

**NEEDS FOR AND  
ALTERNATIVES TO (NFAT)  
REVIEW OF MANITOBA  
HYDRO'S PROPOSAL FOR THE  
KEYYASK AND CONAWAPA  
GENERATING STATIONS**

***PUBLIC VERSION***

*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*

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Technical Appendix 7B

Export Contracts

February 28, 2014

## Technical Appendix 7B: Export Contracts

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## Acronyms

### Technical Appendix 7B

CSI	Commercially Sensitive Information
DA	Day-Ahead
GRE	Great River Energy
GS	Generating Station
HVDC	High Voltage Direct Current
LCA	La Capra Associates
LMP	Locational Marginal Price
MH	Manitoba Hydro
MHEB	Manitoba Hydro Electric Board
MISO	Midcontinent Independent System Operator
MP	Minnesota Power
MW	Megawatt
NFAT	Needs For and Alternatives To
NSP	Northern States Power
PDP	Preferred Development Plan
REC	Renewable Energy Certificate
RPS	Renewable Portfolio Standard
SOW	Scope of Work
US	United States
WPS	Wisconsin Public Service Corporation

## I. Introduction to Export Contracts (Part B)

### A. Scope

La Capra Associates (LCA) has prepared this second part of Technical Appendix 7 to address the remaining elements of our Need for and Alternatives To (NFAT) Scope of Work (LCA SOW), the issues primarily related to anticipated contract revenues calculated by applying the terms of the agreements as written.<sup>1</sup> Contract modeling, volumes, pricing, transmission and related issues will be covered. This report addresses the following topics:

- Firm energy commitments
- Firm energy pricing
- Peak demand opportunity market sales
- Off-peak period opportunity market sales
- Revenue projections and variances from NFAT Submission
- Transmission requirements and access

The material contained in this second part of the Technical Appendix relies on the NFAT Submission, discovery responses from Manitoba Hydro (MH) provided in time to be analyzed for incorporation, as well as information contained in other LCA Technical Appendices, including Technical Appendix 7 (Part A): Export Contracts,<sup>2</sup> Technical Appendix 6: Export Markets, and Technical Appendix 8: Transmission. As noted in Part A, this Appendix also relies on a review of executed power contracts and terms sheets provided by MH on a confidential basis pursuant to a collateral settlement

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<sup>1</sup> This report is not intended to provide, or be relied upon as, a legal opinion regarding the power contracts themselves, and instead reviews the agreements from the perspective of a power planner for commercially reasonable structure and contract features.

<sup>2</sup> Part A of this Technical Appendix included an overview of MH's contracting practices, a narrative description of the power contracts themselves, and a review and assessment of several important contract features.

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agreement created in a separate proceeding.<sup>3</sup> There are several agreements including term sheets that have been reviewed, including those between MH and counter parties Wisconsin Public Service (WPS), Northern States Power (NSP), Minnesota Power (MP) and Great River Energy (GRE). These are collectively referred to as the power contracts in this Appendix. These agreements are identified as follows for both Parts A and B of this Technical Appendix:

Number	Counter Party	Type of Agreement	CSI Reference <sup>4</sup>
1	Wisconsin Public Service	Term Sheet for Energy and Capacity	Vol.1, Tab 1
2	Northern States Power	375/325 MW System Power	Vol.1, Tab 2
3	Northern States Power	350 MW Diversity Sale	Vol.1, Tab 3
4	Northern States Power	125 MW System Power	Vol.1, Tab 4
5	Wisconsin Public Service	100 MW System Power Sale	Vol.2, Tab 5
6	Wisconsin Public Service	108 MW Energy Sale	Vol.2, Tab 6
7	Minnesota Power	250 MW System Power Sale	Vol.2, Tab 7
8	Minnesota Power	Energy Exchange Agreement	Vol.2, Tab 8
9	Great River Energy	Term Sheet for Energy and Capacity	Vol.2, Tab 9
10	Minnesota Power	Term Sheet for Energy and Capacity	Vol.2, Tab 10

**Figure 7-12: Power Contracts Chart**

MH included a summary of the terms and conditions of the contracts in Appendix 6.1. MH provided the contracts as CSI under a protective agreement and did not file actual copies of the power contracts with the NFAT Submission itself.

While the NFAT Submission provides general descriptions of the contracts associated with the Preferred Development Plan, the agreements themselves have been deemed confidential, including the pricing terms reviewed in this report. As a result, a significant portion of this Technical Appendix will be provided on a confidential basis.

<sup>3</sup> These agreements were provided in two volumes and entitled “Manitoba Hydro Export Contracts and Terms Sheets” and were provided as Trade Secret and Confidential Information. Negotiations on term sheet agreements, and with potential other purchasers, may be ongoing and could have resulted in final power contracts following the filing of the NFAT Submission.

<sup>4</sup> The volumes and tab numbers correspond to those used in the binders of contracts MH provided.



## II. Contract Revenue

### A. Terms Regarding Firm Energy, Capacity and Pricing

The power contracts reviewed included detailed descriptions of the features, quantities and pricing for both capacity and energy, and in some cases related power products.<sup>5</sup> LCA developed projections of the revenues by contract using the energy and capacity quantities and pricing provisions specified in the contracts.

For the most part, the contracts contained fixed, formulaic pricing for firm energy exports, while “additional” or “opportunity” energy sales (non-firm, sales more broadly referred to as “supplemental” energy sales<sup>6</sup>) [REDACTED] [REDACTED]<sup>7</sup>. LCA’s projects contract revenues using forecasts of DA MHEB LMP.

[REDACTED] are transacted,<sup>9</sup> but there is not a specific price set for this product in most contracts. Instead, the power contracts either expressly or by implication roll the [REDACTED] into the energy price for sales.

Generally, the approach to pricing firm energy and capacity starts with a fixed initial nominal price in \$/MWh, or \$/MW-month for capacity, defined in the contract for the

<sup>5</sup> See for example [REDACTED]  
[REDACTED]

<sup>6</sup> For the purposes of this analysis, opportunity and additional energy as defined in the contracts will be referred to as “Supplemental” energy. Refer to Technical Appendix 6 for a detailed discussion on “opportunity” sales.

<sup>7</sup> [REDACTED]

<sup>8</sup> Delivery Point is defined in the power contracts as the point or points where MH’s major transmission facilities cross the international boundary between the Province of Manitoba and the United States of America, which is the MHEB node.

<sup>9</sup> Refer to Technical Appendix 7 Part A, pp. 7A-22 to 7A-27.

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first year. Firm energy and capacity prices are then escalated by a pre-determined factor<sup>10</sup> as defined in the contract.

[REDACTED]

[REDACTED] are used to constrain energy prices (those subject to [REDACTED]

[REDACTED] as defined in each contract, where

applicable. LCA represented the [REDACTED] in our modelling of the contract revenues. There was variation between the different agreements and products covered.

The pricing terms can be located here by agreement:

Number	Contract	Energy Pricing Reference	Capacity Pricing Reference
1	WPS Term Sheet Energy and Capacity	Vol.1, Tab 1, page 6-7	Vol.1, Tab 1, page 5
2	NSP 375/325 System Power	Vol.1, Tab 2, page 50-54	Vol.1, Tab 2, pages 47-49
3	NSP 350 Diversity Sale	Vol.1, Tab 3, pages 54-62	Vol.1, Tab 3, page 54
4	NSP 125 MW System Power	Vol.1, Tab 4, pages 48-52	Vol.1, Tab 4, pages 45-47
5	WPS 100 MW System Power Sale	Vol.2, Tab 5, pages 58-60	Vol.2, Tab 5, pages 57-58
6	WPS 108 MW Energy Sale	Vol.2, Tab 6, pages 36-37	Vol.2, Tab 6, N/A
7	MP 250 MW System Power Sale	Vol.2, Tab 7, pages 51-55	Vol.2, Tab 7, pages 50-51
8	MP Energy Exchange Agreement	Vol.2, Tab 8, pages 34-35	Vol.2, Tab 8, N/A
9	GRE Term Sheet for Energy and Capacity	Vol.2, Tab 9, N/A	Vol.2, Tab 9, N/A
10	MP Term Sheet for Energy and Capacity	Vol.2, Tab 10, pages 11-12	Vol.2, Tab 10, page 11

**Figure 7-13: References for Energy Pricing and Capacity Pricing Terms in Power Contracts**

A comprehensive overview of the energy pricing and capacity pricing for the power contracts listed in Figure 7-12, is provided in Attachments 1 and 2, respectively.

For example, the [REDACTED] in Figure 7-12, uses the following formula approach for various energy products:

<sup>10</sup> [REDACTED]

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Energy Product	Pricing
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]

**CONFIDENTIAL Figure 7-14: Energy Pricing Wisconsin Public Service 300 MW Term Sheet for Energy and Capacity**

Capacity provided a more homogenous product sale opportunity and there was less variation in the pricing approach between contracts. Below are some examples for three different contracts:

Agreement	Price	Note
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]

**CONFIDENTIAL Figure 7-15: Selected Capacity Pricing**

The exact pricing approach varied between each agreement. For a comprehensive description of the various energy pricing terms and capacity terms by contract, refer to Attachments 1 and 2, respectively. These tables provide a detailed, plain language roadmap to the products offered, including pricing, applicable hours and quantities, along with explanatory notes. The terms summarized in these tables formed the basis for the modeling of contract revenues, as discussed later.

Part of the LCA SOW required a review of the contractual provisions for opportunity sales in the peak and off-peak hours. None of the agreements reviewed specifically addressed "opportunity sales,"<sup>11</sup> herein referred to as "supplemental sales." LCA reviewed the pricing of supplemental sales as part of our review of the contract pricing provisions.

## **B. Modeling of Contract Revenues - Assumptions**

To evaluate the benefits and revenues of the Preferred Development Plan along with the other generation alternative development plans presented in the NFAT, LCA prepared revenue projections for the power contracts listed in Figure 7-13. Each contract was reviewed for product specifications and associated volume, pricing, and other related terms using a 'bottom-up,' contract-by-contract approach. Potential revenue streams were modeled based on the energy and capacity volumes and quantities, and the contractual prices for those products.

Modeling the contracts required the use of specific assumptions (e.g., future [REDACTED], [REDACTED], market energy values, etc.). LCA's initial objective in modelling the contracts was to verify the revenue assumptions for these contracts used by MH in its

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<sup>11</sup> "Opportunity sales" is an undefined term in the power contracts. Please see Technical Appendix 6 - Export Markets, Section IV, Subsection A - "Types of Sales" for a detailed description of Opportunity Sales. The various power contracts used different terminology to define what we refer to herein as "supplemental sale" energy, such as: "Weekend Energy," "Supplemental Energy," and "Additional Energy." For our analysis, "Supplemental Energy" was assumed to be all peak and off-peak energy that is not guaranteed.

economic analysis. For this purpose, LCA modeled the contracts with assumptions similar to those used by MH.<sup>12</sup>

With these contract models, LCA also performed sensitivity analysis on the key drivers, including the track of [REDACTED] and spot market prices, to determine if MH's projections were reasonable.

[REDACTED]

Several of the power contracts, including the [REDACTED]

[REDACTED]

[REDACTED]<sup>13</sup> [REDACTED]

[REDACTED] The power contracts shown in CONFIDENTIAL Figure 7-16 and CONFIDENTIAL Figure 7-17 use [REDACTED], respectively. Pricing provisions for all contracts are summarized in Attachment 1.

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<sup>12</sup> Unfortunately, LCA was unable to reconcile our own projected energy quantities and revenues with those provided by MH, which is discussed in a later section. However, in order to try to replicate and reconcile MH's analysis of estimated revenue from the power contracts, LCA used MH's NFAT assumptions from Appendix 11.2 Reference Scenario.

<sup>13</sup> [REDACTED]

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Counterparty	Type of Agreement	Type of Energy	Hours	Energy Pricing
Wisconsin Public Service	300 MW System Participation Term Sheet	Guaranteed Peak Energy		
Wisconsin Public Service	100 MW System Power Sale	Weekday Energy		
Minnesota Power	250 MW System Power Sale	Weekday Energy		
		Weekend Energy		
Minnesota Power	50 MW Term Sheet for Energy and Capacity	Firm Energy		

**CONFIDENTIAL** Figure 7-16: Energy Pricing of Power Contracts with [REDACTED]

The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.

Counterparty	Type of Agreement	Capacity Pricing
Wisconsin Public Service	300 MW System Participation Term Sheet	[REDACTED]
Wisconsin Public Service	100 MW System Power Sale	
Minnesota Power	250 MW System Power Sale	
Minnesota Power	50 MW Term Sheet for Energy and Capacity	

CONFIDENTIAL Figure 7-17: Capacity Pricing of Power Contracts [REDACTED]

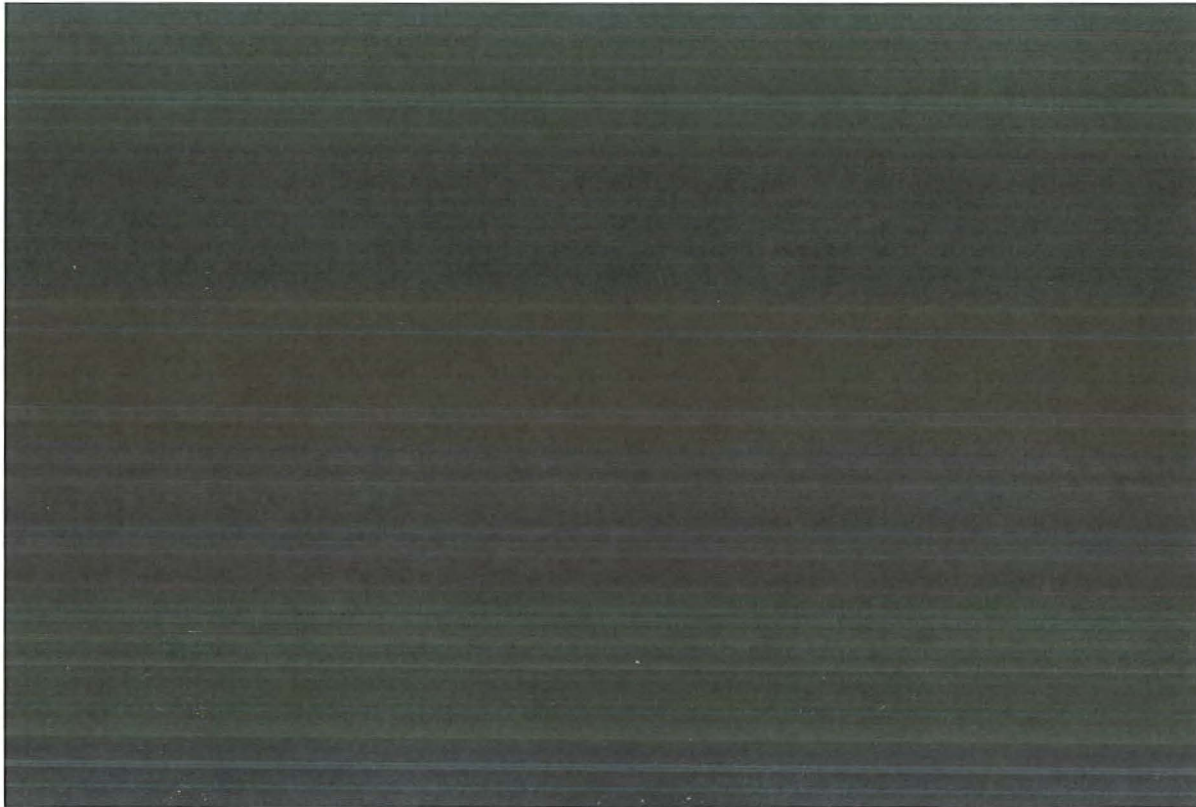
Values used for the [REDACTED] included both actual historical and a forecast of the index. Actual historical annual [REDACTED] values were utilized for the time period from calendar years 2005-2013.<sup>14</sup> Projections in MH's NFAT submission, Appendix 11.2, Reference Scenario Table contained annual [REDACTED] values for 2014 forward. The [REDACTED] used by MH in Appendix 11.2 is [REDACTED] annually for the majority of the time period covered by the contracts.<sup>15</sup>

CONFIDENTIAL Figure 7-18 below shows the historical and forecasted nominal [REDACTED] assumed in the power contract modeling.

<sup>14</sup> Id.

<sup>15</sup> For comparison, the U.S. Energy Information Administration (EIA) reference case projections for [REDACTED]. On this basis, MH's value is a more conservative basis for estimating future revenues than would result with the use of the EIA reference case value.

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**CONFIDENTIAL Figure 7-18: Nominal [REDACTED] 2005-2013 Actual Annual Rate & MH Forecast from 2014**

**Electricity Price Forecast**

As discussed in Technical Appendix 06 - Export Markets, MH retained five<sup>16</sup> independent consultants to provide a forecast of annual peak and off-peak MISO prices at the MINN Hub.<sup>17</sup> As explained by MH, the original 2012/2013 price forecast had to be adjusted for two primary reasons: a) by late 2012 it was apparent that the [REDACTED] [REDACTED] compared to the original forecast prepared in

<sup>16</sup> [REDACTED] Brattle Group, [REDACTED]

<sup>17</sup> Adjusted for congestion and losses between MINN Hub and the MHEB pricing node based on the results of historical price data, Appendix 9.3, p. 9.



early 2012, and b) the [REDACTED] forecast needed to be consistent with the [REDACTED] forecast, which had relied upon a different set of consultants.<sup>18</sup>

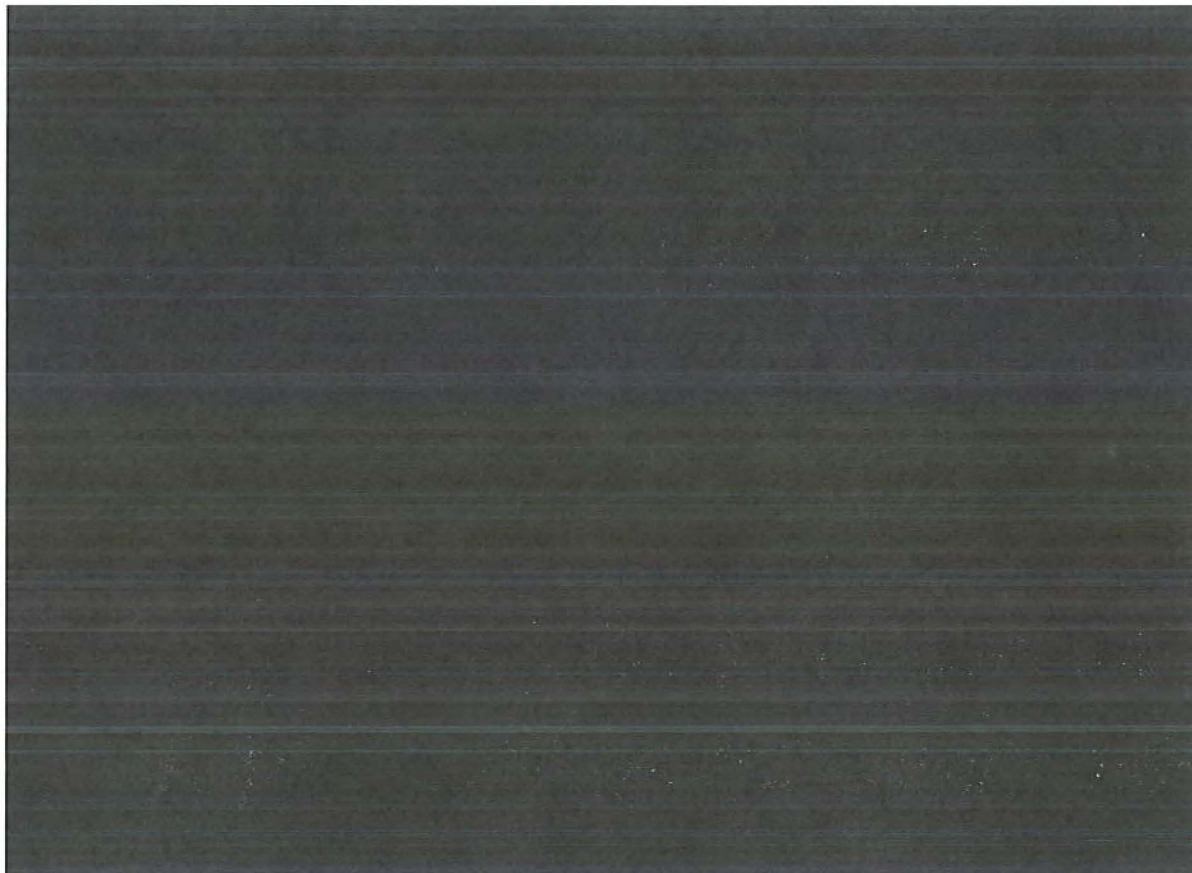
The 2012 Adjusted Energy Price Forecast<sup>19</sup> was used for the economic analysis presented in the NFAT Submission, with the exception of the 2013 update discussed in Chapter 12. For the analysis presented here, the 2012 Adjusted Energy Price Forecast has been used for projections of on-peak and off-peak electricity prices. In the power contract revenue projections LCA performed all [REDACTED] components priced at the [REDACTED] [REDACTED] assume corresponding on-peak and off-peak energy prices from the 2012 Adjusted Forecast. The 2012 Adjusted Energy Price Forecast for on-peak and off-peak price projections is shown in CONFIDENTIAL Figure 7-19 below.

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<sup>18</sup> SPS-007 NFAT Confidential Sept 24 2013 Price Forecast Process.

<sup>19</sup> For the adjustment see SP-010 2012 Adjusted Electricity Price Forecast.

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**CONFIDENTIAL Figure 7-19: 2012 Adjusted Electricity Price Forecast<sup>20</sup>**

**Natural Gas Price Forecast**

[REDACTED]
[REDACTED]

[REDACTED]. As defined in the contract:

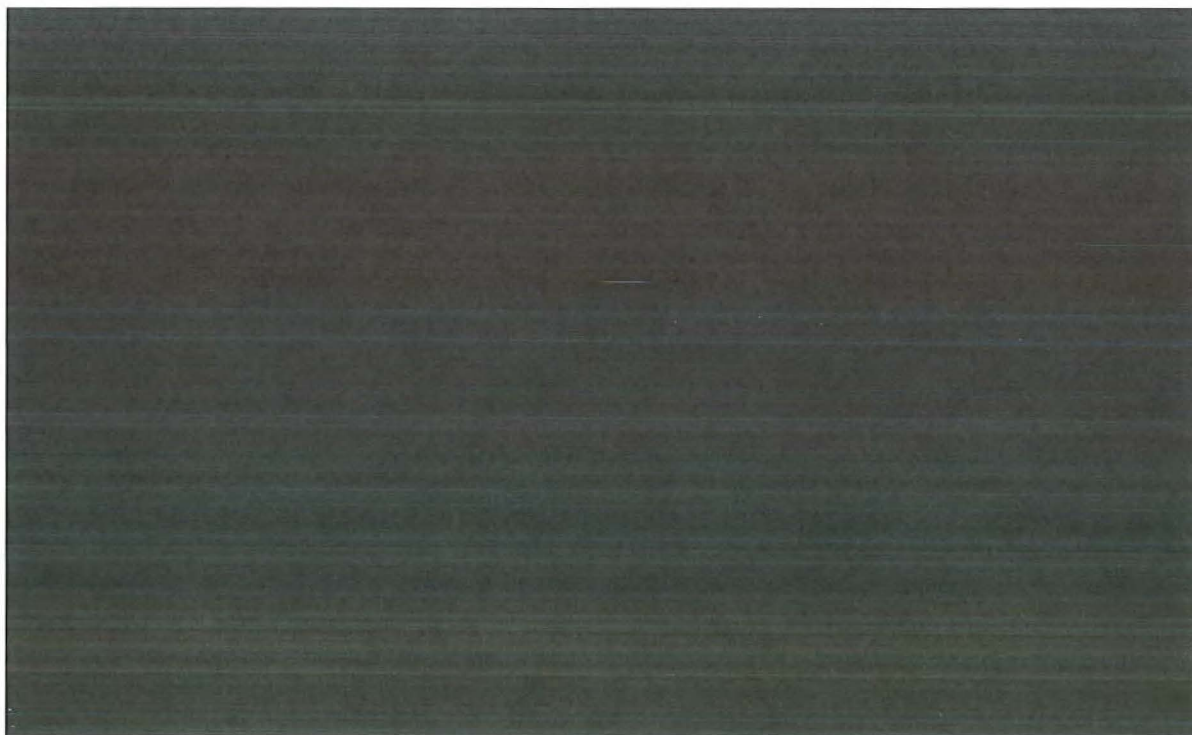
[REDACTED]

<sup>20</sup> Levelized cost over FY 2014 – FY 2048, is calculated using a 7.05% nominal discount rate assumed from Appendix 11.2 Reference Assumptions.

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<sup>21</sup> MP 250 MW System Power Sale Agreement, Vol. 2, Tab 7, p. 8. Provided under "Manitoba Hydro Export Contracts and Terms Sheets."  
<sup>22</sup> Adjusted to nominal dollars in LCA modeling.  
<sup>23</sup> [Redacted text]



**CONFIDENTIAL Figure 7-20: Nominal 2006 - 2012 Henry Hub Average Annual NG Price & MH Henry Hub NG Reference Forecast from 2013**

**SPLASH Export Contract Modeling**

As described in Technical Appendix 06, Part IV, MH models firm energy obligations associated with the energy contracts in its long-term planning model, SPLASH. [REDACTED]

[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED] 24
[REDACTED]	[REDACTED] 25
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED] 26
[REDACTED]	[REDACTED]

<sup>24</sup> MH revenues and volumes are shown in SP-131 NFAT Confidential - REVISED Economic Cash Flows Energy Exports V4.

<sup>25</sup> Provided as attachment to CONFIDENTIAL LCA/MH I-105, dated November 2013.

<sup>26</sup> Attachment to CONFIDENTIAL LCA/MH I-105, SPLASH User's Manual, p. 44.

The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.

[Redacted]

[Redacted]

### C. Projecting Energy Volumes and Revenues

LCA modeled each of the power contracts based on contractual energy volumes and pricing to project associated revenues. Firm energy along with supplemental energy were modeled, as defined in the contracts.

#### Firm Energy Commitments

MH provided<sup>27</sup> yearly cash flows showing aggregated projected energy volumes and associated aggregated revenues from energy exports for the 15 scenarios detailed in the NFAT Report.<sup>28</sup> The cash flows from all export sales are divided into the following categories and defined in Figure 7-21.

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<sup>27</sup> SP-131 NFAT Confidential – REVISED Economic Cash Flows Energy Exports V4 energy and revenue only.

<sup>28</sup> However, MH has yet to provide a detailed break-down, contract-by-contract, of volumes and revenues for firm and supplemental energy as defined in each contract, for each of the 15 cases. This data has been requested via LCA/MH I-228, LCA/MH I-27, and through teleconference with MH.

Category	Definition
<b>On-Peak Opportunity Exports</b>	On-Peak exports that are not long-term firm sales of dependable energy
<b>Off-Peak Opportunity Exports</b>	Off-Peak exports that are not long-term firm sales of dependable energy
<b>Non-Committed Firm Exports</b>	Sales of excess dependable hydro-electric energy assumed to be sold through long-term contracts but for which no contract or term sheet yet exists
<b>Existing Firm Exports</b>	Sales from long-term signed export contracts
<b>Term Sheet Firm Exports</b>	Sales from the WPS agreement still under negotiation

**Figure 7-21: SPLASH Model Export Revenue Output Categories**

For this analysis, the energy volumes and revenues LCA modeled from executed export contracts shown in Figure 7-12 can be compared to the data provided by MH in the “Existing Firm Exports” category. This comparison is provided in a later section.

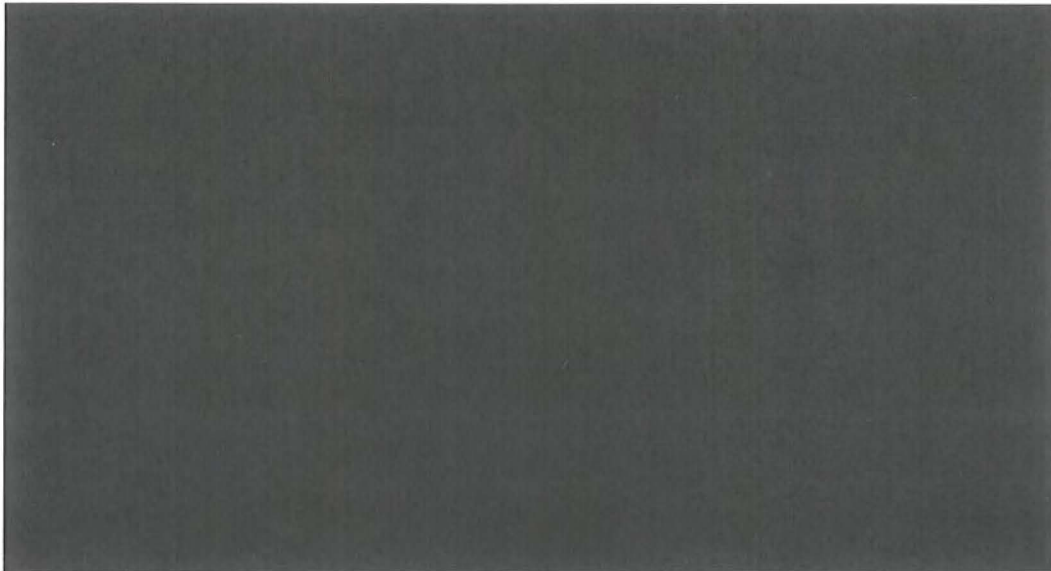
The various power contracts referenced different terminology to define “firm” energy, such as: “Firm Energy,” “Must Offer Energy,” “Weekday Energy,” “Fixed Price Energy,” or “Guaranteed Energy.” In this analysis, “firm” energy is taken to mean energy during peak and off-peak<sup>29</sup> periods [REDACTED]

The following figures display in graphical form the LCA projections of energy volumes and energy revenues for the different energy products for each contract or term sheet. Generally, on-peak volumes and energy prices are fixed, as defined in each contract, while supplemental energy can vary. In LCA’s projections of energy volumes and revenues, the maximum allowed under the contract for all supplemental energy was assumed. These energy volumes and revenues were modeled using, where possible, the same assumptions as MH, in order to provide a common means to reconcile energy volumes and revenue.<sup>30</sup>

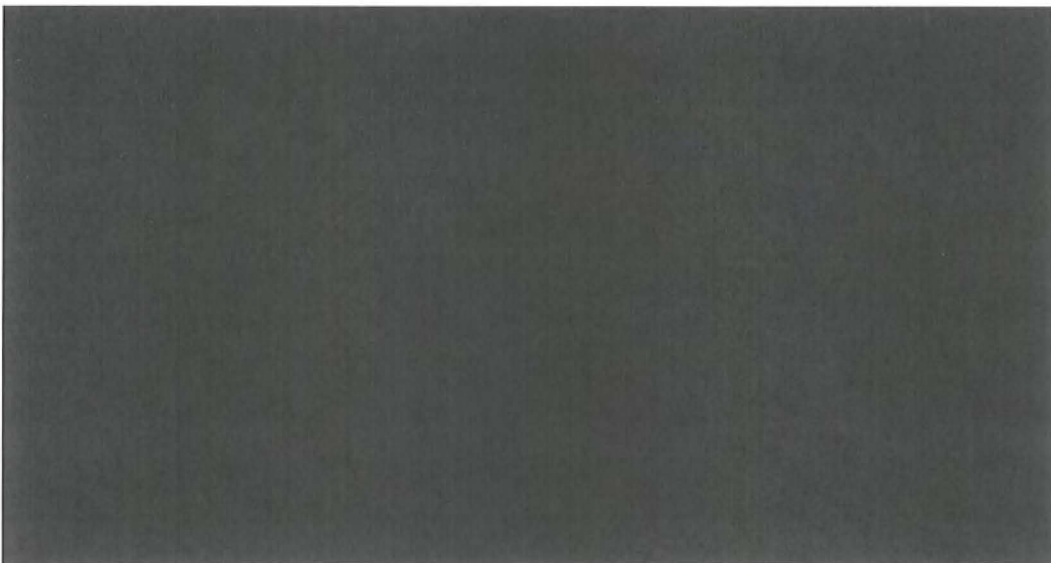
<sup>29</sup> Refer to the MP 250 MW System Power Agreement Vol. 2, Tab 7, Section 5.1, pp. 51-54.

<sup>30</sup> See footnote 17.

*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*



**CONFIDENTIAL Figure 7-22: WPS 300 MW System Participation Term Sheet Energy Volumes<sup>31</sup>**



**CONFIDENTIAL Figure 7-23: WPS 300 MW System Participation Term Sheet Energy Revenues<sup>32</sup>**

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<sup>31</sup> [Redacted]

*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*



**CONFIDENTIAL Figure 7-24: NSP 375/325 MW System Power Agreement Energy Volumes<sup>33</sup>**

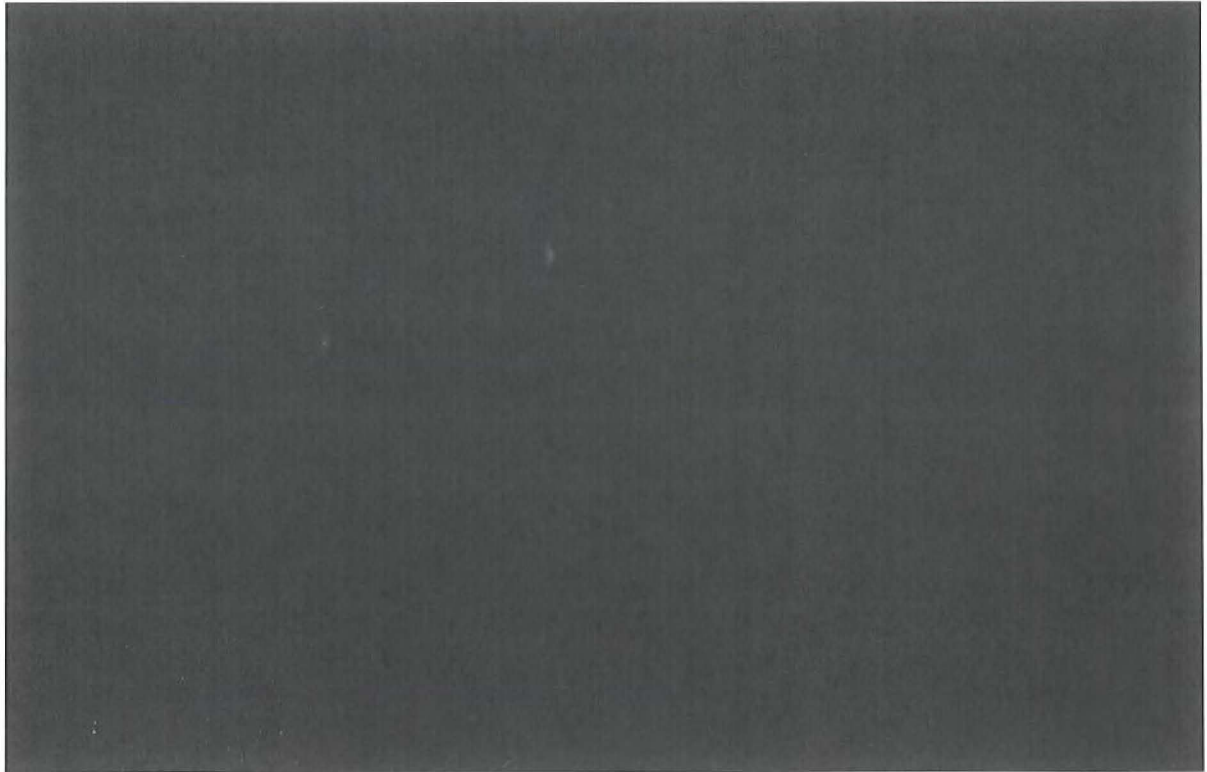
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32 [Redacted]

33 [Redacted]



*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*



**CONFIDENTIAL Figure 7-25: NSP 375/325 MW System Power Agreement Energy Revenues<sup>34</sup>**

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[Redacted footnote content]

*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*



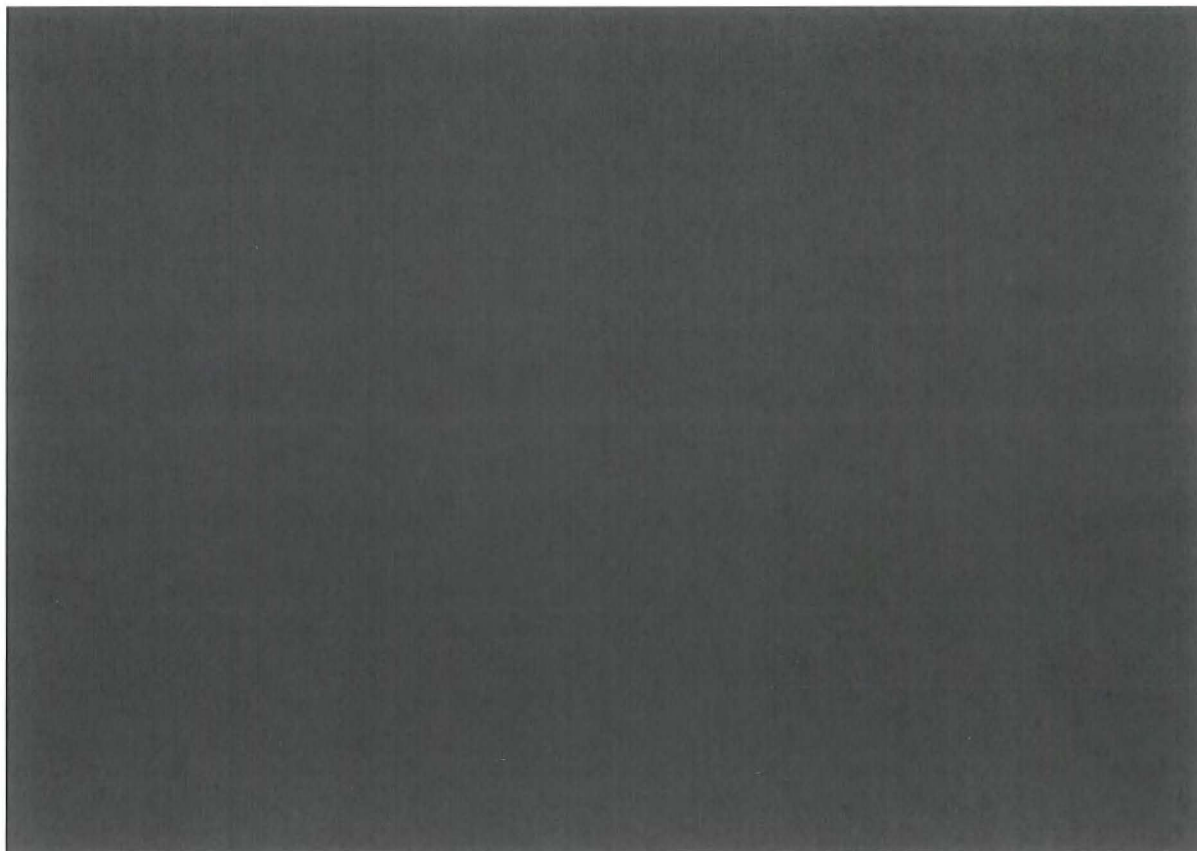
**CONFIDENTIAL Figure 7-26: NSP 350 MW Diversity Sale Energy Volumes<sup>35</sup>**

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*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*



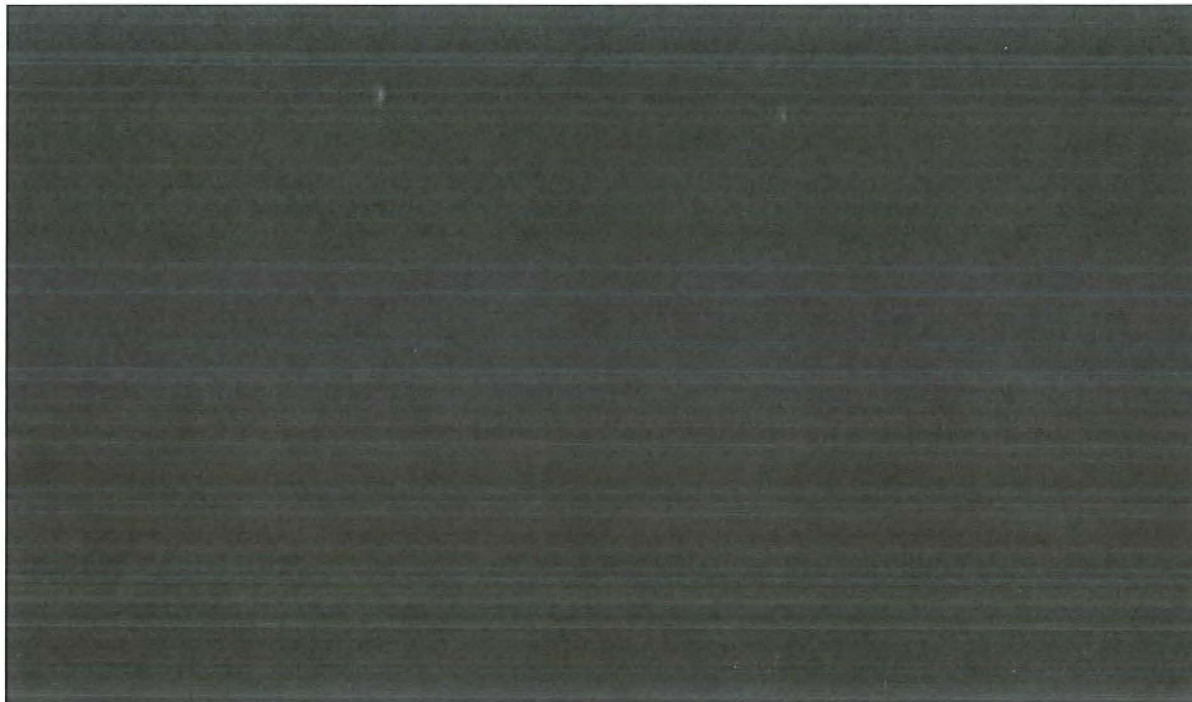
**CONFIDENTIAL Figure 7-27: NSP 350 MW Diversity Sale Energy Revenues<sup>36</sup>**

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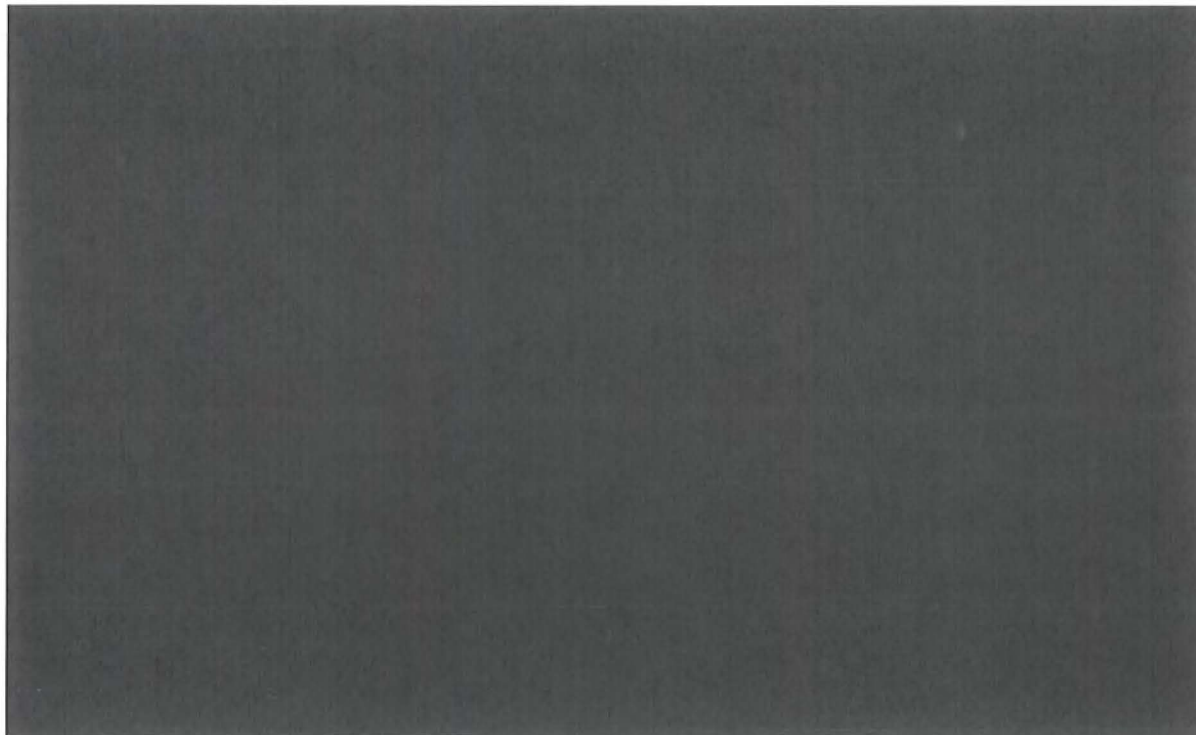
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*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*



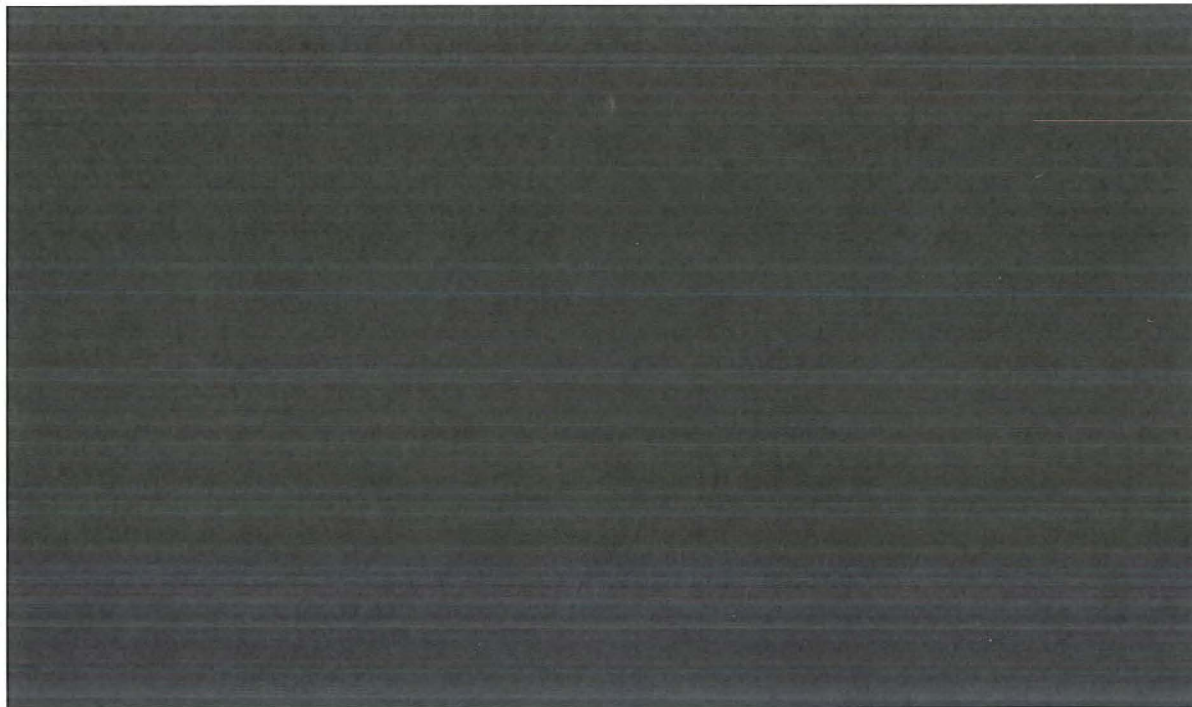
**CONFIDENTIAL Figure 7-28: NSP 125 MW System Power Agreement Energy Volumes**

*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*



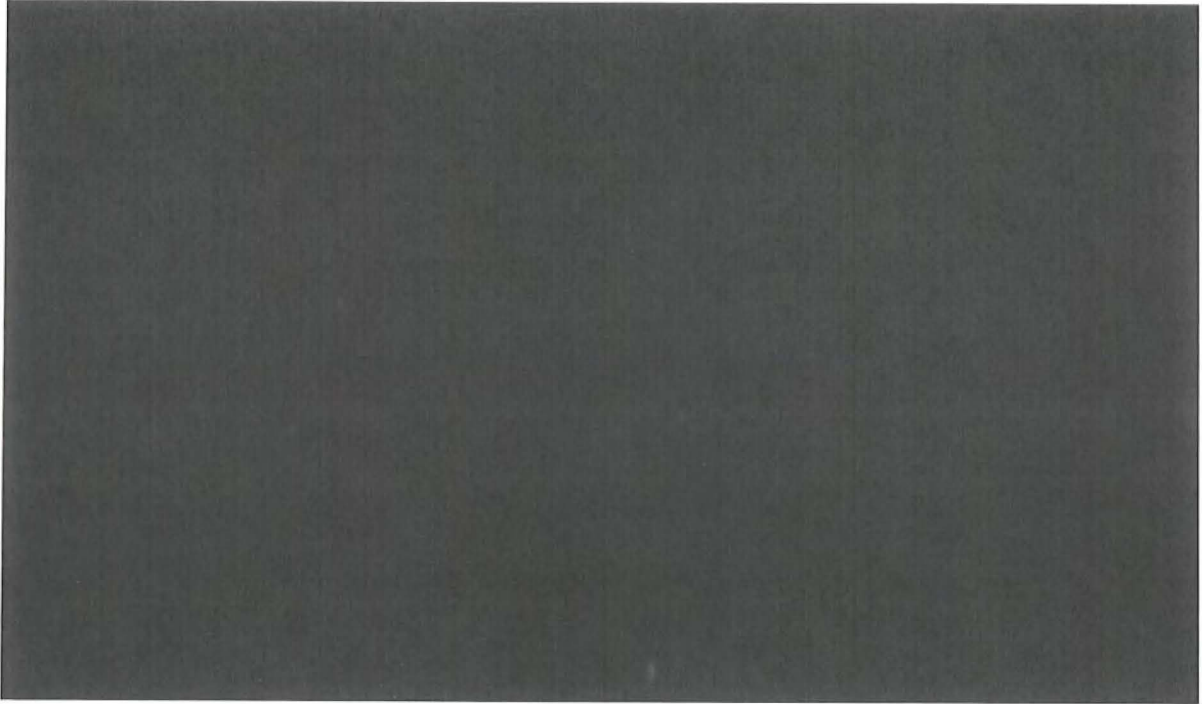
**CONFIDENTIAL Figure 7-29: NSP 125 MW System Power Agreement Energy Revenues**

*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*



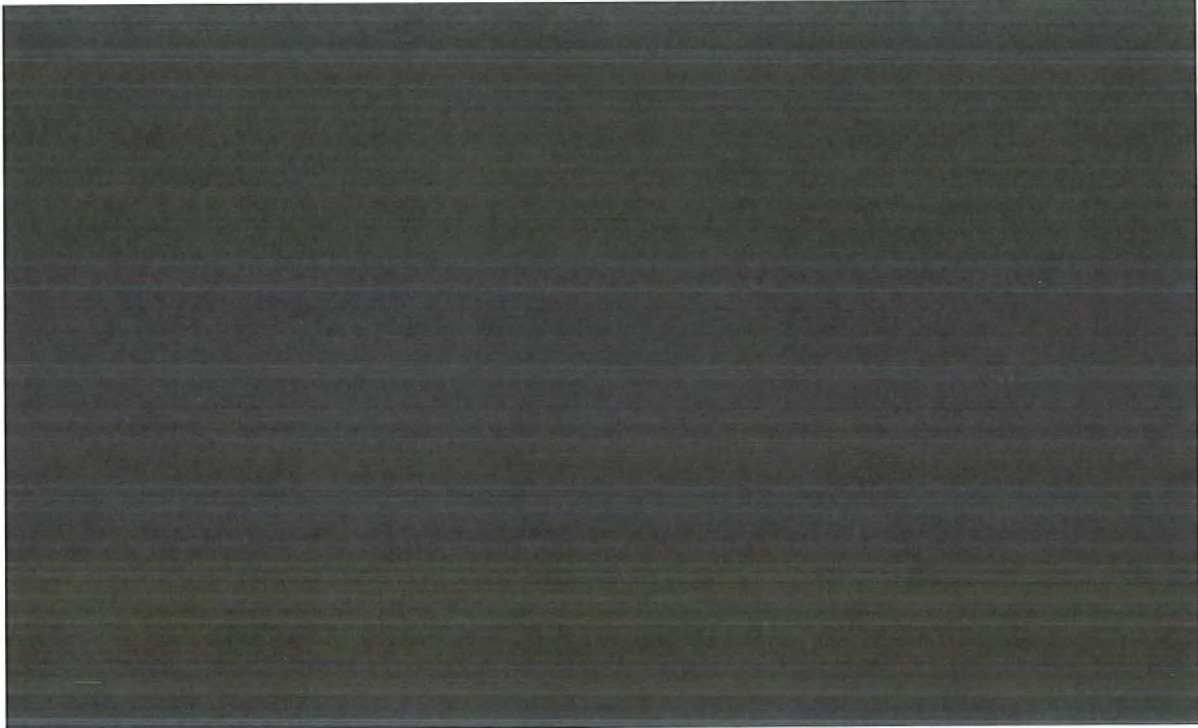
**CONFIDENTIAL Figure 7-30: WPS 100 MW System Power Sale Energy Volumes**

*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*



**CONFIDENTIAL Figure 7-31: WPS 100 MW System Power Sale Energy Revenues**

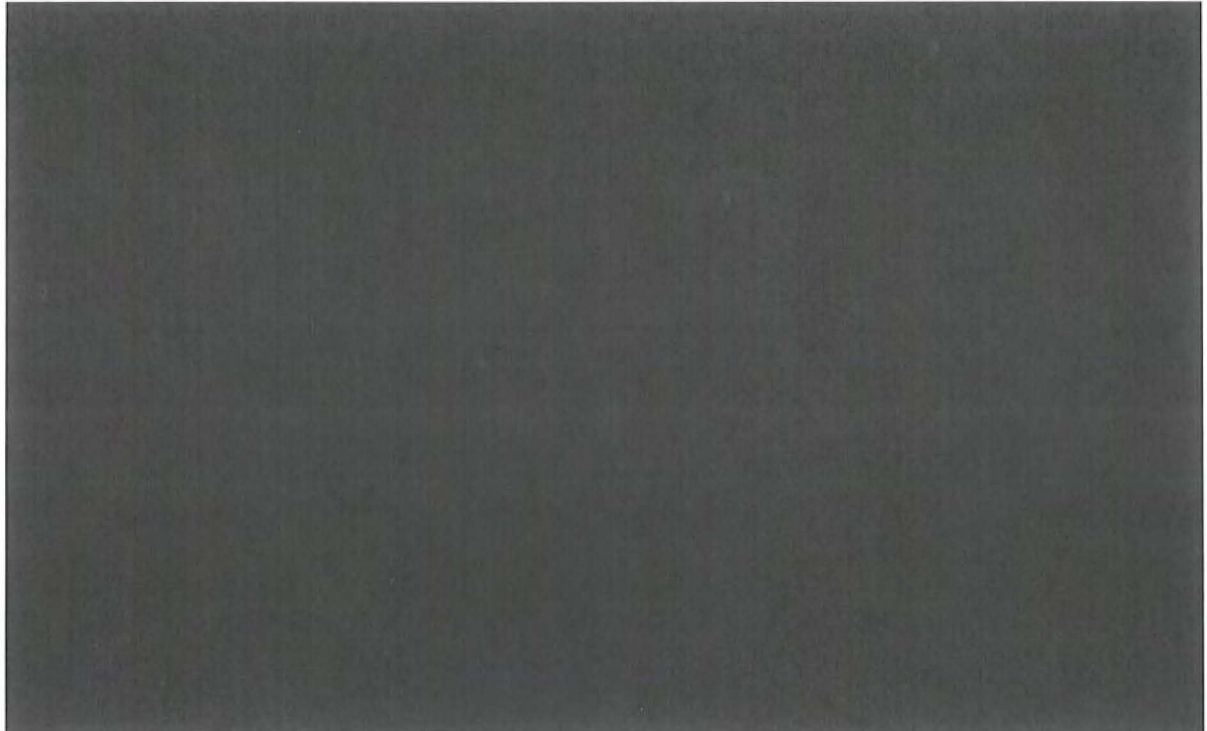
*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*



**CONFIDENTIAL Figure 7-32: WPS 108 MW Energy Sale Energy Volumes**



*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*



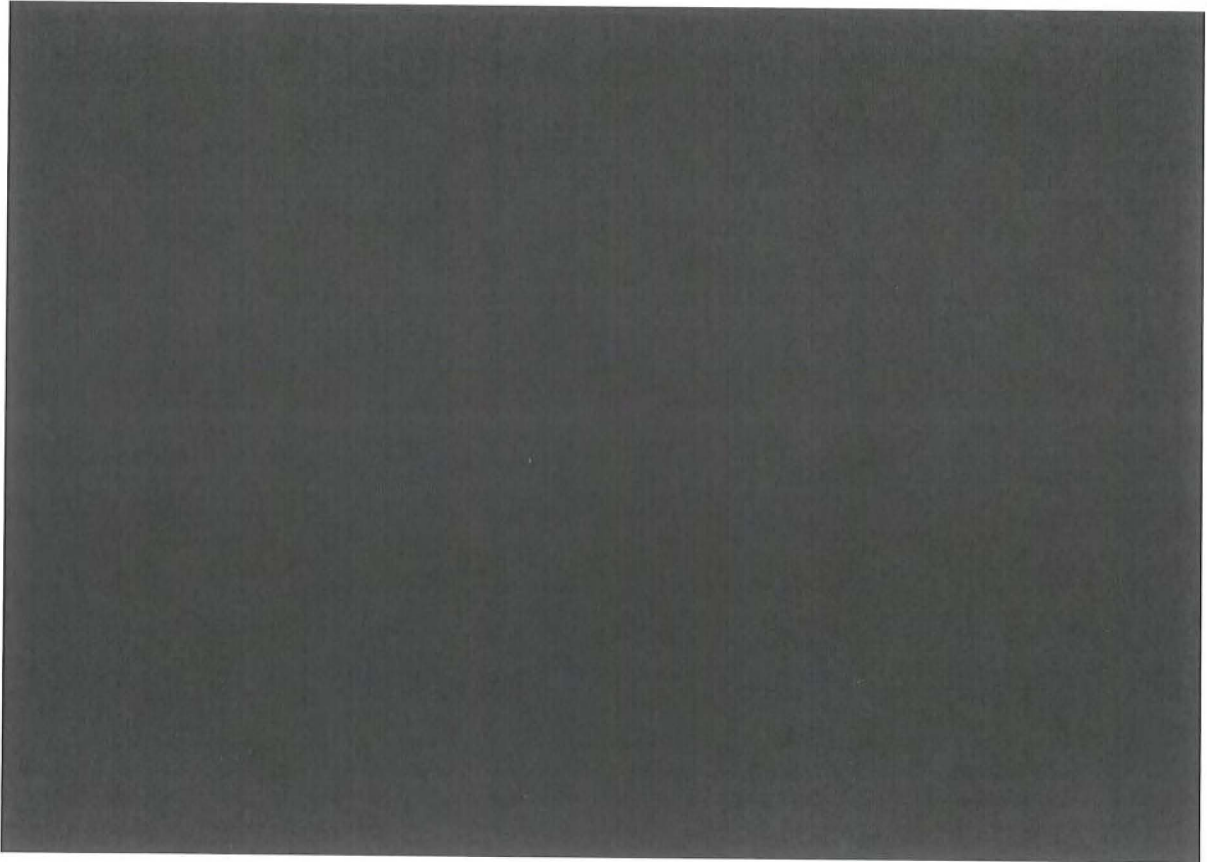
**CONFIDENTIAL Figure 7-33: WPS 108 MW Energy Sale Energy Revenues**

*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*



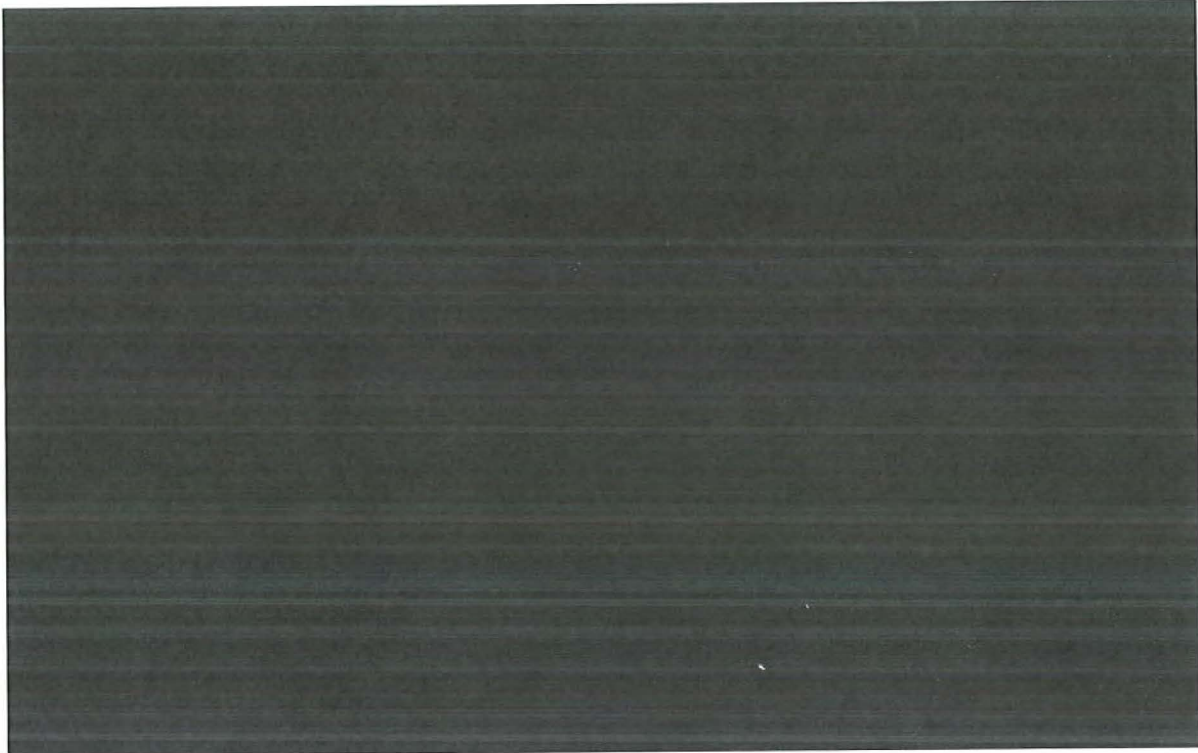
**CONFIDENTIAL Figure 7-34: MP 250 MW System Power Sale Energy Volumes**

*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*



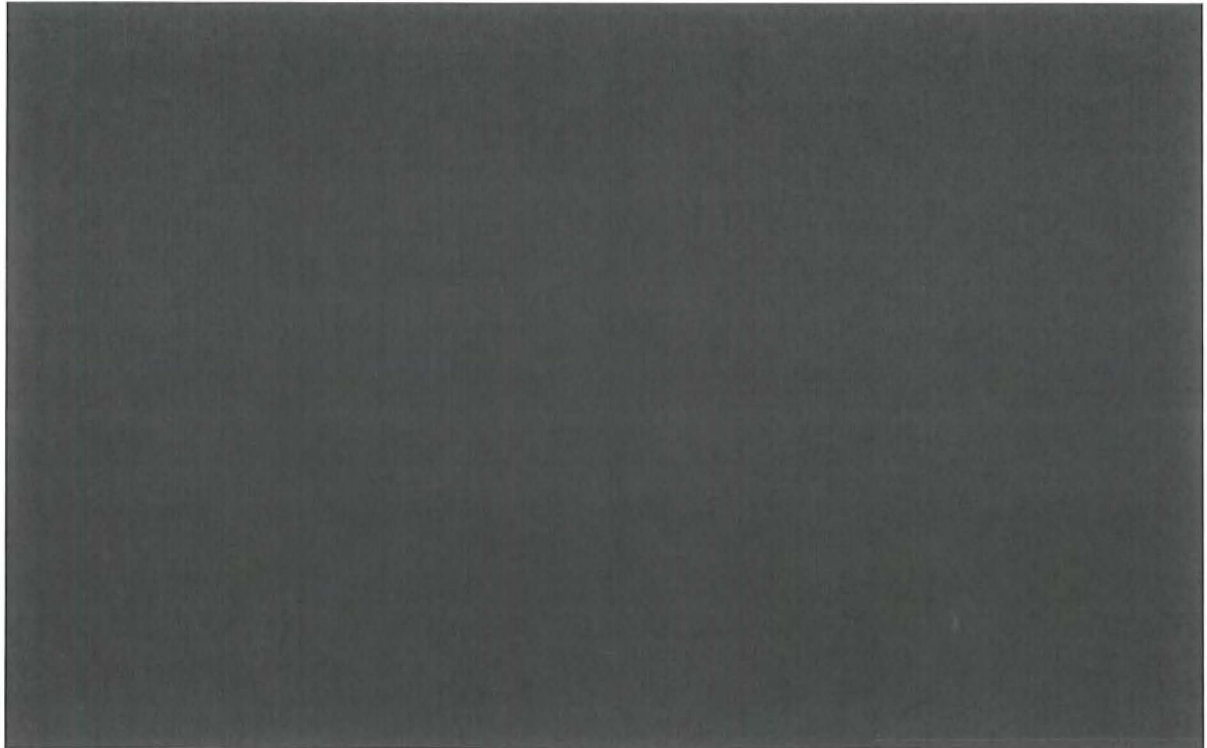
**CONFIDENTIAL Figure 7-35: MP 250 MW System Power Sale Energy Revenues**

*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*



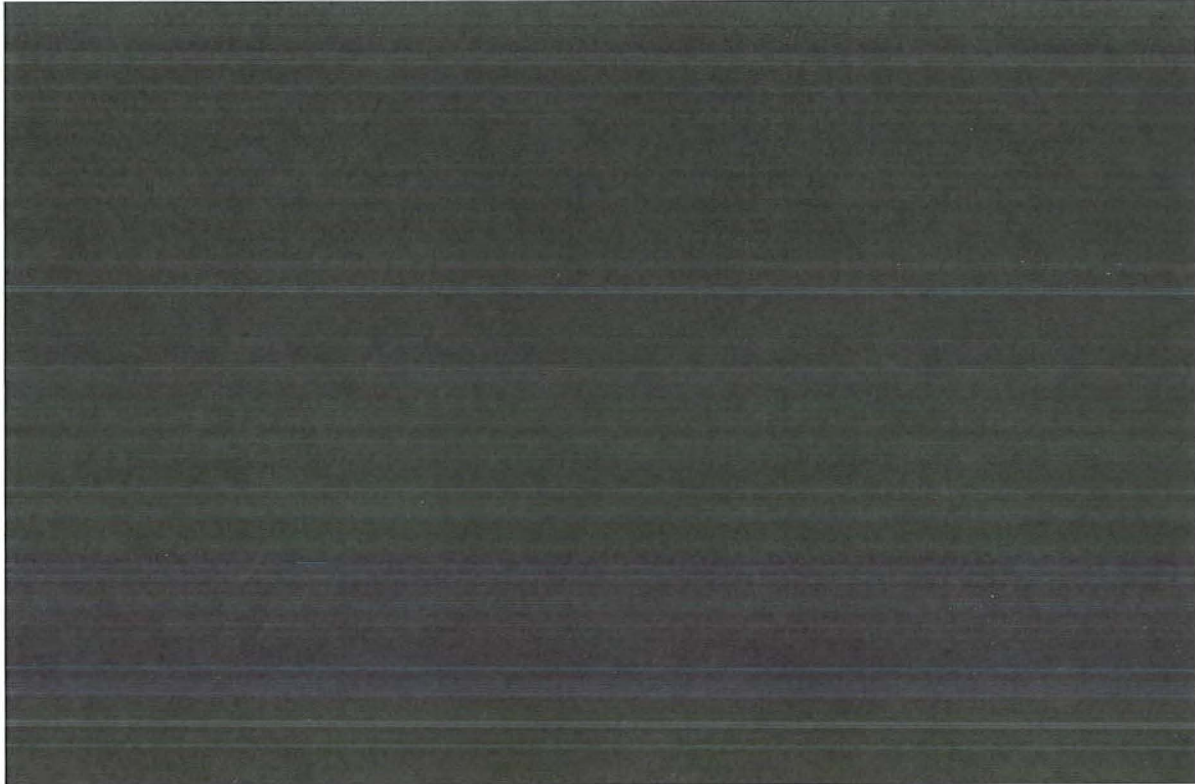
**CONFIDENTIAL Figure 7-36: GRE 200 MW Term Sheet for Energy and Capacity Energy Volumes**

*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*

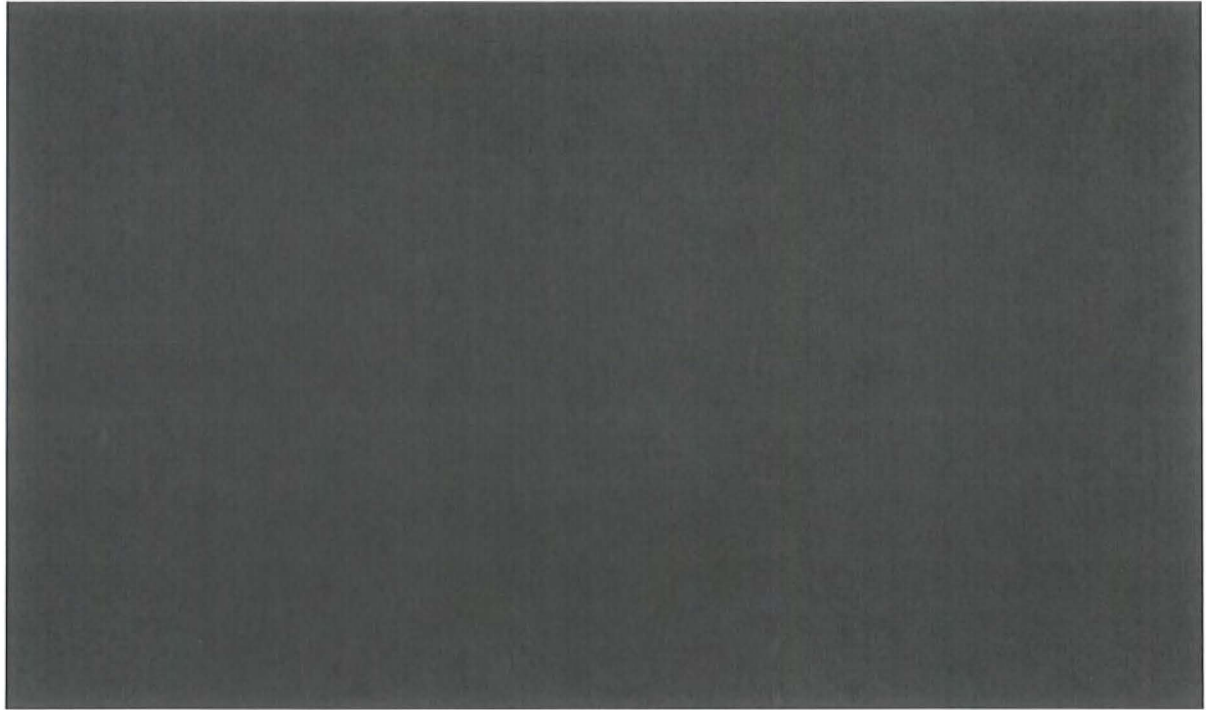


**CONFIDENTIAL Figure 7-37: GRE 200 MW Term Sheet for Energy and Capacity  
Energy Revenues**

*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*



**CONFIDENTIAL Figure 7-38: MP 50 MW Term Sheet for Energy and Capacity Energy Volumes**



**CONFIDENTIAL Figure 7-39: MP 50 MW Term Sheet for Energy and Capacity Energy Revenues**

**Supplemental Market Sales**

As discussed earlier, the SPLASH model does not distinguish the supplemental sales derived from export contracts as opposed to all other energy sales. While the energy and cash flows provided by MH contain an On-Peak Opportunity Export and Off-Peak Opportunity Export break-down, the supplemental energy from the export contracts discussed in this chapter are embedded in these categories, along with opportunity energy from all other MH generation. Therefore, the volumes of, and revenues derived from, non-firm energy from the export contracts modeled by LCA cannot be directly compared to the values provided by MH.

Off-Peak and Peak supplemental energy volumes and energy revenues are included in CONFIDENTIAL Figure 7-22 through CONFIDENTIAL Figure 7-39. The various power contracts used different terminology to define "supplemental sale" energy, such as:

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“Weekend Energy,” “Supplemental Energy,” and “Additional Energy.” For our analysis, “Supplemental Energy” was assumed to be all peak and off-peak energy that is not guaranteed. Projected supplemental energy was [REDACTED]<sup>37</sup> [REDACTED], or in some cases [REDACTED].<sup>38</sup> The [REDACTED] for each energy type sold for each contract is detailed in Attachment 1.

For all energy components with [REDACTED] at the delivery point was assumed available for all hours applicable. Therefore, our projections do not take into consideration any internal or external limitations (e.g., generation constraints, transmission capacity, and then-current market conditions).

#### D. Modeling Capacity Revenues

The following figures display in graphical form the capacity revenues for each contract or term sheet, as applicable. These capacity revenues were derived from the LCA modeling analysis of the contracts using the assumptions detailed previously, with the attempt to model the contract terms as closely as possible and to use the same assumptions as MH.<sup>39</sup>

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<sup>37</sup> [REDACTED]

<sup>38</sup> [REDACTED]

<sup>39</sup> See footnote 17.



*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*

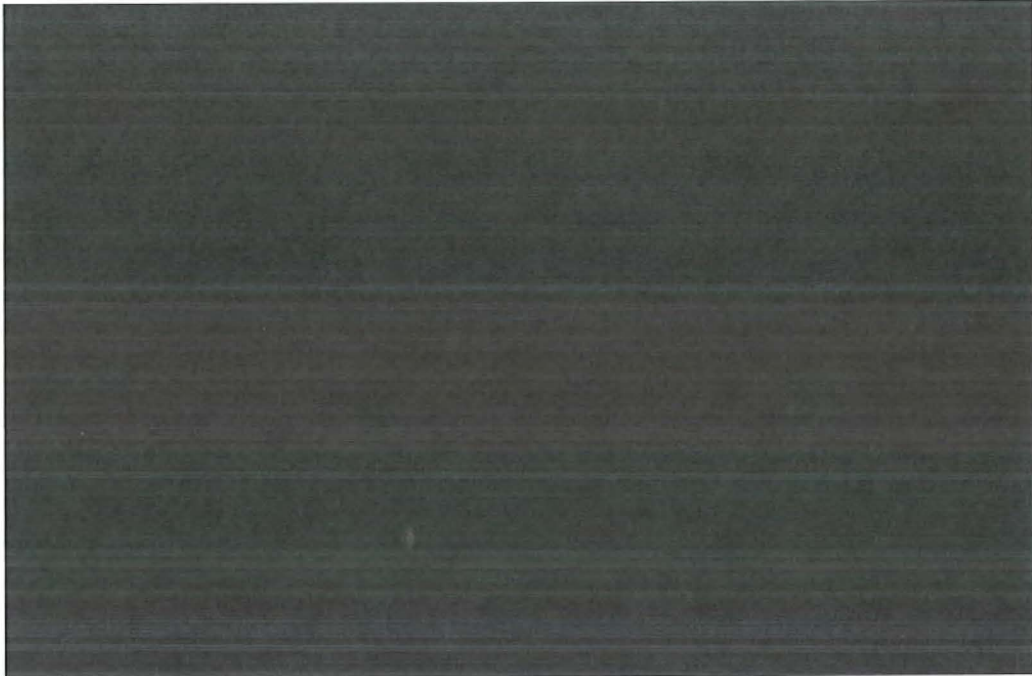


**CONFIDENTIAL Figure 7-40: WPS 300 MW System Participation Term Sheet Capacity Revenues<sup>40</sup>**

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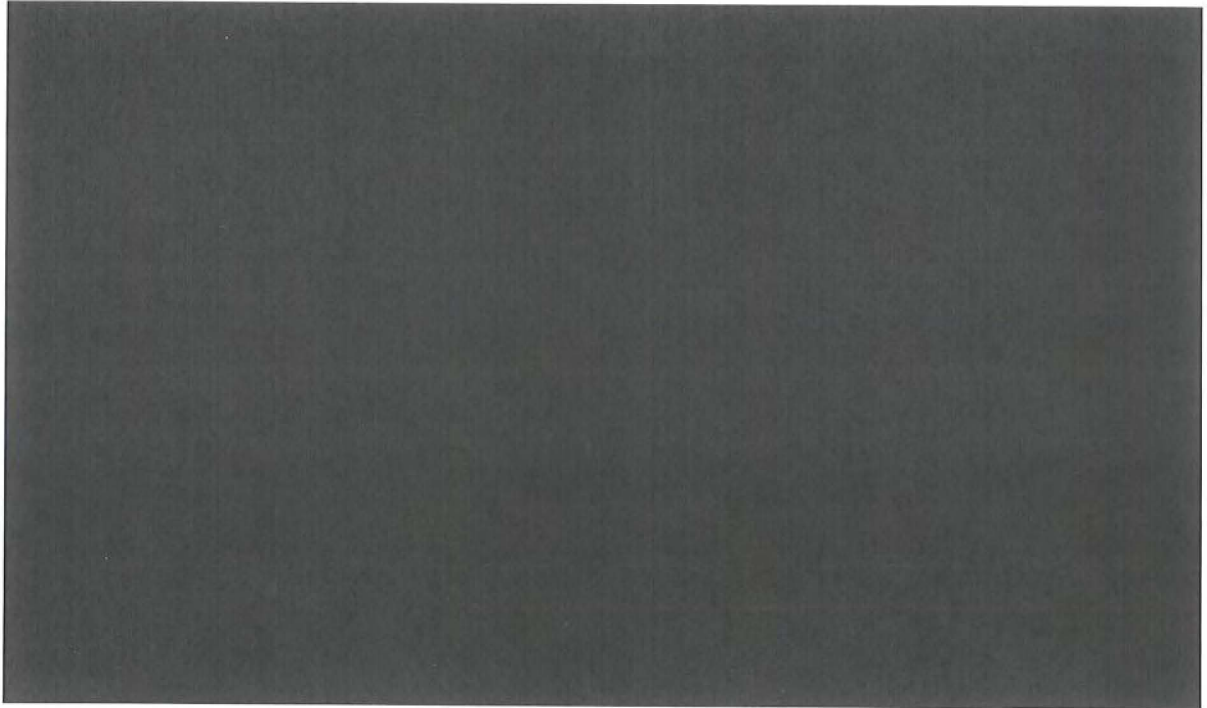
40

*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*



**CONFIDENTIAL Figure 7-41: NSP 375/325 MW System Power Agreement Capacity Revenues**

*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*



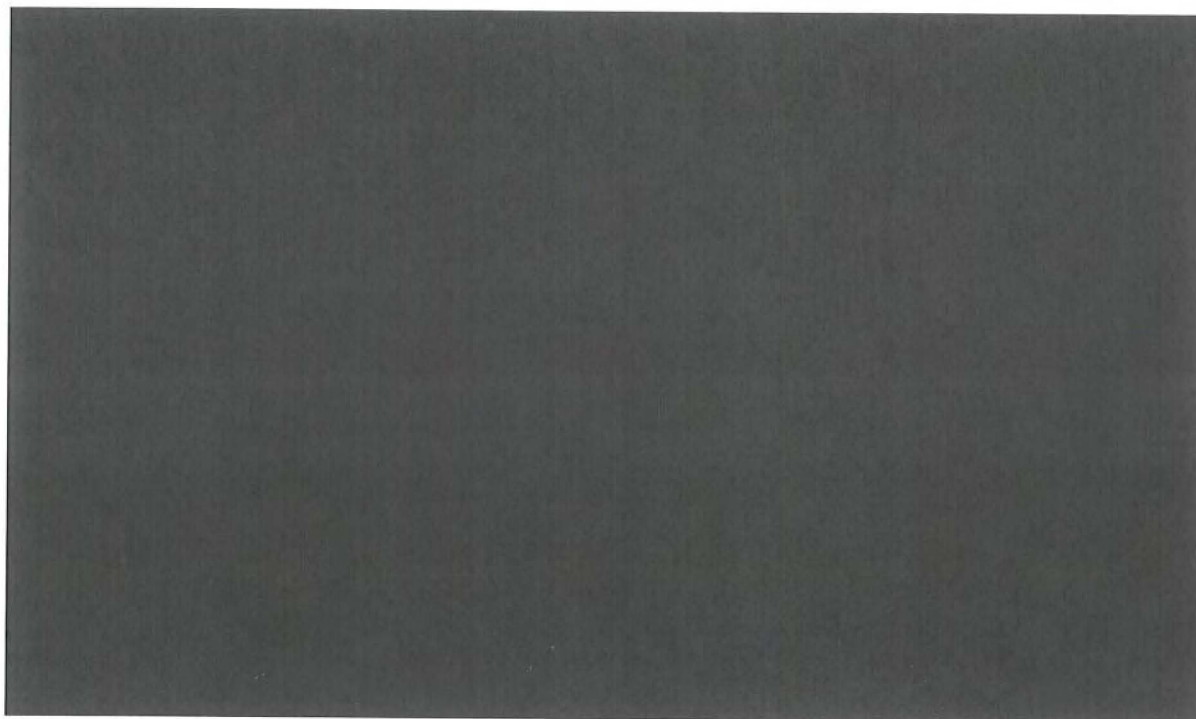
**CONFIDENTIAL Figure 7-42: NSP 125 MW System Power Agreement Capacity Revenues**

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**CONFIDENTIAL Figure 7-43: WPS 100 MW System Power Sale Capacity Revenues**

*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*



**CONFIDENTIAL Figure 7-44: MP 250 MW System Power Sale Capacity Revenues**



**CONFIDENTIAL Figure 7-45: MP 50 MW Term Sheet Capacity Revenues**

### **E. LCA Risk Analysis**

The LCA export contract revenue analysis discussed herein focused on ensuring that projected revenues were at least as high as forecast by MH in its NFAT submission.<sup>41</sup> That is, in evaluating the revenue risk associated with MH power contracts, LCA assessed the potential for realizing revenues lower than estimated by MH. In this

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<sup>41</sup> The content of our analysis was limited to a comparison to MH's own revenue projections, versus other potential analyses concerning, for instance, the level of revenues necessary to make the NFAT development economic (i.e., realization of a positive and accretive return on investment to MH). For the economic analysis, please refer to Technical Appendix 9A & 9B.

analysis, LCA modeled the maximum amount of energy volume available in the contracts for supplemental energy. However, as described earlier, MH supplemental energy volumes are modeled in SPLASH and subsequently there is an inherent energy volume discrepancy. A comparison between MH and LCA volume and revenue estimates are presented later in this section.

To understand such risk, LCA performed sensitivity analysis on the major factors affecting contract revenue. In particular, we focused upon the effects on firm energy and capacity revenue of future inflation as measured by the [REDACTED], and the effects of future market prices on supplemental sales revenue.

### [REDACTED] Sensitivity

As shown in Attachment 1, firm energy pricing and revenues are particularly dependent on [REDACTED].

Since [REDACTED] is such a significant driver of firm energy pricing and revenue, it was important to understand the sensitivity of contract revenues to this factor. A break-even analysis was performed to determine how much [REDACTED] would have to decrease in order to have firm energy contract prices fall below projected market prices.

Due to the firm energy contract pricing structure and relatively high initial reference prices when the contracts were executed,<sup>42</sup> it was found that a sustained, substantial negative rate for actual [REDACTED] would have to be reached in order for contract prices to fall below forecasted market prices. Importantly, however, all firm energy pricing components dependent on [REDACTED] had a negative price collar or "floor" that does not allow the energy price to fall below the initial reference prices, which have generally been set [REDACTED] to forecasted market prices.

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<sup>42</sup> See for example the 2007 initial reference price  $X_{2007}$  in the WPS 300 MW Term Sheet, and other initial reference prices for other export contracts in Figure 5 herein.

Since such a scenario of sustained deflation has never occurred in the history of U.S. economy, and because of the contractual price floor, it was concluded that there is no significant downside risk to the contract energy revenues due to [REDACTED].

#### Market Price Sensitivity

As shown in Attachment 1, [REDACTED] are independent from market prices and are, therefore, not sensitive to changes in market prices. In this section, we test the market price sensitivity associated with supplemental energy. Supplemental energy revenue sensitivity to market prices is also incorporated into the sensitivity analysis include in LCA's Technical Appendices 9A and B.

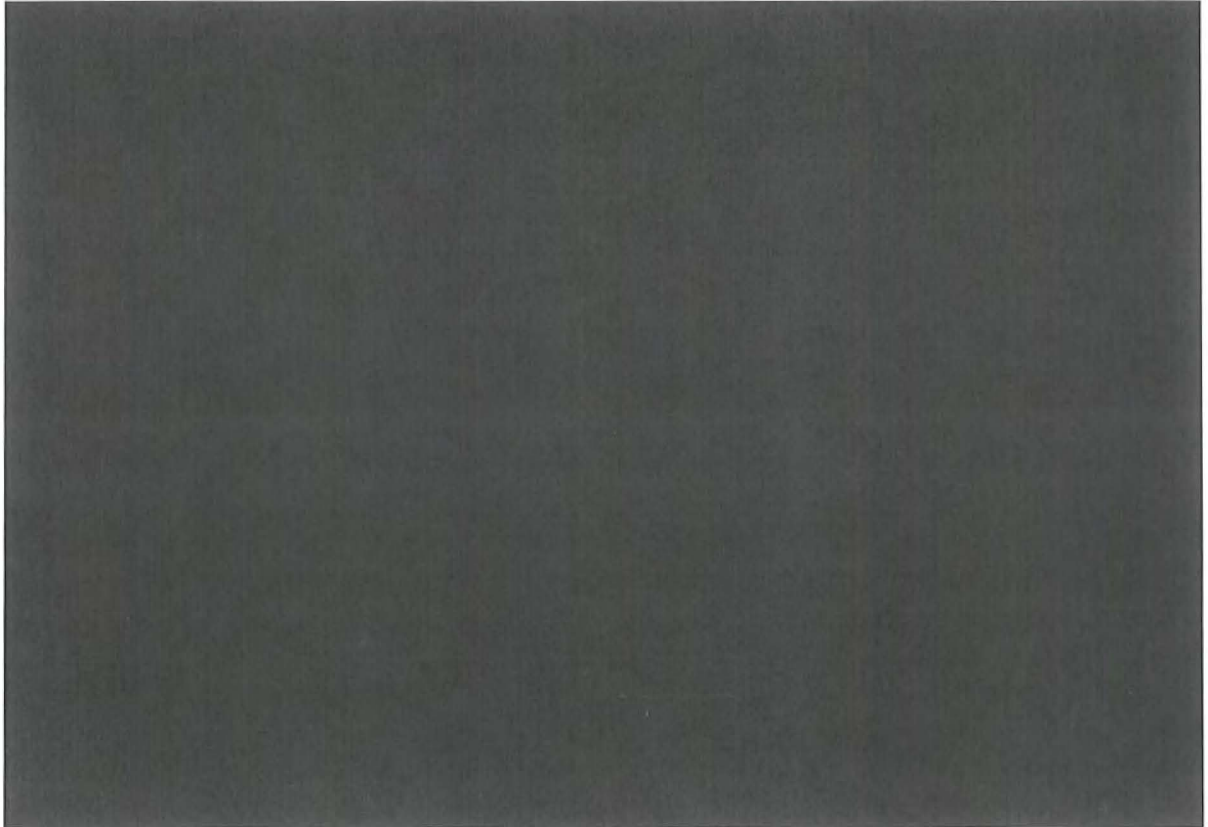
It is important to note that the projected revenues for off-peak and peak supplemental sales are largely dependent on the long-term energy forecast used for DA MHEB LMP, since these energy volumes are assumed to be sold at market. Our projections utilized the MH 2012 Adjusted Energy Price Forecast.

However, since the PUB requested an independent evaluation and forecast for DA MHEB LMP, which has been prepared by Potomac Economics, we also undertook a sensitivity analysis using the Potomac Economics Energy Forecast. CONFIDENTIAL Figure 7-46 compares the Potomac Economics Reference Energy Price Forecast to the MH 2012 Adjusted Energy Price Forecast for on-peak and off-peak periods. [REDACTED]

[REDACTED]

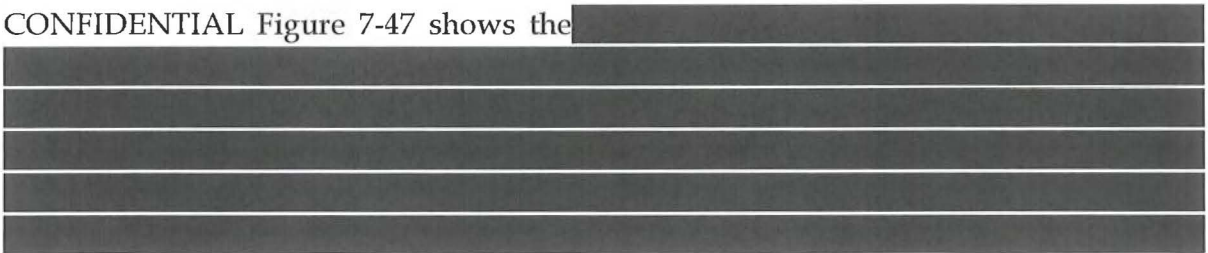


*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*



**CONFIDENTIAL Figure 7-46: MH 2012 Adjusted Energy Forecast vs. Potomac Economics Reference Forecast<sup>43,44</sup>**

CONFIDENTIAL Figure 7-47 shows the



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<sup>43</sup> Reference forecast for Potomac Economics with CO<sub>2</sub>, taken from Potomac Economics Workpaper - EXH Price Comparison to Consultants.xlsx

<sup>44</sup> Levelized Cost calculated using a 7.05% nominal discount rate assumed from Appendix 11.2 Reference Assumptions.

The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.

[Redacted]

	Additional Energy (Nominal Million \$USD)	Additional Energy (Nominal Million \$USD)
FYB	2012 Adjusted Energy Forecast	Potomac Economics Reference Energy Forecast
2020		
2021		
2022		
2023		
2024		
2025		
2026		
2027		
2028		
2029		
2030		
2031		
2032		
2033		
2034		
2035		
<b>Total</b>		
<b>Present Value @7.05%</b>		

**CONFIDENTIAL Figure 7-47: Sensitivity on Energy Price Forecast for MP 250 MW System Power Sale Agreement<sup>45</sup>**

Similarly, CONFIDENTIAL Figure 7-48 shows [Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

<sup>45</sup> Nominal Present Value is calculated using a 7.05% nominal discount rate assumed from Appendix 11.2 Reference Assumptions.

The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.

	Additional Peak Energy (Nominal Million \$USD)	Additional Peak Energy (Nominal Million \$USD)	Additional Off-Peak Energy (Nominal Million \$USD)	Additional Off-Peak Energy (Nominal Million \$USD)
FYB	2012 Adjusted	Potomac Economics Reference	2012 Adjusted	Potomac Economics Reference
2015				
2016				
2017				
2018				
2019				
2020				
2021				
2022				
2023				
2024				
2025				
2026				
2027				
2028				
2029				
2030				
2031				
2032				
2033				
2034				
2035				
<b>Total</b>				
<b>Present Value @7.05%</b>				

**CONFIDENTIAL** Figure 7-48: Sensitivity on Energy Price Forecast for MH On-Peak and Off-Peak Energy<sup>46</sup>

<sup>46</sup> Nominal Present Value is calculated using a 7.05% nominal discount rate assumed from Appendix 11.2 Reference Assumptions.

F. LCA Evaluation

Energy Pricing

In Technical Appendix 7A, LCA discussed MH contracting practices and related risk analyses for firm export contract sales, including the specific types of analysis required before Board approval could be sought.<sup>47</sup> One such analysis concerns [REDACTED].

MH states that "[REDACTED]

[REDACTED]

[REDACTED]<sup>48</sup> While we do not consider here the [REDACTED]

[REDACTED], as discussed below we have confirmed, [REDACTED]

[REDACTED]

[REDACTED]. This is important because it is vital to consider

[REDACTED]

[REDACTED]

[REDACTED]

CONFIDENTIAL Figure 7-49 compares the projected contract energy revenues and bundled average contract energy prices to the MH 2012 Adjusted On-Peak Energy Price Forecast. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

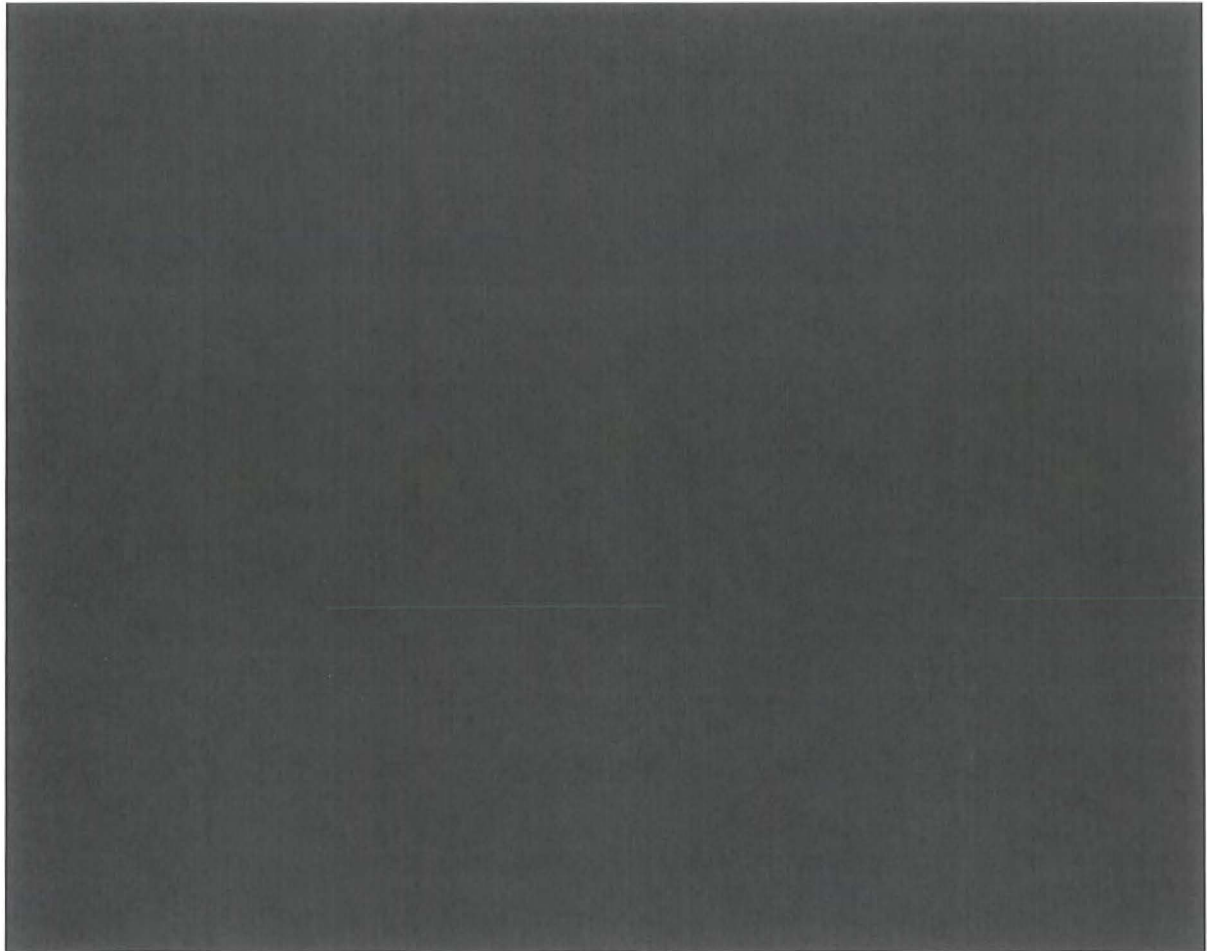
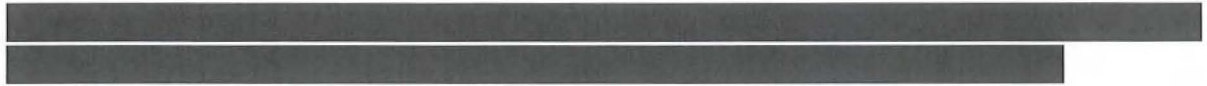
[REDACTED]

[REDACTED]

<sup>47</sup> SP-084 (Confidential) ("Risk Analysis of Export Contracts").

<sup>48</sup> Id. At p.4.

*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*



**CONFIDENTIAL Figure 7-49: Firm Export Energy Pricing vs. 2012 Adjusted Energy Price Forecast<sup>49</sup>**



<sup>49</sup> Levelized cost calculated using a 7.05% nominal discount rate assumed from Appendix 11.2 Reference Assumptions.

*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*

[REDACTED]

51

[REDACTED]

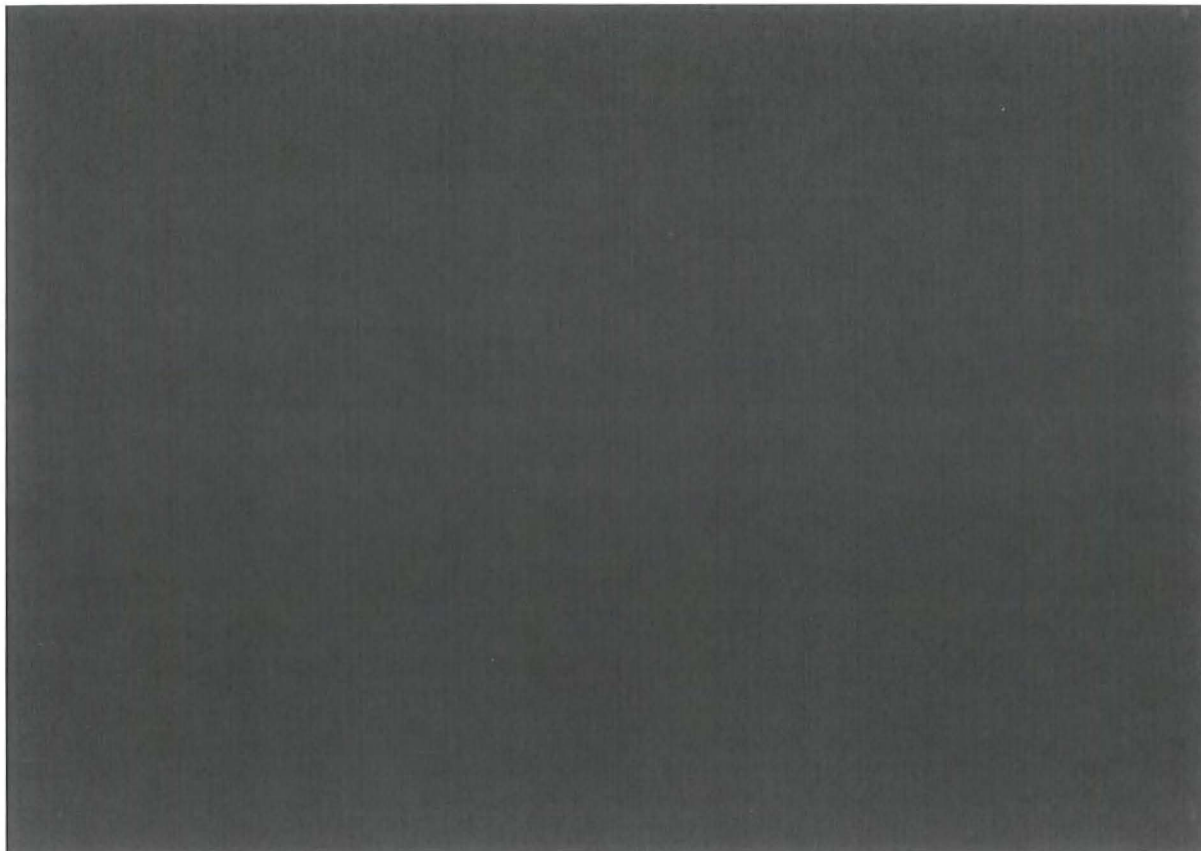
52

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<sup>50</sup> MH and GRE signed a 200 MW seasonal diversity agreement, but LCA was only very recently provided a copy. We modeled the term sheet provided earlier.

<sup>51</sup> The figure shows the energy sold for export under the diversity exchange agreements. The energy purchased under those agreements are not depicted.

<sup>52</sup> [REDACTED]



**CONFIDENTIAL Figure 7-50: Average Load-Weighted Bundled Contract Energy Pricing vs. 2012 Adjusted Energy Forecast<sup>53</sup>**

**Conclusion on Energy Pricing**

Based on our review of the export power contracts, term sheets and other documents, LCA concludes that the contract energy price terms for the offered products do result in prices that meet or exceed forecast market prices, in most instances with substantial margin. Given the reduced market price expectations seen in the 2012 Adjusted Energy Price Forecast and the Potomac Economics forecast, the contract price floors provide

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<sup>53</sup> Levelized Cost calculated using a 7.05% nominal discount rate assumed from Appendix 11.2 Reference Assumptions.

substantial assurance that revenues from these agreements will exceed spot market prices.

[REDACTED]

This pricing analysis also illustrates mark-to-market related revenue risk potential. In particular, as the graphics in Figures 7-49 and 7-50 indicate, the WPS 300 MW term sheet projected pricing and revenues appear to be substantially higher than projected market prices, MH's long-term on-peak dependable energy price forecast, and more importantly, [REDACTED]

[REDACTED]. Because this is a term sheet only, that has already been subject to numerous amendments,<sup>54</sup> and because it requires regulatory approvals including from the Wisconsin Public Service Commission,<sup>55</sup> there is an amount of uncertainty associated with MH's ability to realize the revenues for that agreement depicted in these figures. The uncertainties associated with the ultimate execution of that agreement is addressed in Technical Appendix 9B. LCA has not made any assessment of any alternative pricing that may ultimately be negotiated if and when this agreement is executed. Without the WPS term sheet representation, the bundled export contract revenues as shown in Figures 7-40 and 7-41 will be lower than we have projected.

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54 [REDACTED]

55 [REDACTED]



**Energy Volumes and Revenues Comparison**

Part of the analysis undertaken involved reviewing the energy volumes and revenues that MH estimated for the Preferred Development Plan and other scenarios. MH provided yearly cash flows showing revenues and associated energy volumes from energy exports for the 15 scenarios detailed in the NFAT Report.<sup>56, 57</sup> The breakdown by energy component category for both volumes and revenue (shown in real dollars for consistency with MH's cash flow analysis) for the All Gas Case and Preferred Development Plan, are shown in CONFIDENTIAL Figure 7-51 - CONFIDENTIAL Figure 7-54.

In our analysis, Plan 14, the Preferred Development Plan, and the All Gas Plan, Plan 1, were examined since these two scenarios encompass the full range of firm export contracts modeled. While the focus of the comparison is on the existing firm exports, a comparison of off-peak and on-peak supplemental sales was also performed.

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<sup>56</sup> SP-131 NFAT Confidential - REVISED Economic Cash Flows Energy Exports V4 energy and revenue only.

<sup>57</sup> However, MH has yet to provide a detailed break-down, contract-by-contract, of volumes and revenues for firm and supplemental energy as defined in each contract, for each of the 15 cases. This information has been requested via LCA/MH I-228, LCA/MH I-27, and through teleconference with MH.

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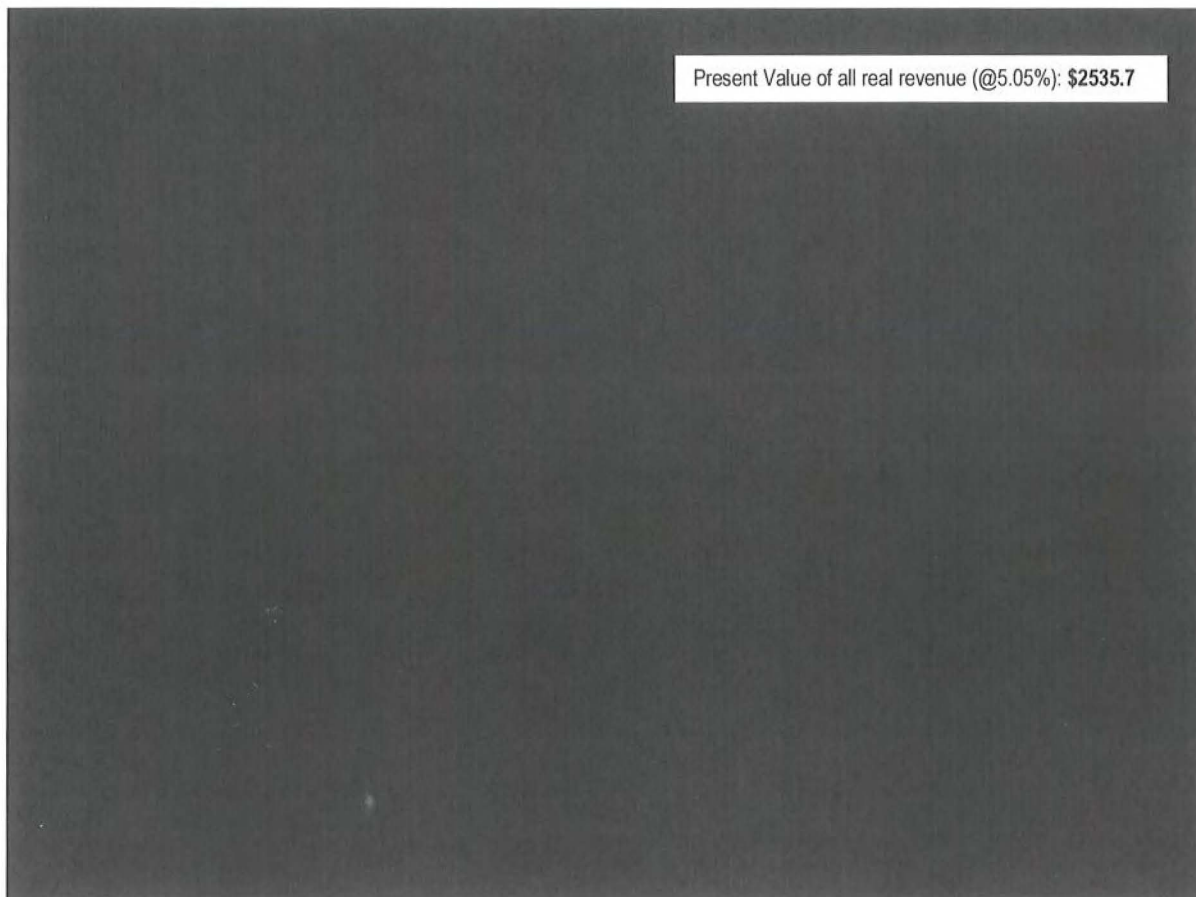


**CONFIDENTIAL Figure 7-51: All Gas Case MH NFAT Projected Energy Volumes<sup>58</sup>**

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<sup>58</sup> SP-131 NFAT Confidential - REVISED Economic Cash Flows Energy Exports V4 energy and revenue only.

*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*

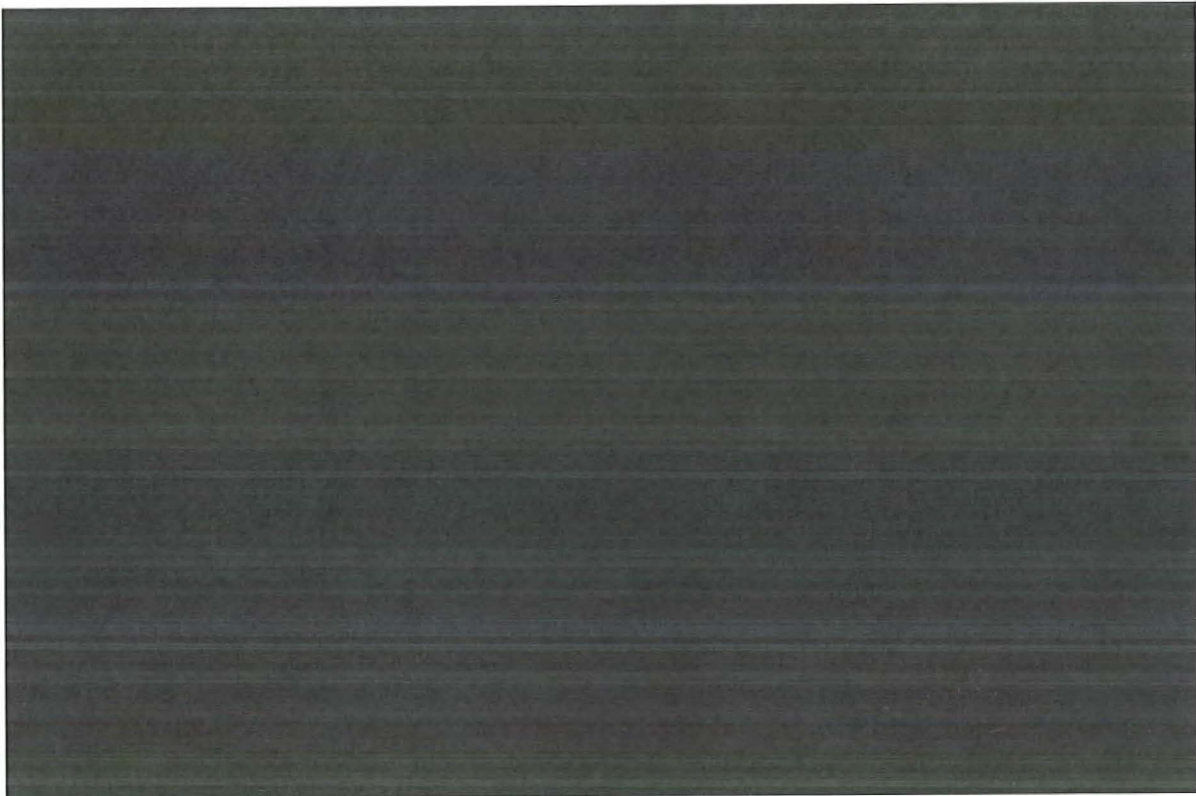


**CONFIDENTIAL Figure 7-52: All Gas Case MH NFAT Projected Energy Revenues<sup>59</sup>**

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<sup>59</sup> SP-131 NFAT Confidential - REVISED Economic Cash Flows Energy Exports V4 energy and revenue only.

*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*



**CONFIDENTIAL Figure 7-53: Preferred Development Plan MH NFAT Projected Energy Volumes<sup>60</sup>**

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<sup>60</sup> SP-131 NFAT Confidential - REVISED Economic Cash Flows Energy Exports V4 energy and revenue only.

Present Value of all real revenue (@5.05%): **\$3180.0**

**CONFIDENTIAL Figure 7-54: Preferred Development Plan MH NFAT Projected Energy Revenues<sup>61</sup>**

When comparing the energy revenues in the following analysis, we utilized the same [REDACTED] and US-CDN Dollar Exchange Rate forecast assumptions from the MH Reference Scenario in Appendix 11.2 of the NFAT Submission.<sup>62</sup> When calculating the present value of the cash flows and levelized rates, LCA used the MH reference real discount rate of 5.05% in all its analysis.<sup>63</sup>

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<sup>61</sup> SP-131 NFAT Confidential - REVISED Economic Cash Flows Energy Exports V4 energy and revenue only.

<sup>62</sup> See footnote 17.

<sup>63</sup> Id.

*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*

[REDACTED] 64 [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED] 65

CONFIDENTIAL Figure 7-55 compares LCA modeled energy volumes and revenues to MH values for existing firm exports for the All Gas Case.

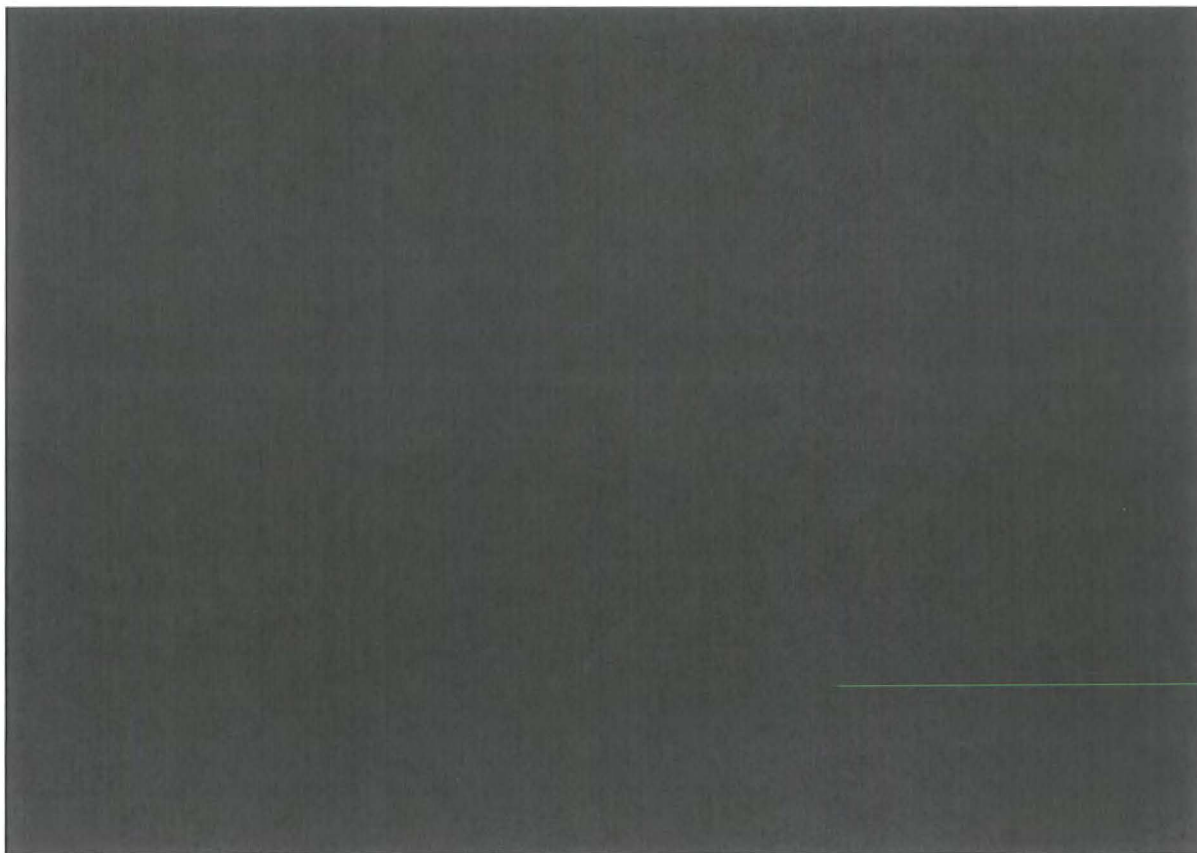
Given that MH has yet to supply its analysis of the individual contract projections in response to LCA interrogatories, it was not possible to reconcile the energy volumes on a year by year basis for the All Gas Case [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

---

64 [REDACTED]  
[REDACTED]

65 Id.

*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*



**CONFIDENTIAL Figure 7-55: Comparison of LCA vs. MH Existing Firm Energy and Capacity Volumes and Revenue for All Gas Case<sup>66,67</sup>**

CONFIDENTIAL Figure 7-56 provides a similar comparison of LCA modeled energy volumes and revenues to MH values for existing firm exports for the Preferred Development Plan. Again, it was not possible to reconcile the projected energy volumes on a year by year basis for the Preferred Development Plan. [REDACTED]

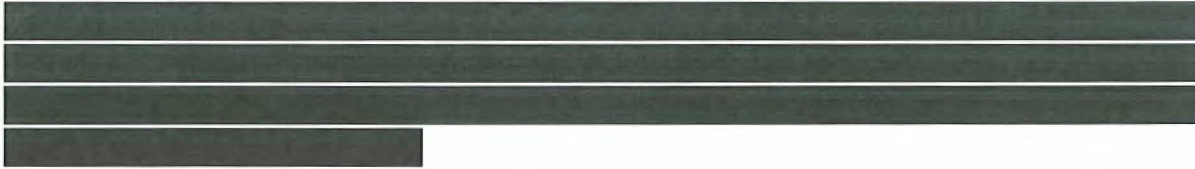
<sup>66</sup>

[REDACTED]

<sup>67</sup>

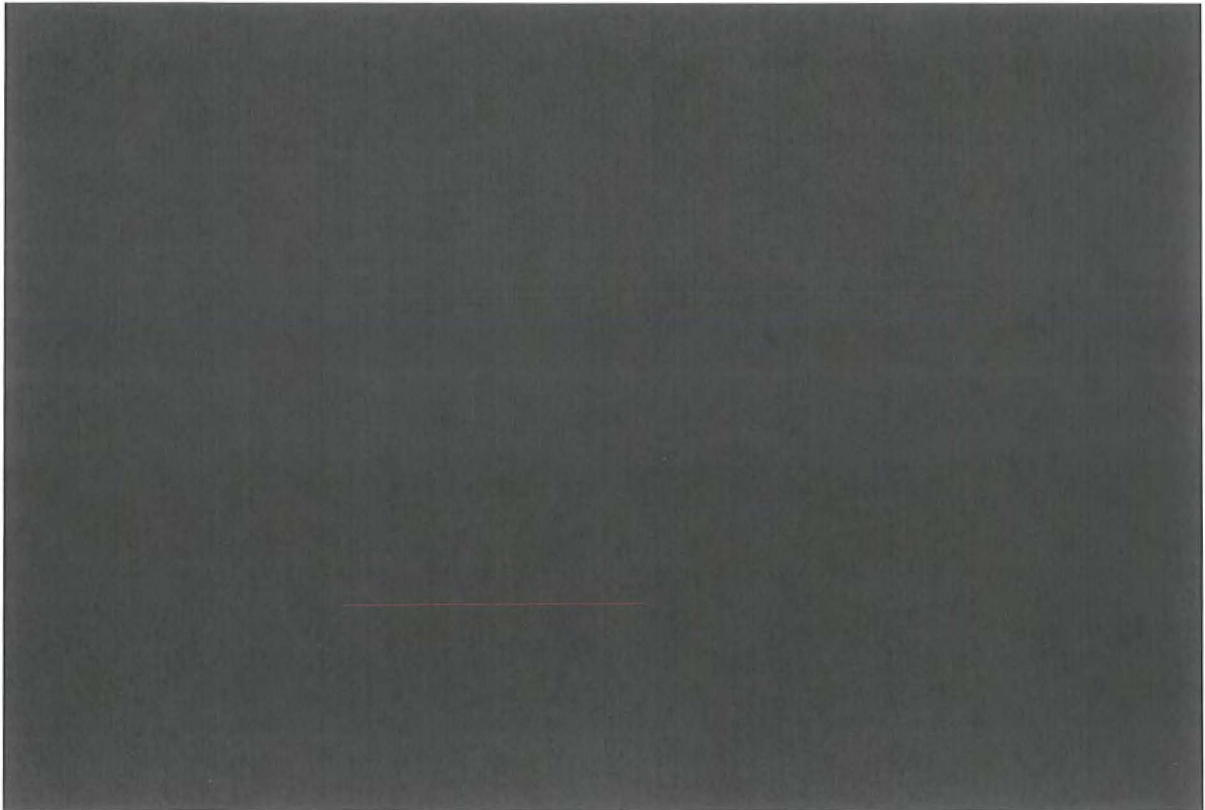
[REDACTED]

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*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*



**CONFIDENTIAL Figure 7-56: Comparison of LCA vs. MH Existing Firm Energy and Capacity Volumes and Revenue for Preferred Development Plan<sup>68,69</sup>**

It was unfortunate that we could not reconcile our contract energy and resulting revenue projections with the lower ones provided by MH. Unless and until MH offers a contract-by-contract set of projections, we cannot explain the differences. Therefore, the

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68 [REDACTED]

69 [REDACTED]

*The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.*

revenues and associated energy volumes cannot be verified on an individual contract-by-contract, or yearly, or scenario basis.

With that said, our focus was on revenue projections compared to what MH is assuming. That is, ensuring projected contract prices and revenues are equal to or greater than those projected by MH, reflecting a premium over forecast market prices.

[REDACTED]

However, as noted we cannot verify their specific, contract-by-contract assumptions. This is important, especially for the WPS 300 MW Term Sheet. Our projected prices and revenues attending that agreement are considerably higher than MH and Potomac Economics' spot market price projections, MH's long-term on-peak dependable energy price forecast, and more importantly, above projected firm energy prices and revenues associated with the other firm energy export contracts. See LCA Technical Appendix 9B for the uncertainty analysis associated with these contracts.

### III. Transmission Access

Part A of this Technical Appendix addressed the issue of the construction of transmission facilities as part of the conditions precedent to the various agreements. This section of the report will review the provisions in the power contracts regarding transmission access and TSRs.

#### A. Contract Provisions Pertaining to Transmission Service Requests

Under the terms of the power contracts, MH and its counterparty are obligated to arrange for Firm Transmission Service for the delivery or receipt of the energy included in the agreements to/from the Delivery Point.<sup>70</sup> This can be accomplished by the process of obtaining TSRs from the respective transmission provider.<sup>71</sup> The TSRs can be either renewed, if they pertain to existing contracts, or initiated, if they pertain to new contracts.

MH provided information related to transmission service reservations for the power contracts included in Figure 7-12, including TSR information in addition to other power contract attributes. MH stated in its responses that 1850 MW of existing TSRs will be active in 2020.<sup>72</sup> However, after summing the capacity requirements of all existing contracts in 2020, there is approximately 700 MW unaccounted for in MH claim. After reviewing all available information and responses received from MH at the time of this draft, LCA does not have a clear understanding on how the 1850 MW of existing TSRs in 2020 was derived by MH.

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<sup>70</sup> Delivery Point is a physical point in the transmission system, agreed by both parties included in the power contract, where the exchange of power takes place. It is usually defined in the power contracts as the point or points where MH's major transmission facilities cross the international boundary between the Province of Manitoba and the United States of America.

<sup>71</sup> Technical Appendix 07A: Export Contracts p. 7A-6 includes different scenarios related to how MH's policies dictate transmission arrangements.

<sup>72</sup> LCA Technical Appendix 08: Transmission - Section IV.A includes additional information related to the TSRs and the need for new transmission.

The renewal of existing contracts is deemed essential by MH in constructing the business case for a new transmission line with the United States. More specifically, MH in its evaluation of the 2010 MH-NSP sale document notes the following:

*Without the MH-NSP Sale, there is significant uncertainty in being able to retain the transmission rights that the MH-NSP Sale would provide. Due to the process for acquiring transmission rights under the MISO and Manitoba Hydro Transmission Tariffs, without the MH-NSP Sale the need for new transmission to Wisconsin Public Service and Minnesota Power would be significantly reduced, likely to the point where a large new interconnection could not be justified. Loss of, or reduced capability of a new interconnection path would put at risk Manitoba Hydro's ability to market surplus energy during favourable water conditions. The risk significantly increases after Keeyask and/or Conawapa Generating Stations are constructed.<sup>73</sup>*

In the event that renewal contract negotiations fail and any of the counterparties walks away, MH would be faced with the requirement to release the reserved capability on the interface for use by other parties. This would result in MH having enough existing capability on the intertie to serve other export sales and eliminates the need for a new interconnection.

**B. 250 MW System Power Sale Agreement between MH and MP transmission access**

The 250 MW power contract between MH and MP includes a provision<sup>74</sup> related to the construction of a new transmission line between the Province of Manitoba and the US. More specifically, the power contract identifies that a new interconnection line is needed before the June 1, 2020 start date of the Contract Term with transfer capability of 250 MW southbound and 250 MW northbound. The agreement includes information related to cost sharing and specifies that MH will be responsible for the Canadian component of the line, while MP will be responsible for the cost related to the United States component. The power contract also specifies that MH will assist MP in its

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<sup>73</sup> SP-085 NFAT Confidential - Evaluation of the 2010 MH-NSP Sale p. (i).

<sup>74</sup> 250 MW System Power Sale Agreement p.29 ARTICLE III 3.1 (1).

pursuit of Multi-Value Project treatment from MISO regarding the new transmission line.

According to the agreement, the parties may arrange for alternative transmission service arrangements to meet their obligations.<sup>75</sup> It is not clear in the power contract what will transpire in case new transmission line is not built, but it does contain provisions that allow for potential alternatives to meet the obligation resulting from the power contract, upon mutual agreement. One of the alternatives may be available capability on the intertie due to the expiration or lack of renewal of existing TSRs.

The NFAT Submission did not include an evaluation of a plan that included Keeyask, the MP 250 MW power sale between MH and MP and excluding any new interconnection. Therefore, LCA is unable to determine how an analysis of the benefits of the MP power sale alone, apart from the associated benefits of a new transmission interconnection.

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<sup>75</sup> 250 MW System Power Sale Agreement p.34 ARTICLE III 3.1 (7).

## **IV. Summary and Conclusions**

### **Revenue Projections**

In this analysis, LCA modeled projections of revenues for firm energy, on-peak supplemental sales, and off-peak supplemental sales, by contract, using billing determinants based on quantities, and pricing provisions specified in the contracts. Each contract was reviewed for product specifications and associated volume, pricing, and other related terms using a 'bottom-up' approach. LCA modeled revenue projections were compared to MH's values in the NFAT Submission for the All Gas Case and Preferred Development plan.

It was not possible to reconcile the projected firm energy volumes on a year by year basis for either the All Gas Plan the Preferred Development Plan. Until MH offers a contract-by-contract set of projections, we cannot explain the differences. Additionally, compared to how SPLASH models supplemental sales, the volumes and revenues from non-firm energy from the export contracts modeled by LCA could not be directly compared to the values provided by MH. Therefore, the revenues and associated energy volumes cannot be verified on an individual contract-by-contract, or yearly, or scenario basis.

Our projections indicate significantly higher volumes for firm exports compared to MH projections, and higher contract prices as compared to both MH's own, and Potomac Economics' independent projections of, spot market prices. Long-term revenue is projected to be higher than assumed by MH.

It was confirmed that the pricing terms for firm energy reflect a premium over MH's energy price forecast. On average, for all of its contracts considered together, we found that MH should receive a substantial premium above forecasted market prices for its firm energy from the contracts and term sheets included in its NFAT analysis. On an average load-weighted bundled contract basis, it was also found that MH is receiving a premium above forecasted market prices.

Our analysis also shows that the weighted average cost of the firm export contracts on-peak pricing is at or above the MH On-Peak Long-Term Dependable Reference Price forecast. The MP 250 contract, the NSP 375/325 and 125 contracts, the WPS 100 and the WPS 300 Term Sheet pricing are all higher than this firm reference price benchmark.

We also note that the WPS 300 MW transaction is not a completed contract. Any final contract would require regulatory approval in Wisconsin and MH's ability to realize the prices and revenues assumed for this contract is subject to those added uncertainties. This uncertainty is addressed in LAC Technical Appendix 9B.

In our evaluation, LCA focused on performing sensitivity analyses on the main factors that affect contract revenue. These include actual [REDACTED] effects on firm energy prices, and [REDACTED] effects on supplemental sales.

LCA's breakeven sensitivity analysis on [REDACTED] found that a sustained, substantial negative rate for actual [REDACTED] would have to be reached in order for contract prices to fall below forecasted market prices. That is because initial reference year prices for firm energy and capacity were set at levels considerably above current and MH forecast market prices. Therefore, it was concluded that because such a prolonged deflation situation is unprecedented in the history of the US economy, and because of contractual price floors, there is no significant downside risk to the contract energy revenues due to inflation.

The energy spot market price forecast is a key variable in determining energy revenues for off-peak and peak supplemental sales. A sensitivity analysis was performed on the energy price forecast, using Potomac Economics' slightly lower energy forecast. Lower spot market energy prices negatively affect the contract revenues for supplemental sales and highlights the risk that MH might not realize all of the projected revenues if actual market prices turn out to be lower than MH forecast.

Overall, we found that for executed agreements (as opposed to the term sheets), appropriate pricing terms for specified products were included in a well-developed and understandable form. The possibility for supplemental sales should system resources

permit, appear to be intact. Nothing in review of the contract terms themselves caused us to revise our conclusions reached in Part A of this Technical Appendix.<sup>76</sup>

### Transmission Analysis

MH claims in its NFAT application that there is not enough capability on the MH-US interface to fulfill the new contracts with MP and WPS. LCA reviewed the documentation provided by MH and did not confirm the 1850 MW amount of existing TSRs in 2020 claimed by the company. LCA's review also identified an excerpt included in MH's evaluation of the 2010 MH-NSP sale which concluded the aforementioned sale was critical in increasing the need for new transmission between MH and US. However, there was no additional information in the document to justify this claim.

The transmission component is also critical in the 250 Power sale agreement between MP and MH. The power contract includes a provision related to the construction of new transmission between MH and US needed to ensure the power will be delivered from MH to MP. However, the contract also includes a section that allows for potential alternatives to new transmission. MH did not provide any additional information related to these alternatives, but the contract does not void the power agreement if new transmission is not built.

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<sup>76</sup> LCA did not undertake a legal review of the export contracts, which was beyond our SOW. However, LCA did conduct a business level review of the export contracts based on our industry experience with such long-term power sales agreements.



CONFIDENTIAL Attachment 1

Date	Counterparty	Type of Agreement	Term	Type of Energy	Energy Quantity	Hours	Energy Pricing	Notes
3/1/2008* *subject to subsequent amendments (most recent dated June 30, 2013)	Wisconsin Public Service	300 MW System Participation Term Sheet	The term will be as negotiated by the Parties and set forth in the definitive agreement for the 500 MW System Participation Power Sale.	Guaranteed Peak Energy	Linked to actual generation and transmission in-service dates and specified in the definitive agreement for the 500 MW System Participation Power Sale, with the capacity quantity presently expected to ramp up to a maximum capacity of 500 MW, which maximum capacity would be in effect for the majority of the Contract Term.	M-F Hour Ending (HE) 7-22 CPT, excluding NERC holidays		
				Weekend Energy		Sat/Sun and NERC holidays HE 7-22 CPT		
				Supplemental Energy		When determined by MH in its sole discretion to be available		
May 27, 2010	Northern States Power	375/325 MW System Power	5/1/2015 - 4/30/2025	Fixed Price Energy Summer	375 MW	M-F HE 7-22		
				Fixed Price Energy Winter	325 MW	M-F HE 9-20		
				Additional Energy				
				Firm LD Energy	Amounts of energy that is not Fixed Price Energy or Additional Energy; subject to total of Fixed, Additional, and LD Firm in any hour under this Agreement shall not exceed 529 MWh per hour at any given time within the hour offered			
May 27, 2010	Northern States Power	350 MW Diversity Sale	5/1/2015 - 4/30/2025	Must Offer Energy Summer	350 MW	Must offer during Expected Peak Load in MISO (4 continuous hours) Monday - Sunday in the Summer Season (May to October)		
				Additional Energy	Each day during the Summer season, amounts of energy that MH has available for sale to NSP, cannot exceed 350 MWh during any Summer season			
				Firm LD Energy	Amounts of energy that is NOT Additional Energy Subject to conditions that the total of MH's Must Offer Energy, MH's Additional Energy, and MH's Firm LD Energy offered in any hour shall not [REDACTED] at any time			
May 27, 2010	Northern States Power	125 MW System Power	5/1/2021 - 4/30/2025	Fixed Price Energy Summer	125 MW	M-F HE 7-22		
				Fixed Price Energy Winter		M-F HE 9-20		
				Additional Energy		Energy that is not Fixed Price Energy that MH in its sole discretion determines to be available		
May 19, 2011	Wisconsin Public Service	100 MW System Power Sale	6/1/2021 - 5/31/2027	Weekday Energy	100 MW	M-F HE 7-22 CPT, excluding NERC holidays		
				Weekend Energy		Sat/Sun and NERC holidays HE 7-22 CPT		
				Additional Energy		When determined by MH in its sole discretion to be available that are not Weekday or Weekend Energy		
May 19, 2011	Wisconsin Public Service	108 MW Energy Sale	6/1/2012 - 5/31/2023	Firm Product B Energy				
				Energy	108 MW			

The Commercially Sensitive Information contained within this report has been redacted in accordance with the protective order.

Date	Counterparty	Type of Agreement	Term	Type of Energy	Energy Quantity	Hours	Energy Pricing	Notes
May 19, 2011	Minnesota Power	250 MW System Power Sale	5/1/2020 - 4/30/2035	Weekday Energy	250 MW	M-F HE 7-22		
				Weekend Energy		Sat/Sun HE 7-22		
				Additional Energy		Monday - Sunday HE 1-6 and 23-24		
May 18, 2011	Minnesota Power	250 MW Energy Exchange Agreement	5/1/2020 - 4/30/2035	MH Stored Energy	250 MW			MP shall be entitled to require MH to offer to MP the amount of energy that MP has requested on a DA-basis that MH offer to MP during contract term MH agrees to request from MP over the Contract term the energy quantity amount determined as follows:
				MP Energy				
				MP Pumped Energy				
December 19, 2012	Great River Energy	200 MW Term Sheet for Energy and Capacity	11/1/2014 - 4/30/2030*	Must Offer Energy	200 MW			Must offer during Expected Peak Load in MISO (4 continuous hours) Monday - Sunday in the Summer Season (May to October) MH has right to sell additional energy of [REDACTED] or all other hours of the year*
				Additional Energy				
May 28, 2013	Minnesota Power	50 MW Term Sheet for Energy and Capacity	5/1/2015 - 5/31/2020	Firm Energy	50 MW			All days HE 7-22 Amount of energy that is not Firm Energy is available for sale to MP, offered on a DA-basis Amount of energy that MH determines it has available for sale to MP for any day, offered on a RT-basis
				Additional Energy				
				Real-Time Energy				

CONFIDENTIAL Attachment 2

Contract Signed	Counterparty	Type of Agreement	Term	Capacity Quantity	Capacity Pricing	Notes
3/1/2008* *subject to subsequent amendments (most recent dated June 30, 2013)	Wisconsin Public Service	300 MW System Participation Term Sheet	The term will be as negotiated by the Parties and set forth in the definitive agreement for the 500 MW System Participation Power Sale.	Linked to actual generation and transmission in-service dates and specified in the definitive agreement for the 500 MW System Participation Power Sale, with the capacity quantity presently expected to ramp up to a maximum capacity of 500 MW, which maximum capacity would be in effect for the majority of the Contract Term.		
May 27, 2010	Northern States Power	375/325 MW System Power	5/1/2015 - 4/30/2025	375 MW Summer/325 MW Winter		
May 27, 2010	Northern States Power	350 MW Diversity Sale	5/1/2015 - 4/30/2025	350 MW to NSP in Summer Season		
May 27, 2010	Northern States Power	125 MW System Power	5/1/2021 - 4/30/2025	125 MW		
May 19, 2011	Wisconsin Public Service	100 MW System Power Sale	6/1/2021 - 5/31/2027	100 MW		
			6/1/2027 - 5/31/2031	N/A		
May 19, 2011	Wisconsin Public Service	108 MW Energy Sale	6/1/2012 - 5/31/2023	N/A		
May 19, 2011	Minnesota Power	250 MW System Power Sale	5/1/2020 - 4/30/2035	250 MW		
May 19, 2011	Minnesota Power	250 MW Energy Exchange Agreement	5/1/2020 - 4/30/2035	N/A		
December 19, 2012	Great River Energy	200 MW Term Sheet for Energy and Capacity	11/1/2014 - 4/30/2030	200 MW to GRE in Summer Season		
May 29, 2013	Minnesota Power	50 MW Term Sheet for Energy and Capacity	5/1/2015 - 5/31/2020	50 MW		

