

**RECORD OF DECISION IN SUPPORT OF
AMENDMENT No. 1 TO POWER SALES CONTRACT NO. 13PM-10978
BETWEEN BONNEVILLE POWER ADMINISTRATION AND ALCOA, INC.**

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	DISCUSSION.....	2
III.	ENVIRONMENTAL CONSIDERATIONS	3
IV.	CONCLUSION.....	3
	ATTACHMENT A EQUIVALENT BENEFITS TEST	1
	a. Models, Data, and Approach Used in the EBT for the Amendment	1
	b. IP Rate and Revenue Forecast Used in the EBT for the Amendment	2
	c. BPA expects to have surplus energy during the term of the Agreement	2
	d. Forecast of revenues from selling an equivalent amount of surplus power.....	4
	e. Calculation of the net financial value of tangible economic benefits of selling power to Alcoa which would not be obtained by selling an equivalent amount of power on the market.....	5
	1. Value of Reserves	5
	2. Avoided Transmission and Ancillary Services Expenses.....	6
	3. Demand Shift	7
	f. Forecasted economic benefits to BPA in the Amendment Scenario are greater than in the Termination Scenario.....	7
	g. Results of Equivalent Benefits Test.....	7
	h. Equivalent Benefits Test (EBT) Tables	9
	ATTACHMENT B GAS PRICE FORECAST	1
	ATTACHMENT C NET BENEFIT RISK ANALYSIS AND NET PRESENT VALUE (NBR-NPV) SCENARIO ANALYSIS.	1

I. INTRODUCTION

On December 7, 2012, Bonneville Power Administration and Alcoa, Inc. executed a power sales agreement, Contract No. 13PM-10978 (Agreement) for power service to Alcoa's Intalco Plant in Ferndale, Washington. This Agreement obligates BPA to supply 300 MW of electric power to Alcoa's Intalco Plant for a term of nine years and nine months, from January 1, 2013, until September 30, 2022, at BPA's industrial firm power rate (IP rate).¹

Pursuant to the terms of the Agreement, Alcoa provided notice to BPA, on March 31, 2015, that it was exercising its right to terminate, with an effective termination date of March 31, 2016. Alcoa explained that its reasons for exercising the termination right include: (1) market conditions continue to be very challenging for the Intalco smelter because the London Metal Exchange aluminum price, which sets the revenue line for smelters, remains at historically low levels; (2) as an energy-intensive industry, electricity is a key driver of production costs, representing approximately 30% of the cost of each pound of aluminum; and (3) with downward revenue pressures and upward cost pressures, Alcoa's operating margins are being significantly squeezed due to both power costs and aluminum prices.

Upon receiving Alcoa's notice of termination, BPA and Alcoa discussed alternatives to the termination. BPA and Alcoa agreed that a reduction in Alcoa's purchase obligation from 300 MW to 75 MW provides both parties more benefits than terminating the Agreement. BPA evaluated the proposed amendment to the Agreement (Amendment) using the Equivalent Benefits Test (EBT) analysis. As described below, based on the EBT analysis, BPA forecasts that the Amendment will yield greater financial benefit to BPA than BPA would obtain if the Agreement were to terminate on March 31, 2016. For this and other reasons described below, BPA determined that the Amendment is consistent with BPA's legal authorities and sound business principles. Accordingly, on April 30, 2015, BPA and Alcoa executed the Amendment reducing BPA's obligation to supply power to Alcoa from 300 MW to 75 MW and preserving benefits to BPA of continuing to sell power under the Agreement.

¹ Prior to making its final determination to enter into the Agreement, BPA evaluated the economic benefits and costs of serving Alcoa ("Equivalent Benefits Test" or "EBT"). The methodology and results of the EBT analysis supporting the Agreement are fully discussed in the Administrator's Record of Decision published on December 6, 2012 [hereinafter 2012 Alcoa ROD].

II. DISCUSSION

The Amendment is intended to provide BPA with an opportunity to generate more revenue than BPA would receive if Alcoa's decision to terminate the Agreement remained in effect. To determine whether the Amendment is consistent with sound business principles, BPA conducted an EBT analysis comparing two scenarios: (1) termination of the Agreement on March 31, 2016 (Termination Scenario); and (2) amending the Agreement to reduce the contract demand to 75 MW effective May 1, 2015, through September of 2022, the remainder of the term of the Agreement (Amendment Scenario).

BPA forecasts that the economic benefits it will accrue in the Amendment Scenario will exceed by approximately \$30,467,073 the forecasted benefits BPA would obtain in the Termination Scenario. The complete EBT analysis is attached to this decision document as Attachment A.

BPA anticipates that, in almost any scenario going forward, the financial benefits of the reduced sale at the IP rate will generate significantly more revenues than the likely alternative of making a sale of 75 MW at expected market prices. Only if the price spread between IP and market reverses in the near term, and market prices exceed the IP rate, would BPA stand to lose some of the currently projected financial benefit it would have seen if the initial termination had gone through. As described in the EBT, BPA's current forecast shows that such an event is very unlikely and there is a much higher likelihood that, during the course of performance under the Amendment, the continued sale will generate financial benefits to BPA in excess of those expected were the contract to terminate.

Additionally, because Alcoa's termination rights in the Agreement remain unchanged, i.e., Alcoa could give notice of termination again in the future, the Amendment includes a "Make Whole" provision. This provision is intended to assure that BPA will be in no worse position than it would otherwise have been had the termination remained in place, even if Alcoa once again decides to exercise its termination rights prior to expiration of the Agreement.

As was the case with earlier decisions to offer power service to Alcoa, the decision to execute the Amendment was also based on a variety of "intangible" operational benefits, which will also be retained by amending the Agreement. *See* 2012 Alcoa ROD at 21–22. These operational benefits are not easily quantified as part of the EBT analysis, but are valuable to BPA in connection with the Administrator's statutory obligation to assure an adequate, efficient, economical, and reliable power supply, by providing BPA with flexibility to help manage the complexities and uncertainties of marketing large quantities of federal power.

For example, the nature of Alcoa's smelting process gives it the ability to increase or decrease its consumption of electricity supplied by BPA with a fair degree of certainty when called upon by BPA to provide BPA valuable operational flexibility. This benefit has grown in recent years as BPA has sought customers and or consumers that have the ability to have their electricity supplies cut or withdrawn for short periods of time. The ability to provide demand response, this relationship allows BPA the ability to redirect its supplies for uses elsewhere in its system.

III. ENVIRONMENTAL CONSIDERATIONS

The Environmental Clearance Memorandum that documents the categorical exclusion for the Amendment has been posted at BPA's website at:

http://efw.bpa.gov/environmental_services/categorialexclusions.aspx.

IV. CONCLUSION

BPA concluded, based on the analysis it performed, that amending the Agreement promotes BPA's business interests and is otherwise consistent with BPA's statutory obligations. Accordingly, BPA has entered into Amendment No. 1 to reduce Alcoa's purchase obligation from 300 MW to 75 MW.

ATTACHMENT A EQUIVALENT BENEFITS TEST

BPA developed the Equivalent Benefits Test² following decisions of the Ninth Circuit Court of Appeals in *Pacific Northwest Generating Cooperative v. Department of Energy (PNGC I)*, 550 F.3d 846 (9th Cir. 2008), *amended on denial of reh'g*, 580 F.3d 792 (9th Cir. 2009), and *Pacific Northwest Generating Cooperative v. Bonneville Power Administration (PNGC II)*, 580 F.3d 828 (9th Cir. 2009), *amended on denial of reh'g*, 596 F.3d 1065 (9th Cir. 2010). In *Alcoa, Inc. v. Bonneville Power Administration (Alcoa)*, 698 F.3d 774 (9th Cir. 2012), the Court approved BPA's use of the EBT as a tool to determine whether the tangible economic benefits to BPA of serving a DSI load are forecast to equal or exceed BPA's cost of serving the load during the period of service.

To make its determination that the Amendment is consistent with sound business principles, BPA used the EBT to compare the forecasted economic value of two scenarios: (1) termination of the Agreement on March 31, 2016 (Termination Scenario); and (2) amending the Agreement to reduce the contract demand to 75 MW effective May 1, 2015, for the remainder of the term of the Agreement (Amendment Scenario).

a. Models, Data, and Approach Used in the EBT for the Amendment

The models and type of data used in this EBT analysis are similar to those used in the EBT analysis described in the 2012 Alcoa ROD. In each of these EBT analyses, BPA employed rate case models, processes, and data from Quarterly Financial Reviews (for the current FY), the most current BPA rate proceeding, as well as modeling tools and methodologies that extend beyond those used in the most current BPA rate proceeding. The Rates Analysis Model (RAM) was used to estimate IP rates for FY 2016-2019 and the Long-Term Rates Model (LTRM) was used to estimate IP rates for FY 2020-2022. These IP rate calculations are based on surplus energy revenues, balancing purchase expenses, augmentation expenses, and 4(h)(10)(C) credits estimated by RevSim (previously referred to as RiskMod) based on spot market electricity prices estimated by the AURORA model using the natural gas price forecast discussed in Attachment B Gas Forecast. Values used for FY 2015 are based on BPA's 1st Quarter Financial Review conducted in January 2015, which was publicly released.

The EBT analysis for the Amendment has been used differently from the EBT analysis used in the 2012 Alcoa ROD. The previous EBT analysis only required one EBT analysis model that primarily compared the differences in revenues between selling power at the IP rate and selling power on the wholesale electricity market. In this case, BPA needed to compare two scenarios (the Amendment and Termination scenarios), which requires two EBT analysis models that each compare the difference in revenues between selling power at the IP rates in differing amounts and timeframes and selling power on the wholesale electricity market. Because of the

² The development of the EBT is described in detail in prior BPA records of decision regarding DSI service. *See, e.g.,* Power Sale to Alcoa Inc. Commencing December 22, 2009 Administrator's Record of Decision, Dec. 21, 2009; 20.5 aMW Power Sale to Port Townsend Paper Company for the Period November 15, 2009 through December 31, 2009, Administrator's Record of Decision, released November 13, 2009.

comparison of differing time frames in this analysis, BPA has included a nominal and a net present value analysis. *See* Table 13.

b. IP Rate and Revenue Forecast Used in the EBT for the Amendment

For FY 2015, IP rates calculated by the RAM for the BP-14 Final Power Rate Proposal were used. For FY 2016-2019, IP rates for the EBT are based on results from RAM adjusted for reductions in Alcoa load and spot market electricity prices reflecting the revised lower natural gas price forecast consistent with the opening package of the Integrated Program Review 2 (IPR2) process (for BP-16 and BP-18). The revised IP rates for FY 2016-2017 are based on these adjustments being applied to the BP-16 Initial Rate Proposal data. For FY 2020-2022, IP rates for the EBT are based on the Fall 2014 Reference Case long-term forecast, which was computed using the Long-Term Rates Model (LTRM). For consistency's sake, these FY 2020-22 results were adjusted to account for reductions in Alcoa load and spot market electricity prices that reflect the revised lower natural gas price forecast.

None of these rate forecasts include the outcome of the IPR2 process on the revenue requirement or pending decisions from the BP-16 rate proceeding which could deviate from Initial Proposal assumptions.

Consistent with the EBT methodology, BPA's projected monthly IP revenues are determined by multiplying the heavy load hour (HLH) and light load hour (LLH) energy entitlements and demand entitlement by their respective IP rate components for each month. BPA has calculated revenues for the Amendment Scenario based on a sale of 75 MW of firm power each hour to Alcoa under the IP rate schedule beginning May 1, 2015 (the revenues for April 2015 are based on the sale of 300 MW), and ending September 30, 2022. *See* Table 1. The energy and demand entitlements are the projected amounts to be sold by diurnal period each month in the Agreement. Since in the Amendment Scenario, BPA expects to make 75 MW available in all hours in each month, 75 megawatts (MW) is the monthly demand amount specified in Table 1. BPA's projected monthly revenues are calculated using the IP rate components specified in Table 1, and then accumulated as illustrated in Table 2. Comparable values for Termination Scenario are reported in Tables 7 & 8.

c. BPA expects to have surplus energy during the term of the Agreement

BPA does not forecast the need to make purchases specifically to serve Alcoa during the remaining term of the Agreement under most water conditions. BPA has forecast a need to make some power purchases, including some normal "balancing" purchases in some months, to meet its total load obligations during the remainder of FY 2015 through September 30, 2022, particularly under critical water conditions.³

³ Balancing purchases are market purchases that BPA makes either before or within a particular month in order to balance its forecast load and resource position within that month. Whether BPA makes any balancing purchases, and in what amounts, is dependent, among other things, on updated water flow forecasts which inform the amount of hydroelectric generation that can be expected in the month, and on within-month weather conditions impacting BPA customer load levels.

BPA’s most recent load and resources studies are contained in the *2014 Pacific Northwest Loads & Resources Study* (the “2014 White Book”), which forecasts loads and resources for both the federal system and the region as a whole for the 10-year period (Operating Years (OY) 2016–2025). BPA is forecast to have a surplus on an average annual basis under the middle 80 percent of historical water conditions for OY 2016 through OY 2023 as illustrated in Figure 1 below.⁴ The 2014 White Book forecast indicates the surplus energy values for the average middle 80% water conditions range from 1,032 to 1,510 aMW during OY 2016 through OY 2023 based on 300 MW of service to Alcoa through September 30, 2022. Based on this EBT analysis, and all things being equal, these surplus energy values increase since the Alcoa load served by BPA is reduced to either 75 MW through September 30, 2022 (Amendment Scenario) or 75 MW for six months in FY 2016 and goes to zero thereafter (Termination Scenario).

Figure 1 – Information from the 2014 White Book

Potential Variability of Annual Federal Energy Surplus/Deficit Projections

Exhibit 17 below compares the annual Federal system surpluses and deficits for OY 2016 through 2023 under four resource scenarios: 1) 1937-critical water conditions (the base case of this study); and the averages of 2) the bottom ten percent; 3) the middle 80 percent; and 4) the top ten percent of the historical 80-water year conditions (1929 through 2008).

Exhibit 17

**Potential Variability of Annual Federal Energy Surplus/Deficit
For OY 2016 through 2023
Utilizing Differing Water Conditions**

Operating Year	2016	2017	2018	2019	2020	2021	2022	2023
1937-Critical Water Conditions	-128	-157	-158	-317	-262	-443	-406	-576
Average Bottom 10% Water Conditions	-73	-122	-93	-249	-194	-375	-340	-510
Average Middle 80% Water Conditions	1,510	1,410	1,466	1,311	1,351	1,168	1,203	1,032
Average Top 10% Water Conditions	3,113	2,960	3,017	2,858	2,863	2,675	2,709	2,537

2014 White Book Technical Appendix, Volume 1 at 73–75, Exhibit 17.

Under Average Middle 80% Water Conditions, the 75 MW of power that will be sold to Alcoa under the Amendment Scenario represents approximately six percent of these forecast surpluses during OY 2016-2023, based on BPA providing 300 MW of power to Alcoa. If this load reduction

⁴ Operating Year (OY) in the 2014 White Book is the 12-month period August 1 through July 31. For example, OY 2016 is August 1, 2015, through July 31, 2016.

were reflected in the White Book, the reduced supply obligation of 75 MW would represent approximately five percent of forecast surpluses. Under 1937-Critical Water Conditions, there are energy deficits in all OY during OY 2016 through OY 2023 based on assuming 300 MW of service to Alcoa through September 30, 2022. After accounting for the reduction in Alcoa load by 225 MW (75 MW vs 300 MW), there are energy deficits in only four of these eight OY.

While BPA has established a portion of its costs for the period of the BP-16 rate proceeding based on 1937-Critical Water Conditions, the secondary energy revenue credits, balancing power purchase expenses and 4(h)(10)(C) credits for the same period were set based on either average or median values for the 80 water years. *See* BP-16-E--BPA-03A at 136–137 (regarding Critical Water Conditions); BP-16-E-BPA-04A at 42–43, tbls.18 & 19, (regarding Secondary Sales revenues and Balancing Purchase costs); BP-16-E-BPA-04A at 37, tbl.15 (regarding 4(h)(10)(C) credits).

For rate design and rate calculation purposes, Power Services sets power rates by allocating the costs of resources to loads and assumes firm resource availability under critical water. If firm resources are inadequate, it is assumed that the shortfall will be met by augmentation purchases, with these costs being recovered from both Slice and Non-Slice customers. When computing the PF and IP rates, additional adjustments are made to account for secondary energy revenue credits, balancing power purchase expenses and 4(h)(10)(C) credits, which are based on either average or median values for the 80 water years. While this approach is used for rate setting purposes, Power Services' marketing decisions in its typical operations are seldom conducted based on hydro generation under critical water conditions. The approach used in the EBT analysis is more aligned with expected conditions, and how Power Services would actually serve the Alcoa load, and is therefore a reasonable approach.

In summary, this analysis of the Equivalent Benefits Test is reasonably based on BPA's foregoing forecasts for OY 2016 through OY 2023 in the 2014 White Book (Average Middle 80% Water Conditions). BPA does not anticipate the need to alter its purchasing strategy for either the Amendment or Termination scenarios.

d. Forecast of revenues from selling an equivalent amount of surplus power.

BPA routinely shapes its inventory to meet the needs of its portfolio of contracts and sells its surplus inventory in the Pacific Northwest power market as described in BPA's BP-16 Initial Rate Proposal proceeding.⁵ Additionally, BPA routinely forecasts Mid-Columbia trading hub (Mid-C) electricity prices consistent with the methodology described in the BP-16 Initial Rate Proposal proceeding to value these purchases and sales.⁶

⁵ For a more complete description of the operating risk factors BPA faces in the course of doing business, refer generally to the *Power Risk and Market Price Study* in the BP-16 rate proceeding; and specifically to section 2.5.2 regarding the operating risk factors and section 2.6.3 regarding surplus energy sales and revenues. *See* BP-16-E-BPA-04 at 37–44 and 47–49. Available at <https://www.bpa.gov/secure/ratecase/openfile.aspx?fileName=BP-16-E-BPA-04+Power+Risk+and+Market+Price+Study.pdf&contentType=application%2fpdf>

⁶ BPA employed its electricity price forecast for multiple purposes in the BP-16 rate proceeding as outlined in the *Power Risk and Market Price Study*. The study also details how BPA established its forecast of Mid-C electricity prices in the BP-16 rate proceeding. *See* BP-16-E-BPA-04 at 17–35.

Power that is not sold to Alcoa at the IP rate will likely be sold into the market. In Table 3, BPA forecasted the revenues through September 30, 2022, it would obtain from the wholesale electricity market for the term of the Agreement in the Amendment Scenario. Table 3 uses a forecast for the market prices of electricity based on the methodology used in the BP-16 rate proceeding and the updated natural gas price forecast reported in Attachment B, Figure 1.

BPA determined its net benefit of serving Alcoa at the IP rate for each month by subtracting the forecasted opportunity cost of foregone surplus energy revenues detailed in Table 3, from the projected IP revenues described in Table 2. BPA's net benefit, before accounting for the benefits associated with adjustments described in Section (e) below, is illustrated in Table 4. Comparable values for the Termination Scenario are reported in Tables 7–10.

e. Calculation of the net financial value of tangible economic benefits of selling power to Alcoa which would not be obtained by selling an equivalent amount of power on the market.

Consistent with its EBT methodology, BPA has identified a number of tangible economic benefits to BPA that would be achieved by selling 75 MW to Alcoa in the Amendment Scenario which would not be achieved by selling an equivalent amount of power on the wholesale electricity market. BPA conducted an economic analysis to determine the net value of those benefits.

1. Value of Reserves

Like Alcoa's previous contracts, the Agreement, as amended, requires Alcoa to make supplemental operating reserves for power system contingencies available to BPA during the contract period. Such reserves would not be available from making a typical market sale. Sales at the IP rate reflect the value of BPA's right to obtain supplemental operating reserves.⁷ Specifically, the energy rate tables in the IP-14 rate schedule adopted in the BP-14 rate proceeding include a \$0.975 per MWh credit for the value of these reserves. For this EBT, BPA used the value of reserves credit from the BP-14 rate proceeding for the EBT through September 30, 2015, and thereafter through September 30, 2022, BPA used the value of reserves credit of \$0.973 per MWh that was calculated for this EBT analysis based on the reduction in IP service to Alcoa.⁸ Therefore, BPA's net benefit above compares a surplus power sale to a sale of power at the IP rate with reserves. BPA adjusted for this in each month through FY 2022 by adding back a value of reserves that provides an equal and opposite offset to the \$0.975 per MWh and \$0.973 per MWh credits for the value of reserves that are reflected in the Final BP-14 and Initial BP-16 rate schedules. In other words, BPA has increased the IP rate by the value of reserves credit for purposes of this analysis so that the comparison to a surplus energy sale into the

⁷ Sales at the IP rate require the provision of the DSI Minimum Operating Reserve – Supplemental. *See* 2016 Power Rates Schedules and General Rate Schedule Provisions, December 2014, at 51. The Agreement is a sale at the IP rate and, accordingly, Alcoa is required to make such supplemental operating reserves available to BPA, as specified in section 6.1 and Exhibit E to the Agreement.

⁸ For the purposes of this EBT analysis, BPA has not forecast a change in the value of reserves credit to be included in future IP rate schedules beyond FY 2017.

wholesale electricity market is on an “apples to apples” basis. See Table 5a. Comparable values for the Termination Scenario are reported in Table 11a.

2. Avoided Transmission and Ancillary Services Expenses

When purchasing power, DSI customers cover the cost of transmission and ancillary services through their own transmission contracts. Wholesale electricity market prices, on the other hand, assume power is delivered by the seller to the Mid-Columbia trading hub (Mid-C); thus, the seller pays for the cost of transmission and ancillary services to that delivery point.

Power Services (PS), the organization within BPA that is responsible for the marketing of federal power, must pay the transmission and ancillary services costs to move surplus power to the Mid-C delivery point in order to realize the full market value for its surplus sales. PS maintains an inventory of transmission products and services to deliver the surplus power it intends to sell. However, this transmission product inventory is not sufficient to deliver all of the surplus power PS might sell under all load and resource conditions, especially during periods of high stream flows. As a result, there is a subset of load and resource conditions under which PS would incur incremental costs for transmission and ancillary services to deliver incremental surplus energy sales. The incremental transmission and ancillary services costs are avoided when BPA sells power to the DSIs because DSIs contract for their own transmission and ancillary services. The planned transmission and ancillary services expenses to address both the expected expenses and their uncertainty were addressed in the BP-16 Initial Rate Proposal and are expected to be similarly addressed in each subsequent BPA rate proceeding.⁹

PS valued these avoided transmission and ancillary services costs through September 30, 2022, using the same methodology employed in the BP-16 Initial Rate Proposal to establish the total costs and risks associated with PS’s inventory of transmission products and services.¹⁰ For this EBT analysis, BPA included a forecast of the changes in the transmission tariff rates through September 30, 2022. The transmission tariff rates used were estimated at the time of the BP-16 Initial Rate Proposal with the estimates beyond the BP-16 rate period reflecting the best estimates available at that point in time.

In these computations, both fixed, take-or-pay costs and variable incremental transmission and ancillary services costs were computed under 3,200 monthly load and resource conditions that did not include augmentation purchases. The augmentation purchases were removed to reflect that under most system load and resource conditions BPA would not need to purchase power to serve Alcoa’s IP load. Incremental transmission and ancillary services costs were computed by comparing the amount of surplus energy available to the monthly excess amount of firm transmission products in

⁹ For further information on BPA’s methodology for addressing planned transmission and ancillary service expenses, refer to *Revenue Requirement Study*, BP-16-E-BPA-02 at 25-28; *Power Revenue Requirement Study Documentation*, BP-16-E-BPA-02A at 17 tbl.3A, lines 116-119; *Power Risk and Market Price Study*, BP-16-E-BPA-04 at 42–43.

¹⁰ The megawatt amounts of surplus energy for FY 2015–FY 2022 were computed using RevSim.

the PS inventory and applying tariff rates to the amount of surplus energy in excess of the PS transmission products inventory. For the Amendment Scenario, monthly transmission and ancillary services costs were computed assuming no IP service provided to Alcoa and 75 MW of IP service continuing from May 1, 2015, through September 30, 2022 (300 MW of IP service was used for April 2015). The 3,200 load and resource conditions were run to estimate the additional amount of transmission that would need to be purchased. The average total monthly expense values of the 3,200 games were computed with and without service to Alcoa and the differences were taken to determine the avoided PS transmission and ancillary services costs when PS makes these IP sales to Alcoa. *See* Table 5b. Comparable values for the Termination Scenario are reported in Table 11b.

3. Demand Shift

The inclusion of the Demand Shift, as discussed in some previous EBT analyses, assumes that the DSIs would not operate in the absence of BPA IP service. In this EBT analysis, BPA set the benefits of the Demand Shift to zero because BPA believes that Alcoa will continue to operate in the absence of BPA IP service since current market conditions suggest that it is possible for Alcoa to maintain operations through another supplier if BPA were unable to supply Alcoa's Intalco smelter. In such circumstances, the demand shift would not materialize because the Intalco load could not be considered incremental based solely on BPA's ability to provide service.

f. Forecasted economic benefits to BPA in the Amendment Scenario are greater than in the Termination Scenario.

BPA forecasts that the economic benefits it will accrue from the sale of 75 MW of firm power to Alcoa at the IP rate, in the Amendment Scenario, will exceed by approximately \$62,066,532 the forecasted benefits BPA could otherwise obtain from selling that power into the wholesale electricity market. *See* Table 4. This is approximately \$22,865,996 more than the \$39,200,537 that BPA would earn in the Termination Scenario. *See* Table 10. On a total net benefits basis, the Amendment Scenario yields \$30,467,073 (\$76,135,466 - \$45,668,394) more. *See* Tables 6 & 12. Additional analysis indicates that the Amendment Scenario also yields higher net present value benefits over the length of the amended contract at discount rates ranging from 4%-12%. *See* Table 13. Also, Amendment Scenario provides a stable revenue stream to hedge against low electricity prices associated with low natural gas prices throughout the entirety of the amended contract.

g. Results of Equivalent Benefits Test

A comparison between the total net benefit results reported in Tables 6 and 12, illustrates that the financial benefits BPA expects to receive in the Amendment Scenario (selling 75 MW at the IP rate to Alcoa under the amended Agreement through September 30, 2022) exceed the forecasted total net benefits that BPA would otherwise obtain in the Termination Scenario by approximately \$30,467,073 (\$76,135,466 minus \$45,668,394). Of this \$30,467,073 difference, \$22,865,996 is

solely due to the net benefits of selling power at the IP rates rather than at the wholesale electricity market prices.

h. Equivalent Benefits Test (EBT) Tables

TABLE 1 – Usage and Rates - Amendment

Month	Alcoa Intalco Usage			Projected IP Rates		
	Demand (kW)	HLH (MWh)	LLH (MWh)	Demand (\$/kW)	HLH (\$/MWh)	LLH (\$/MWh)
Apr-15	300,000	124,800	91,200	\$0	\$35.89	\$30.25
May-15	75,000	30,000	25,800	\$0	\$31.13	\$23.21
Jun-15	75,000	31,200	22,800	\$0	\$32.86	\$24.70
Jul-15	75,000	31,200	24,600	\$0	\$40.62	\$34.63
Aug-15	75,000	31,200	24,600	\$0	\$44.09	\$37.22
Sep-15	75,000	30,000	24,000	\$0	\$43.78	\$38.03
Oct-15	75,000	32,400	23,400	\$0	\$46.69	\$40.43
Nov-15	75,000	28,800	25,275	\$0	\$49.81	\$42.71
Dec-15	75,000	31,200	24,600	\$0	\$52.11	\$44.47
Jan-16	75,000	30,000	25,800	\$0	\$50.76	\$40.00
Feb-16	75,000	30,000	22,200	\$0	\$49.56	\$41.07
Mar-16	75,000	32,400	23,325	\$0	\$42.54	\$36.23
Apr-16	75,000	31,200	22,800	\$0	\$41.38	\$35.48
May-16	75,000	30,000	25,800	\$0	\$37.08	\$25.79
Jun-16	75,000	31,200	22,800	\$0	\$37.74	\$15.98
Jul-16	75,000	30,000	25,800	\$0	\$47.76	\$36.42
Aug-16	75,000	32,400	23,400	\$0	\$52.15	\$43.71
Sep-16	75,000	30,000	24,000	\$0	\$55.50	\$46.00
Oct-16	75,000	31,200	24,600	\$0	\$48.22	\$41.06
Nov-16	75,000	30,000	24,075	\$0	\$49.59	\$42.68
Dec-16	75,000	31,200	24,600	\$0	\$51.33	\$43.88
Jan-17	75,000	30,000	25,800	\$0	\$51.28	\$43.29
Feb-17	75,000	28,800	21,600	\$0	\$52.18	\$42.93
Mar-17	75,000	32,400	23,325	\$0	\$41.96	\$35.92
Apr-17	75,000	30,000	24,000	\$0	\$40.48	\$35.10
May-17	75,000	31,200	24,600	\$0	\$37.64	\$27.07
Jun-17	75,000	31,200	22,800	\$0	\$38.39	\$21.02
Jul-17	75,000	30,000	25,800	\$0	\$46.06	\$34.43
Aug-17	75,000	32,400	23,400	\$0	\$50.09	\$41.23
Sep-17	75,000	30,000	24,000	\$0	\$52.49	\$43.04
Oct-17	75,000	31,200	24,600	\$0	\$51.15	\$43.26
Nov-17	75,000	30,000	24,075	\$0	\$52.59	\$44.93
Dec-17	75,000	30,000	25,800	\$0	\$55.40	\$46.99
Jan-18	75,000	31,200	24,600	\$0	\$55.95	\$45.61
Feb-18	75,000	28,800	21,600	\$0	\$55.75	\$45.58
Mar-18	75,000	32,400	23,325	\$0	\$44.01	\$36.89
Apr-18	75,000	30,000	24,000	\$0	\$43.48	\$37.44
May-18	75,000	31,200	24,600	\$0	\$37.64	\$27.10
Jun-18	75,000	31,200	22,800	\$0	\$36.55	\$17.93
Jul-18	75,000	30,000	25,800	\$0	\$48.44	\$36.79
Aug-18	75,000	32,400	23,400	\$0	\$52.78	\$43.79
Sep-18	75,000	28,800	25,200	\$0	\$55.23	\$45.04

TABLE 1 - Usage and Rates – Amendment (continued)

Month	Alcoa Intalco Usage			Projected IP Rates		
	Demand (kW)	HLH (MWh)	LLH (MWh)	Demand (\$/kW)	HLH (\$/MWh)	LLH (\$/MWh)
Oct-18	75,000	32,400	23,400	\$0	\$50.25	\$42.95
Nov-18	75,000	30,000	24,075	\$0	\$54.89	\$46.16
Dec-18	75,000	30,000	25,800	\$0	\$56.05	\$47.90
Jan-19	75,000	31,200	24,600	\$0	\$53.66	\$44.48
Feb-19	75,000	28,800	21,600	\$0	\$55.37	\$45.84
Mar-19	75,000	31,200	24,525	\$0	\$43.38	\$36.69
Apr-19	75,000	31,200	22,800	\$0	\$42.21	\$36.91
May-19	75,000	31,200	24,600	\$0	\$38.44	\$28.81
Jun-19	75,000	30,000	24,000	\$0	\$38.90	\$21.36
Jul-19	75,000	31,200	24,600	\$0	\$47.28	\$36.93
Aug-19	75,000	32,400	23,400	\$0	\$51.86	\$42.48
Sep-19	75,000	28,800	25,200	\$0	\$53.61	\$43.91
Oct-19	75,000	32,400	23,400	\$0	\$46.16	\$39.51
Nov-19	75,000	30,000	24,075	\$0	\$50.04	\$42.19
Dec-19	75,000	30,000	25,800	\$0	\$52.54	\$45.15
Jan-20	75,000	31,200	24,600	\$0	\$52.16	\$43.16
Feb-20	75,000	30,000	22,200	\$0	\$49.79	\$41.26
Mar-20	75,000	31,200	24,525	\$0	\$41.44	\$34.90
Apr-20	75,000	31,200	22,800	\$0	\$40.49	\$35.03
May-20	75,000	30,000	25,800	\$0	\$35.91	\$24.17
Jun-20	75,000	31,200	22,800	\$0	\$34.63	\$14.81
Jul-20	75,000	31,200	24,600	\$0	\$45.08	\$34.91
Aug-20	75,000	31,200	24,600	\$0	\$49.24	\$40.68
Sep-20	75,000	30,000	24,000	\$0	\$52.09	\$43.56
Oct-20	75,000	32,400	23,400	\$0	\$47.65	\$40.85
Nov-20	75,000	28,800	25,275	\$0	\$50.94	\$43.16
Dec-20	75,000	31,200	24,600	\$0	\$51.01	\$44.08
Jan-21	75,000	30,000	25,800	\$0	\$52.90	\$44.21
Feb-21	75,000	28,800	21,600	\$0	\$52.85	\$43.04
Mar-21	75,000	32,400	23,325	\$0	\$42.59	\$36.19
Apr-21	75,000	31,200	22,800	\$0	\$42.94	\$36.28
May-21	75,000	30,000	25,800	\$0	\$36.94	\$25.10
Jun-21	75,000	31,200	22,800	\$0	\$38.40	\$18.63
Jul-21	75,000	31,200	24,600	\$0	\$49.23	\$36.30
Aug-21	75,000	31,200	24,600	\$0	\$52.22	\$42.76
Sep-21	75,000	30,000	24,000	\$0	\$54.42	\$45.35
Oct-21	75,000	31,200	24,600	\$0	\$50.12	\$41.98
Nov-21	75,000	30,000	24,075	\$0	\$51.26	\$43.58
Dec-21	75,000	31,200	24,600	\$0	\$51.74	\$44.04
Jan-22	75,000	30,000	25,800	\$0	\$52.94	\$45.09
Feb-22	75,000	28,800	21,600	\$0	\$53.10	\$44.06
Mar-22	75,000	32,400	23,325	\$0	\$42.63	\$36.10

TABLE 1 - Usage and Rates – Amendment (continued)

Month	Alcoa Intalco Usage			Projected IP Rates		
	Demand (kW)	HLH (MWh)	LLH (MWh)	Demand (\$/kW)	HLH (\$/MWh)	LLH (\$/MWh)
Apr-22	75,000	31,200	22,800	\$0	\$42.22	\$35.69
May-22	75,000	30,000	25,800	\$0	\$37.16	\$24.96
Jun-22	75,000	31,200	22,800	\$0	\$35.26	\$13.98
Jul-22	75,000	30,000	25,800	\$0	\$48.40	\$36.30
Aug-22	75,000	32,400	23,400	\$0	\$52.82	\$43.45
Sep-22	75,000	30,000	24,000	\$0	\$55.24	\$45.47

TABLE 2 – BPA’s Projected Revenue - Amendment

Month	Revenues by Rate Determinant			Projected IP Revenue	
	Demand (\$)	HLH (\$)	LLH (\$)	Month (\$)	Cumulative Total Contract-to-Date (\$)
Apr-15	\$0	\$4,479,072	\$2,758,800	\$7,237,872	\$7,237,872
May-15	\$0	\$933,900	\$598,818	\$1,532,718	\$8,770,590
Jun-15	\$0	\$1,025,232	\$563,160	\$1,588,392	\$10,358,982
Jul-15	\$0	\$1,267,344	\$851,898	\$2,119,242	\$12,478,224
Aug-15	\$0	\$1,375,608	\$915,612	\$2,291,220	\$14,769,444
Sep-15	\$0	\$1,313,400	\$912,720	\$2,226,120	\$16,995,564
Oct-15	\$0	\$1,512,756	\$945,982	\$2,458,738	\$19,454,302
Nov-15	\$0	\$1,434,567	\$1,079,440	\$2,514,007	\$21,968,308
Dec-15	\$0	\$1,625,820	\$1,094,054	\$2,719,873	\$24,688,182
Jan-16	\$0	\$1,522,806	\$1,032,126	\$2,554,931	\$27,243,113
Feb-16	\$0	\$1,486,826	\$911,850	\$2,398,676	\$29,641,789
Mar-16	\$0	\$1,378,239	\$844,984	\$2,223,223	\$31,865,012
Apr-16	\$0	\$1,291,111	\$808,873	\$2,099,984	\$33,964,996
May-16	\$0	\$1,112,456	\$665,343	\$1,777,799	\$35,742,795
Jun-16	\$0	\$1,177,398	\$364,258	\$1,541,656	\$37,284,451
Jul-16	\$0	\$1,432,840	\$939,527	\$2,372,367	\$39,656,818
Aug-16	\$0	\$1,689,540	\$1,022,758	\$2,712,298	\$42,369,116
Sep-16	\$0	\$1,665,134	\$1,103,954	\$2,769,088	\$45,138,204
Oct-16	\$0	\$1,504,558	\$1,010,139	\$2,514,698	\$47,652,902
Nov-16	\$0	\$1,487,700	\$1,027,507	\$2,515,207	\$50,168,109
Dec-16	\$0	\$1,601,348	\$1,079,391	\$2,680,740	\$52,848,848
Jan-17	\$0	\$1,538,495	\$1,116,885	\$2,655,381	\$55,504,229
Feb-17	\$0	\$1,502,798	\$927,316	\$2,430,114	\$57,934,343
Mar-17	\$0	\$1,359,441	\$837,878	\$2,197,319	\$60,131,662
Apr-17	\$0	\$1,214,529	\$842,285	\$2,056,814	\$62,188,477
May-17	\$0	\$1,174,367	\$666,037	\$1,840,404	\$64,028,880
Jun-17	\$0	\$1,197,711	\$479,175	\$1,676,886	\$65,705,766
Jul-17	\$0	\$1,381,767	\$888,167	\$2,269,934	\$67,975,700
Aug-17	\$0	\$1,622,963	\$964,888	\$2,587,851	\$70,563,552
Sep-17	\$0	\$1,574,676	\$1,032,936	\$2,607,613	\$73,171,164

TABLE 2 - BPA's Projected Revenue – Amendment (Continued)

Month	Revenues by Rate Determinant			Projected IP Revenue	
	Demand (\$)	HLH (\$)	LLH (\$)	Month (\$)	Cumulative Total Contract- to-Date (\$)
Oct-17	\$0	\$1,595,900	\$1,064,179	\$2,660,079	\$75,831,243
Nov-17	\$0	\$1,577,650	\$1,081,610	\$2,659,260	\$78,490,503
Dec-17	\$0	\$1,662,001	\$1,212,388	\$2,874,389	\$81,364,892
Jan-18	\$0	\$1,745,493	\$1,122,025	\$2,867,518	\$84,232,410
Feb-18	\$0	\$1,605,643	\$984,440	\$2,590,083	\$86,822,493
Mar-18	\$0	\$1,425,940	\$860,369	\$2,286,309	\$89,108,802
Apr-18	\$0	\$1,304,444	\$898,641	\$2,203,085	\$91,311,887
May-18	\$0	\$1,174,477	\$666,591	\$1,841,068	\$93,152,955
Jun-18	\$0	\$1,140,338	\$408,770	\$1,549,108	\$94,702,062
Jul-18	\$0	\$1,453,284	\$949,168	\$2,402,451	\$97,104,514
Aug-18	\$0	\$1,710,186	\$1,024,720	\$2,734,906	\$99,839,420
Sep-18	\$0	\$1,590,732	\$1,134,979	\$2,725,711	\$102,565,131
Oct-18	\$0	\$1,628,090	\$1,004,999	\$2,633,089	\$105,198,220
Nov-18	\$0	\$1,646,588	\$1,111,245	\$2,757,833	\$107,956,053
Dec-18	\$0	\$1,681,417	\$1,235,933	\$2,917,350	\$110,873,403
Jan-19	\$0	\$1,674,059	\$1,094,173	\$2,768,232	\$113,641,635
Feb-19	\$0	\$1,594,647	\$990,247	\$2,584,894	\$116,226,529
Mar-19	\$0	\$1,353,533	\$899,758	\$2,253,290	\$118,479,819
Apr-19	\$0	\$1,317,050	\$841,435	\$2,158,485	\$120,638,304
May-19	\$0	\$1,199,446	\$708,727	\$1,908,174	\$122,546,477
Jun-19	\$0	\$1,166,867	\$512,676	\$1,679,543	\$124,226,020
Jul-19	\$0	\$1,475,258	\$908,580	\$2,383,838	\$126,609,858
Aug-19	\$0	\$1,680,289	\$994,044	\$2,674,334	\$129,284,192
Sep-19	\$0	\$1,543,895	\$1,106,573	\$2,650,468	\$131,934,660
Oct-19	\$0	\$1,495,525	\$924,460	\$2,419,985	\$134,354,645
Nov-19	\$0	\$1,501,150	\$1,015,618	\$2,516,768	\$136,871,413
Dec-19	\$0	\$1,576,169	\$1,164,790	\$2,740,959	\$139,612,372
Jan-20	\$0	\$1,627,501	\$1,061,698	\$2,689,199	\$142,301,572
Feb-20	\$0	\$1,493,702	\$915,990	\$2,409,692	\$144,711,263
Mar-20	\$0	\$1,292,932	\$856,001	\$2,148,932	\$146,860,196
Apr-20	\$0	\$1,263,392	\$798,654	\$2,062,046	\$148,922,241
May-20	\$0	\$1,077,189	\$623,522	\$1,700,711	\$150,622,952
Jun-20	\$0	\$1,080,588	\$337,644	\$1,418,232	\$152,041,184
Jul-20	\$0	\$1,406,494	\$858,669	\$2,265,163	\$154,306,347
Aug-20	\$0	\$1,536,344	\$1,000,782	\$2,537,126	\$156,843,473
Sep-20	\$0	\$1,562,614	\$1,045,460	\$2,608,073	\$159,451,546
Oct-20	\$0	\$1,543,947	\$955,901	\$2,499,849	\$161,951,395
Nov-20	\$0	\$1,467,162	\$1,090,821	\$2,557,983	\$164,509,377
Dec-20	\$0	\$1,591,404	\$1,084,445	\$2,675,849	\$167,185,227
Jan-21	\$0	\$1,586,970	\$1,140,582	\$2,727,552	\$169,912,779
Feb-21	\$0	\$1,522,129	\$929,607	\$2,451,735	\$172,364,514
Mar-21	\$0	\$1,379,799	\$844,095	\$2,223,894	\$174,588,408
Apr-21	\$0	\$1,339,702	\$827,116	\$2,166,818	\$176,755,226

TABLE 2 - BPA's Projected Revenue – Amendment (Continued)

Month	Revenues by Rate Determinant			Projected IP Revenue	
	Demand (\$)	HLH (\$)	LLH (\$)	Month (\$)	Cumulative Total Contract- to-Date (\$)
May-21	\$0	\$1,108,289	\$647,604	\$1,755,893	\$178,511,120
Jun-21	\$0	\$1,198,151	\$424,666	\$1,622,817	\$180,133,937
Jul-21	\$0	\$1,535,821	\$892,888	\$2,428,710	\$182,562,647
Aug-21	\$0	\$1,629,180	\$1,051,929	\$2,681,108	\$185,243,755
Sep-21	\$0	\$1,632,525	\$1,088,427	\$2,720,952	\$187,964,707
Oct-21	\$0	\$1,563,590	\$1,032,644	\$2,596,234	\$190,560,942
Nov-21	\$0	\$1,537,943	\$1,049,194	\$2,587,137	\$193,148,078
Dec-21	\$0	\$1,614,167	\$1,083,387	\$2,697,554	\$195,845,632
Jan-22	\$0	\$1,588,095	\$1,163,234	\$2,751,329	\$198,596,961
Feb-22	\$0	\$1,529,292	\$951,804	\$2,481,096	\$201,078,057
Mar-22	\$0	\$1,381,320	\$841,971	\$2,223,291	\$203,301,348
Apr-22	\$0	\$1,317,240	\$813,688	\$2,130,928	\$205,432,276
May-22	\$0	\$1,114,670	\$643,989	\$1,758,659	\$207,190,935
Jun-22	\$0	\$1,100,137	\$318,836	\$1,418,974	\$208,609,909
Jul-22	\$0	\$1,452,088	\$936,497	\$2,388,585	\$210,998,494
Aug-22	\$0	\$1,711,451	\$1,016,781	\$2,728,232	\$213,726,726
Sep-22	\$0	\$1,657,074	\$1,091,234	\$2,748,308	\$216,475,034

TABLE 3- BPA' Forecasted Revenues Obtained From the Market - Amendment

Month	Forecasted Market Price		Forecasted Revenues Obtained from the Market			
	HLH Price (\$/MWh)	LLH Price (\$/MWh)	HLH (\$)	LLH (\$)	Month (\$) (HLH + LLH)	Cumulative Total Contract-to-Date (\$)
Apr-15	\$23.83	\$19.46	\$2,974,284	\$1,775,123	\$4,749,407	\$4,749,407
May-15	\$21.31	\$15.70	\$639,182	\$405,072	\$1,044,254	\$5,793,661
Jun-15	\$22.10	\$15.40	\$689,515	\$351,167	\$1,040,682	\$6,834,343
Jul-15	\$27.52	\$20.72	\$858,599	\$509,628	\$1,368,227	\$8,202,570
Aug-15	\$31.35	\$24.06	\$978,074	\$591,952	\$1,570,026	\$9,772,596
Sep-15	\$32.06	\$25.38	\$961,808	\$609,188	\$1,570,996	\$11,343,592
Oct-15	\$27.96	\$24.21	\$905,890	\$566,486	\$1,472,377	\$12,815,969
Nov-15	\$29.83	\$25.57	\$859,068	\$646,406	\$1,505,474	\$14,321,442
Dec-15	\$31.21	\$26.63	\$973,597	\$655,157	\$1,628,754	\$15,950,196
Jan-16	\$30.40	\$23.96	\$911,908	\$618,072	\$1,529,981	\$17,480,177
Feb-16	\$29.68	\$24.60	\$890,363	\$546,047	\$1,436,410	\$18,916,587
Mar-16	\$25.47	\$21.69	\$825,337	\$506,006	\$1,331,343	\$20,247,930
Apr-16	\$24.78	\$21.24	\$773,162	\$484,381	\$1,257,543	\$21,505,473
May-16	\$22.21	\$15.44	\$666,177	\$398,431	\$1,064,607	\$22,570,080
Jun-16	\$22.60	\$9.57	\$705,067	\$218,130	\$923,197	\$23,493,277
Jul-16	\$28.60	\$21.81	\$858,034	\$562,621	\$1,420,655	\$24,913,932
Aug-16	\$31.23	\$26.17	\$1,011,755	\$612,463	\$1,624,218	\$26,538,150
Sep-16	\$33.24	\$27.55	\$997,140	\$661,086	\$1,658,225	\$28,196,375
Oct-16	\$31.80	\$27.08	\$992,073	\$666,064	\$1,658,137	\$29,854,511
Nov-16	\$32.70	\$28.14	\$980,957	\$677,516	\$1,658,473	\$31,512,984
Dec-16	\$33.84	\$28.93	\$1,055,894	\$711,727	\$1,767,621	\$33,280,605
Jan-17	\$33.82	\$28.54	\$1,014,450	\$736,450	\$1,750,900	\$35,031,506
Feb-17	\$34.41	\$28.31	\$990,912	\$611,452	\$1,602,364	\$36,633,870
Mar-17	\$27.67	\$23.69	\$896,386	\$552,479	\$1,448,865	\$38,082,734
Apr-17	\$26.69	\$23.14	\$800,834	\$555,384	\$1,356,219	\$39,438,953
May-17	\$24.82	\$17.85	\$774,352	\$439,170	\$1,213,522	\$40,652,475
Jun-17	\$25.31	\$13.86	\$789,744	\$315,958	\$1,105,702	\$41,758,177
Jul-17	\$30.37	\$22.70	\$911,107	\$585,638	\$1,496,745	\$43,254,922
Aug-17	\$33.03	\$27.19	\$1,070,147	\$636,226	\$1,706,373	\$44,961,295
Sep-17	\$34.61	\$28.38	\$1,038,307	\$681,096	\$1,719,403	\$46,680,698
Oct-17	\$33.35	\$28.20	\$1,040,365	\$693,737	\$1,734,102	\$48,414,799
Nov-17	\$34.28	\$29.29	\$1,028,468	\$705,100	\$1,733,568	\$50,148,367
Dec-17	\$36.12	\$30.63	\$1,083,456	\$790,354	\$1,873,810	\$52,022,177
Jan-18	\$36.47	\$29.73	\$1,137,884	\$731,447	\$1,869,331	\$53,891,508
Feb-18	\$36.34	\$29.71	\$1,046,716	\$641,755	\$1,688,471	\$55,579,980
Mar-18	\$28.69	\$24.05	\$929,569	\$560,873	\$1,490,442	\$57,070,421
Apr-18	\$28.35	\$24.41	\$850,365	\$585,823	\$1,436,188	\$58,506,610
May-18	\$24.54	\$17.66	\$765,640	\$434,550	\$1,200,190	\$59,706,799
Jun-18	\$23.83	\$11.69	\$743,385	\$266,476	\$1,009,861	\$60,716,660
Jul-18	\$31.58	\$23.98	\$947,394	\$618,761	\$1,566,155	\$62,282,815
Aug-18	\$34.41	\$28.55	\$1,114,868	\$668,014	\$1,782,881	\$64,065,696
Sep-18	\$36.01	\$29.36	\$1,036,996	\$739,891	\$1,776,887	\$65,842,584

**TABLE 3 - BPA's Forecasted Revenues Obtained from the Market – Amendment
(continued)**

Month	Forecasted Market Price		Forecasted Revenues Obtained from the Market			Cumulative Total Contract-to-Date (\$)
	HLH Price (\$/MWh)	LLH Price (\$/MWh)	HLH (\$)	LLH (\$)	Month (\$) (HLH + LLH)	
Oct-18	\$34.71	\$29.66	\$1,124,516	\$694,149	\$1,818,666	\$67,661,249
Nov-18	\$37.91	\$31.88	\$1,137,292	\$767,533	\$1,904,825	\$69,566,075
Dec-18	\$38.71	\$33.09	\$1,161,349	\$853,655	\$2,015,004	\$71,581,078
Jan-19	\$37.06	\$30.72	\$1,156,267	\$755,741	\$1,912,008	\$73,493,086
Feb-19	\$38.24	\$31.66	\$1,101,417	\$683,960	\$1,785,377	\$75,278,463
Mar-19	\$29.96	\$25.34	\$934,880	\$621,460	\$1,556,340	\$76,834,803
Apr-19	\$29.16	\$25.49	\$909,682	\$581,176	\$1,490,858	\$78,325,661
May-19	\$26.55	\$19.90	\$828,453	\$489,515	\$1,317,969	\$79,643,630
Jun-19	\$26.87	\$14.75	\$805,951	\$354,103	\$1,160,055	\$80,803,684
Jul-19	\$32.66	\$25.51	\$1,018,955	\$627,553	\$1,646,509	\$82,450,193
Aug-19	\$35.82	\$29.34	\$1,160,570	\$686,583	\$1,847,153	\$84,297,346
Sep-19	\$37.03	\$30.33	\$1,066,363	\$764,306	\$1,830,669	\$86,128,015
Oct-19	\$35.64	\$30.51	\$1,154,765	\$713,819	\$1,868,584	\$87,996,599
Nov-19	\$38.64	\$32.57	\$1,159,108	\$784,207	\$1,943,315	\$89,939,914
Dec-19	\$40.57	\$34.86	\$1,217,034	\$899,389	\$2,116,423	\$92,056,337
Jan-20	\$40.28	\$33.32	\$1,256,670	\$819,787	\$2,076,457	\$94,132,794
Feb-20	\$38.45	\$31.86	\$1,153,357	\$707,279	\$1,860,636	\$95,993,430
Mar-20	\$32.00	\$26.95	\$998,333	\$660,958	\$1,659,291	\$97,652,721
Apr-20	\$31.27	\$27.05	\$975,524	\$616,678	\$1,592,202	\$99,244,923
May-20	\$27.72	\$18.66	\$831,748	\$481,451	\$1,313,199	\$100,558,122
Jun-20	\$26.74	\$11.43	\$834,372	\$260,711	\$1,095,083	\$101,653,205
Jul-20	\$34.81	\$26.95	\$1,086,020	\$663,019	\$1,749,039	\$103,402,244
Aug-20	\$38.02	\$31.41	\$1,186,283	\$772,751	\$1,959,034	\$105,361,278
Sep-20	\$40.22	\$33.64	\$1,206,567	\$807,248	\$2,013,816	\$107,375,094
Oct-20	\$38.28	\$32.82	\$1,240,396	\$767,964	\$2,008,360	\$109,383,453
Nov-20	\$40.93	\$34.67	\$1,178,707	\$876,357	\$2,055,064	\$111,438,518
Dec-20	\$40.98	\$35.42	\$1,278,522	\$871,235	\$2,149,757	\$113,588,275
Jan-21	\$42.50	\$35.52	\$1,274,960	\$916,335	\$2,191,295	\$115,779,570
Feb-21	\$42.46	\$34.58	\$1,222,867	\$746,839	\$1,969,706	\$117,749,276
Mar-21	\$34.21	\$29.07	\$1,108,520	\$678,140	\$1,786,660	\$119,535,936
Apr-21	\$34.50	\$29.14	\$1,076,307	\$664,499	\$1,740,806	\$121,276,741
May-21	\$29.68	\$20.17	\$890,391	\$520,280	\$1,410,672	\$122,687,413
Jun-21	\$30.85	\$14.96	\$962,586	\$341,174	\$1,303,759	\$123,991,172
Jul-21	\$39.55	\$29.16	\$1,233,868	\$717,340	\$1,951,207	\$125,942,380
Aug-21	\$41.95	\$34.35	\$1,308,871	\$845,112	\$2,153,982	\$128,096,362
Sep-21	\$43.72	\$36.43	\$1,311,558	\$874,434	\$2,185,993	\$130,282,355
Oct-21	\$42.41	\$35.52	\$1,323,149	\$873,849	\$2,196,998	\$132,479,353
Nov-21	\$43.38	\$36.88	\$1,301,446	\$887,854	\$2,189,299	\$134,668,652
Dec-21	\$43.78	\$37.27	\$1,365,948	\$916,789	\$2,282,737	\$136,951,389
Jan-22	\$44.80	\$38.15	\$1,343,886	\$984,357	\$2,328,243	\$139,279,632
Feb-22	\$44.93	\$37.29	\$1,294,125	\$805,440	\$2,099,565	\$141,379,197
Mar-22	\$36.08	\$30.55	\$1,168,908	\$712,497	\$1,881,404	\$143,260,601

TABLE 3 - BPA's Forecasted Revenues Obtained from the Market – Amendment
(continued)

Month	Forecasted Market Price		Forecasted Revenues Obtained from the Market			
	HLH Price (\$/MWh)	LLH Price (\$/MWh)	HLH (\$)	LLH (\$)	Month (\$) (HLH + LLH)	Cumulative Total Contract-to-Date (\$)
Apr-22	\$35.73	\$30.20	\$1,114,682	\$688,563	\$1,803,244	\$145,063,846
May-22	\$31.44	\$21.12	\$943,261	\$544,959	\$1,488,221	\$146,552,067
Jun-22	\$29.84	\$11.83	\$930,964	\$269,807	\$1,200,771	\$147,752,837
Jul-22	\$40.96	\$30.72	\$1,228,793	\$792,487	\$2,021,280	\$149,774,118
Aug-22	\$44.70	\$36.77	\$1,448,272	\$860,426	\$2,308,698	\$152,082,816
Sep-22	\$46.74	\$38.48	\$1,402,257	\$923,429	\$2,325,686	\$154,408,502

TABLE 4 – BPA’s Net Benefit Before Adjustment - Amendment

	Net Revenue or (Cost)	
Month	Month (\$)	Cumulative Total Contract-to-Date (\$)
Apr-15	\$2,488,465	\$2,488,465
May-15	\$488,464	\$2,976,929
Jun-15	\$547,710	\$3,524,639
Jul-15	\$751,015	\$4,275,654
Aug-15	\$721,194	\$4,996,848
Sep-15	\$655,124	\$5,651,972
Oct-15	\$986,361	\$6,638,333
Nov-15	\$1,008,533	\$7,646,866
Dec-15	\$1,091,119	\$8,737,985
Jan-16	\$1,024,950	\$9,762,936
Feb-16	\$962,266	\$10,725,202
Mar-16	\$891,881	\$11,617,082
Apr-16	\$842,441	\$12,459,524
May-16	\$713,192	\$13,172,715
Jun-16	\$618,459	\$13,791,174
Jul-16	\$951,712	\$14,742,886
Aug-16	\$1,088,081	\$15,830,967
Sep-16	\$1,110,863	\$16,941,829
Oct-16	\$856,561	\$17,798,390
Nov-16	\$856,734	\$18,655,125
Dec-16	\$913,118	\$19,568,243
Jan-17	\$904,481	\$20,472,724
Feb-17	\$827,750	\$21,300,473
Mar-17	\$748,455	\$22,048,928
Apr-17	\$700,596	\$22,749,524
May-17	\$626,882	\$23,376,406
Jun-17	\$571,184	\$23,947,589
Jul-17	\$773,189	\$24,720,778
Aug-17	\$881,479	\$25,602,257
Sep-17	\$888,210	\$26,490,467
Oct-17	\$925,977	\$27,416,444
Nov-17	\$925,692	\$28,342,136
Dec-17	\$1,000,579	\$29,342,715
Jan-18	\$998,187	\$30,340,902
Feb-18	\$901,611	\$31,242,513
Mar-18	\$795,867	\$32,038,380
Apr-18	\$766,897	\$32,805,277
May-18	\$640,878	\$33,446,156
Jun-18	\$539,246	\$33,985,402
Jul-18	\$836,297	\$34,821,699
Aug-18	\$952,024	\$35,773,723
Sep-18	\$948,824	\$36,722,547

**TABLE 4 - BPA's Net Benefit before Adjustment -
Amendment (continued)**

Net Revenue or (Cost)

Month	Month (\$)	Cumulative Total Contract-to-Date (\$)
Oct-18	\$814,424	\$37,536,971
Nov-18	\$853,007	\$38,389,978
Dec-18	\$902,347	\$39,292,325
Jan-19	\$856,224	\$40,148,549
Feb-19	\$799,517	\$40,948,065
Mar-19	\$696,951	\$41,645,016
Apr-19	\$667,627	\$42,312,643
May-19	\$590,205	\$42,902,847
Jun-19	\$519,489	\$43,422,336
Jul-19	\$737,329	\$44,159,665
Aug-19	\$827,181	\$44,986,846
Sep-19	\$819,799	\$45,806,645
Oct-19	\$551,401	\$46,358,046
Nov-19	\$573,453	\$46,931,500
Dec-19	\$624,536	\$47,556,036
Jan-20	\$612,742	\$48,168,778
Feb-20	\$549,056	\$48,717,834
Mar-20	\$489,641	\$49,207,474
Apr-20	\$469,843	\$49,677,318
May-20	\$387,512	\$50,064,830
Jun-20	\$323,148	\$50,387,979
Jul-20	\$516,124	\$50,904,103
Aug-20	\$578,092	\$51,482,195
Sep-20	\$594,258	\$52,076,452
Oct-20	\$491,489	\$52,567,941
Nov-20	\$502,918	\$53,070,860
Dec-20	\$526,092	\$53,596,952
Jan-21	\$536,257	\$54,133,209
Feb-21	\$482,029	\$54,615,238
Mar-21	\$437,234	\$55,052,472
Apr-21	\$426,013	\$55,478,485
May-21	\$345,222	\$55,823,707
Jun-21	\$319,058	\$56,142,765
Jul-21	\$477,502	\$56,620,267
Aug-21	\$527,126	\$57,147,393
Sep-21	\$534,959	\$57,682,353
Oct-21	\$399,236	\$58,081,589
Nov-21	\$397,837	\$58,479,426
Dec-21	\$414,817	\$58,894,243
Jan-22	\$423,086	\$59,317,329
Feb-22	\$381,531	\$59,698,860
Mar-22	\$341,887	\$60,040,747

**TABLE 4 - BPA's Net Benefit before Adjustment -
Amendment (continued)**

Net Revenue or (Cost)

Month	Month (\$)	Cumulative Total Contract-to-Date (\$)
Apr-22	\$327,684	\$60,368,430
May-22	\$270,438	\$60,638,869
Jun-22	\$218,203	\$60,857,071
Jul-22	\$367,305	\$61,224,376
Aug-22	\$419,534	\$61,643,911
Sep-22	\$422,621	\$62,066,532

TABLE 5a – BPA’s Net Benefit Adjustments - Amendment

Value of Reserves		
Month	Month (\$)	Cumulative Total Contract-to-Date (\$)
Apr-15	\$210,600	\$210,600
May-15	\$54,405	\$265,005
Jun-15	\$52,650	\$317,655
Jul-15	\$54,405	\$372,060
Aug-15	\$54,405	\$426,465
Sep-15	\$52,650	\$479,115
Oct-15	\$54,293	\$533,408
Nov-15	\$52,615	\$586,023
Dec-15	\$54,293	\$640,317
Jan-16	\$54,293	\$694,610
Feb-16	\$50,791	\$745,401
Mar-16	\$54,220	\$799,621
Apr-16	\$52,542	\$852,163
May-16	\$54,293	\$906,457
Jun-16	\$52,542	\$958,999
Jul-16	\$54,293	\$1,013,292
Aug-16	\$54,293	\$1,067,585
Sep-16	\$52,542	\$1,120,127
Oct-16	\$54,293	\$1,174,421
Nov-16	\$52,615	\$1,227,036
Dec-16	\$54,293	\$1,281,329
Jan-17	\$54,293	\$1,335,623
Feb-17	\$49,039	\$1,384,662
Mar-17	\$54,220	\$1,438,882
Apr-17	\$52,542	\$1,491,424
May-17	\$54,293	\$1,545,718
Jun-17	\$52,542	\$1,598,260
Jul-17	\$54,293	\$1,652,553
Aug-17	\$54,293	\$1,706,846
Sep-17	\$52,542	\$1,759,388
Oct-17	\$54,293	\$1,813,682
Nov-17	\$52,615	\$1,866,297
Dec-17	\$54,293	\$1,920,590
Jan-18	\$54,293	\$1,974,884
Feb-18	\$49,039	\$2,023,923
Mar-18	\$54,220	\$2,078,143
Apr-18	\$52,542	\$2,130,685
May-18	\$54,293	\$2,184,979
Jun-18	\$52,542	\$2,237,521
Jul-18	\$54,293	\$2,291,814
Aug-18	\$54,293	\$2,346,107
Sep-18	\$52,542	\$2,398,649

**TABLE 5a - BPA's Net Benefit Adjustments –
Amendment
Value of Reserves (continued)**

Month	Month (\$)	Cumulative Total Contract-to-Date (\$)
Oct-18	\$54,293	\$2,452,943
Nov-18	\$52,615	\$2,505,558
Dec-18	\$54,293	\$2,559,851
Jan-19	\$54,293	\$2,614,145
Feb-19	\$49,039	\$2,663,184
Mar-19	\$54,220	\$2,717,404
Apr-19	\$52,542	\$2,769,946
May-19	\$54,293	\$2,824,240
Jun-19	\$52,542	\$2,876,782
Jul-19	\$54,293	\$2,931,075
Aug-19	\$54,293	\$2,985,368
Sep-19	\$52,542	\$3,037,910
Oct-19	\$54,293	\$3,092,204
Nov-19	\$52,615	\$3,144,819
Dec-19	\$54,293	\$3,199,112
Jan-20	\$54,293	\$3,253,406
Feb-20	\$50,791	\$3,304,196
Mar-20	\$54,220	\$3,358,417
Apr-20	\$52,542	\$3,410,959
May-20	\$54,293	\$3,465,252
Jun-20	\$52,542	\$3,517,794
Jul-20	\$54,293	\$3,572,087
Aug-20	\$54,293	\$3,626,381
Sep-20	\$52,542	\$3,678,923
Oct-20	\$54,293	\$3,733,216
Nov-20	\$52,615	\$3,785,831
Dec-20	\$54,293	\$3,840,125
Jan-21	\$54,293	\$3,894,418
Feb-21	\$49,039	\$3,943,457
Mar-21	\$54,220	\$3,997,678
Apr-21	\$52,542	\$4,050,220
May-21	\$54,293	\$4,104,513
Jun-21	\$52,542	\$4,157,055
Jul-21	\$54,293	\$4,211,348
Aug-21	\$54,293	\$4,265,642
Sep-21	\$52,542	\$4,318,184
Oct-21	\$54,293	\$4,372,477
Nov-21	\$52,615	\$4,425,092
Dec-21	\$54,293	\$4,479,386
Jan-22	\$54,293	\$4,533,679
Feb-22	\$49,039	\$4,582,718
Mar-22	\$54,220	\$4,636,939

**TABLE 5a - BPA's Net Benefit Adjustments –
Amendment**
Value of Reserves (continued)

Month	Month (\$)	Cumulative Total Contract-to-Date (\$)
Apr-22	\$52,542	\$4,689,481
May-22	\$54,293	\$4,743,774
Jun-22	\$52,542	\$4,796,316
Jul-22	\$54,293	\$4,850,609
Aug-22	\$54,293	\$4,904,903
Sep-22	\$52,542	\$4,957,445

TABLE 5b – BPA’s Net Benefit Adjustments - Amendment**Avoided Tx and Ancillary Service Costs**

Month	Month (\$)	Cumulative Total Contract-to-Date (\$)
Apr-15	\$581,157	\$581,157
May-15	\$173,263	\$754,420
Jun-15	\$157,755	\$912,175
Jul-15	\$122,859	\$1,035,034
Aug-15	\$25,129	\$1,060,163
Sep-15	\$13,756	\$1,073,919
Oct-15	\$10,722	\$1,084,641
Nov-15	\$40,807	\$1,125,448
Dec-15	\$32,838	\$1,158,286
Jan-16	\$93,561	\$1,251,846
Feb-16	\$90,924	\$1,342,770
Mar-16	\$113,848	\$1,456,617
Apr-16	\$121,223	\$1,577,840
May-16	\$184,144	\$1,761,984
Jun-16	\$167,598	\$1,929,582
Jul-16	\$127,815	\$2,057,397
Aug-16	\$70,455	\$2,127,852
Sep-16	\$11,402	\$2,139,255
Oct-16	\$14,224	\$2,153,479
Nov-16	\$44,116	\$2,197,595
Dec-16	\$34,534	\$2,232,128
Jan-17	\$97,979	\$2,330,107
Feb-17	\$86,900	\$2,417,007
Mar-17	\$128,686	\$2,545,693
Apr-17	\$118,126	\$2,663,819
May-17	\$180,114	\$2,843,933
Jun-17	\$155,334	\$2,999,267
Jul-17	\$123,294	\$3,122,561
Aug-17	\$67,372	\$3,189,932
Sep-17	\$7,691	\$3,197,624
Oct-17	\$11,462	\$3,209,086
Nov-17	\$47,827	\$3,256,912
Dec-17	\$37,983	\$3,294,896
Jan-18	\$106,686	\$3,401,582
Feb-18	\$96,117	\$3,497,698
Mar-18	\$139,437	\$3,637,136
Apr-18	\$127,736	\$3,764,872
May-18	\$201,847	\$3,966,719
Jun-18	\$180,083	\$4,146,801
Jul-18	\$135,488	\$4,282,289
Aug-18	\$71,896	\$4,354,185
Sep-18	\$9,594	\$4,363,779

TABLE 5b – BPA’s Net Benefit Adjustments – Amendment
(continued)

Avoided Tx and Ancillary Service Costs		
Month	Month (\$)	Cumulative Total Contract-to-Date (\$)
Oct-18	\$12,647	\$4,376,426
Nov-18	\$47,085	\$4,423,511
Dec-18	\$38,559	\$4,462,069
Jan-19	\$105,578	\$4,567,648
Feb-19	\$95,351	\$4,662,999
Mar-19	\$138,305	\$4,801,304
Apr-19	\$127,490	\$4,928,794
May-19	\$194,750	\$5,123,544
Jun-19	\$168,373	\$5,291,916
Jul-19	\$133,212	\$5,425,129
Aug-19	\$72,366	\$5,497,495
Sep-19	\$9,205	\$5,506,700
Oct-19	\$12,486	\$5,519,185
Nov-19	\$53,741	\$5,572,926
Dec-19	\$42,021	\$5,614,948
Jan-20	\$112,591	\$5,727,539
Feb-20	\$109,007	\$5,836,546
Mar-20	\$144,497	\$5,981,043
Apr-20	\$133,020	\$6,114,063
May-20	\$208,766	\$6,322,829
Jun-20	\$185,882	\$6,508,711
Jul-20	\$140,631	\$6,649,342
Aug-20	\$74,190	\$6,723,532
Sep-20	\$9,829	\$6,733,361
Oct-20	\$12,651	\$6,746,012
Nov-20	\$51,050	\$6,797,062
Dec-20	\$40,879	\$6,837,941
Jan-21	\$110,308	\$6,948,249
Feb-21	\$99,518	\$7,047,767
Mar-21	\$143,221	\$7,190,989
Apr-21	\$132,431	\$7,323,419
May-21	\$201,171	\$7,524,590
Jun-21	\$174,279	\$7,698,870
Jul-21	\$134,303	\$7,833,173
Aug-21	\$70,977	\$7,904,150
Sep-21	\$8,285	\$7,912,434
Oct-21	\$11,226	\$7,923,661
Nov-21	\$48,409	\$7,972,070
Dec-21	\$37,871	\$8,009,940
Jan-22	\$109,219	\$8,119,159
Feb-22	\$98,970	\$8,218,129
Mar-22	\$143,058	\$8,361,187

TABLE 5b - BPA's Net Benefit Adjustments – Amendment
(continued)

Avoided Tx and Ancillary Service Costs

Month	Month (\$)	Cumulative Total Contract-to-Date (\$)
Apr-22	\$132,491	\$8,493,678
May-22	\$211,108	\$8,704,785
Jun-22	\$186,477	\$8,891,262
Jul-22	\$139,257	\$9,030,519
Aug-22	\$72,216	\$9,102,735
Sep-22	\$8,754	\$9,111,489

TABLE 6 – BPA’s Net Benefits after Adjustments - Amendment**BPA's Adjusted Net Revenue or (Cost)**

Month	Net Revenue or (Cost) (A) Month (\$)	Value of Reserves (B) Month (\$)	Avoided Tx Costs (C) Month (\$)	Demand Shift (D) Month (\$)	A + B + C + D Month (\$)	Cumulative Total Contract-to-Date (\$)
Apr-15	\$2,488,465	\$210,600	\$581,157	\$0	\$3,280,221	\$3,280,221
May-15	\$488,464	\$54,405	\$173,263	\$0	\$716,133	\$3,996,354
Jun-15	\$547,710	\$52,650	\$157,755	\$0	\$758,115	\$4,754,469
Jul-15	\$751,015	\$54,405	\$122,859	\$0	\$928,279	\$5,682,748
Aug-15	\$721,194	\$54,405	\$25,129	\$0	\$800,728	\$6,483,476
Sep-15	\$655,124	\$52,650	\$13,756	\$0	\$721,530	\$7,205,006
Oct-15	\$986,361	\$54,293	\$10,722	\$0	\$1,051,376	\$8,256,382
Nov-15	\$1,008,533	\$52,615	\$40,807	\$0	\$1,101,955	\$9,358,337
Dec-15	\$1,091,119	\$54,293	\$32,838	\$0	\$1,178,251	\$10,536,588
Jan-16	\$1,024,950	\$54,293	\$93,561	\$0	\$1,172,804	\$11,709,392
Feb-16	\$962,266	\$50,791	\$90,924	\$0	\$1,103,981	\$12,813,372
Mar-16	\$891,881	\$54,220	\$113,848	\$0	\$1,059,949	\$13,873,321
Apr-16	\$842,441	\$52,542	\$121,223	\$0	\$1,016,206	\$14,889,527
May-16	\$713,192	\$54,293	\$184,144	\$0	\$951,629	\$15,841,156
Jun-16	\$618,459	\$52,542	\$167,598	\$0	\$838,599	\$16,679,755
Jul-16	\$951,712	\$54,293	\$127,815	\$0	\$1,133,820	\$17,813,575
Aug-16	\$1,088,081	\$54,293	\$70,455	\$0	\$1,212,829	\$19,026,405
Sep-16	\$1,110,863	\$52,542	\$11,402	\$0	\$1,174,807	\$20,201,212
Oct-16	\$856,561	\$54,293	\$14,224	\$0	\$925,078	\$21,126,290
Nov-16	\$856,734	\$52,615	\$44,116	\$0	\$953,465	\$22,079,755
Dec-16	\$913,118	\$54,293	\$34,534	\$0	\$1,001,945	\$23,081,700
Jan-17	\$904,481	\$54,293	\$97,979	\$0	\$1,056,753	\$24,138,453
Feb-17	\$827,750	\$49,039	\$86,900	\$0	\$963,689	\$25,102,142
Mar-17	\$748,455	\$54,220	\$128,686	\$0	\$931,361	\$26,033,503
Apr-17	\$700,596	\$52,542	\$118,126	\$0	\$871,264	\$26,904,767
May-17	\$626,882	\$54,293	\$180,114	\$0	\$861,289	\$27,766,056
Jun-17	\$571,184	\$52,542	\$155,334	\$0	\$779,060	\$28,545,116
Jul-17	\$773,189	\$54,293	\$123,294	\$0	\$950,776	\$29,495,892
Aug-17	\$881,479	\$54,293	\$67,372	\$0	\$1,003,144	\$30,499,036
Sep-17	\$888,210	\$52,542	\$7,691	\$0	\$948,443	\$31,447,479
Oct-17	\$925,977	\$54,293	\$11,462	\$0	\$991,732	\$32,439,211
Nov-17	\$925,692	\$52,615	\$47,827	\$0	\$1,026,134	\$33,465,345
Dec-17	\$1,000,579	\$54,293	\$37,983	\$0	\$1,092,855	\$34,558,200
Jan-18	\$998,187	\$54,293	\$106,686	\$0	\$1,159,167	\$35,717,367
Feb-18	\$901,611	\$49,039	\$96,117	\$0	\$1,046,767	\$36,764,134
Mar-18	\$795,867	\$54,220	\$139,437	\$0	\$989,525	\$37,753,659
Apr-18	\$766,897	\$52,542	\$127,736	\$0	\$947,175	\$38,700,835
May-18	\$640,878	\$54,293	\$201,847	\$0	\$897,018	\$39,597,853
Jun-18	\$539,246	\$52,542	\$180,083	\$0	\$771,871	\$40,369,724
Jul-18	\$836,297	\$54,293	\$135,488	\$0	\$1,026,078	\$41,395,802
Aug-18	\$952,024	\$54,293	\$71,896	\$0	\$1,078,214	\$42,474,016
Sep-18	\$948,824	\$52,542	\$9,594	\$0	\$1,010,960	\$43,484,976

TABLE 6 - BPA's Net Benefit after Adjustments – Amendment (continued)**BPA's Adjusted Net Revenue or (Cost)**

Month	Net Revenue or (Cost) (A) Month (\$)	Value of Reserves (B) Month (\$)	Avoided Tx Costs (C) Month (\$)	Demand Shift (D) Month (\$)	A + B + C + D Month (\$)	Cumulative Total Contract-to-Date (\$)
Oct-18	\$814,424	\$54,293	\$12,647	\$0	\$881,364	\$44,366,340
Nov-18	\$853,007	\$52,615	\$47,085	\$0	\$952,707	\$45,319,047
Dec-18	\$902,347	\$54,293	\$38,559	\$0	\$995,199	\$46,314,246
Jan-19	\$856,224	\$54,293	\$105,578	\$0	\$1,016,096	\$47,330,341
Feb-19	\$799,517	\$49,039	\$95,351	\$0	\$943,907	\$48,274,248
Mar-19	\$696,951	\$54,220	\$138,305	\$0	\$889,476	\$49,163,724
Apr-19	\$667,627	\$52,542	\$127,490	\$0	\$847,658	\$50,011,383
May-19	\$590,205	\$54,293	\$194,750	\$0	\$839,248	\$50,850,631
Jun-19	\$519,489	\$52,542	\$168,373	\$0	\$740,403	\$51,591,034
Jul-19	\$737,329	\$54,293	\$133,212	\$0	\$924,835	\$52,515,869
Aug-19	\$827,181	\$54,293	\$72,366	\$0	\$953,840	\$53,469,710
Sep-19	\$819,799	\$52,542	\$9,205	\$0	\$881,546	\$54,351,255
Oct-19	\$551,401	\$54,293	\$12,486	\$0	\$618,180	\$54,969,435
Nov-19	\$573,453	\$52,615	\$53,741	\$0	\$679,809	\$55,649,245
Dec-19	\$624,536	\$54,293	\$42,021	\$0	\$720,851	\$56,370,095
Jan-20	\$612,742	\$54,293	\$112,591	\$0	\$779,627	\$57,149,722
Feb-20	\$549,056	\$50,791	\$109,007	\$0	\$708,854	\$57,858,576
Mar-20	\$489,641	\$54,220	\$144,497	\$0	\$688,358	\$58,546,934
Apr-20	\$469,843	\$52,542	\$133,020	\$0	\$655,406	\$59,202,339
May-20	\$387,512	\$54,293	\$208,766	\$0	\$650,572	\$59,852,911
Jun-20	\$323,148	\$52,542	\$185,882	\$0	\$561,573	\$60,414,484
Jul-20	\$516,124	\$54,293	\$140,631	\$0	\$711,049	\$61,125,533
Aug-20	\$578,092	\$54,293	\$74,190	\$0	\$706,575	\$61,832,108
Sep-20	\$594,258	\$52,542	\$9,829	\$0	\$656,628	\$62,488,736
Oct-20	\$491,489	\$54,293	\$12,651	\$0	\$558,434	\$63,047,170
Nov-20	\$502,918	\$52,615	\$51,050	\$0	\$606,583	\$63,653,753
Dec-20	\$526,092	\$54,293	\$40,879	\$0	\$621,265	\$64,275,017
Jan-21	\$536,257	\$54,293	\$110,308	\$0	\$700,859	\$64,975,876
Feb-21	\$482,029	\$49,039	\$99,518	\$0	\$630,587	\$65,606,463
Mar-21	\$437,234	\$54,220	\$143,221	\$0	\$634,676	\$66,241,139
Apr-21	\$426,013	\$52,542	\$132,431	\$0	\$610,985	\$66,852,124
May-21	\$345,222	\$54,293	\$201,171	\$0	\$600,686	\$67,452,810
Jun-21	\$319,058	\$52,542	\$174,279	\$0	\$545,879	\$67,998,689
Jul-21	\$477,502	\$54,293	\$134,303	\$0	\$666,099	\$68,664,788
Aug-21	\$527,126	\$54,293	\$70,977	\$0	\$652,396	\$69,317,185
Sep-21	\$534,959	\$52,542	\$8,285	\$0	\$595,786	\$69,912,971
Oct-21	\$399,236	\$54,293	\$11,226	\$0	\$464,756	\$70,377,727
Nov-21	\$397,837	\$52,615	\$48,409	\$0	\$498,861	\$70,876,588
Dec-21	\$414,817	\$54,293	\$37,871	\$0	\$506,981	\$71,383,569
Jan-22	\$423,086	\$54,293	\$109,219	\$0	\$586,598	\$71,970,167
Feb-22	\$381,531	\$49,039	\$98,970	\$0	\$529,540	\$72,499,707
Mar-22	\$341,887	\$54,220	\$143,058	\$0	\$539,165	\$73,038,872

TABLE 6 - BPA's Net Benefit after Adjustments – Amendment (continued)**BPA's Adjusted Net Revenue or (Cost)**

Month	Net Revenue or (Cost) (A) Month (\$)	Value of Reserves (B) Month (\$)	Avoided Tx Costs (C) Month (\$)	Demand Shift (D) Month (\$)	A + B + C + D Month (\$)	Cumulative Total Contract-to-Date (\$)
Apr-22	\$327,684	\$52,542	\$132,491	\$0	\$512,716	\$73,551,589
May-22	\$270,438	\$54,293	\$211,108	\$0	\$535,839	\$74,087,428
Jun-22	\$218,203	\$52,542	\$186,477	\$0	\$457,222	\$74,544,649
Jul-22	\$367,305	\$54,293	\$139,257	\$0	\$560,856	\$75,105,505
Aug-22	\$419,534	\$54,293	\$72,216	\$0	\$546,043	\$75,651,548
Sep-22	\$422,621	\$52,542	\$8,754	\$0	\$483,918	\$76,135,466

TABLE 7 – Usage and Rates - Termination**Alcoa Intalco Usage****Projected IP Rates**

Month	Demand (kW)	HLH (MWh)	LLH (MWh)	Demand (\$/kW)	HLH (\$/MWh)	LLH (\$/MWh)
Apr-15	300,000	124,800	91,200	\$0	\$35.89	\$30.25
May-15	300,000	120,000	103,200	\$0	\$31.13	\$23.21
Jun-15	300,000	124,800	91,200	\$0	\$32.86	\$24.70
Jul-15	300,000	124,800	98,400	\$0	\$40.62	\$34.63
Aug-15	300,000	124,800	98,400	\$0	\$44.09	\$37.22
Sep-15	300,000	120,000	96,000	\$0	\$43.78	\$38.03
Oct-15	300,000	129,600	93,600	\$0	\$46.85	\$40.56
Nov-15	300,000	115,200	101,100	\$0	\$49.98	\$42.85
Dec-15	300,000	124,800	98,400	\$0	\$52.28	\$44.62
Jan-16	300,000	120,000	103,200	\$0	\$50.93	\$40.14
Feb-16	300,000	120,000	88,800	\$0	\$49.73	\$41.21
Mar-16	300,000	129,600	93,300	\$0	\$42.68	\$36.35

TABLE 8 – BPA's Projected Revenue - Termination**Revenues by Rate Determinant****Projected IP Revenue**

Month	Demand (\$)	HLH (\$)	LLH (\$)	Month (\$)	Cumulative Total Contract- to-Date (\$)
Apr-15	\$0	\$4,479,072	\$2,758,800	\$7,237,872	\$7,237,872
May-15	\$0	\$3,735,600	\$2,395,272	\$6,130,872	\$13,368,744
Jun-15	\$0	\$4,100,928	\$2,252,640	\$6,353,568	\$19,722,312
Jul-15	\$0	\$5,069,376	\$3,407,592	\$8,476,968	\$28,199,280
Aug-15	\$0	\$5,502,432	\$3,662,448	\$9,164,880	\$37,364,160
Sep-15	\$0	\$5,253,600	\$3,650,880	\$8,904,480	\$46,268,640
Oct-15	\$0	\$6,071,127	\$3,796,497	\$9,867,624	\$56,136,264
Nov-15	\$0	\$5,757,331	\$4,332,104	\$10,089,435	\$66,225,699
Dec-15	\$0	\$6,524,885	\$4,390,753	\$10,915,638	\$77,141,338
Jan-16	\$0	\$6,111,459	\$4,142,219	\$10,253,678	\$87,395,016
Feb-16	\$0	\$5,967,063	\$3,659,518	\$9,626,581	\$97,021,597
Mar-16	\$0	\$5,531,271	\$3,391,167	\$8,922,438	\$105,944,034

TABLE 9 – BPA’s Forecasted Revenues Obtained from the Market - Termination

Month	Forecasted Market Price		Forecasted Revenues Obtained from the Market			
	HLH Price (\$/MWh)	LLH Price (\$/MWh)	HLH (\$)	LLH (\$)	Month (\$) (HLH + LLH)	Cumulative Total Contract-to-Date (\$)
Apr-15	\$23.83	\$19.46	\$2,974,284	\$1,775,123	\$4,749,407	\$4,749,407
May-15	\$21.31	\$15.70	\$2,556,728	\$1,620,287	\$4,177,014	\$8,926,422
Jun-15	\$22.10	\$15.40	\$2,758,061	\$1,404,668	\$4,162,729	\$13,089,151
Jul-15	\$27.52	\$20.72	\$3,434,396	\$2,038,511	\$5,472,907	\$18,562,058
Aug-15	\$31.35	\$24.06	\$3,912,296	\$2,367,807	\$6,280,103	\$24,842,161
Sep-15	\$32.06	\$25.38	\$3,847,233	\$2,436,751	\$6,283,984	\$31,126,145
Oct-15	\$27.96	\$24.21	\$3,623,562	\$2,265,945	\$5,889,507	\$37,015,652
Nov-15	\$29.83	\$25.57	\$3,436,272	\$2,585,623	\$6,021,895	\$43,037,547
Dec-15	\$31.21	\$26.63	\$3,894,388	\$2,620,628	\$6,515,016	\$49,552,563
Jan-16	\$30.40	\$23.96	\$3,647,634	\$2,472,290	\$6,119,924	\$55,672,487
Feb-16	\$29.68	\$24.60	\$3,561,451	\$2,184,189	\$5,745,640	\$61,418,127
Mar-16	\$25.47	\$21.69	\$3,301,348	\$2,024,023	\$5,325,371	\$66,743,498

TABLE 10 – BPA’s Net Benefit Before Adjustment - Termination

Month	Month (\$)	Cumulative Total Contract-to-Date (\$)
Apr-15	\$2,488,465	\$2,488,465
May-15	\$1,953,858	\$4,442,322
Jun-15	\$2,190,839	\$6,633,161
Jul-15	\$3,004,061	\$9,637,222
Aug-15	\$2,884,777	\$12,521,999
Sep-15	\$2,620,496	\$15,142,495
Oct-15	\$3,978,117	\$19,120,612
Nov-15	\$4,067,540	\$23,188,152
Dec-15	\$4,400,622	\$27,588,775
Jan-16	\$4,133,754	\$31,722,529
Feb-16	\$3,880,941	\$35,603,470
Mar-16	\$3,597,067	\$39,200,537

TABLES 11a and 11b - BPA's Net Benefit - Termination

TABLE 11a - BPA's Net Benefit

<u>Adjustments</u>		
Value of Reserves		
Month	Month (\$)	Cumulative Total Contract-to-Date (\$)
Apr-15	\$210,600	\$210,600
May-15	\$217,620	\$428,220
Jun-15	\$210,600	\$638,820
Jul-15	\$217,620	\$856,440
Aug-15	\$217,620	\$1,074,060
Sep-15	\$210,600	\$1,284,660
Oct-15	\$215,611	\$1,500,271
Nov-15	\$208,946	\$1,709,217
Dec-15	\$215,611	\$1,924,828
Jan-16	\$215,611	\$2,140,439
Feb-16	\$201,701	\$2,342,140
Mar-16	\$215,321	\$2,557,462

TABLE 11b - BPA's Net Benefit

<u>Adjustments</u>		
Avoided Tx and Ancillary Service Costs		
Month	Month (\$)	Cumulative Total Contract-to-Date (\$)
Apr-15	\$564,390	\$564,390
May-15	\$686,640	\$1,251,030
Jun-15	\$623,192	\$1,874,222
Jul-15	\$454,828	\$2,329,050
Aug-15	\$85,347	\$2,414,397
Sep-15	\$42,286	\$2,456,683
Oct-15	\$39,792	\$2,496,475
Nov-15	\$146,326	\$2,642,802
Dec-15	\$118,541	\$2,761,343
Jan-16	\$358,584	\$3,119,927
Feb-16	\$349,476	\$3,469,403
Mar-16	\$440,992	\$3,910,395

TABLE 12 – BPA's Net Benefit after Adjustments - Termination

BPA's Adjusted Net Revenue or (Cost)

Month	Net Revenue or (Cost) (A) Month (\$)	Value of Reserves (B) Month (\$)	Avoided Tx Costs (C) Month (\$)	Demand Shift (D) Month (\$)	A + B + C + D Month (\$)	Cumulative Total Contract-to-Date (\$)
Apr-15	\$2,488,465	\$210,600	\$564,390	\$0	\$3,263,455	\$3,263,455
May-15	\$1,953,858	\$217,620	\$686,640	\$0	\$2,858,118	\$6,121,573
Jun-15	\$2,190,839	\$210,600	\$623,192	\$0	\$3,024,630	\$9,146,203
Jul-15	\$3,004,061	\$217,620	\$454,828	\$0	\$3,676,509	\$12,822,712
Aug-15	\$2,884,777	\$217,620	\$85,347	\$0	\$3,187,744	\$16,010,455
Sep-15	\$2,620,496	\$210,600	\$42,286	\$0	\$2,873,383	\$18,883,838
Oct-15	\$3,978,117	\$215,611	\$39,792	\$0	\$4,233,521	\$23,117,359
Nov-15	\$4,067,540	\$208,946	\$146,326	\$0	\$4,422,812	\$27,540,171
Dec-15	\$4,400,622	\$215,611	\$118,541	\$0	\$4,734,775	\$32,274,945
Jan-16	\$4,133,754	\$215,611	\$358,584	\$0	\$4,707,950	\$36,982,895
Feb-16	\$3,880,941	\$201,701	\$349,476	\$0	\$4,432,118	\$41,415,013
Mar-16	\$3,597,067	\$215,321	\$440,992	\$0	\$4,253,381	\$45,668,394

Table 13 – Nominal and Net Present Value Net Benefits at Discount Rates of 4%, 8%, and 12% for the Amendment Scenario and Termination Scenario

Annual Discount Rate 4.00%			Annual Discount Rate 8.00%			Annual Discount Rate 12.00%		
<u>Amendment Scenario</u>			<u>Amendment Scenario</u>			<u>Amendment Scenario</u>		
<u>NPV For 75 MW IP Sale to ALCOA</u>			<u>NPV For 75 MW IP Sale to ALCOA</u>			<u>NPV For 75 MW IP Sale to ALCOA</u>		
<u>Thru Sept 2022</u>			<u>Thru Sept 2022</u>			<u>Thru Sept 2022</u>		
	Net Benefits	Net Benefits		Net Benefits	Net Benefits		Net Benefits	Net Benefits
	IP-Mkt	Total		IP-Mkt	Total		IP-Mkt	Total
Undiscounted Total	\$62,066,532	\$76,135,466	Undiscounted Total	\$62,066,532	\$76,135,466	Undiscounted Total	\$62,066,532	\$76,135,466
NPV @ Discount Rate	\$54,890,422	\$67,078,313	NPV @ Discount Rate	\$48,874,905	\$59,523,981	NPV @ Discount Rate	\$43,802,440	\$53,185,243
<u>Termination Scenario</u>			<u>Termination Scenario</u>			<u>Termination Scenario</u>		
<u>NPV For 300 MW IP Sale to ALCOA</u>			<u>NPV For 300 MW IP Sale to ALCOA</u>			<u>NPV For 300 MW IP Sale to ALCOA (12</u>		
<u>(12 Months)</u>			<u>(12 Months)</u>			<u>Months)</u>		
	Net Benefits	Net Benefits		Net Benefits	Net Benefits		Net Benefits	Net Benefits
	IP-Mkt	Total		IP-Mkt	Total		IP-Mkt	Total
Undiscounted Total	\$39,200,537	\$45,668,394	Undiscounted Total	\$39,200,537	\$45,668,394	Undiscounted Total	\$39,200,537	\$45,668,394
NPV @ Discount Rate	\$38,274,507	\$44,617,247	NPV @ Discount Rate	\$37,377,786	\$43,599,241	NPV @ Discount Rate	\$36,509,286	\$42,613,143
<u>Delta Analysis</u>			<u>Delta Analysis</u>			<u>Delta Analysis</u>		
	Net Benefits	Net Benefits		Net Benefits	Net Benefits		Net Benefits	Net Benefits
	IP-Mkt	Total		IP-Mkt	Total		IP-Mkt	Total
Undiscounted Delta	\$22,865,996	\$30,467,073	Undiscounted Delta	\$22,865,996	\$30,467,073	Undiscounted Delta	\$22,865,996	\$30,467,073
NPV Delta	\$16,615,914	\$22,461,066	NPV Delta	\$11,497,119	\$15,924,740	NPV Delta	\$7,293,154	\$10,572,100

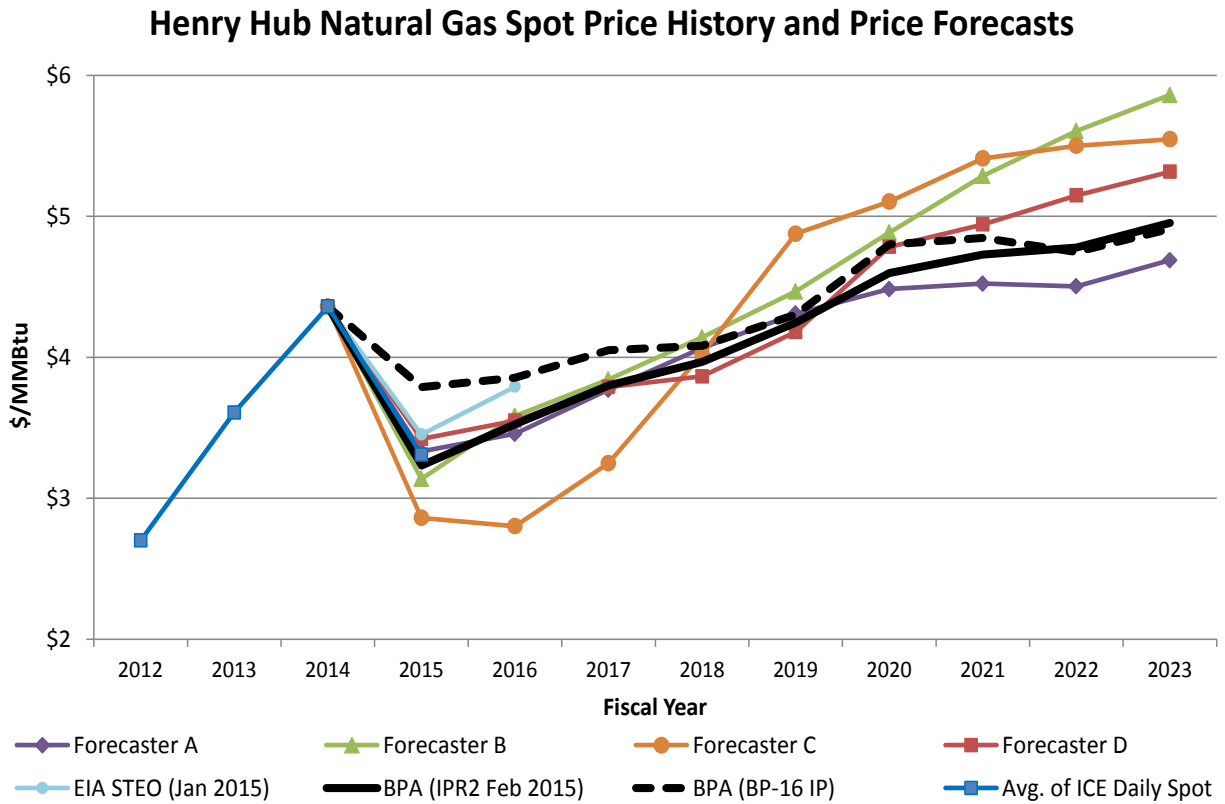
ATTACHMENT B GAS PRICE FORECAST

The gas price forecast component of BPA's electricity price forecast is important because natural gas price movements contribute to price movements in electric power markets in the Pacific Northwest, as a preponderance of the generating resources establishing marginal prices for electric power are fueled by natural gas. BPA's natural gas price forecast used in the BP-16 Initial Rate Proposal, the methodology for its development and its use as an input to BPA's electricity price forecasts, are outlined in section 2.3.1 of the Power Risk and Market Price Study. *See* BP-16-E-BPA-04 at 17. That natural gas price forecast was released December 10, 2014. BPA has updated its forecast of natural gas prices for use in this analysis of the Agreement in FY 2015 and all subsequent periods. BPA's updated natural gas price forecast was completed in early February 2015, during BPA's Integrated Program Review 2.

BPA has compared its updated forecast of spot market natural gas prices at the Henry Hub to the recent forecasts produced by other forecasters in the industry. The comparison, shown in Gas Price Forecast - Figure 1 below, includes a history of the Henry Hub spot prices – as opposed to the more frequently referenced NYMEX (now CME Group) forward market for Henry Hub natural gas prices – BPA's forecast of natural gas prices from the BP-16 Initial Rate Proposal, and other forecasters' views of the future. The forecasters, in alphabetical order, typically included in our comparisons are: Bentek Energy LLC, the United States Department of Energy's Energy Information Administration (EIA), IHS Inc., PIRA Energy Group, and Wood Mackenzie. With the exception of the EIA, each of these forecasters considers their information to be proprietary. The vintage of these forecasts varies between October 2014 and January 2015. The historical observations reflect the monthly average of the daily spot market prices for natural gas at the Henry Hub quoted on the Intercontinental Exchange (ICE) for the months from October 2011 through March 2015.

Gas Price Forecast - Figure 1 demonstrates that recent spot market prices for natural gas at the Henry Hub have been less than \$4 per MMBtu on an annual average basis in FY 2012, FY 2013, and in FY 2015 through March 31, 2015. This illustration also demonstrates that the forecasts of five other industry experts are between \$2.86 per MMBtu and \$3.45 per MMBtu for FY 2015 – the starting fiscal years of BPA's evaluation of equivalent benefits for the Agreement – and the forecasts of all five of the other industry forecasters remain lower than \$5 per MMBtu through at least FY 2019. BPA's updated forecast of spot prices for natural gas at the Henry Hub is consistent with the views reflected by these five industry experts. As a result, BPA believes its updated natural gas price forecast is reasonable compared to a recent history of monthly average Henry Hub spot prices for natural gas and compared to the expectations of other industry experts. Gas Price Forecast - Figure 1 also depicts the extent to which BPA's updated natural gas price forecast has progressed downward since the BP-16 Initial Rate Proposal.

Gas Price Forecast - Figure 1 Henry Hub Natural Gas Spot Price Forecast



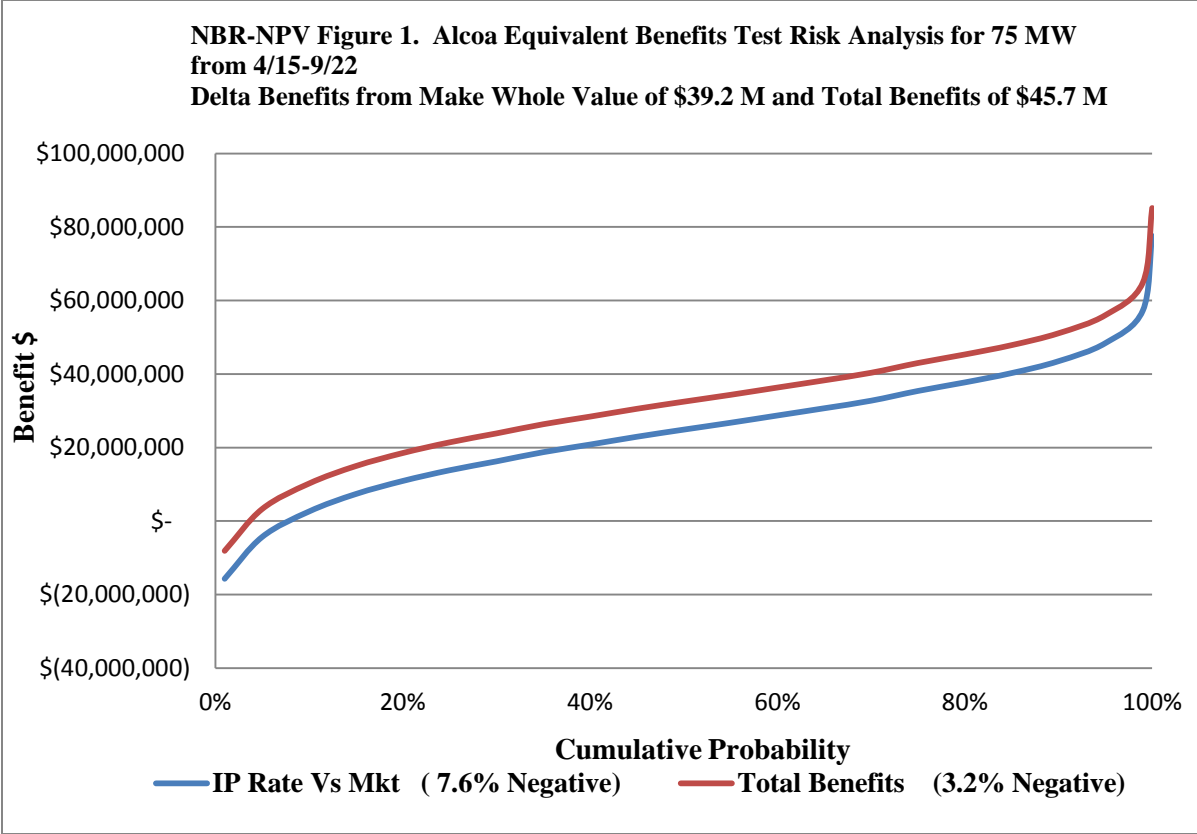
ATTACHMENT C
NET BENEFIT RISK ANALYSIS AND NET PRESENT VALUE (NBR-NPV) SCENARIO
ANALYSIS.

BPA performed a net benefit risk analysis over the duration of the amended contract (from April 1, 2015 thru September 30, 2022) to evaluate the probability that the \$39,200,537 make whole value¹¹ (IP rate revenues minus spot market electricity revenues) would not be recovered under the amended contract. It also did the same analysis for total benefits of \$45,668,394. These analyses were performed based on using the monthly spot market electricity prices simulated by AURORA for 3200 iterations through FY 2022. The results indicate there is a 7.6% probability that the \$39,200,537 will be under recovered due to spot market electricity prices being higher than the IP rates. The results also indicate there is a 3.2% probability that the total benefits of \$45,668,394 will be under recovered. *See* NBR-NPV Figure 1.

The Agreement allows Alcoa to terminate the contract with one year notice. Therefore there is a possibility that Alcoa might terminate the Agreement in the future. For that reason, BPA analyzed the nominal and net present value impacts of a termination at various points in time, using different discount rates. The net present value scenario analysis shows the net present values of Alcoa terminating the amended 75 MW contract at various durations in time for discount rates of 4%, 8%, and 12%. Overall relative to the 300 MW termination case, the results indicate modest annual reductions in net present values through the first 3-4 years (depending on the discount rate) and moderate increases in net present values in years 5 through the contract expiration on September 30, 2022. *See* NBR-NPV Table 1.

¹¹ The Make Whole Payment is defined in the Amendment and is intended to place BPA in the same economic position that would have occurred had Alcoa's termination notice, dated March 31, 2015, remained in effect.

ATTACHMENT C
NET BENEFIT RISK ANALYSIS AND NET PRESENT VALUE SCENARIO ANALYSIS



NBR-NPV Table 1 Net Present Value Analysis (\$M)

	Termination Scenario	Amendment Scenario at Different Termination Dates							
		3/31/2016	3/31/2017	3/31/2018	3/31/2019	3/31/2020	3/31/2021	3/31/2022	9/30/2022
<u>Nominal Values</u>									
IP Minus Market	\$39.2	\$39.2	\$39.2	\$39.2	\$41.6	\$49.2	\$55.1	\$60.0	\$62.1
Total Net Benefits	\$45.7	\$41.5	\$43.2	\$44.9	\$49.2	\$58.5	\$66.2	\$73.0	\$76.1
<u>4% Discount Rate</u>									
IP Minus Market	\$38.3	\$37.8	\$37.0	\$36.5	\$38.5	\$44.9	\$49.5	\$53.4	\$54.9
Total Net Benefits	\$44.6	\$40.0	\$40.8	\$42.0	\$45.5	\$53.4	\$59.5	\$64.8	\$67.1
<u>8% Discount Rate</u>									
IP Minus Market	\$37.4	\$36.5	34.9	\$34.1	\$35.8	\$41.0	\$44.8	\$47.7	\$48.9
Total Net Benefits	\$43.6	\$38.6	38.6	\$39.3	\$42.3	\$48.8	\$53.8	\$57.8	\$59.5
<u>12% Discount Rate</u>									
IP Minus Market	\$36.5	\$35.2	\$33.0	\$31.9	\$33.2	\$37.7	\$40.7	\$43.0	\$43.8
Total Net Benefits	\$42.6	\$37.3	\$36.6	\$36.8	\$39.3	\$44.8	\$48.8	\$51.9	\$53.2