



State of Rhode Island and Providence Plantations

DEPARTMENT OF ATTORNEY GENERAL

150 South Main Street • Providence, RI 02903
(401) 274-4400 - TDD (401) 453-0410

Peter F. Kilmartin, Attorney General

April 24, 2012

VIA HAND DELIVERY & ELECTRONIC MAIL

Luly E. Massaro, Commission Clerk
Rhode Island Public Utilities
89 Jefferson Boulevard
Warwick, Rhode Island 02888

Re: Docket 4319 – Review of Power Purchase Agreement Between The Narragansett Electric Company d/b/a National Grid And Black Bear Development, LLC

Dear Ms. Massaro:

Enclosed please find an original and nine (9) copies of the redacted Confidential Memorandum of Division witness Richard S. Hahn for filing by the Division of Public Utilities and Carriers in the above-captioned proceeding.

Please be advised that the Memorandum of Richard S. Hahn may refer to information, contain data or have data embedded therein of a nature that National Grid or Black Bear Development, LLC have asserted a claim of confidentiality toward. The Division is thus providing a redacted copy of Richard S. Hahn's memorandum in order to preserve the rights, privileges, claims or objections of the parties. The Division through this filing is otherwise in no way waiving any of its rights or objections with respect to these matters.

I appreciate your attention in this matter and if you should have any questions, please feel free to contact me.

Very truly yours,

Jon G. Hagopian
Special Assistant Attorney General

Enclosures

cc: Service List

La Capra Associates

To: Rhode Island Public Utilities Commission
From: Richard Hahn, La Capra Associates, on behalf of the Division of Public Utilities and Carriers
Re: Purchased Power Agreement between National Grid and Black Bear Hydro Power, Docket 4319
Date: April 24, 2012

REDACTED VERSION

On March 19, 2012, National Grid (“NGRID” or the “Company”) filed with the Rhode Island Public Utilities Commission (the “Commission”) a Purchased Power Agreement (“PPA”) with Black Bear Development Holdings, LLC (“Black Bear Hydro” or “BBHP”). The Rhode Island Division of Public Utilities and Carriers (“Division”) requested that La Capra Associates, Inc. review the PPA and provide comments for submission to the PUC, on behalf of the Division. This memorandum provides the results of La Capra Associates’ review of the PPA and associated analyses filed by NGRID.

Summary

Based upon my review of the proposed PPA and the analyses provided by NGRID, I offer the following conclusions.

- The PPA was selected via a Commission-approved long-term procurement process for renewable projects.
- According to the Company’s March 2, 2012 Summary Report to the Commission, the BBHP ranked highest based upon the final combined price and non-price criteria.
- BBHP proposed two contract prices: One price for contractual delivery in Maine and another, higher price for contractual delivery in Rhode Island. The physical delivery point is in Maine. NGRID has selected the higher price for contractual delivery in Rhode Island. I disagree with this choice. The Maine delivery point should be chosen because it results in lower expected costs to Rhode Island ratepayers even if projected costs for congestion and losses between Maine and Rhode Island are added to the PPA price for

the Maine contractual delivery point. The Maine contractual delivery point is also the price proposal that resulted in the BBHP project being ranked highest in the Company's RFP.

- The Company compared the cost of the BBHP PPA over its 15-year term of the contract to the cost of market purchases for capacity, energy, and RECs using a market price forecast prepared by ESAI, and concluded that the BBHP PPA will be below market (a favorable outcome to Rhode Island ratepayers). [REDACTED]

[REDACTED] Current energy prices are lower and current REC prices are higher than projected by ESAI. Using alternative market prices forecasts developed by La Capra Associates lowered the amount by which the BBHP PPA was below market, but I do expect the PPA to be below market prices over its term.

- The terms and conditions in the PPA are reasonable and should be accepted.

Based upon the above, I recommend that the proposed PPA be approved but with the Maine delivery point and price option.

Overview of the Project

According to the testimony of Mr. Chadbourne, the BBHP is a 3.75 MW (nameplate) run-of-river hydroelectric project to be located in Orono, Maine. The project will be constructed adjacent to the existing "Orono A" facility on an existing dam in the Stillwater Branch of the Penobscot River, and it will contain three vertical turbine generators, each with a nameplate rating of 1.25 MW at a power factor of 0.90. The new units are sometimes referred to as "Orono B". The BBHP will interconnect to an adjacent Bangor Hydro distribution substation, which is connected by the Bangor Hydro 46 kV transmission system to the Graham Substation. The Graham Substation is the location for the 115 kV interconnection to the NEPOOL Pool Transmission Facilities.

NGRID sought proposals for the purchase of capacity, energy, and RECs via an RFP for long-term renewable contracts. NGRID sought such proposals to achieve 50% of the 90 MW renewable energy requirements by December 31, 2011.

In its response to NGRID's long-term renewable RFP, BBHP proposed two pricing mechanisms. The first mechanism is a price of [REDACTED] [REDACTED] for contractual deliveries at the Graham substation. Under this pricing mechanism, NGRID would incur additional charges for any positive or negative costs for congestion and losses between the Graham substation and the Rhode Island load zone ("RI zone").

The second mechanism is price of \$99.00 per MWH in the first year of a 15-year PPA escalating at 2.0% per annum for contractual deliveries to the RI zone. The payments to BBHP under the proposed PPA are [REDACTED] than prices for the Maine contractual delivery point, but are reduced for any positive costs for congestion and losses between the Graham substation and the RI zone. This pricing mechanism is included in Exhibit E of the proposed PPA.

It is my understanding that when the BBHP units become eligible to receive capacity revenues, the bundled price above will be reduced by the value of that capacity. This represents a financial settlement of the value of capacity. The projected annual capacity factor for the proposed units is 90%, equating to an expected output of approximately 31,268 MWH per year.

It is also my understanding that NGRID will receive an incentive payment equivalent to 2.75% of all PPA payments, as provided for in Rhode Island state law

Price Mechanism

On page 12 -13 of the pre-filed testimony, Mr. Milhous and Ms. Abrams describe the proposed pricing mechanism in the PPA.

"Second, consultation with ISO-NE confirmed that assignment of the output from the Black Bear Orono B Project to the Company through a generator asset registration form would result in credit to the Company at the Rhode Island zonal price. The Black Bear Orono B Project will be treated by ISO-NE as a Settlement Only Generator and its energy will be priced in the real time market at the generator node clearing price (Graham Substation). In the ISO-NE settlement process, the Company would be credited

with real time energy at the Rhode Island zonal price. However, the Company would also receive charges from ISO-NE for "price separation", i.e., the difference between the real time prices at the generator node in Maine and the Rhode Island zone. The price separation would be attributed to losses and congestion, and for any given hour could be positive or negative. As further explained below, the bundled pricing in the PPA accounts for the expected energy price separation between the Maine generator zone and the Rhode Island zone, such that Black Bear Hydro bears the risk of that price separation."

This mechanism can be illustrated as follows. In the first year of the PPA term, the bundled price is \$99.00 per MWH. If congestion and losses between Maine and Rhode Island average \$5.00 per MWH for the year, NGRID will incur charges from ISO-NE in its settlement of \$5.00 per MWH for all MWHs generated by BBHP. The PPA price paid by NGRID to BBHP would be reduced to \$94.00 per MWH from \$99.00 per MWH. However, the actual cost paid by Rhode Island ratepayers would still be \$99.00 per MWH, consisting of \$94.00 per MWH in PPA payments to BBHP and \$5.00 per MWH in the ISO-NE settlement for NGRID.

Suppose that the price separation between Maine and Rhode Island becomes \$10.00 per MWH instead of \$5.00 per MWH. The actual cost paid by Rhode Island ratepayers would still be \$99.00 per MWH, consisting of \$89.00 per MWH in PPA payments to BBHP and \$10.00 per MWH in charges from ISO-NE in the settlement process. The proposed pricing mechanism shields Rhode Island ratepayers from changes in congestion and losses and maintains the actual cost at the PPA price of \$99.00 per MWH escalated at 2% per annum.

Section 4.2(a) of the PPA addresses the scheduling and delivery of energy.

"During the Services Term, Seller shall Schedule Deliveries of Energy hereunder with ISO-NE within the defined Operational Limitations of the Facility and in accordance with this Agreement, all ISO-NE Practices and ISO-NE Rules, as applicable. Seller shall transfer the Energy to Buyer in the Real Time Energy Market in such a manner that Buyer may resell such Energy in the Real Time Energy Market, and Buyer shall have no

obligation to pay for any Energy not transferred to Buyer in the Real Time Energy Market or for which Buyer is not credited in the ISO-NE Settlement Market System (including, without limitation, as a result of an outage on any electric transmission or distribution system). As of the Effective Date, Delivery of the Energy is contemplated to occur within the ISO-NE Settlement Market System through Buyer being registered as the Asset Owner for the Facility in such ISO-NE Settlement Market System, and Seller will take all actions reasonably requested by Buyer in order to register Buyer as the Asset Owner for the Facility in the ISO-NE Settlement Market System. Buyer may, in its sole discretion and in conformity with ISO-NE Rules and ISO-NE Practices, direct Seller to (i) Schedule Delivery of the Energy in the Day-Ahead Energy Market and/or (ii) Deliver the Energy to Buyer or at Buyer's direction through Internal Bilateral Transactions executed through ISO-NE and settled at the delivery node associated with the Facility (subject to adjustment for the Zonal Price Separation described in Section 3 of Exhibit E. Any such Internal Bilateral Transactions will specify hourly delivery of Energy and will be entered into daily, and any necessary adjustments will be made pursuant to ISO-NE settlement protocols. Any such Internal Bilateral Transactions will be entered into the Day-Ahead Energy Market and/or the Real Time Energy Market, as applicable"

I do not believe that simply registering NGRID as the asset owner of BBHP will result in NGRID receiving credit for the output of the BBHP units at the RI zonal price, as stated in the Company's direct testimony. In fact, this step may not be necessary to implement the pricing provisions of the PPA. I believe that changing the ISO-NE asset ownership to NGRID from BBHP will cause NGRID to receive credit for the output of the BBHP units at the Graham nodal price, not the RI zonal price. An Internal Bilateral Transaction ("IBT") within the ISO-NE settlement, as contemplated in section 4.2(a) would be the vehicle or mechanism that results in NGRID receiving credit for the output of the BBHP units at the RI zonal price and also paying ISO-NE for the Rhode Island - Maine price separation as described in the Company's pre-filed testimony.

Therefore, as I understand the Company's proposed pricing mechanism in the PPA, there may be three steps required for implementation. The first step is to make NGRID the ISO-NE asset

owner of the BBHP units via the asset registration form. The second step may be for NGRID and BBHP to enter into a Real Time IBT within the ISO-NE market settlement system. The IBT should place the cost of congestion and losses associated with the delivery of the output of the BBHP units to the RI zone from Maine in NGRID's settlement statement with ISO-NE, as described in the Company's pre-filed testimony. The third step is to reduce the PPA price (initial price is \$99.00 per MWH escalated at 2.0% per year for energy delivered to the RI zone) by the cost of congestion and losses between Maine and the RI zone. As a result of these steps, congestion and loss costs are deducted from NGRID's payment to BBHP and an equal amount is added to NGRID's ISO-NE settlement statement. This causes Rhode Island ratepayers to be shielded from changes in the cost of congestion and losses between Maine and Rhode Island,

Exhibit E to the PPA describes the price adjustment to implement this approach. As provided in Exhibit E, the \$99.00 per MWH price is reduced by the actual congestion / losses costs. As shown above, if the hourly LMP differential between Graham and the RI zone is \$5.00 per MWH, the price paid to BBHP is reduced to \$94.00 per MWH. In Attachment I to this memo, I provide a more detailed example of how congestion costs are assigned per the PPA.

Delivery Point

The actual physical delivery point is the Graham 115KV substation in Maine. It is not uncommon in power contracts to have a contractual delivery point that is different from the physical delivery point, especially in centralized markets such as ISO-NE where customers, not generators, pay for transmission and congestion and losses are readily measured and monitored. Having different physical and contractual delivery points does not in any way limit what NGRID may do with the purchased power. NGRID may re-sell this power into ISO-NE markets and credit those revenues as offsets against PPA payments. It is my understanding this is what NGRID intends to do with the products purchased pursuant to this PPA. NGRID could also use the products purchased under this PPA to fulfill its obligations as a default service provider. This option remains available regardless of the contractual delivery point specified in the PPA.

The proposed PPA is based upon a contractual delivery point in the RI zone with a starting price of \$99.00 per MWH escalated at 2% per annum. In its response to the RFP, BBHP proposed an

alternative pricing option of [REDACTED] with Graham substation as the contractual delivery point.

The Company's pre-filed testimony does not adequately explain why the RI zone delivery point and associated price was chosen. On page 12 of the Company's testimony, the following Q&A appears.

"Q. Please describe the rationale for basing the energy pricing on the Rhode Island Zone, as opposed to the Maine zone.

A. First, the purchase of energy under the contract and the sale in the Rhode Island zone should enable the Company to use the energy in Rhode Island, which is consistent with the statute's underlying goal of developing renewable energy supplies for Rhode Island.

Second, consultation with ISO-NE confirmed that the assignment of the output from the Black Bear Orono B Hydro Project to the Company through a generator asset registration form would result in credit to the Company at the Rhode Island zonal price. The Black Bear Orono B Hydro Project will be treated by ISO-NE as a Settlement Only generator, and its energy will be priced in the real time market at the generator node clearing price (Graham Substation). In the ISO-NE settlement process, the Company would be credited with real time energy at the Rhode Island zonal price. However, the Company would also receive charges from ISO-NE for the price separation, i.e., the difference between the real time prices at the generator node in Maine and the Rhode Island zone. The price separation would be attributed to losses and congestion, and for any given hour could be positive or negative. As further explained below, the bundled price in the PPA accounts for the expected energy price separation between the Maine generator zone and the Rhode Island zone, such that Black Bear hydro bears the risk of that price separation.

Finally, receiving credit at the Rhode Island zone provides flexibility in future utilization of the energy, such that the energy would be valued at the Rhode Island market cost (including price separation)."

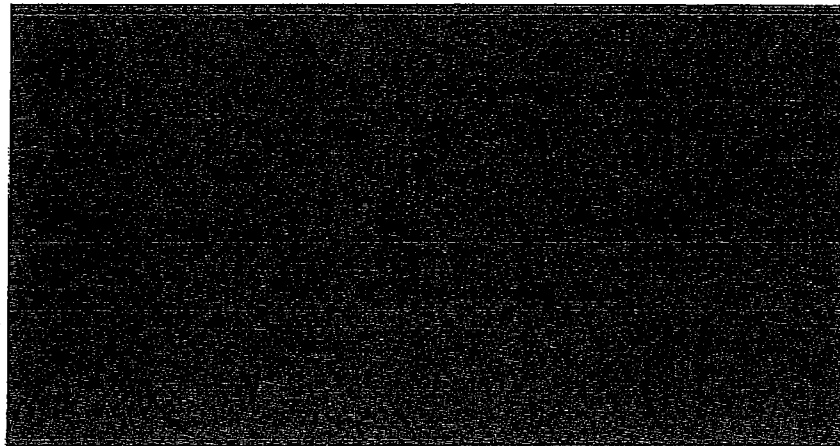
In a conference call with Company representatives on April 20, 2012, the Company stated that it did consider the price separation issue but chose the Rhode Island contractual delivery point by looking at the ESAI price forecast and the other RFP bids that had submitted prices for both Maine and Rhode Island. When asked if there was any written analysis of this issue, the Company stated that there was none.

The ability to use the energy purchased from BBHP in Rhode Island is unaffected by the choice of contractual delivery point - Maine or Rhode Island. The physical delivery point is still Graham substation, but NGRID may use this energy anywhere, including Rhode Island, so long as it pays for congestion and losses. So the real questions to be answered are (1) which contractual delivery point was rated the highest in the RFP scoring system, and (2) which contractual delivery point results in the lower expected costs to Rhode Island ratepayers.

Figure 1 below is an excerpt from the summary report for the results of the June 30, 2011 renewable RFP showing the aggregate project scores. As shown in this excerpt, the pricing that resulted in the BBHP proposal being ranked highest was for the Maine delivery point, not Rhode Island. If only Rhode Island contractual delivery points are to be considered, the Saddleback Ridge Project ranked higher than the BBHP.

Figure 1

Confidential Excerpt from the March 2, 102 Summary Report



Next, I performed an assessment of which pricing option was best for Rhode Island ratepayers. The fundamental question to be answered by this analysis is whether the expected cost of congestion and losses between Maine and the RI zone will be [REDACTED]

[REDACTED]. I did this analysis using the ESAI market price assumptions provided in the Company filing and using a market price forecast that I developed for this proceeding using more recent market conditions. Figure 2 below provides my market price forecast. My energy prices are lower than ESAI's and my REC prices are higher than ESAI's.

Figure 2
La Capra Associates Market Prices

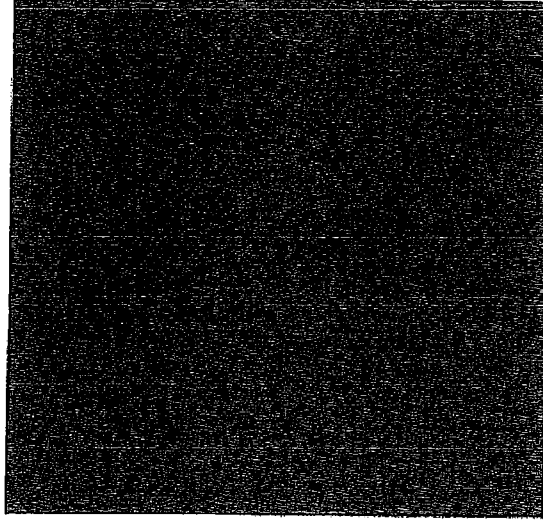
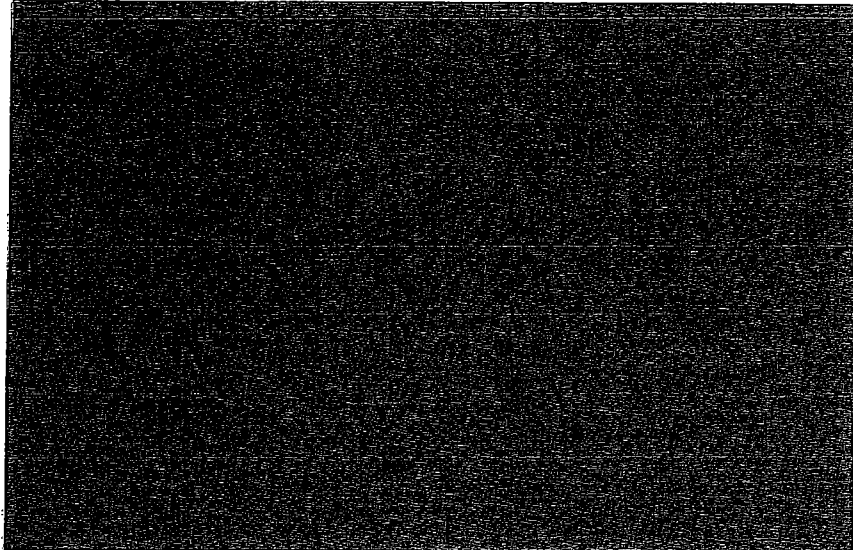


Figure 3 below contains the results of my analysis of the alternative delivery points. This figure shows that over the term of the PPA, the Maine delivery point would result in lower costs to Rhode Island ratepayers using either ESAI or my market price forecast. Based upon this analysis, I recommend that the Maine delivery point and price formula be selected instead of the Rhode Island delivery point.

Figure 3
PPA Costs for Alternative Delivery Points and Prices



It should be noted that my market prices forecast projects a lower zonal price separation between Maine and Rhode Island than does the ESAI forecast. The ESAI forecast projects an average price separation over the 15 year term of [REDACTED]. In 2011, the actual real time zonal price separation between Rhode Island and Maine was \$1.19 per MWH. Year to date 2012, this difference averages \$0.66 per MWH. Central Maine Power Company is constructing the Maine Power Reliability Program ("MPRP"), a 1.5 billion expansion of the transmission facilities from Northern Maine into New Hampshire. When completed, the MPRP will dramatically reduce losses and congestion between Maine and the rest of New England. The New England East - West Solution ("NEEWS") is another large expensive transmission upgrade project that will reduce congestion and losses. The Rhode Island Reliability Project ("RIRP") is yet another expensive transmission project under construction. When all of these transmission projects are completed, I would expect future zonal price separation between Maine and Rhode Island to decline from today's levels.

Recent results for ISO-NE's Forward Capacity Market ("FCM") serve as further evidence that congestion and losses between Maine and the rest of New England is declining. In the first few Forward Capacity Auctions ("FCAs"), Maine was export-constrained and therefore was a

separate pricing zone for FCM purposes. In the last two FCAs, the market cleared without price separation. This indicates that congestion between Maine and the rest of New England is waning.

Based upon the above information, I believe that the Company's choice of the Rhode Island contractual delivery point is not in the best interest of Rhode Island ratepayers, nor is it consistent with the results of the Company's renewable RFP. [REDACTED]

[REDACTED]. Based upon the best information available at this time, Rhode Island ratepayers would be better off with the Graham substation as the contractual delivery point and paying any actual costs for congestion and losses between Maine and Rhode Island.

Comparison to Market Prices

The Company claims in its pre-filed testimony the BBHP PPA will over its entire term be below market prices. I performed a mark-to market comparison using both the ESAI and the La Capra Associates market price forecasts. Figure 4 below provides the results of that comparison based upon the sum of payments over the 15 year term, while Figure 5 depicts the net present value ("NPV") of the payments. With the La Capra Associates market price forecast, the PPA payments are still below market, although by a slightly lesser amount. Also, the Maine delivery point and price result in a greater margin versus market prices, indicating that the Maine delivery point will produce greater benefits for Rhode Island ratepayers.

Figure 4

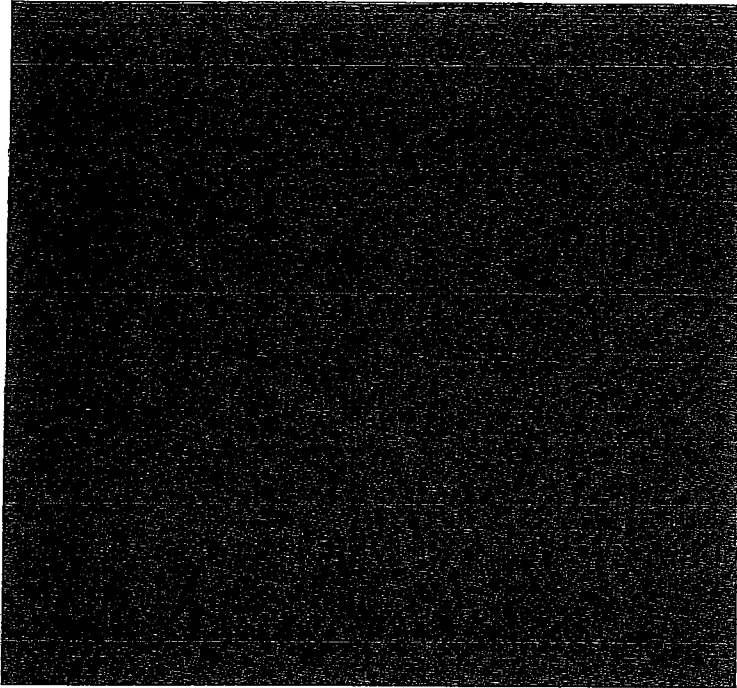
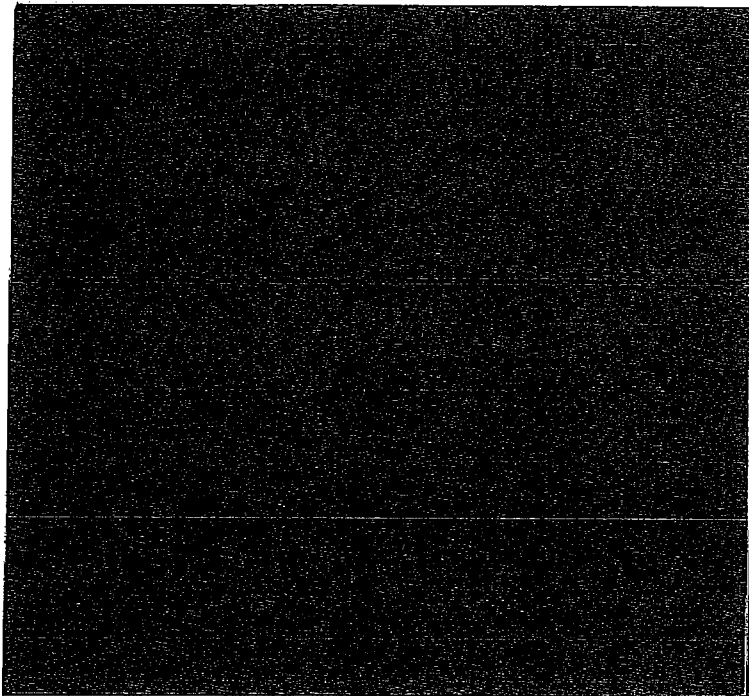


Figure 5



I note that on pages 16 to 17 of the Company's pre-filed testimony, the Company states that the reduction in the PPA payments for zonal price separation are an added benefit not included in the Company's mark-to-market assessment. I disagree with that statement. Under the PPA's terms, any reduction in PPA payments to Black Bear Hydro due to zonal price separation will just be offset by an equivalent amount of higher charges in NGRID's ISO-NE settlement statement. Under the PPA, Rhode Island customers will pay \$99.00 per MWH escalated at 2% per year regardless of what the actual cost of congestion and losses are between Maine and Rhode Island.

Capacity Factor

The projected capacity factor for the BBHP units is 90%. In response to Division Set 1 discovery questions, BBHP stated that the recent capacity factor for the existing Orono A units is approximately 70%. BBHP further states that the new Orono B units can be expected to have a higher capacity factor because the project will utilize newer more efficient turbines and modification to the headpond will increase water flow. While there is some uncertainty regarding the future capacity factor for the new units, Rhode Island ratepayers will pay only for energy delivered, so there is no risk to them if capacity factor is lower than 90%. A lower capacity factor would reduce the contribution from this project to meeting the 90 MW renewable total.

Terms and Conditions

I have reviewed the terms and conditions contained in the PPA and have no suggested changes at this time.

Attachment I
Hypothetical Illustration of ISO-NE Settlement
For the BBHP PPA

The following example illustrates the pricing mechanism in the BBHP PPA with a simple one-hour sample settlement. Figure I-1 below shows a hypothetical ISO-NE settlement for one hour without the PPA. In this "without the PPA" scenario, I assume that the proposed Orono B hydro units are built, and are sold into ISO-NE real time energy market, and not sold to NGRID. This scenario is provided only as a baseline against which to compare how the proposed PPA will affect the settlement process. LMPs at the Graham substation and in the RI zone are assumed to be \$50.00 per MWH and \$55.00 per MWH respectively, and congestion / losses cost is \$5.00 per MWH. NGRID (shown as NECO or Narragansett Electric Company) is assumed to have 1,000 MW of load, and BBHP generates 3 MW. NGRID's net cost without the PPA is \$55,000 in this one hour.

Figure I-1

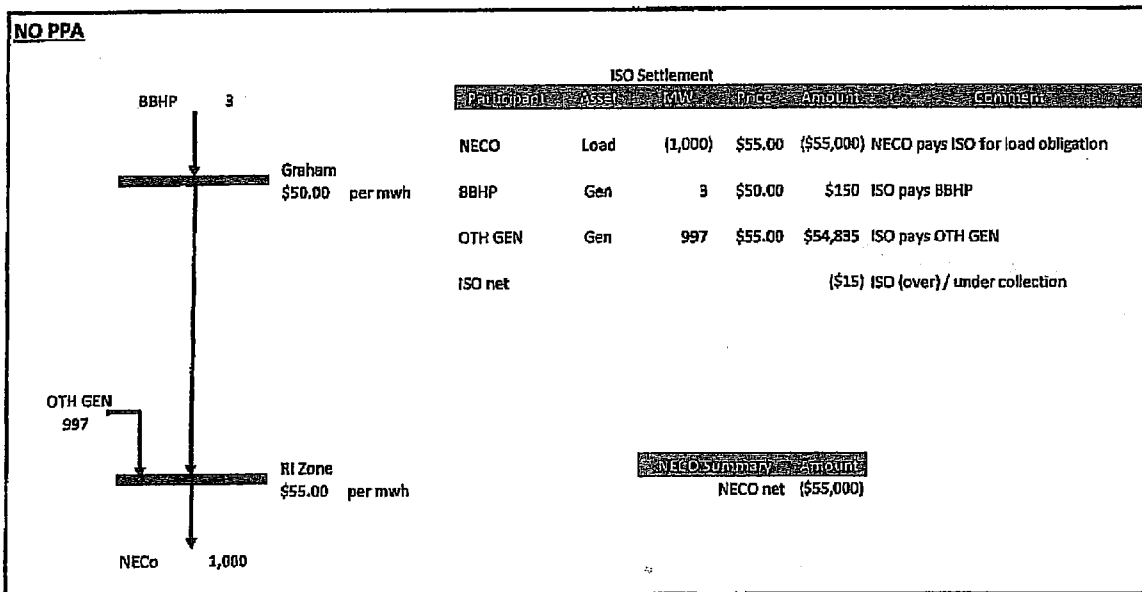
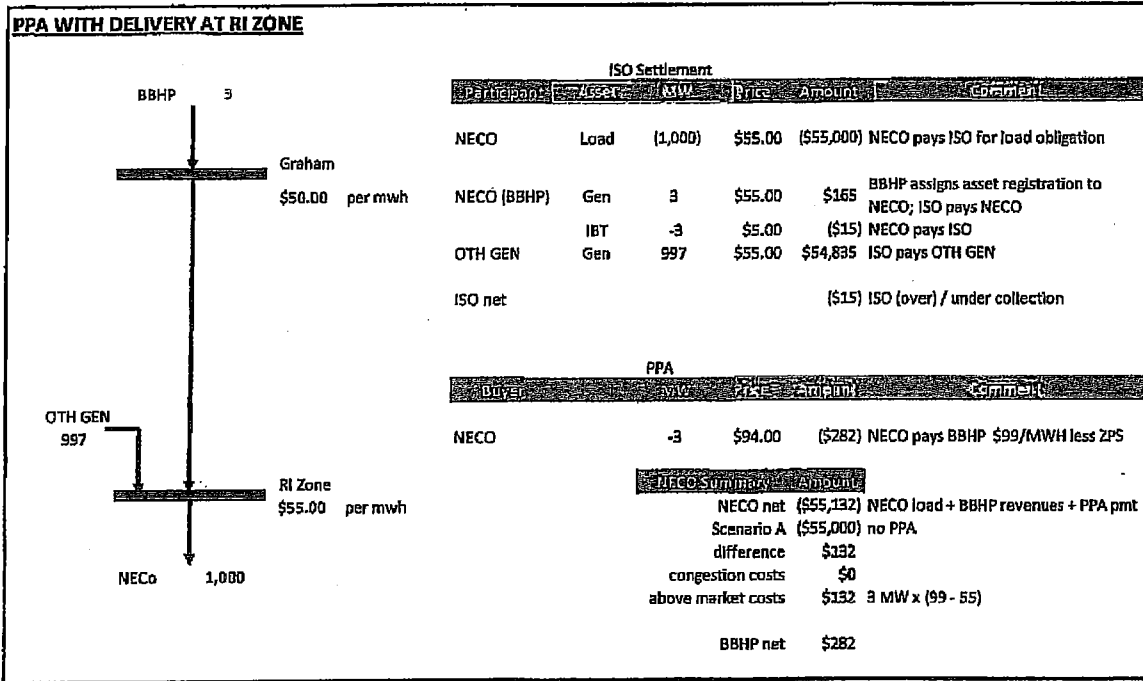


Figure I-2 below shows how the PPA changes the above example. In this example, the proposed PPA is assumed to be implemented as filed.

Figure I-2



The price paid to BBHP is reduced to \$94.00 per MWH, which reduces BBHP's revenues by \$15.00. NGRID's settlement statement has \$15.00 in higher costs due to the IBT. NGRID's net cost is now \$55,132 or \$132 higher than without the PPA. NGRID incurs no costs for congestion and losses (other than what is included in the PPA), and the higher net cost of \$132 is equal to the above market costs for the output of the BBHP units or $(\$99 - 55) \times 3 \text{ MW}$.

Figure I-3 below shows what happens if congestion and losses increase to \$10 per MWH from \$5.00 per MWH due to a drop in LMP at Graham (to \$45.00 per MWH from \$50 per MWH). The payment to BBHP is reduced by \$30, and an equal amount is added to NGRID's settlement statement NGRID's net cost and it's above market costs for the PPA remains unchanged. This illustrates how the proposed mechanism can shield NGRID, and therefore Rhode Island ratepayers, from changes in the cost of congestion and losses. It is important to re-emphasize

that, under the PPA payments as proposed, NGRID is paying for congestion and losses via the prices in Exhibit E of the PPA.

Figure I-3

