bids for 35 projects.

In a market with significant demand and limited supply, PSNH's customers will be best served by a competitive bidding process where renewable project developers compete for the right to enter into a long-term PPA with PSNH. Without such a market test, it is uncertain that the PPA is competitively priced.

Q. **How does the PPA pricing compare to alternatives?**

A. The PPA price is higher than the pricing for the alternative that I compared it to. Finding comparable pricing for alternatives is difficult given limited market transparency. This is yet another reason why relying on a market test such as provided by competitive bidding process is appropriate when offering long-term PPAs.

I compared the projected pricing in the Laidlaw PPA with the pricing reflected in a term sheet that was submitted to PSNH for a biomass project being developed by Concord Steam and Power. This analysis indicates that the pricing offered in the Laidlaw PPA is 13% higher than Concord Steam and Power's term sheet over a 20-year term on a net present value basis. See Exhibit JCD-3. This is a considerable difference which at a minimum should have caused PSNH to further consider Concord Steam and Power's project as an alternative to the Laidlaw Project. When there are two or more competing projects, customers are best served by having the projects compete head to head. PSNH elected to forgo such direct competition and to award a contract to Laidlaw.

Q. In the absence of a competitive solicitation by PSNH, what other methods can be used to measure the reasonableness of the Laidlaw PPA?

Without a market test provided by a competitive process, it is appropriate to consider the facilities' costs relative to alternatives and the developer's internal rate of return (IRR). This approach has been used by other regulatory commissions in New England. For example, the Rhode Island PUC noted that "[i]n order to address pricing in the absence of competitive bids, the IRR analysis is an important analytical tool because the IRR should be sufficient to attract investors, but not more than is necessary to secure financing." Rhode Island Public Utilities Commission, *In Re: Review of Proposed Town*

of New Shoreham Project Pursuant to R.I. Gen. Laws. S. 39-26.1-7, Docket No. 4111, p. 73.

Q. What is a reasonable after tax return on equity for the Project?

A. A typical after tax return on equity for an IPP project with a long-term PPA is from 12 to 16%. The Laidlaw Project has little fuel price risk. The limited project risk is reflected in the high degree of leverage (82/18 debt-equity ratio) assumed by Laidlaw for project financing. (New Hampshire Site Evaluation Committee Decision, p. 43.) Therefore, I believe that the lower end of this range is appropriate for the Laidlaw Project. I reflected a 12% after tax return on equity when calculating the Project's weighted average cost of capital for the purposes of calculating net present values.

Q. Have you estimated the Project's IRR?

A. Yes, I have in terms of an after tax return on equity. PSNH's own analysis suggests that the lessor, an equity partner in the Laidlaw Project (PJPD), would earn a 17.5% IRR on the lease payment, production tax credit, and associated project cash flows. (Data Request STAFF-03, Q-STAFF-011-RV01) This IRR includes the return available to cover debt costs which are well below the costs of equity. Therefore, the return that would be available to equity would be considerably higher, indicating that the PPA price is too high, and exceeds other alternatives available if PSNH had used a competitive solicitation. Furthermore, this calculation of the IRR does not include the cash flows from operations and as such understates the total cash flows provided by the Project.

In addition, this analysis assumed a 2010 in-service date rather than the current assumption of 2014 and as such did not reflect the escalation in the Alternative

Compliance Payment which will result in higher REC payments to the project. Under the pricing formula in the PPA these annual REC payments represent over $20 million in project revenues in 2010, whereas PSNH estimates fixed and variable operating and maintenance costs for the Project of less than $10 million. Both would escalate at about the Consumer Price Index (CPI). Deferring the start date and escalating prices (which represent about $20 million) and costs (about $10 million) will provide additional cash flows (roughly the value of $10 million escalated by the CPI for four year) and enhance the value of the Project.

Finally, the fuel costs for the project in 2010 in this PSNH analysis imply a biomass cost of $38/ton, derived by dividing the fuel cost by the project output and dividing the resulting value by the 1.8 ton/MWh assumed conversion efficiency, whereas the energy revenue reflects a biomass cost of $34/ton. This indicates that either the Project expenses are overstated or its revenues understated, both of which indicate that the Project's IRR is understated.

Because these discrepancies all indicate that PSNH's analysis understated Project cash flows, I performed an independent analysis of the Project cash flows. My own analysis indicates that the Project will provide a 46.2% after tax return on equity. This is well in excess of the return required for such investments and indicates that the pricing provided by the PPA is too high.

Q. How did you calculate the after tax return on equity provided by the Project?

A. I used a cash flow model that was developed as part of a collaborative effort in a proceeding in Vermont before the Public Service Board to set rates for Vermont's standard offer program in Docket No. 7533. The model structure was accepted by all the

active participants in the proceeding. I used this basic model under direction from Board staff to help set the final Standard Offer prices that were adopted.

Q. Could you review the assumptions that you relied on for this cash flow analysis.

A. Where possible I used the assumptions that PSNH used in its analysis presented in Data Request STAFF-03, Q-STAFF-011-RV01. In addition, I assumed that the project would incur general and administrative (G&A) overhead expenses of $1,000,000. The G&A expense is a rough estimate and depends on the project structure and the entity providing these services.

I also reflected four years of escalation for the variable and fixed operations and maintenance costs to reflect the fact that the PSNH analysis was for 2010 and my analysis assumed a 2014 in-service date. In addition, I used Laidlaw's net output estimate of 63 MW and project capacity factor of 87.5%. (New Hampshire Site Evaluation Committee, Laidlaw Berlin Power, LLC, Tr. 8/26/10, Afternoon Session at 90, 94.)

I used the $167 million project cost reported by Laidlaw. (New Hampshire Site Evaluation Committee Decision, p. 43.) In addition, I assumed that the project would be financed using an 80/20 debt-equity ratio and a cost of debt of 7%. This debt-equity ratio yields a minimum debt service coverage ratio of 1.43 and average of over 1.8, which is very attractive. Laidlaw assumes an 82/18 debt-equity ratio according to the New Hampshire Site Evaluation Committee decision. (p. 43) John Hancock Insurance Company provided a "comfort letter" to Laidlaw, suggesting that the prospective lender reviewed the project pro formas and found the underlying assumptions to be reasonable from a financing perspective. (p. 43)

I reflected a debt service reserve of six months and working capital requirements of three months of project expenses. Conservatively, I have assumed that the Project would only be able to utilize 75% of the value of the production tax credits that it generates. As a biomass project, I assumed that $96 million (57.5%) of the $167 million total project cost would qualify for seven year Modified Accelerated Cost Recovery System, $68.5 million (41% of project total costs) for 20-year straight line depreciation and that the remaining $2.5 million (1.5%) would be non-depreciable. Additional assumptions for this analysis are identified in Exhibit JCD-4.

Q. How have you considered the project ownership structure in your cash flow analysis?

A. The Project has a lease agreement with PJPD Holding LLC (PJPD). It appears that both Laidlaw and PJPD are owned by NewCo Energy Inc. (NewCo), which was formed solely for the purposes of the construction and operation of the Project. (New Hampshire Site Evaluation Committee, Decision Granting Certificate of Site and Facility with Conditions, Laidlaw Berlin Power, LLC, (November 8, 2010) p. 4-5.) I therefore evaluated the aggregate cash flows that would be required and generated by the Project and available to NewCo. This allows me to evaluate the project economics from an overall project perspective and assess the returns to NewCo. (New Hampshire Site Evaluation Committee Decision, p. 4-5.)

As noted above, this analysis indicates a 46.2% after tax return on equity for the Project. This is well in excess of the return required for such investments and indicates that the pricing provided by the PPA is too high.

V. IMPACT OF PPA ON RENEWABLE ENERGY MARKET

Q. What impact would the Laidlaw PPA have on the New Hampshire renewable energy market?

A. The Laidlaw PPA is likely to have an adverse impact on the New Hampshire renewable energy market. There are two direct adverse impacts from the Laidlaw PPA on the New Hampshire renewable energy market. The Laidlaw PPA will adversely affect the biomass market by increasing overall fuel prices and will adversely affect the REC market by decreasing prices.

As discussed in the Direct Testimony of Messrs. Berti and Dammann and Mr. Saltsman, the Laidlaw Project will significantly increase the demand for biomass and, as a result, increase biomass prices, which will adversely affect the competitiveness of existing biomass projects, reducing their role in the market and making it more difficult for new biomass projects to enter the market.

In addition, the Project would have an adverse impact on REC prices (i.e., cause them to decrease) and by so doing adversely affect other prospective and existing renewable energy projects in New Hampshire. However, PSNH customers will not realize a benefit of any reduction in RPS compliance costs because they would continue to be purchase RECs at above market prices under the Laidlaw PPA. My analysis indicates that PSNH would be surplus RECs until 2019 at a 0% customer migration rate and until 2023 at a 31% migration rate. Therefore, PSNH customers will not be able to benefit from these REC price declines during this period. In fact, they would be adversely affected (i.e., the Project rate impacts would increase) to the degree that PSNH

has a surplus of Class I RECs which it must sell at a price that is likely to be below the cost that PSNH paid for these RECs.

Q. What did you assume regarding the RECs that would be available to PSNH under this analysis?

A. The starting point for my analysis was PSNH's assumptions regarding its additional REC requirements after existing contracts are considered. (Data Request OCA-01, Q-OCA-003, Page 9 of 9.). This analysis includes the Class I RECs generated by Schiller, which may no longer be able to participate in the Massachusetts Class I market and the RECs that would be generated by the Laidlaw Project at an 87.5% capacity factor and 63 MW net output. See Exhibit JCD-5.

Q. Why did you include the Class I RECs generated at Schiller in your analysis? Does not PSNH currently sell these RECs rather than utilize them to satisfy the REC requirements of its default energy supply obligations?

A. Massachusetts has proposed changes to its Renewable Portfolio Standard rules that would require biomass generation to be from "sustainable" sources such as "non-forest derived and forest derived residues, forest salvage, and energy crops" and to meet restrictive efficiency requirements. It is my understanding that if these rule changes are adopted the biomass output from Schiller is unlikely to qualify as a Class I REC. While PSNH may continue to not utilize the RECs generated at Schiller for its default energy supply obligations, the revenues from these REC sales are credited back to PSNH's customers. Therefore, when evaluating PSNH's effective position in the REC market it is reasonable to consider these RECs when assessing its overall REC requirements. By not doing so, PSNH is effectively increasing its customers' exposure to REC market

prices and the evidence indicates that this increased exposure would result in higher costs.

Q. What does your analysis of PSNH's need for additional RECs indicate?

A. The fact that PSNH is forecast to be surplus through 2018 with no additional customer attrition and through 2022 with 31% customer attrition indicates that it is over-hedged and its customers over-exposed to REC market prices. This suggests that the Laidlaw Project is larger than needed "to meet reasonably projected renewable portfolio requirements." RSA 362-F:9 I. I also understand that under RSA 362-F:3, New Hampshire's RPS requirement expires in 2025.

Q. Are not the impacts on the REC market the same impacts that would occur from the development of any renewable energy project with an equivalent output?

A. Yes in the sense that new projects that offer additional output to the market can cause prices to decrease for other projects. My concern is that the REC prices for the Laidlaw Project are clearly above market and the PPA protects Laidlaw from from market price risks, with PSNH's customers' required to bear these risks. The PPA disproportionately benefits the Laidlaw Project and there was not an adequate basis upon which PSNH elected to provide the Project with this benefit.

VI. COMPARISON OF PPA PRICING TO EXPECTED FUTURE MARKET PRICES

Q. How did you calculate that the prices for three electricity products sold under the PPA to PSNH were $453 million higher than anticipated future market prices on a cumulative basis?

A. I first compared the energy price under the PPA relative to future market prices and then REC and capacity prices.

The energy price of $83/MWh is well above the projected market price for energy. This point is accepted by PSNH. In a data request response, PSNH indicates that the cumulative over payments for energy (i.e., contract energy price less the market energy price) under the "Base Case" forecast would be $143.5 million over the 20-year PPA term. (Response to Data Request STAFF-01, Q-STAFF-011-RV01, Attachment 3). With the Project's net output at 63 MW and at an 87.5% capacity factor, the Project output is higher, resulting in an increase in the cumulative over payments to $160.5 million.

I believe that this Base Case for energy prices is likely to be too high and that PSNH's "Low Case" energy prices are a more realistic base case or central forecast.

Q. Why do you believe that PSNH's "Low Case" energy prices are more reasonable than its "Base Case"?

A. This assessment is based on current and expected future market conditions. As a point of reference, the average Day Ahead locational marginal energy price (LMP) for the Berlin node (4383 LD: Berlin_NH34.5) for the twelve months ending November 2010 was $46.47/MWh. PSNH's Low Case energy price for 2014 is $53.31/MWh. This implies about a 3.5% compound annual growth rate in energy prices from 2010 to 2014. PSNH's Base Case energy price for 2014 is $66.63/MWh, implying a 5.7% compound annual growth rate.

Q. What is the evidence regarding future prices for energy in the New England market?

A. Dramatically lower delivered natural gas prices and to a lesser degree reduced demand have resulted in significant declines in LMPs in New England in the last two

years. Natural gas-fired generators are the marginal resources for the majority of time in the ISO-NE market and are likely to continue to represent the marginal generating resource for the foreseeable future. An estimate of future prices for the Mass Hub, a key trading point in the ISO-NE market, assembled by Citi Utilities Group estimates annual average prices of $47.4/MWh for 2011, $50.1/MWh for 2012, and $52.4/MWh for 2013. See Exhibit JCD-6.

An indication regarding likely future power prices can be provided by reviewing natural gas futures prices, which are available for longer periods of time than wholesale power prices. Significant increases in the cost of energy (LMPs), therefore, are not anticipated as natural gas prices are expected to remain low. Over the long term ICE Henry Hub futures natural gas prices (as of December 8, 2010) escalate by an average of about 2.7% per year from 2014 to 2019. The escalation in power prices is likely to be greater than this as higher electricity demand results in increasing reliance on less efficient generating units which would result in increases in market heat rates (power price divided by natural gas price).

In sum, these Low Market Case energy prices are more in line with market conditions reflected by current New Hampshire zone LMPs, the Citi Utilities Group estimates, and the rate escalation reflected by natural gas futures prices. Therefore, I believe that the Low Market Case presented by PSNH in Response to Data Request STAFF-01, Q-STAFF-011-RV01, Attachment 2 is more appropriate for comparing the Laidlaw PPA energy prices to likely future market prices than the Base Case.

Q. How did you calculate the amount by which the energy payments made to Laidlaw pursuant to the PPA are likely to be above their market value?

A. I used the PSNH Low Market Case scenario to estimate the cumulative difference between the PPA-stipulated energy payment and the future market value for energy. Under these conditions, the Cumulative Reduction under the PPA increases from $160.5 million (63 MW net output at 87.5% capacity factor) under Base Case energy market prices to $321.5 under the Low Market Case. It effectively doubles. See Exhibit JCD-2.

Q. To what degree do the Laidlaw project capacity payments appear to be above market?

A. The capacity price specified in the PPA ($4.25/kW-month for the first five years and then escalating by $0.15/kW-month) also appears to be well above market for the initial years of the PPA. This is reflected by the capacity price forecast used by PSNH which is below the PPA price through 2019. ISO-NE Forward Capacity Market (FCM) clears about three years before the market need date so Forward Capacity Auction (FCA) prices are known through Power Year (June 1 through May 31) 2013-14. The prices in FCA #4 for June 1, 2013 to May 31, 2014 cleared at the floor of $2.951/kW-month. With prices clearing at the floor there was more supply available at this price than the Installed Capacity Requirement (ICR), which establishes the market demand. This suggests that if there was not a floor price then prices would have cleared at a lower level and there is the potential for further price declines in the next FCA.

The 2010 Regional System Plan supports this perspective by indicating that without retirements existing and proposed resources are sufficient to meet forecast ICRs until 2019. The 2010 RSP states: "Assuming the over 35,000 MW of resources that cleared the third Forward Capacity Auction (FCA #3) for the capacity commitment period for 2012/2013 remain in commercial operation beyond 2012, and no generation or

demand resources retire or permanently delist, New England should have adequate resources through 2019." (p. 3)

The FCA has produced capacity prices that are well below virtually all market analysts expectations and without significant changes to the FCM design significant prices increases are unlikely for the next round of the FCA.

Q. How does the PPA price for Class I RECs compare to current market prices?

A. The PPA price for these Class I RECs (estimated to be $53.80/MWh) is above current market prices. Class I RECs for 2010 recently traded at about $13 and for 2011 traded at about $19. (Evolution Completes REC Auction for University of New Hampshire, http://new.evomarkets.com/desks/renewable/post/324/) These low prices reflect the current supply surplus in the New England REC market and slack energy demand in New England. Reflecting these low prices and this surplus, the banking provisions in these Renewable Portfolio Standards are being fully utilized. This will reduce future demand for RECs and sustain this surplus as load serving entities are able to rely more heavily on banked RECs to meet their requirements, further reducing the demand.

Q. What factors need to be considered when evaluating likely the future prices of Class I RECs?

When evaluating future REC market prices one needs to recognize that the market is regulatory construct. Unlike electric energy, there is no inherent demand for RECs. These RECs do not provide a service. This demand is based on regulatory requirements. As a result, REC market prices are very sensitive to the potential for changes in the laws and regulations that underpin these programs as well as a fundamental change to market

dynamics such as the Laidlaw Project being awarded a contract and representing the largest source of Class I RECs in the New England market

Therefore, even when REC markets are in deficit as they were several years ago REC prices tend to trade at discount to Alternative Compliance Payment pricing which is the penalty that load serving entities pay when they have not contracted for or supplied sufficient RECs.

Furthermore, other than for biomass projects there is little cost to RPS eligible renewable generators to produce RECs, therefore, in the short run most suppliers are not sensitive to the REC price. With respect to long run market dynamics, there are parties selling RECs in the New England market that are largely indifferent to REC pricing. For example, Hydro-Quebec supplied 10.8% of Massachusetts' total REC supply in 2009 (Massachusetts Renewable and Alternative Energy Portfolio Standards Annual Compliance Report for 2009, http://www.mass.gov/Eoeea/docs/doer/rps/rps+aps-2009annual-rpt.pdf). These RECs from Quebec are likely to be from Hydro-Quebec's Government mandated purchases from wind projects. The cost recovery from these wind projects is not tied to REC prices. To some degree the sale of RECs is essentially a windfall to Hydro-Quebec. Similarly, Vermont has a Sustainably Priced Energy Development (SPEED) Program which promotes the development of renewable projects in the state. Because Vermont has no formal RPS program, electric utilities that purchase the output of these SPEED projects resell any qualifying RECs, providing additional supply which is not sensitive to price and helps constrain REC prices.

While PSNH is proposing to use the RECs generated by the Laidlaw Project to satisfy the REC requirements of its default energy supply customers, any surplus RECs

generated by the project are not likely to qualify as Class I RECs in Massachusetts given the proposed stringent requirements for sustainable biomass which only includes "non-forest derived and forest derived residues, forest salvage, and energy crops." Assuming that this proposal is adopted, then the output of the Laidlaw Project and a number of other biomass projects is not likely to be eligible to participate in the Massachusetts Class I RPS program. In the short-term at least, this is likely to result in increases in the Massachusetts Class I REC prices as supply contracts and declines in the Class I REC prices in other New England states as supply made available to these markets increases from non-compliant Massachusetts Class I RECs.

Q. What do these trends mean in terms of the REC pricing in the Laidlaw PPA?

Given these factors, I believe that there is a considerable risk that the PPA price would be higher than the market price for New Hampshire Class I RECs. Therefore, PSNH's Low Market Case REC prices (about $33.63 in 2014 and escalating at the Consumer Price Index thereafter) are a more reasonable estimate of future REC prices than its Base Case.

VII. PUBLIC INTEREST CRITERIA

Q. Would the Cumulative Reduction adequately protect PSNH customers from above market prices?

A. No. The calculation of the Cumulative Reduction does not consider the time value of money; dollars spent today are more valuable than those received tomorrow. The Cumulative Reduction is the running total of above market energy payments. PSNH's customers should be compensated for the greater value of above market payments made in the initial years of the PPA relative to repayments in the later years. In

essence, these above market payments represent an interest free, unsecured loan made by PSNH's customers to Laidlaw. As a result, the Cumulative Reduction should be adjusted to reflect this time value of money by compounding "balances" at an 8% interest rate, which is reflective of the Laidlaw Project's effective cost of capital.

In addition, the Cumulative Reduction only considers above market energy payments, it does not consider above market capacity or REC payments. As discussed above, there is a reasonable likelihood that the REC payments could be above market on an aggregate basis over the term of the PPA. I calculate the aggregate overpayment to be $453 million, not considering the compounding discussed above. See Exhibit JCD-2.

Finally, the Cumulative Reduction provides protection to PSNH customers only if the Project has market value at the end of the 20-year PPA term and there is no security provided for above market energy payments if the Project defaults.

Q. Do you believe that the Laidlaw PPA satisfies the five criteria outlined in Section II of RSA 362:F-9 that the Commission is to consider when determining whether a request of an electric distribution company to enter into a multi-year PPA with renewable energy sources is in the public interest?

A. For the reasons described herein, I believe that the Laidlaw PPA is clearly contrary to four of these criteria:

(1) The efficient and cost-effective realization of the purposes and goals of this chapter;

(2) Adherence to the restructuring policy principles of RSA 374-F:3;

(3) The extent to which such multi-year procurements are likely to create a reasonable mix of resources, in combination with the company's overall energy

and capacity portfolio, in light of the energy policy set forth in RSA 378:37 and either the distribution company's integrated least cost resource plan pursuant to RSA 378:37-41, if applicable, or a portfolio management strategy for default service procurement that balances potential benefits and risks to default service customers;

(4) The extent to which such procurement is conducted in a manner that is administratively efficient and promotes market-driven competitive innovations and solutions;

Q. Does this conclude your direct testimony?

A. Yes.