



March 7, 2014

Ms. Kate Whitney
Montana Public Service Commission
1701 Prospect Avenue
P.O. Box 202601
Helena, MT 59620-2601

RE: Docket No. D2013.12.85
PPLM Hydro Assets Purchase
PSC Set 10 Data Requests (131-195)

Dear Ms. Whitney:

Enclosed for filing is a copy of NorthWestern Energy's responses to PSC Set 10 Data Requests (131-195). A hard copy will be mailed to the most recent service list in this Docket this date. The Montana Public Service Commission and the Montana Consumer Counsel will be served by hand delivery this date. This Data Request will also be e-filed on the PSC website and emailed to counsel of record.

Should you have questions please contact Joe Schwartzberger at 406 497-3362.

Sincerely,

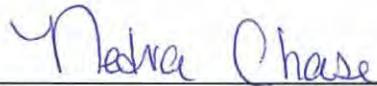
Nedra Chase
Administrative Assistant
Regulatory Affairs

NC/nc
CC: Service List

CERTIFICATE OF SERVICE

I hereby certify that a copy of NorthWestern Energy's responses to PSC Set 10 Data Requests (131-195) in Docket D2013.12.85, the PPLM Hydro Assets Purchase, has been hand delivered to the Montana Public Service Commission and to the Montana Consumer Counsel this date. These Data Request responses will be e-filed on the PSC website and served on the most recent service list by mailing a copy thereof by first class mail, postage prepaid and will also be emailed to counsel of record.

Date: March 7, 2014



Nedra Chase
Administrative Assistant
Regulatory Affairs

**Docket No D2013.12.85
Hydro Assets Purchase
Service List**

Joe Schwartzenberger
NorthWestern Energy
40 E Broadway
Butte MT 59701

Patrick R Corcoran
NorthWestern Energy
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Butte MT 59701

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NorthWestern Energy
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Montana Public Service Commission
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J W Wilson & Associates
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Arlington VA 22209

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2871 Conway Rd. 127
Orlando FL 32815

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Uda Law Firm, P C
7W 6th Ave Suite 4E
Helena MT 59601

Roger Kirk/Ben Singer
Hydrodynamics Inc
521 E Peach Suite 2B
Bozeman MT 59715

Joe Hovenkotter Gen Counsel
Energy Keepers Inc
110 Main Street Suite 304
Polson MT 59860

Ranald McDonald
CSKT Tribal Legal Dept
P O Box 278
Pablo MT 59855

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6380 South Fiddlers Green Circle
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Greenwood Village CO 80111

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Charles Magraw
501 8th Ave
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Dr Thomas Power
920 Evans
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Fred Szufnarowski
Essex Partnership, LLC
65 Main St. Suite 22
Ivoryton, CT 06442

NorthWestern Energy
Docket D2013.12.85
PPLM Hydro Assets Purchase

Public Service Commission (PSC)
Set 10 (131-195)

Data Requests served February 21, 2014

PSC-131

Regarding: Ascend Analytics and PowerSimm
Witness: Fine

- a. Please provide a copy of NorthWestern's service agreement with Ascend Analytics.
- b. Please provide a list of NorthWestern's total compensation thus far to Ascend Analytics, separated into relevant categories; e.g. fixed retainer, charges for the Mustang analysis, charges for other analysis, etc.
- c. Please provide a list of total expected compensation going forward to Ascend Analytics, separated into relevant categories.

RESPONSE:

- a. See attached public version of the requested documents. On March 7, 2014, NorthWestern filed a motion for protective order regarding this Attachment. NorthWestern will update this response by providing this information in the appropriate format after the Commission rules on the motion for protective order.

- b. Total compensation paid to Ascend Analytics for services through February 15, 2014 is as follows:

Market Assessment Special Project	\$38,500.00
Mustang Project	\$29,014.60
Avoided Cost Modeling	\$6,152.00
Software License & Hosting Fee	\$25,000.00
Modeling, Report Preparation, ETAC Presentations, Travel*	\$289,806.21

* This includes Model construction, 2013 Plan Modeling, Model and Results Validation, and 2013 Plan Preparation including Volume 1 Chapter 6 and Volume 2 Chapter 4.

- c. During 2014 NorthWestern estimates the following approximate amounts of compensation associated with services to be provided by Ascend:

PowerSimm Implementation and Licensing	\$152,150
Consulting Services, Witness Services, Support Services	\$100,000



CLM0002979
NWE SPO 403418

CONSULTING AGREEMENT

This Consulting Agreement ("*Agreement*") is made this 13 day of Oct, 2013, by and between Ascend Analytics, LLC, a Limited Liability Company, of 1877 Broadway, Suite 706, Boulder, CO 80302 ("*Consultant*"), organized under the State of Colorado, and NorthWestern Corporation d/b/a NorthWestern Energy ("*NorthWestern*").

NorthWestern and Consultant agree as follows:

1. **Services.** This Agreement is for PowerSimm planner software to support the analysis and development of NorthWestern Energy's resource plan. Consultant shall perform the services in accordance with the Scope of Work attached hereto as Exhibit A ("*Services*") and incorporated herein by this reference. Consultant shall furnish all necessary personnel for the performance of the Services.

NorthWestern's representative for the purposes of this Agreement is David Fine or such other person NorthWestern may designate in writing. Consultant's representative for the purposes of this Agreement is Gary Dorris or such other person Consultant may designate in writing.

2. **Term and Schedule.** The term of this Agreement and any schedule for the performance of the Services is set forth in Exhibit A. Time is of the essence in the performance of each and every obligation by Consultant.

3. **Compensation and Invoicing.** NorthWestern shall compensate Consultant as full payment for Services performed and for all costs and expenses incurred in the performance of the Services in accordance with the rates set forth in Exhibit A.

All invoices shall be sent to:

NorthWestern Corporation
Attn: Accounts Payable – David Fine
40 East Broadway
Butte, MT 59701
Email invoices to: accountspayable@northwestern.com.

All invoices shall reference Agreement # CLM0002979; NWE SPO #403418 and name the NorthWestern representative identified above. The invoice shall provide such detail as to allow NorthWestern to compute the amount due for Services performed. In the event of a dispute regarding an invoice, NorthWestern shall pay the undisputed portion and notify Consultant of the amount in dispute and the basis for the withholding. Payment shall be made within 30 days of receipt of an undisputed invoice for completed Services.

4. **Quality of Service and Correction of Defects.** Consultant shall perform the Services in accordance with the standards of care and diligence practiced by recognized consulting firms and professionals in performing services of a similar nature ("*Standard of Care*"). Consultant's employees, agents, representatives and subcontractors shall have the qualifications to proficiently perform the Services in accordance with current industry standards and required by all applicable governmental regulations. Consultant and each of its employees, agents, representatives and subcontractors shall conduct themselves in a professional, ethical, moral and legal manner.

If Consultant fails to satisfy the Standard of Care, Consultant shall correct the defective Services at no additional cost to NorthWestern. If the Services are of such nature that the defect cannot be corrected by re-performance, NorthWestern may reduce the compensation owed to Consultant to reflect the diminished value of Services performed. The remedies provided herein shall be in addition to any other remedies that NorthWestern may have at law or in equity.

5. Termination.

5.1 Termination for Convenience. NorthWestern may, in its sole discretion, terminate this Agreement for its convenience in whole or in part upon 10 days written notice. In the event of such termination for convenience, NorthWestern shall pay Consultant for Services rendered through the termination date and direct costs (excluding any anticipated or lost profits) incurred by Consultant as a result of the termination. Such payment is Consultant's sole right and remedy.

5.2 Termination for Cause. NorthWestern may terminate this Agreement, without prejudice to any right or remedy, if NorthWestern determines Consultant has breached any of its obligations under this Agreement or Consultant is failing to perform the Services in a timely manner or with the quality required by this Agreement. NorthWestern shall provide written notice to Consultant stating the nature of the breach or unsatisfactory condition. Within 15 days after receipt of this written notice, Consultant shall remedy the breach or unsatisfactory condition or provide evidence, acceptable to NorthWestern, that: (i) proper corrective action is being taken to remedy the condition; or (ii) that no breach has occurred. If Consultant fails to remedy or to commence and thereafter with due diligence pursue resolution of the breach unsatisfactory condition, then NorthWestern may terminate this Agreement without further notice. If this Agreement is terminated for cause, NorthWestern shall pay Consultant for Services satisfactorily performed through the date of termination but will not be liable for any further payment to Consultant. In addition to any other remedies it may have under this Agreement or under the law, Consultant is liable for any direct costs incurred by NorthWestern as a result of the termination.

6. Indemnification. Consultant shall indemnify, hold harmless and defend NorthWestern, its officers, directors and employees from any and all claims, demands, litigation, fines, expenses or liabilities (including costs and attorneys' fees) of every kind and character arising from or incident to the performance of the Services by Consultant for injuries to or death of any person, damages to property, infringement of copyright, trademark, patent or other intellectual property rights, violation of federal, state or local governmental laws, or other breach of legal duty arising from performance of the Services, the work products resulting from the Services and the use thereof or Consultant's breach of any term or obligation of this Agreement. In the event the claims, demands, litigation, fines, expenses or liabilities are caused by the joint or concurrent negligence of NorthWestern and Consultant, the loss shall be borne by each party in proportion to its degree of negligence.

Whenever any suit or other proceeding which involves any matter for which the indemnification provisions of this Agreement are applicable, Consultant shall, upon receipt of timely notice of the institution of such suit or other proceedings, assume the defense thereof and defend the same at its own expense and shall pay any and all costs, charges, attorneys' fees and other expenses and any and all judgments that may be incurred by or obtained against NorthWestern in such suits or other proceedings, and if any judgment or other lien is placed upon or obtained against the property of NorthWestern as a result of such suits or other proceedings, Consultant shall at once cause the same to be released and discharged by giving bond or otherwise.

7. **Limitation.** NorthWestern is not liable to Consultant for any indirect, incidental, consequential, special, exemplary or punitive damages arising from or related to this Agreement, its performance, enforcement, breach or termination, such as, but not limited to, loss of revenue, anticipated profits, or loss of business.

8. **Confidentiality.** Consultant shall not, without the prior written permission of NorthWestern, use, disclose, or permit to be disclosed, or, in the case of documents, reproduce or permit to be reproduced to any third party or entity any Confidential Information acquired from or given by NorthWestern to Consultant in the course of preparing for and performing Services under this Agreement. For the purpose of this Agreement, the term "*Confidential Information*" includes designs, drawings, plans, calculations, formulae, techniques and/or trade secrets or like information and any other written information, data, correspondence or other tangible materials disclosed orally, electronically or in any other intangible form, by NorthWestern as well as data, findings, results, or recommendations developed by Consultant in connection with the Services under this Agreement. Confidential Information includes all information as described herein, whether or not it is marked "Confidential" or "Proprietary".

All Confidential Information disclosed by NorthWestern remains the property of NorthWestern and, upon request, will be returned at termination or upon the expiration of the term of this Agreement. Confidential Information must be used by Consultant strictly for the performance of this Agreement and for no other purpose. Consultant's confidentiality obligation hereunder does not extend to information which: (i) is already public or becomes available to the public through no fault of Consultant; (ii) was in the possession of Consultant prior to receipt from NorthWestern; or (iii) Consultant can demonstrate that such information was independently developed by Consultant without reference to NorthWestern's information.

If compelled by a requirement of a government agency, a court, or by law or discovery to disclose any Confidential Information, Consultant shall make reasonable efforts to resist disclosure and shall notify NorthWestern in writing prior to making any disclosure in order to provide NorthWestern a reasonable opportunity to either waive any objection to such disclosure or request a remedy from the appropriate authority. Consultant shall cooperate with NorthWestern in efforts to obtain such a remedy. If NorthWestern waives its objections or is unsuccessful in its request for a remedy or fails to make such a request, Consultant will only furnish that portion of the Confidential Information that is legally required.

Consultant acknowledges the importance of protecting the security and confidentiality of NorthWestern's non-public customer information in accordance with state and federal customer privacy laws. Consultant shall maintain policies and procedures to: (a) insure the security and confidentiality of customer information, (b) protect against any anticipated threats or hazards to the security or integrity of such information, and (c) protect against unauthorized access to or use of such information that could result in substantial harm or inconvenience to NorthWestern's customers. Consultant shall implement and maintain necessary administrative, technical and physical safeguards to insure the security and confidentiality of customer information.

9. **Ownership of Documents.** All technical or business information, documents, and reports, in whatever medium or format, including but not limited to, data, specifications, drawings, artwork, sketches, designs, plans, records, reports, proposals prepared by Consultant in the course of the Services performed hereunder ("*Prepared Information*"), shall be promptly furnished by Consultant to NorthWestern in accordance with the terms of this Agreement or upon NorthWestern's request. All such Prepared Information shall be the exclusive property of NorthWestern and shall be deemed to be works for hire. To the extent the Services incorporate

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Consultant's proprietary or protected intellectual property, Consultant hereby grants NorthWestern an irrevocable, nonexclusive, royalty-free license for use of the same solely in connection with the operation, maintenance, repair, or alteration of Owner's facilities and business operations.

10. **Insurance.** Consultant shall satisfy the insurance requirements set forth in Exhibit X, attached hereto and incorporated herein by reference. Before commencing Services, Consultant shall deliver to NorthWestern's Contract Administration Department, 40 East Broadway, Butte, MT 59701, an insurance certificate evidencing the required coverage.

11. **Performance of Services.**

11.1 **Laws and Regulations.** Consultant shall comply fully with all applicable workers' compensation requirements and all other applicable federal, state and local laws, regulations, and ordinances. Consultant shall comply with the Americans with Disabilities Act and all Non-Discrimination, Affirmative Action and Utilization of Minority and Small Business Enterprises statutes, regulations, and ordinances.

11.2 **Taxes.** Consultant shall be responsible for payment of all taxes, assessments, and contributions, whether local, state, or federal in nature, in connection with the performance of the Services, including without limitation, contractor's excise tax, and all sales and use tax with respect to labor and materials used to provide the Services, and all social security, Medicare and Medicaid, unemployment insurance, and workers' compensation, and other payroll taxes required to be paid with respect to employees, representatives and direct and indirect agents of Consultant. Consultant shall hold NorthWestern harmless from any and all liability on account of any such taxes or assessments.

11.3 **Changes.** NorthWestern may, by written order to Consultant, make changes within the general scope of the Services. If such change increases or decreases the cost of or time for performing the Services hereunder, then NorthWestern shall make an equitable adjustment in the payment to Consultant and/or the time for performance hereunder.

11.4 **Independent Contractor.** It is specifically agreed and acknowledged that in the performance of the Services, Consultant is an independent contractor and not the employee, agent or representative of NorthWestern.

11.5 **Subcontractors.** Consultant may employ subcontractors to perform any work hereunder only with the prior written consent of NorthWestern. Consultant shall be as fully responsible for the acts or omissions of any subcontractor as it is for its own acts or omissions.

11.6 **Removal of Personnel.** NorthWestern may require Consultant to remove individual personnel from performing Services for any lawful reason.

11.7 **Nonexclusive.** This Agreement is not exclusive. NorthWestern may retain the services of other consultants for this and similar work and Consultant may perform services for third parties.

11.8 **Conflicts of Interest.** In consideration of the mutual covenants contained in this Agreement, Consultant knowingly and voluntarily agrees that during the term of this Agreement, Consultant will not, except as otherwise expressly permitted herein, consult with, render services to, or become employed by any person or entity which was the

subject or beneficiary of any Services Consultant provided to or on behalf of NorthWestern pursuant to this Agreement.

12. **Force Majeure.** If either party is prevented in whole or in part from performing its obligations under this Agreement by unforeseeable causes beyond its reasonable control and without its fault or negligence, then the party so prevented shall be excused from performance, to the extent performance is actually affected; provided that the affected party delivers written notice to the other party of the force majeure condition within a reasonable time after the onset of such condition.

13. **Examination of Consultant's Records.** Upon reasonable notice, NorthWestern or its third party representative may examine any books, records, or other documents of Consultant directly relating to the performance of the Services and the costs thereof. Consultant shall cooperate in this effort and make employees and records reasonably available.

14. **Applicable Law, Forum and Disputes.**

14.1 **Law and Venue.** This Agreement shall be governed in all respects by the laws of the State of Montana. Any action arising out of this Agreement must be brought in state or federal courts of the State of Montana and Consultant consents to the jurisdiction of such courts in any such action or proceeding and waives any objection to venue therein. Process in any action or proceeding referred to in the preceding sentence may be served on either party electronically.

14.2 **Dispute Resolution.** When a dispute has arisen and negotiations between the parties have reached an impasse, either party may give the other party written notice of the dispute. In the event such notice is given, the parties shall attempt to resolve the dispute promptly by negotiations between representatives who have authority to settle the controversy and who are at a higher level of management than the persons with direct responsibility for the matter. The representatives shall confer in person or by telephone promptly to attempt to resolve the dispute. If the dispute has not been resolved by negotiation between the representatives within 30 days of the notice, then either party may proceed to a court of competent jurisdiction.

15. **Notices.** Notices required or permitted to be given under this Agreement will be in writing and deemed to be properly given if (i) delivered in person, (ii) sent by electronically with confirmation, (iii) deposited in the United States mail with first class postage prepaid certified mail, return receipt requested, or (iv) delivered by private, prepaid courier and addressed to the appropriate party representative at the address set forth below:

Ascend Analytics
1877 Broadway, Suite 706
Boulder, CO 80302
Attn: Gary Dorris
Phone: 303-415-1400

NorthWestern Energy
40 East Broadway
Butte, MT 59701
Attn: David Fine
Phone: 406-497-3363

16. **Survival.** Each of the terms, conditions and obligations set forth in Sections 4, 6, 7, 8, 9, 10, 13 and 14 shall survive the termination or expiration of this Agreement for the maximum period allowed under applicable law.

17. **Miscellaneous.** Consultant shall not assign this Agreement, in whole or in part, without the prior written consent of NorthWestern, which consent will not be unreasonably withheld. A

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waiver by either party of any default or breach by the other party of any covenants, terms or conditions of this Agreement will not limit the right of a party to enforce such covenants, terms or conditions or to pursue rights in the event of any subsequent default or breach. If any portion of this Agreement is held to be void or unenforceable, the balance will continue to be effective. This Agreement is binding upon and inures to the benefit of the heirs, legal representatives, successors and assigns of the parties. This Agreement will not be modified, amended or changed in any respect except by a written document signed by the parties. This Agreement is for the exclusive benefit of the parties and does not constitute a third party beneficiary agreement and may not be relied upon or enforced by a third party. Each party represents that it has full power and authority to enter into and perform this Agreement and the person signing this Agreement on behalf of each party has been properly authorized and empowered to sign this Agreement. This Agreement constitutes the entire agreement of the parties. Covenants or representations not contained or incorporated therein are not binding upon the parties. This Agreement may be executed in counterparts, which together constitute one instrument. Copies of this fully executed instrument have the same force and effect as the original.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed effective the day and year first above written.

**NorthWestern Corporation d/b/a/
NorthWestern Energy
(NWE)**

**Ascend Analytics, LLC
(Consultant)**

By: *John D. Hines*
Print Name: John D HINES
Title: VP - Supply
Date: 10/13/13

By: *Gary W. Doerflinger*
Print Name: Gary W. Doerflinger
Title: President
Date: Oct 10, 2013

Exhibit A

SCOPE OF WORK AND FEE SCHEDULE

Summary: To provide NorthWestern with consulting expertise and PowerSimm planner software to support the analysis and development of NorthWestern Energy's resource plan.

TASK 1 – Deterministic base Resource selection

Purpose: Perform resource evaluation using deterministic modeling results building on the base portfolio analysis of Ascend's previous study that examined the impacts of the potential retirement of Colstrip.

Ascend will work in conjunction with NorthWestern on the establishment of baseline portfolio conditions and resources for evaluation. The first activity will be to review the market inputs assumptions and values applied in the previous analysis. For the input assumptions, we will continue to follow the precepts of developing market based values that are well supported by system fundamentals of demand and supply. The over-riding factor will be consistency of market input assumptions for power with be long-run equilibrium. Operating reserves will be included in the analysis by applying WSCC standards of 5% to wind and thermal generation and 7% to hydro generation. The resources to be evaluated as part of the resource expansion plans are shown in Table 1. The levelized revenue requirements for each resource options will initially be input as a fixed cost item. These costs will be dynamically calculated in Tasks 4 and 5.

Table 1. Resources Options for Consideration

Type	Resource	Size	Considerations
Baseload	Combined Cycle		
	Gas Combined Heat & Power		
Intermediate/Peaking	Aeroderivative Gas Turbine		Capital cost
	Frame Gas Turbine		Start-up costs
	Reciprocating Engine		
Renewable & Other	Solar PV		
	Wind		

Recognizing that subsequent tasks will provide uncertainty analysis, sensitivities will be kept to minimum to avoid duplication of effort. Potential sensitivity scenarios are listed in Table 2. Carbon pricing will follow an expected value consistent with the probability weighted mode of the carbon price distribution to be used in Task 2. Because the uncertainty analysis of Task 2 creates a time series pattern of future conditions that are more reflective of shock and retreat patterns observed for market prices and load, the limitation of sensitivity analysis to adequately reflect uncertainty will be a notable difference between simulations and deterministic scenarios.

Table 2. Potential Sensitivity Scenarios

Sensitivity Variable	Scenario Case
Carbon	Low, Med, High
Load	Low, Med, High
Gas	Low, Med, High

Because of the need for rapid generation of results, Ascend will defer the preponderance of training on PowerSimm following completion of this task. The expected time schedule for this task is five weeks.

TASK 2 – resource selection under uncertainty

Purpose: This task provides resource evaluation with uncertainty.

The critical dimension to incorporating uncertainty into portfolio analysis is to substantiate that uncertainty has been added in a meaningful manner that both benchmarks well to observed values and incorporates fundamental physical relationship such as weather driving load and load driving prices for power and in some cases wind. A list of the type of validation analysis to be provided is shown in Appendix A. The end result will be to provide NWE with a “validation” section to the resource plan that uses graphics and tabular results to substantiate the credibility that uncertainty has satisfied rigorous benchmark criteria.

The expected time scheduled for this task is six weeks.

This could increase if there is a requirement for multiple scenario development.

TASK 3 – Flexible Resource Adequacy

Purpose: This task identifies potential costs and reliability limitations associated with adding additional renewable resources to the portfolio.

Limited resource flexibility has proven to be a challenge for generators in the Pacific Northwest. The premium for flexibility has been manifest through negative market prices for energy and the opening of an active market for spinning regulation reserves. The fundamental issue of resource flexibility will likely persist into the future as additional renewable generation continues to rapidly be added to the WSCC with limited offsets from retiring coal generation. For the NWE, the issue of flexibility has direct operating implications.

The addition of the current planned wind generation for 2015 and additional wind generation poses a cost. The costs and flexibility requirements of procuring additional wind generation can be measured in terms of ramp-up and down and start-up and shut-down cost realized by NWE. These costs can be understood in terms of both the direct physical production costs and market interactions in two distinct states: a) with wind generation b) without wind generation. We will look at the costs and conditions of flexibility, in terms of the following principal factors:

1. Hours, quantity, and costs when NWE will be forced to sell electricity because of must run constraints from generation and expected forward market purchases
2. Hours, quantity, and cost when NWE has a rapid change of generation supply that forces a sudden an unexpected sale of electricity
3. Hours, quantity, and cost when NWE has to sell electricity at negative market prices

From the above three factors, we will utilize the simulations to develop a range of potential outcomes and their associated costs. Costs will be considered in terms of direct response costs and market interactions.

TASK 4 – Automatic Deterministic Resource selection

Purpose: This task automates the resource selection process of Task 1.

Automatic resource selection determines the mix of future supply resources to minimize the total revenue requirements for power generation while satisfying constraints related to annual energy purchases and sales and renewable resources. Deterministic resource selection, will pick the best resource plan for a given future forecast.

The expected time scheduled for this task is about four weeks.

TASK 5 – AUTOMATIC Stochastic Resource Selection

Purpose: This task automates the resource selection process of Task 2.

This task builds on the results of Task 4 to determine the best mix of future supply resources over a broad range of future conditions.

TASK 6 – Report Development

Ascend will contribute to developing NWE's resource plan. Ascend will provide descriptions and overview of PowerSimm, the resource selection process, and analytics used to analyze flexible resource adequacy. In addition, Ascend will provide its experience and approach to communicate the inclusion of uncertainty as part of a resource plan.

Activity	Estimated Cost
Task 1: Deterministic Base Resource Selection	\$25,000
Task 2: Resource Selection Under Uncertainty	\$25,000
Task 3: Flexible Resource Adequacy	\$30,000
Task 4: Automatic Resource Selection with Uncertainty	\$15,000
Task 5: Automatic Resource Selection with Uncertainty	\$15,000
Task 6: Report Development/Presentation	\$25,000
Subtotal:	\$135,000
Software and Hosting Fee ¹	\$25,000
Travel	\$4,000
TOTAL Not To Exceed Amount:	\$169,000

Travel expenses will be billed at cost (travel, rental, lodging, meals) or can be pre-arranged and paid for by Northwestern. All work contemplated herein as well as additional work beyond the initial scope will be billed on a time and materials basis at Ascend's standard rates:

Table 4. Consulting Rates

Staff	Project Role	Rate 2013
Alex Lauderbaugh	Analyst	
Brock Mosovsky	Senior Analyst	
David Bellman	Project Manager	
Chuck Tooman	Managing Consultant	
Sean Burrows, PhD	Principal Analyst	
Gary Dorris, PhD	Engagement Director	

¹ The software fees are inclusive of PowerSimm and supporting software with the exception of SAS. NWE may be required to purchase a workstation license of SAS for approximately \$12,000, which can then be utilized for future PowerSimm activities.

EXHIBIT X

Insurance Requirements

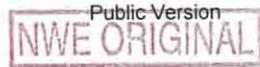
1. Coverage: Consultant shall secure and maintain at its own cost and expense the following minimum insurance coverage:

- 1.1 Commercial General Liability: \$1,000,000
- 1.2 Automobile Liability: \$1,000,000
- 1.3 Worker's Compensation: Statutory
- 1.4 Employer's Liability: \$1,000,000 each accident; \$1,000,000 disease - policy limit; and \$1,000,000 disease – each employee
- 1.5 Professional Liability: \$1,000,000

2. Policy Requirements: All policies must:

- 2.1 be placed with such insurers having an A.M. Best rating of A-VII or better (not applicable to professional liability);
- 2.2 be endorsed to name NorthWestern as an additional insured with respect to any liabilities assumed under the Agreement (not applicable to workers' compensation, employers' liability and professional liability);
- 2.3 apply severally and not collectively to each insured against whom claim is made or suit is brought;
- 2.4 be primary with respect to the interest of NorthWestern as additional insured and any insurance maintained by NorthWestern is excess and not contributory insurance with the insurance required hereunder;
- 2.5 include a waiver of the right of subrogation against NorthWestern;
- 2.6 include within automobile coverage(s), owned, non-owned, hired and borrowed vehicles; and
- 2.7 not be canceled or have limits or coverage reduced or restricted without Consultant providing at least 30 days prior written notice to the Contract Administration Department, NorthWestern Energy, 40 East Broadway, Butte, Montana 59701.

3. Evidence of Insurance. The completed insurance certificate form and a copy of the policy endorsement must be delivered to the NorthWestern Energy Contract Administration Department, 40 East Broadway, Butte, Montana 59701.



MODIFICATION NO. 1
To the Agreement between
NorthWestern Corporation d/b/a NorthWestern Energy
And
Ascend Analytics, LLC
Contract #CLM0002979
NWE SPO 403418

Contract Date: October 10, 2013

TO: Gary Dorris
Ascend Analytics, LLC
1877 Broadway, Suite 706
Boulder, CO 80302

CONTRACT DESCRIPTION: Modeling and expert reports/testimony preparation consulting

The above referenced contract is hereby modified as follows:

DESCRIPTION OF CHANGE: To expand the services and payment provided under the contract

CONTRACT COMPLETION DATE ADJUSTMENT: March 31, 2014.

PAYMENT ADJUSTMENT: Exhibit A, Scope of Work and Fee Schedule, shall be changed to reflect the following agreed-upon addition:

Table 5 – for Task 7, Not-to-Exceed \$100,000.00

Name	Responsibility	2013 Commercial Rates
Gary Dorris, Ph.D.	Engagement Director	
Alex Lauderbaugh	Project Manager	
Brock Mosovsky, Ph.D.	Managing Analyst	
Michael Burt	Senior Analyst	

There will be premium charges of an additional \$100/hr for time spent by Gary Dorris for providing and in direct preparation of testimony.

OTHER: The following additional Task shall be added to Exhibit A:

Task 7

Ascend Analytics will develop expert reports, perform analysis, provide general economic consulting expertise, expert witness services, and as best serve the interests of NorthWestern Energy in support of regulatory proceedings.

Ascend Analytics will also provide supporting work products to address issues and topics such as utility best practices in resource and portfolio planning.

The above adjustments constitute the entire and complete modification to the contract referenced herein. Except as modified by the above, all terms and conditions of NWE Contract #CLM0002979/NWE SPO 403418 shall remain in full force and effect.

NORTHWESTERN CORPORATION
d/b/a NORTHWESTERN ENERGY
(Company)

ASCEND ANALYTICS, LLC
(Contractor)

By: <u><i>John D. Hines</i></u>	By: <u><i>Gary W. Dorris</i></u>
Printed Name: <u>John D HINES</u>	Printed Name: <u>Gary W. Dorris</u>
Title: <u>VP-Supply</u>	Title: <u>President</u>
Date: <u>10/13/13</u>	Date: <u>10/13/2013</u>

Public Version
ORIGINAL

MODIFICATION NO. 2
To the Agreement between
NorthWestern Corporation d/b/a NorthWestern Energy
And
Ascend Analytics, LLC
Contract #CLM0002979
NWE SPO 403418

Contract Date: October 10, 2013

TO: Gary Dorris
Ascend Analytics, LLC
1877 Broadway, Suite 706
Boulder, CO 80302

CONTRACT DESCRIPTION: Modeling and expert reports/testimony preparation consulting

The above referenced contract is hereby modified as follows:

DESCRIPTION OF CHANGE: To expand the services provided under the contract

CONTRACT COMPLETION DATE ADJUSTMENT: September 30, 2014.

PAYMENT ADJUSTMENT: Contractor must specify Order No. 111720 and PO Line 20 on all invoices for work completed under this Modification.

OTHER: The following additional scope of services shall be added to Exhibit A:

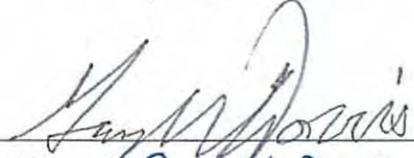
Scope of Work to be performed by Ascend Analytics in support of the Hydro acquisition and MPSC docket, to include modeling; work with MPSC consultant, intervenors, and ETAC; witness services and answering data requests; work with NWE staff; preparation of rebuttal testimony; and other tasks as assigned by NWE.

The above adjustments constitute the entire and complete modification to the contract referenced herein. Except as modified by the above, all terms and conditions of NWE Contract #CLM0002979/NWE SPO 403418 shall remain in full force and effect.

NORTHWESTERN CORPORATION
d/b/a NORTHWESTERN ENERGY
(Company)

ASCEND ANALYTICS, LLC
(Contractor)

By: 
Printed Name: JOHN D. HINES
Title: VICE PRESIDENT - SUPPLY
Date: 2/24/14

By: 
Printed Name: Gary W. Dorris
Title: President
Date: 1/22/14

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PSC-132

Regarding: Carbon Cost Distribution
Witness: Dorris

- a. Please explain why you chose to model carbon costs using a triangular probability distribution rather than a uniform or other continuous distribution. Be specific with respect to expected costs and benefits, and available prior information.
- b. Please explain why you chose to model carbon costs with a continuous distribution rather than a discrete distribution with positive probability at selected price points. For example, positive probability at zero, \$10, \$20, \$30, etc. Please be specific with respect to expected costs and benefits, and available prior information.
- c. Please describe in detail how a simulation draws from the triangular distribution to generate a sequence of carbon cost outcomes. For example, please provide the date and time of the first draw, the time intervals between subsequent draws (if any), independence of draws within a simulation, independence of draws between simulations, assumed escalation factors, and any other information used to generate a sequence of carbon costs for a given simulation.

RESPONSE:

- a. The triangular distribution was selected for several reasons:
 1. The triangular distribution is often applied to problems where actual data is absent, but an understanding of a range in values can be derived.
 2. The triangular distribution provides equal weight in the current formulation for values above and below the mean. Recognizing that the mean of the distribution for carbon is at the very lower end of other utility carbon forecast curves shown in Figure 6-11 (Volume 1, Chapter), the assumption realized through the triangular distribution that half of the realized outcomes for carbon will be below the conservative (low) carbon forecast further buttresses the conservative assumption of low carbon prices. Although the uniform distribution places equal weight between values above and below the mean, there is no weighting of values closer to the mean. This would place too much emphasis on the tail values and potentially bias the results.
 3. The triangular distribution is bounded for all values between the min and max of the distribution. The normal distribution would be inappropriate because of the potential for negative carbon prices and very large carbon prices. The lognormal and Beta also

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hold potential for extremely high carbon prices because of their natural leptokurtic construct and positive skew, providing potential simulation values substantially greater than the maximum value of the triangular. Consequently, the triangular yields a relatively easy-to-understand distribution of values with established min and maximum values.

4. The triangular distribution is a continuous distribution that probabilistically envelopes future states of carbon conservatively consistent with the survey of carbon curves.

The use of distributions that probabilistically envelope future states provides a substantial step forward from deterministic scenarios. Deterministic views of future conditions are absent the natural variability of weather, hydro conditions, and commodity prices that will inevitably be realized. There simply is no “normal” to adequately represent the future with a single realization. Not only would selection of a deterministic run produce a biased and inconsistent estimator relative to the mean of simulated conditions, use of a deterministic run would also provide negligible understanding of the uncertainty of enshrouding future conditions.

The natural myopia of the deterministic framework has traditionally been expanded by use of sensitivity runs. However, sensitivity runs tend to expand upon the limitations of deterministic runs by adding very limited dimensions of uncertainty inconsistent with observed price patterns. For example, a high gas case would simply increase monotonically the rate of escalation of gas prices by 5% annually over the study horizon. These monatomic shifts in prices fail to capture the range in price movements from episodic events such as war, hurricanes, or sharp recessions. Moreover, we're left with model results predicated upon the unrealistic and unrepresentative input assumptions. The ability to utilize results of the scenario runs into the resource selection process becomes extremely challenged with alternative plans perceived to have equal weight.

- b. A discrete distribution is one in which the data can only take on certain values, for example \$10, \$20, or \$30. A continuous distribution is one in which data can take on any value within a specified range. A continuous triangular distribution enables carbon to take on any value within the bounded range. As mentioned above, the triangular distribution is often applied to problems where actual data is absent, but an understanding of a range in values can be derived. The available prior information is shown in Figure 6-11 (Vol. 1, Chapt. 6) from the sample of carbon costs used in other Integrated Resource Plan filings.

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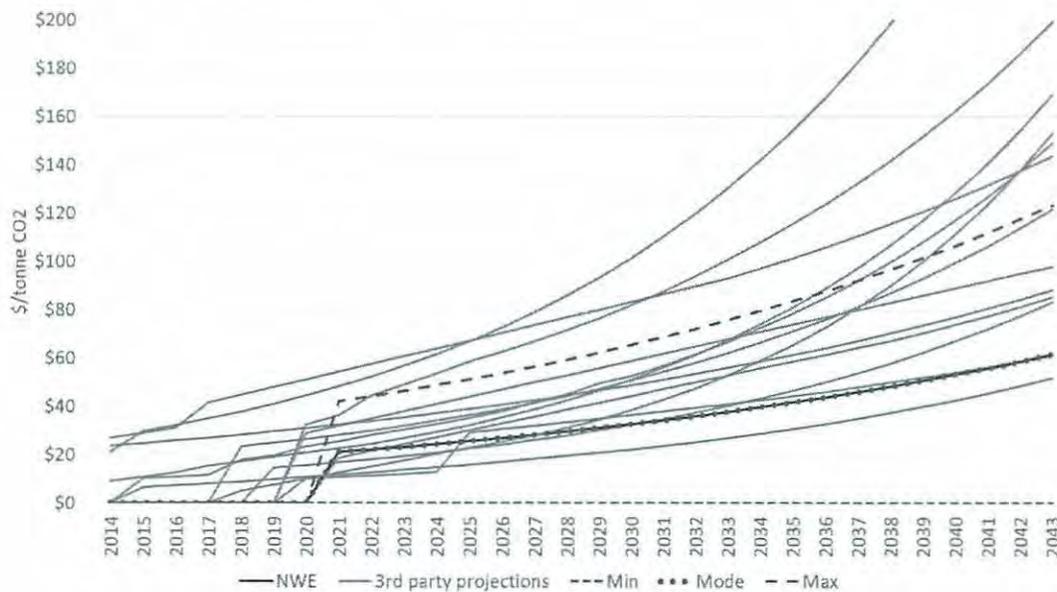
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Figure 6-11

CO₂ Price Projections & Assumed Triangular Distribution



Recognizing that the carbon data consists of other forecasted carbon prices, the accepted empirical modeling practice with limited data would be to utilize a triangular distribution. Ascend has utilized the triangular distribution for carbon in other IRP filings.

The question notes a positive probability to zero value for carbon. While the triangular distribution does have a positive, albeit infinitesimally small, value, we believe a zero price for carbon over the planning horizon is not realistic. The Public Service Commission for the state of Washington recently ruled that a zero cost for carbon is “unrealistic and unreasonable.” The economic rationalization for ruling against a zero carbon cost follows from the inability of utilities to procure long-term power from coal or gas generation with the seller carrying the full burden of future carbon legislation. Because no independent power producer was willing to assume carbon risk for an extended future sale of power, the price of carbon is clearly greater than zero.

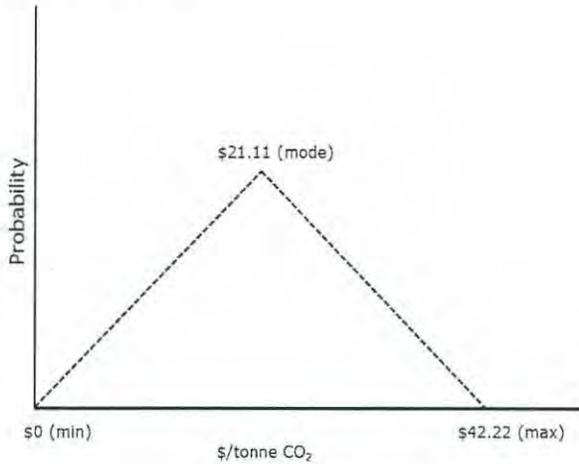
The economic realities observed through independent power producers’ inability to assume the risk of carbon provides a firm marker that carbon remains a tangible expected

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The following graphics illustrate the generation Monte Carlo simulations for carbon prices from the triangular distribution.

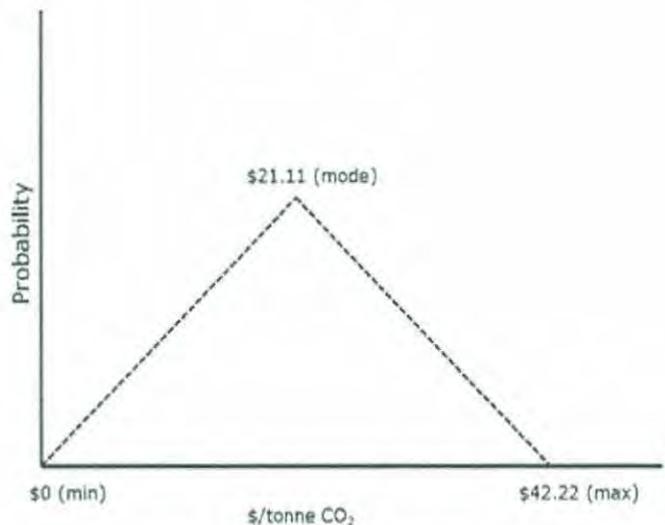
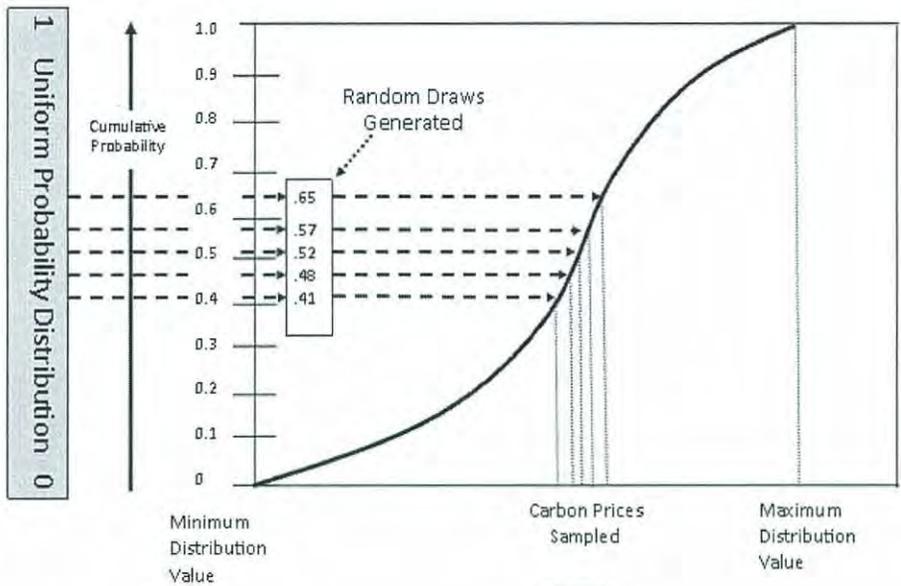
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Cumulative Distribution to Triangular Distribution



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The generation of simulated values from the triangular distribution follows the process illustrated above. First, probabilities are drawn from a uniform distribution of 0 to 1. Then these probabilities are aligned with the probabilities of the cumulative triangular distribution. The cumulative distribution translates these random draws into values from the price of carbon. The probabilities and values then combine to shape the probability density function of carbon through the Monte Carlo simulations.

Carbon prices in 2021 are drawn through the Monte Carlo simulation process described above. The price of carbon is held constant over the entire year. Because we have no time series pattern for the behavior of carbon prices, the carbon prices for subsequent years are drawn independent of the prior year's carbon price. The mode for carbon follows a 5% real escalation rate. The maximum value for carbon is simply double the mode, creating an equilateral triangle.

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PSC-133

Regarding: Triangular Distribution Method
Witness: Dorris

- a. What probability is assigned to a \$0 carbon price in the triangular distribution that PowerSimm uses to model carbon pricing?
- b. In response to PSC-072b, Mr. Fine states that “The stochastic simulation of the carbon price variable included low and high price trajectories that effectively capture the effects of earlier or later onset dates in the PowerSimm models.” Please explain whether PowerSimm incorporates any carbon price prior to the year 2021, and whether the model excludes a carbon price for years after 2021.
- c. Is the carbon price effect isolable as to its effect on the NPV of the portfolios resulting from the PowerSimm modeling? If not, please explain why. If it is, please provide the quantification of the carbon price’s effect on each of the six PowerSimm portfolio runs.

RESPONSE:

- a. The triangular distribution does have a positive but extremely small probability of realizing a zero price for carbon over the planning horizon. The economic rationale for the low probability weighting of \$0 carbon price is discussed in the response to Data Request PSC-132b.
- b. Carbon prices are included as of January 1, 2021. The price of carbon prior to 2021 has been assumed to be \$0/ton. Relative to the carbon curves of other utilities shown in Figure 6-11, the start year of 2021 further represents the relatively conservative carbon assumptions used in the analysis. Carbon was consistently modeled from the triangular distributions from 2021 to the end of the study horizon.
- c. The value or cost of carbon cannot be removed from the NPV of the portfolios without rerunning the portfolios. It has been agreed that no additional runs will be performed. Furthermore, rerunning of PowerSimm with no carbon costs would provide an inappropriate economic framework to assess the future supply costs and risks. Carbon is part and parcel of future energy supply risks. Exclusion of carbon would be inconsistent with the established criteria to probabilistically envelope future carbon prices. While the analysis has taken a conservative approach to modeling future carbon prices, it would not be realistic or reasonable to diminish the value of carbon over the planning horizon to zero.

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PSC-134

Regarding: PowerSimm Modeling
Witness: Fine

- a. Does NorthWestern believe that modeling the six portfolio alternatives (see Table 1 in February 14, 2014 Supplement to the 2013 Electricity Supply Resource Procurement Plan) in PowerSimm with alternative assumptions concerning the mode and upper limit of the carbon cost distribution would be prohibitively expensive? If so, please explain why in detail.
- b. If the answer to part (a) is “yes,” should the Commission discount the value of the model for an inability to cost effectively produce information the Commission or intervenors need to evaluate whether granting preapproval is in the public interest?
- c. Should the Commission discount the value of the model for the purpose of evaluating whether preapproval of the Hydros acquisition is in the public interest, given that the Commission and intervening parties do not have access to the model for the purpose of checking the sensitivity of outcomes to alternative parameter and probability distribution specifications?

RESPONSE:

- a. No. NorthWestern believes it has provided a thorough and complete analysis of carbon price impacts through the use of the defined stochastic variable. See the response to Data Request PSC-132 for a detailed explanation of carbon price sampling.
- b. See the response to part a, above.
- c. No. NorthWestern has provided a thorough analysis using appropriate modeling metrics and methods. The conclusions reached in the 2013 Electricity Supply Resource Procurement Plan (2013 Plan) and further supported by supplemental modeling results and answers to be provided for Data Requests PSC-162 and PSC-163 demonstrate that the evaluation of future supply portfolio costs and risks have been examined over an adequate range of potential future states.

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PSC-135

Regarding: Hedging Acquisition Costs
Witness: Stimatz

- a. If NorthWestern acquires the Hydros at the proposed price, and future market prices do not attain NorthWestern's projected levels, would NorthWestern's customers face out-of-market exposure?
- b. All else equal, is the value of the Hydros directly correlated with carbon costs? If not, please explain.
- c. All else equal, are the values of thermal assets such as Colstrip 3 inversely correlated with carbon costs? If not, please explain.
- d. Did NorthWestern examine the potential value of a combined hydro/coal acquisition to reduce customers' potential out-of-market exposure to lower than expected market prices due to lower than expected carbon costs?

RESPONSE:

- a. No. On the contrary, the acquisition of the Hydros greatly reduces customers' exposure to market prices. Future expenses related to the Hydros are relatively predictable and not dependent on changes in market prices. In contrast, other supply alternatives such as a combined cycle combustion turbine face large market price exposure due to variability in fuel prices. After Kerr is conveyed to the CSKT in 2015, market sales will be a minor component of the supply portfolio because the portfolio will be short on average. The cost of the Hydros to customers will not be dependent on market prices and customers will not face "out of market" exposure because in most instances, NorthWestern will not be selling energy into the market.
- b. Since there are no carbon costs or expenses associated with the Hydros, NorthWestern takes the term "carbon costs" to be a reference to both the carbon component of electricity market pricing and the carbon costs for thermal generators. If this is the case, then yes, all else equal, on a forward-looking basis, the market value of the Hydros is positively correlated with the forecasted price of carbon. However, as described in part a, above, the costs to customers are expected to be very stable and predictable and not dependent on the market price of electricity or the market price of carbon. If carbon prices turn out to be something other than what was forecast, this may impact the future *market value* of the Hydros (i.e., their resale value), but it won't change their value to NorthWestern's customers.

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- c. Yes.
- d. Acquisition of the combined hydro/coal portfolio would not have reduced customers' exposure to lower than expected market prices, whether driven by carbon costs or other factors.

As described in the response to part a, above, the acquisition of the Hydros alone dramatically decreases NorthWestern's customers' exposure to the uncertainty of market prices. With the acquisition of the Hydros alone, NorthWestern customers do not have exposure to lower than expected market prices because the portfolio including the Hydros will still be short on average.

The acquisition of a combined hydro/coal portfolio would have greatly increased NorthWestern's customers' exposure to lower market prices because it would have provided far more output than is needed to meet load. A combined hydro/coal acquisition would have put the portfolio in a long position of approximately 450 average megawatts.

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PSC-136

Regarding: Thermal Asset Confidential Information Memorandum
Witness: Meyer

- a. Did PPL provide a Confidential Information Memorandum (CIM) to NorthWestern regarding the attributes of its thermal assets and other thermal asset offer conditions of Project Mustang?
- b. If so, did NorthWestern use the CIM to inform thermal asset model specifications in its revenue requirement or DCF models?
- c. Did PPL provide an updated CIM at any further point prior to July 1, 2013?
- d. If so, did NorthWestern use the update CIM to inform or update thermal asset model specifications in its revenue requirement or DCF models?
- e. Please provide all Confidential Information Memoranda that were provided to NorthWestern for the purpose of evaluating the PPL thermal assets. If a complete, updated version is available that represents conditions and attributes following May 6, 2013, that version alone will suffice.

RESPONSE:

- a. Yes. PPL provided a CIM dated September 2012 that contained information for both the thermal and hydro assets.
- b. Yes. Similar to the process for the hydros, NorthWestern used the CIM as a point of reference but further refined the estimates through the due diligence process and used these as inputs into the both the revenue requirement and DCF models. As discussed in the responses to several data requests, these inputs did not capture all the unknown and unquantifiable risks associated with future environmental regulations and the sale-leaseback.
- c. PPL provided a thermal-only CIM dated April 2013 and a hydro-only CIM dated June 2013.
- d. NorthWestern utilized the updated thermal-only CIM as confirmation that the sale-leaseback would be terminated and removed the lease expense related to the sale-leaseback.

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- e. NorthWestern provided the redacted public version of the September 2012 CIM as part of its updated response to Data Request MCC-009 filed on February 18, 2014. See the file named "MCC_009_00000526" in the folder labeled "MCC-009" on the CD provided with that response.

As for the April 2013 thermal-only CIM, on March 3, 2014, NorthWestern objected to this portion of the data request. NorthWestern will respond, if necessary, after the Commission has ruled on the objection.

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PSC-137

Regarding: AEO Carbon Forecast
Witness: Fine

- a. Is the AEO carbon price forecast specifically predicated on GHG regulation through state plans pursuant to Section 111(d) of the Clean Air Act?
- b. Please describe, to the best of your knowledge, how AEO decided to use \$15/ton as a benchmark for carbon price in the GHG15 scenario that NWE adopted for use in its electricity price forecast.
- c. Why did NWE choose to adopt the GHG15 AEO scenario, rather than another AEO carbon-price scenario?

RESPONSE:

- a. No, to NorthWestern's knowledge the EIA does not specifically state that its GHG regulation cases are based on Section 111(d) of the Clean Air Act.
- b. NorthWestern does not know how the EIA decided on its carbon cases. See the Attachment provided in response to Data Request PSC-120 for the description of carbon cases included in the 2013 AEO.
- c. The three EIA 2013 AEO carbon cases (GHG10, GHG15, and GHG25) were reviewed internally and presented to the Electric Technical Advisory Committee. The GHG15 case, which is the medium case, is a reasonable case for NorthWestern to incorporate into resource planning work.

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PSC-138

Regarding: NWE's Carbon Regulation Assumptions
Witness: Fine

- a. By adopting a carbon price in its electricity price forecast, is NWE assuming that carbon will be regulated in some manner in the future?
- b. If the answer to subpart (a) is affirmative, does NWE believe that the vehicle for carbon regulation is likely to be the regulation of carbon emissions through Section 111(d) of the Clean Air Act?

RESPONSE:

- a. No, but it is a necessary risk to model.
- b. See the response to part a, above.

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PSC-139

Regarding: NWE's Use of Other Utilities' Carbon Scenarios
Witness: Dorris

- a. How many of the resource plans and IRPs that NWE consulted used multiple scenarios for CO₂ price analysis?
- b. How did NWE select which scenario of particular utilities to use in creating the table that it provided in response to PSC-073a?
- c. The Commission has reviewed the Puget Sound Energy 2013 IRP, which spells out 4 carbon price scenarios: Base, Low, High, and Very High. Which of these did NWE use for the purposes of creating Figure 6-11 and the spreadsheet provided in response to PSC-073a?
- d. Do any of the utilities use a triangular distribution of carbon price in their modeling, like NWE is using through PowerSimm?

RESPONSE:

- a. NWE consulted 13 planning entities' CO₂ forecasts. Of these, eight showed multiple scenarios for CO₂ price.
- b. NWE took an average of all presented scenarios in each document to report one price trajectory for each utility, excluding scenarios with zero CO₂ price. NWE does not believe it to be likely for a zero price of carbon to be realized in the planning horizon, nor prudent to plan based on a zero carbon price forecast; see the response to Data Request PSC-132b. For this reason, we did not include price trajectories of zero value for carbon in the utility-level averages shown in Figure 6-11 of the 2013 Plan.
- c. NWE took an average of the Low, High, and Very High. We did not include Base, a trajectory with zero CO₂ price, in this average for reasons discussed in the response to Data Request PSC-132b and in the response to part b, above.
- d. Triangular distributions have been applied by other Western Electricity Coordinating Council (WECC) utilities. However, the use of stochastics in the planning process is an emerging best practice. Stochastics have become central to intermediate term portfolio hedging and balancing. The benefits of incorporating risk into intermediate term portfolio management decisions have begun to migrate to the planning process. The Northwest Power and Conservation Council (NWPPCC) has recognized the risk

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incumbent with resource planning and has used stochastics as part of the regional resource plan for Washington, Oregon, Idaho, and Montana. By including “meaningful uncertainty” through a well validated use of stochastics in the planning process, NorthWestern has realized best practices in resource planning.

For the utilities we surveyed for this analysis, the price of carbon was not simulated. The utility plans reviewed did not utilize stochastic processes, or a simulation-based approach to quantify expected costs and risks, however. NWE’s use of a triangular distribution to characterize future CO₂ prices is appropriate and consistent with the overall stochastic modeling framework and would not be immediately applicable to a deterministic or scenario-based view of future conditions, as presented in the utilities’ resource plans.

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PSC-140

Regarding: NWE's Modification of Utilities' Carbon Price Forecast
Witness: Dorris, parts a & b / Fine, part c

- a. Please describe, for each column showing the nominal dollar price in the response of PSC-073a, how the dollars/ton was calculated (i.e., were these values taken directly from utilities' plans, or has NWE modified the information out of those utilities' plans in some way?)
- b. NWE uses the term "tonne" in Figure 6-11. Does it mean metric ton, and, if so, has NWE adjusted the carbon price estimates listed in the columns on the spreadsheet in response to PSC-073a appropriately?
- c. Please identify the carbon forecasts you considered but did not include in your representation on Figure 6-11, which you mention in response to PSC-073c.

RESPONSE:

- a. As described on page 6-27 of the 2013 Plan, NWE took these cost numbers directly from other utilities' planning documents. In order to present self-consistent prices in Figure 6-11, NWE converted all CO₂ prices to nominal dollars when necessary using a 2.1% rate of inflation. Most utilities presented their price forecasts originally in nominal dollars, so this conversion was only necessary for a few forecasts: Idaho Power (NWE first averaged Planning and Upper constant dollar prices, then converted to nominal), Seattle City Light (converted from 2010\$), and Xcel – New Mexico (CO₂ price dollar years were not specified; we interpreted them as 2012\$ and converted to nominal dollars).

Most utility planning documents did not extend to the end of the 2043 study horizon of NWE's 2013 Plan. We thus calculated an annual rate of growth in nominal \$/tonne price of CO₂ for each utility forecast for the last five years of the price trajectory and applied that same annual rate of growth going forward until the end of the 2043 study horizon. These scaling factors are applied starting in the following years: Arizona, 2028; Avista, 2034; Idaho, 2033; PacifiCorp, 2033; PGE, 2039; PSE, 2034; Seattle, 2032; Snohomish, 2023; Tacoma, 2031; TEP, 2028.
- b. Yes. We converted short tons to metric tons and present our unified results in terms of dollars per metric ton or "tonne."

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c. The forecasts are as follows:

1. A report entitled 2012 Carbon Dioxide Price Forecast by Synapse Energy Economics, Inc. (October, 2012);
2. Two cases developed by the EIA, GHG10 and GHG25; and
3. Forecasts developed by the Northwest Power and Conservation Council.

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PSC-141

Regarding: Carbon Price Effect on NPV
Witness: Stimatz

- a. The total net present value of the assets evaluated in Ex. JMS-1 is approximately \$825 million. Please identify the amount of net present value that results from the inclusion of a carbon price in 2021 in your analysis.
- b. The total net present value of the assets evaluated in the spreadsheet provided in response to PSC-066 is approximately \$735 million. Please identify the amount of net present value that results from the inclusion of a carbon price in your DCF analysis.
- c. In your response to PSC-093b, you appear to state that the carbon cost forecast included in the spreadsheet in response to PSC-066 is not the carbon cost forecast included in the analysis you present in Exs. JMS-1 and -2. Please confirm that is the case.
- d. Relative to your answer in sub-part c, what is the cost in dollars/ton that is assumed for carbon price in the spreadsheet produced in response to PSC-066.

RESPONSE:

- a. NorthWestern has not performed this analysis.

Consistent with the decision reflected in the Notice of Commission Action dated February 20, 2014, NorthWestern is not creating a new document or performing new analysis.

- b. NorthWestern has not performed this analysis.

Consistent with the decision reflected in the Notice of Commission Action dated February 20, 2014, NorthWestern is not creating a new document or performing new analysis.

- c. No, this is not the case. There are two aspects of incorporating carbon pricing into the valuation models. The first is the estimate of the effect of carbon pricing on the electricity market price. This is the aspect that was described in the Stimatz Direct Testimony on pages 24-28. The market component of carbon price forecast was the same in Exhibit__(JMS-1) and Exhibit__(JMS-2) as in the file provided in response to Data Request PSC-066. The carbon forecast was applied to the Mid-C forecast curve in the same way.

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The second aspect is the cost of carbon emissions for thermal generators. As described in the response to Data Request PSC-093b, the incremental cost to the thermal generators in the model provided in response to Data Request PSC-066 was based on the methodology from the 2011 Electricity Supply Resource Procurement Plan (2011 Plan) (and was the same as had been used in the earlier valuation that resulted in the round 1 bid submitted in January of 2013). NorthWestern was proceeding toward developing a bid for all of the assets, but as described in the Bird Direct Testimony and in numerous discovery request responses, NorthWestern could not get comfortable with the risks associated with the coal plants. The workbook submitted in response to Data Request PSC-066, which is dated June 24, represents the state of the DCF modeling of the coal assets at that time, but since NorthWestern determined around that time that it would not be submitting a bid that included the coal plants, the incremental costs were not updated and a final valuation for purposes of bidding on the coal plants was not completed.

- d. The table below shows the carbon price per ton from both of the methodologies described in part c, above.

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Year	Carbon Price 2013 Plan (\$/ton)	Carbon Price 2011 Plan, Adjusted to 2021 Start (\$/ton)
2014	\$ -	\$ -
2015	\$ -	\$ -
2016	\$ -	\$ -
2017	\$ -	\$ -
2018	\$ -	\$ -
2019	\$ -	\$ -
2020	\$ -	\$ -
2021	\$ 21.11	\$ 9.55
2022	\$ 22.16	\$ 12.64
2023	\$ 23.27	\$ 16.20
2024	\$ 24.43	\$ 19.34
2025	\$ 25.66	\$ 22.16
2026	\$ 26.94	\$ 25.70
2027	\$ 28.28	\$ 29.85
2028	\$ 29.70	\$ 34.16
2029	\$ 31.18	\$ 38.67
2030	\$ 32.74	\$ 43.18
2031	\$ 34.38	\$ 48.26
2032	\$ 36.10	\$ 53.84
2033	\$ 37.90	\$ 58.78

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PSC-142

Regarding: Electricity Price Forecast
Witness: Stimatz

- a. Does the forward electricity price curve from Mid-C that you use in your analysis include costs associated with CO₂ besides the price adder NWE includes in 2021?
- b. If the answer to (a) is “no,” how can NWE be sure that the forward-looking Mid-C electric price strip does not already include a carbon adder that market participants are themselves already forecasting?

RESPONSE:

- a. NorthWestern’s Mid-C forward prices for 2014-2020 are based on market price quotes as described in the Stimatz Direct Testimony on pages 20-21. Market price quotes are third-party estimates of the price at which market participants could transact for future delivery. Whether and to what extent market participants include estimates of future carbon costs in the prices at which they are willing to buy or sell is not known.
- b. There is no clear indication of a particular carbon adder in market prices. Based on the lead time likely for the implementation of such pricing, it is unlikely that the market quotes include a significant adder for carbon pricing in the intermediate term.

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PSC-143

Regarding: DCF Analysis
Witness: Bird

The DCF analysis included with your testimony shows a valuation of less than the \$900 million which NWE is proposing to establish as the rate base value. Please explain why the Commission should adopt a value for its rate base that is higher than the value reflected in your DCF model

RESPONSE:

First, as stated in the Stimatz Direct Testimony on page 4, lines 16-20:

“The purpose of the analysis was to develop one estimate of the approximate, mid-range value that other potential bidders might attribute to the Hydros. The DCF valuation was one of many pieces of information available to NorthWestern’s executive team to aid their decisions regarding the ultimate bid.”

The DCF valuation was not viewed by NorthWestern, nor should it be viewed by the Commission, as the only, or even as the most important, indication of value. NorthWestern considered many other value estimates as well, including a separate DCF analysis performed by its advisor, Credit Suisse, valuation of similar transactions, comparable company analysis, and comparison to costs of other alternative generation sources. Please see the Masud Direct Testimony on pages 4-12, as well as AM Exhibit 1, pages 11-13.

Second, there were many assumptions in the DCF analysis that were conservative. Please see the Bird Direct Testimony on page 17 and the response to Data Request PSC-121. NorthWestern calculated sensitivities with regard to these assumptions and found that with an October 1, 2014 closing date and using the mid-year convention for cash flows, DCF analysis can easily support valuation well over \$900 million.

Third, as demonstrated throughout NorthWestern’s application, testimony, exhibits, and responses to data requests, the acquisition of the Hydros is the best alternative available to meet customers’ load over the long term. In particular, please see the Stimatz Direct Testimony on pages 34-44, the Hines Direct Testimony on pages 4-21, the Prefiled Supplemental Testimony of Joseph M. Stimatz, and the Prefiled Supplemental Testimony of John D. Hines.

Finally, \$900 million is the purchase price negotiated between PPLM and NorthWestern. Whether a lower price could have been negotiated is not known, cannot be known, and is not relevant. The purchase price of \$900 million has been agreed upon, and as demonstrated by NorthWestern, it is reasonable, prudent, and the lowest cost, least risk opportunity available to serve customers.

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PSC-144

Regarding: Market Heat Rates
Witness: Stimatz

NWE states in response to PSC-075a that “the methodology using the projected market heat rate results in an average factor for the period of 2021 through 2033 of 0.65, which is slightly higher than the 0.6 used in the Plan.” Please identify the difference in NPV between your two analyses (i.e., PowerSimm and DCF) resulting from the use of these two different variables.

RESPONSE:

The NPV calculated in the DCF model and the NPV calculated based on the PowerSimm modeling are not directly comparable. The DCF model was used to provide one estimate of the market value of the Hydros to other potential bidders. The NPV calculated from the PowerSimm modeling was the net present value of the total supply portfolio costs, including the Hydros and the other resources. Thus, there is no way to identify differences in NPV between the two analyses.

In regard to the DCF and PowerSimm modeling individually, NorthWestern has not performed the analysis to determine the difference in NPV that would result from the use of the two different factors.

Consistent with the decision reflected in the Notice of Commission Action dated February 20, 2014, NorthWestern is not creating a new document or performing new analysis.

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PSC-145

Regarding: REC Prices
Witness: Fine

In Order 7199d at ¶42, the Commission held that “RECs represent ‘all of the environmental attributes associated with a megawatt-hour unit of electricity production’ See Mont. Code Ann. 69-3-2003(14)...The Commission finds that a resource’s CO₂ emissions or lack thereof are an environmental attribute.”

- a. Do REC prices on Table 5.4 of the 2013 plan include the cost/value of avoided carbon?
- b. If the answer to (a) is no, please explain why the REC prices do not include the cost/value of avoided carbon, and how you can be sure that they do not include market participants’ perception of the value of avoided carbon.

RESPONSE:

- a. No.
- b. RECs are primarily used to meet state-mandated renewable portfolio standards (RPS). Carbon costs are a function of carbon emissions and an associated penalty that are distinguished from RPS. NorthWestern cannot comment on market participants’ perceptions.

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Regarding: Appropriate Comparisons in Pre-Approval Dockets
Witness: Hines

The Commission, in its Order pre-approving the Spion Kop resource, compared the resource to alternatives with no carbon cost. Elsewhere, the Commission noted that “the lowest-cost fully weighted alternative to which the Commission compared Spion Kop in order 71591 was a blended market-CCCT avoided cost without CO₂ costs.” Order 7199d, ¶43.

Does NWE agree with Orders 71591 and 7199d that it is appropriate to compare a resource proposed for pre-approval against an alternative with no assumed carbon cost?

RESPONSE:

NorthWestern believes Commission consideration of resources for pre-approval should be consistent with Montana statute and Commission rules. NorthWestern believes prudent resource planning and resource acquisition analysis should address risk. See the Hines Direct Testimony at page JDH-47, lines 19-23 and page JDH-51, lines 1-6. NorthWestern does not believe it is appropriate to opine on Commission analyses. Also please see ARM 38.5.8213(1)(e). For convenience I quote it below:

“A utility’s electricity supply resource planning, procurement, and decision-making processes should incorporate proven cost-effective computer modeling and rigorous analyses. A utility should use modeling and analyses to: (e) develop methods for weighting resource attributes . . . Resource attributes may include, but are not necessarily limited to: (i) underlying fuel source and associated price volatility **and risk, including risks related to future regulatory constraints on environmental impacts such as emissions of carbon dioxide . . .**” (emphasis added).

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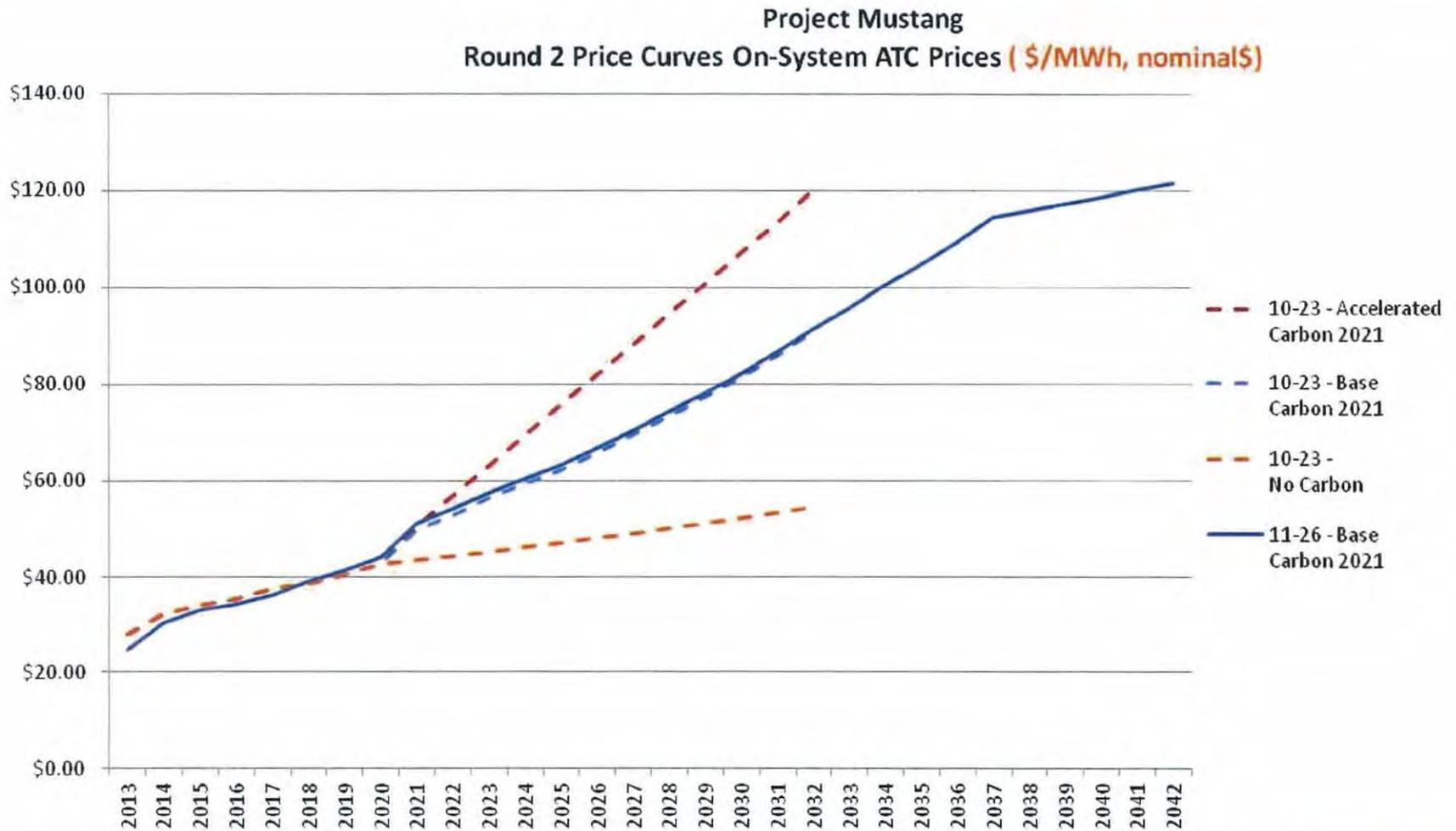
Regarding: Forward Price Curves
Witness: Stimatz

- a. Please provide color copies of the graphs and charts on pages MCC_006_00000058 and MCC_006_00000059.
- b. Please provide in electronic form the data used to populate the graphs referred to in subpart a.
- c. With respect to the Base Carbon Penalty Adder¹ on page MCC_006_00000021, are these numbers the same as the carbon price forecast used in Exhibits JMS-1 and -2? If not, please explain how the numbers on this page were derived, and why NWE decided to depart from using them.

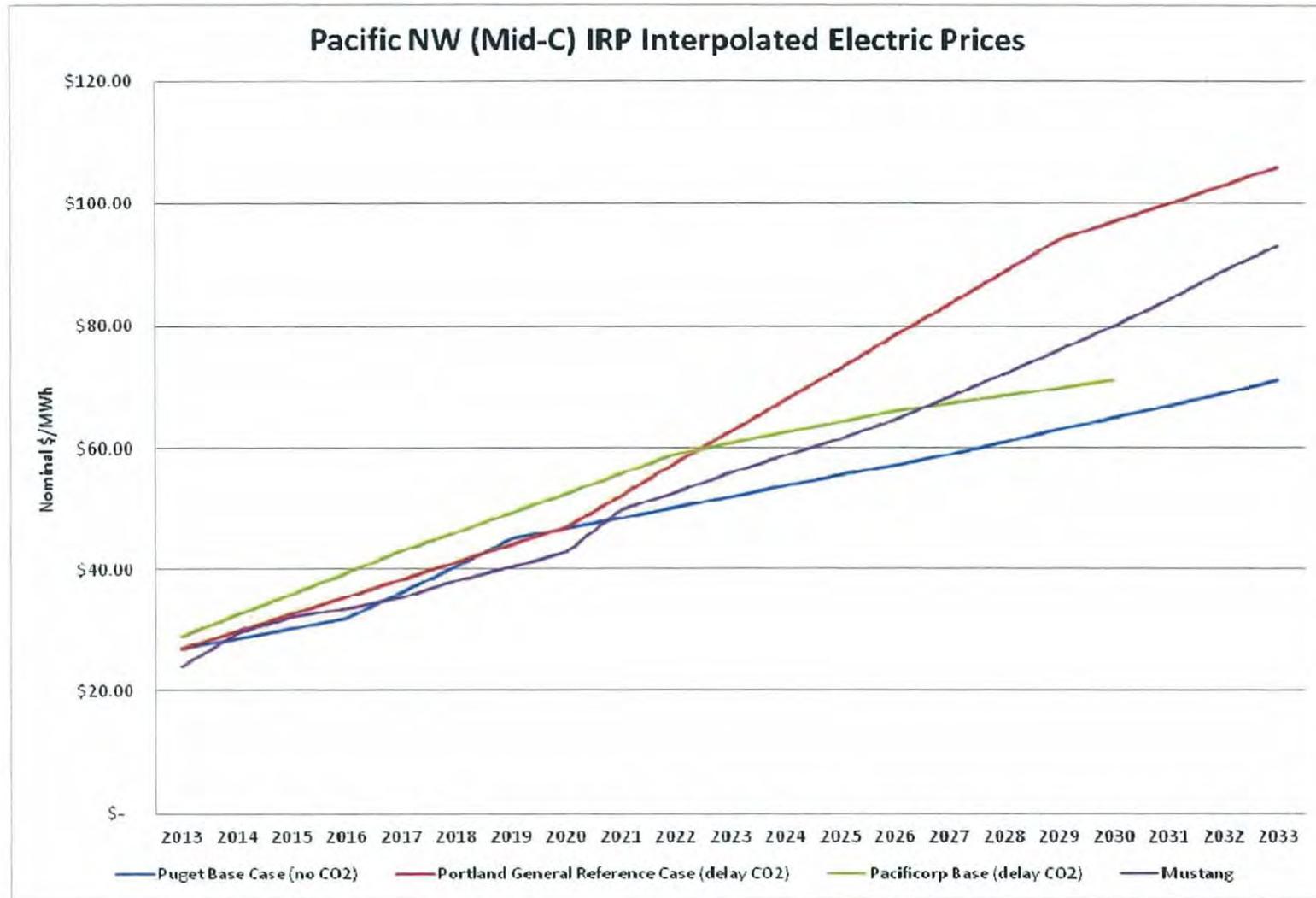
RESPONSE:

- a. See Attachment.
- b. See the folder labeled "PSC-147" on the attached CD.
- c. No they are not the same. The materials referenced above are from the December 12, 2012 board meeting and were prepared using the carbon pricing assumptions NorthWestern had used in the 2011 Plan. This methodology had been developed for the 2009 Plan and was based on the proposed Waxman-Markey legislation. As it has done in each planning cycle, NorthWestern updated its carbon pricing methodology for the 2013 Plan to reflect its current expectations. This methodology was adopted for use in the DCF analysis presented in Exhibits JMS-1 and -2.

ON-SYSTEM FORWARD PRICE CURVES (UPDATED NOV 26)



UPDATED FORECAST COMPARED WITH 3 IOU'S IN PNW



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PSC-148

Regarding: Claims of Privilege
Witness: N/A

- a. Explain what is meant by the phrase “Attorney Work Product” in the redacted portions of MCC_006_00000168 through MCC_006_00000170. Do you mean that the material is covered by attorney-client privilege, or by the work product doctrine, or both? If the material was prepared in anticipation of litigation, please refer to the litigation to which you refer.
- b. Please describe why “Pat Corcoran’s MPSC memo” referred to on page MCC_006_00000111 has not been provided. If it is withheld under a claim of privilege, please describe the privilege, including (if a work product doctrine claim) the litigation to which it refers.
- c. Numerous documents written by Gary Wiseman and presented to the NWE Board of Directors have not been provided, and are marked as privileged in the privilege log. Please provide the basis of the claim of privilege (i.e., attorney-client or work product or both?) and describe for each document, if it is a claim related to anticipated litigation, the litigation to which the claim refers.

RESPONSE:

- a. These questions request legal analysis. The proper vehicle for presentation of legal analysis is in a legal brief. In the interest of assisting the Commission, NorthWestern provides a short synopsis of the issues here. As shown on the privilege log provided for response to MCC-006 (PRIV_400016), the redacted information is privileged under both the attorney-client privilege and the work product doctrine.

Section 26-1-803, MCA, provides that neither an attorney, nor a client, may be examined about any communication made by the client to the attorney or the advice given to the client in the course of the attorney’s professional employment.

The work product doctrine, also referred to as “Attorney Work Product,” is intended to preserve a zone of privacy in which a lawyer can prepare and develop legal strategy with an eye toward litigation free from intrusion by adversaries. *Hickman v. Taylor*, 329 U.S. 495, 510-511, 67 S.Ct. 385, 91 L.Ed. 451 (1947). The Montana version of the work product doctrine is in M.R. Civ. P. 26(b)(3). Materials prepared by a party or the party’s representative in anticipation of litigation or for trial are not generally discoverable.

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Adversarial proceedings before the Commission, such as this docket and previous resource approval dockets, are litigation for purposes of the work product doctrine. *See, e.g., Pacific Gas and Elec. Co. v. United States*, 69 Fed. Cl. 784 (2006). The touchstone of a regulatory proceeding that makes it subject to the work product doctrine is an adversarial process. *See, Id.; Restatement(Third) of Law Governing Lawyers* § 87 (2000). – This docket is an adversarial process with parties, discovery, testimony, cross-examination, rebuttal, and record-based decision making.

The redacted material is information communicated by NorthWestern to its in-house counsel and outside counsel or advice from counsel communicated to NorthWestern's executive team and Board of Directors. The redacted material is also information that was produced in anticipation of litigation, including this docket.

- b. Pat Corcoran's MPSC memo is a document prepared in anticipation of litigation, this docket. Mr. Corcoran, a member of NorthWestern's executive team, working with NorthWestern's in-house and outside counsel, prepared an analysis and discussion of anticipated litigation before the Commission. The memo was prepared because of the anticipated adversarial proceeding before the Commission. The memo is work product.
- c. NorthWestern is not clear as to what the Commission means by "numerous documents written by Gary Wiseman." In the privilege log for MCC-006, there are three documents authored by Mr. Wiseman from which portions were redacted (PRIV_400011, PRIV_400018, and PRIV_400019). In each case, the redacted portions are identified as "content prepared in anticipation of litigation provided by outside counsel." Work product material may be disclosed to a non-adversary when the disclosing party has a reasonable expectation for believing that the recipient will keep the disclosed material confidential. *American Zurich Ins. Co. v. Thirteenth Judicial Dist. Court*, 2012 MT 61, ¶¶ 26-27, 364 Mont. 299, 280 P.3d 240. NorthWestern disclosed the work product material to an independent consultant/engineer with whom it had a contractual relationship and who had executed a nondisclosure agreement. NorthWestern had a reasonable expectation that Mr. Wiseman and his firm would maintain the confidentiality of the information. NorthWestern did not waive the work product doctrine's protection of the material prepared in anticipation of litigation, including this docket, by disclosing it to Mr. Wiseman.

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PSC-149

Regarding: Bill Impacts
Witness: DiFronzo, Meyer, Stimatz

On page MCC_006_000000117, a variety of expected bill impacts are listed as they relate to a bid for Project Mustang.

- a. Please confirm that the “Project Mustang” referred to here is the bid on the Hydros.
- b. Please explain how NWE calculated the “Est. Customer Bill Impact (vs Current)” for 2014-2016 and the “Est. Customer Bill Impact (vs Projected)” for 2014-2016.
- c. Were the increases reflected here intended to represent cumulative bill impacts (i.e., an increase of 13.2% over the projected bill if a \$876 million rate base value was accepted, followed by another 6.0% increase the following year)?
- d. Are there newer estimates than this of forward bill impacts for the years of both 2015 and 2016? If so, please provide them.

RESPONSE:

- a. Yes.
- b. The estimated customer bill impact (vs. Current) computation was based on comparing residential rates from July 2013 to projected customer bills with the supply rates projected for years 2014-2016 with the inclusion of the hydro revenue requirement and exclusion of electric supply purchases displaced by the hydro production.

The estimated customer bill impact (vs. Projected) was based on projecting the customer bills without hydro for each of the years compared to the projected bills with the inclusion of the hydro revenue requirement and exclusion of electric supply purchases displaced by the hydro production.
- c. No. The bill impact was comparing the costs with and without hydro separately for each year and not cumulative.
- d. Yes, please see the response to Data Request PSC-034.

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PSC-150

Regarding: Follow-up to response MCC-006
Witness: Rowe, parts a & b / N/A, part c

In NorthWestern's response to data request MCC-006, p. 109 of 422, there is a statement that reads, "The Mustang 2.0 acquisition will require approval of the MPSC. The type of regulatory approval is being evaluated."

- a. Assuming a "require[d] approval of the MPSC" is being sought in this proceeding, please explain what requires NorthWestern to seek such approval.
- b. Please identify what other "type[s] of regulatory approval [were] being evaluated."
- c. Please provide the Pat Corcoran MPSC memo referred to on p. 111 of 422 of the response to data request MCC-006.

RESPONSE:

- a. What would the Commission's response have been if NorthWestern had not submitted this transaction for its approval? Respect for the Commission's role and NorthWestern's prudent management required NorthWestern to seek and to obtain approval. NorthWestern cannot put the transaction's revenue requirement into rate base without the Commission's approval.
- b. While we knew we were going to seek approval through the preapproval process, the specific relief to be requested in and through the Application had not been determined at that time.
- c. This memo is subject to the attorney client privilege and the work product doctrine and is not being produced.

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PSC-151

Regarding: CCCT Modeling Assumptions in RPP
Witness: Fine

- a. For the purposes of its 2013 RPP, did NWE consider modeling a CCCT that was jointly owned by NWE and other utilities, in order to achieve greater economies of scale?
- b. If the answer to (a) is no, please explain why it did not engage in this analysis.

RESPONSE:

- a. No.
- b. NorthWestern has not identified another utility with whom it could reasonably expect to jointly own a CCCT. Such an assumption would be speculative. Adding a generic joint venture partner would create additional elements of uncertainty rather than providing a lower cost and lower risk alternative for NorthWestern to consider.

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PSC-152

Regarding: Transmission Service
Witness: Stimatz

- a. Will the transmission rights that PPLM now uses to bring the electricity generated at the Hydros to its wholesale customers transfer to NWE if it acquires the Hydros?
- b. If the answer to (a) is no, please explain how NWE plans to obtain sufficient transmission service to deliver the Hydros' electricity to its customers.
- c. Do NWE's valuation and revenue requirement models include transmission expenses? If so, please identify where those expenses are included.

RESPONSE:

- a. No. PPLM delivers electricity to wholesale customers over point-to-point transmission service. Point-to-point service is used to move or "wheel" electricity from one point to another; it cannot be used to deliver electricity to end-use customers such as NorthWestern's supply customers.
- b. NorthWestern delivers electricity to its supply customers through its Network Integration Transmission Service ("Network Service") agreement and it will continue to do so after acquiring the Hydros. Charges for Network Service are based on load, not generation, so NorthWestern customers will not incur additional charges related to Network Service as a result of the acquisition of the Hydros.

In periods when NorthWestern has resources in excess of its load requirements, it will procure point-to-point transmission as necessary to make deliveries to wholesale counterparties. See also the response to part c, below.

- c. Yes. In the DCF model, anticipated transmission expenses were included as part of the basis adjustment to the Mid-C prices as described in the Stimatz Direct Testimony on pages 21-24. Transmission costs were not listed explicitly as an expense; rather, the costs of transmission were modeled as a reduction to the market price received for energy sales.

Similarly, for purposes of estimating the revenue credits portion of the revenue requirement, transmission expense was included as a basis adjustment (reduction) to the Mid-C market price.

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PSC-153

Regarding: Public Perception of Resources
Witness: Hines

- a. What if any feedback has NWE acquired in recent years, via polls, surveys or other information gathering techniques, from its customers, or the Montana public at large that could be construed in favor of, or adverse to, the hydro acquisition as a “green”, “clean” “renewable”, “sustainable” “carbon free” or “environmentally friendly” addition to the generation portfolio?
- b. What if any feedback has NWE acquired in recent years, via polls, surveys or other information gathering techniques, from its customers, or the Montana public at large that could be construed in favor of, or adverse to the suggested comparable alternatives to the hydro acquisition?

RESPONSE:

- a. A recent source of feedback is the recent hydro transaction overview which NorthWestern has been giving, in concert with the Bureau of Business and Economic Research presentations. These overviews have been given this winter throughout NorthWestern’s Montana service territory. NorthWestern recently gave this hydro transaction overview in Great Falls, with an attendance of about 100 local citizens. During this overview the audience was asked whether coal should be considered in lieu of or preferred over these hydro assets as a generation source in the electricity supply portfolio. It appeared that no one in the audience, through a show of hands, preferred additional coal generation compared to the hydro resources. This audience was also asked whether they felt NorthWestern should ignore carbon as a risk in our electricity planning and acquisition analyses. Again, no one supported ignoring carbon risk.
- b. See the response to part a, above.

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PSC-154

Regarding: 2013 Electricity Supply Resource Procurement Plan
Witness: Fine

- a. On p. 4-11, in Volume 1, NorthWestern states that when it purchased the transmission and distribution utility from Montana Power Company it had to rely entirely on market purchases to provide energy and capacity. NorthWestern further states that it has since taken steps to provide resource adequacy, but still relies heavily on market purchases to meet peak load obligations. Do these statements mean that market purchases can provide energy and capacity but cannot provide resource adequacy? If not, please explain.
- b. Does NorthWestern believe that only utility-owned resources within its balancing authority area are capable of providing resource adequacy? If so, please explain why.
- c. On p. 4-12, in Volume 1, NorthWestern refers to a 2012 forecast in which the Pacific Northwest Adequacy Forum identified a 350 MW capacity deficit by 2017. Provide any subsequent forecasts from the adequacy forum, or provide a web address where such forecasts are available.
- d. On p. 4-12, in Volume 1, NorthWestern states that as the region's surplus diminishes, relying on market purchases to meet peak demand will be more expensive and physical reliability risks will increase. Does this statement refer to the region's surplus of energy, capacity or both?
- e. Explain to what extent physical reliability for NorthWestern's customers is determined by the relationship between load and generation in its balancing authority area?

RESPONSE:

- a. Market purchases can provide both energy and capacity. However, they may not provide resource adequacy. The context here is with regard to the Supply portfolio which may have needs that go beyond what market products can physically and economically provide to meet resource adequacy for the retail load.
- b. No.

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- c. NorthWestern is not aware of updates to the Pacific Northwest Power Supply Adequacy Assessment for 2017. If and when an update is available NorthWestern expects to find it at: <http://www.nwcouncil.org/reports/>
- d. The reference is primarily referring to capacity.
- e. Resources directly interconnected within the NorthWestern BA are generally viewed as having greater physical reliability because they do not need additional infrastructure, such as additional transmission, for delivery of output to load. NorthWestern and its customers also benefit from installed generating capacity being greater than load within the BA.

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PSC-155

Regarding: 2013 Electricity Supply Resource Procurement Plan
Witness: Fine, parts a-d / Dorris, part e

- a. Provide the numerical natural gas prices for the 2013 NPCC Medium Case and the 2013 EIA AEO shown in Figure 5-1 on p. 5-3, in Volume 1, in MS Excel format if available.
- b. Explain the factors contributing to the apparent change in the rate of increase in natural gas prices beginning in about 2021 in NorthWestern's 2013 RPP PowerSimm Mean forecast, shown in Figure 5-1 on p. 5-3, in Volume 1.
- c. Provide the numerical electricity prices for the 2013 NPCC Delayed Federal CO₂ Case shown in Figure 5-2 on p. 5-4, in Volume 1, in MS Excel format if available.
- d. Identify the source of the NPCC natural gas and electricity prices shown in Figures 5-1 and 5-2 and, if available, provide a web address where the prices are located.
- e. Volume 2, Chapter 4, p. 4-15, of the 2013 Plan describes the payoff diagrams that appear on the following pages. The description states that lines below the X-axis show the net costs (i.e. negative revenues) of the hydro and CC assets in their respective portfolios. Please expand the explanation of the payoff diagrams and, in particular, what the plots below the X-axis are intended to show.

RESPONSE:

- a. Please see the Excel file titled PSC-155(a)&(c)_NPCC & EIA Electric & Nat Gas Forecasts.xlsx in the folder labeled "PSC-155" on the CD attached to PSC-147.
- b. The natural gas price forecast is modeled in a manner that maintains a level of implied market heat rates so that generating resources earn reasonable profits.
- c. Please see the response to part a, above.
- d. NPCC natural gas price forecast: The Seventh Power Plan Fuel Price Forecasts, July 2013. NPCC electricity price forecast: Update to the Wholesale Electricity Price Forecast, February 2013. Both documents are located at: <http://www.nwcouncil.org/energy/forecast/>

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e. Explanation of payoff diagram figures:

The payoff diagrams show the spread of total portfolio costs of the six modeled NWE portfolios (the three original portfolios filed in the 2013 Plan plus the three additional portfolios filed as a supplement to the 2013 Plan), and of the four new modeled resources (the Hydros, the combined cycle, the LMS 100, and the 100 MW of new wind), as a function of average annual Mid-C market price. The X-axis shows the annual average Mid-C power price for a given simulation, while the Y-axis shows net costs for total portfolios (above the X-axis) or individual resources (below the X-axis). Each dot represents a value realized in one year, for one portfolio or resource, in an individual PowerSimm simulation.

Each dot above the X-axis represents the total annual supply cost for a given portfolio in a single future simulation with an annual market price corresponding to the X-axis value. Each dot below the X-axis represents the annual net cost of a given resource in a single future simulation with an annual market price corresponding to the X-axis value. Resource net cost is defined as the negative of net revenue, i.e., variable operating costs minus market sales revenue.

The slope of lines corresponding to each portfolio above the X-axis is generally positive, indicating that NWE incurs higher costs with higher market prices; i.e., NWE has a short position. The slope of lines below the X-axis, representing resource revenues, is negative, indicating that for futures with higher prices, generating assets realize higher revenues (and thus lower net costs).

Taken together, the payoff diagrams illustrate that the Current + Hydro portfolio has a lower exposure to market price risk than any other portfolio (i.e. a shallower slope of net cost versus market price). This is due to the presence of the hydro assets in the portfolio that earn more money with increased market prices, even as NWE incurs more cost. The resources added to the other modeled portfolios (i.e., LMS 100, wind asset, and CCCT) also reduce exposure to market price compared to the Current portfolio, but by a much smaller amount.

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PSC-156

Regarding: 2013 Plan, Updated Forward Price Information
Witness: Stimatz

- a. Provide the same forward price information provided in response to data request PSC-011b, Attachment 2, updated to reflect market expectations on or about February 7, 2014. Provide additional updates on or about the same day in each subsequent month until the hearing in this proceeding.
- b. Confirm that the forward natural gas price curves referred to on p. 5-2 in Volume 1 are the same as those used in Exhibit_(JMS-2) to estimate Mid-C market prices? If different forward natural gas prices are used in the resource procurement plan, please provide supporting documentation for those forward prices, including the date on which the forward prices were assembled and the source(s) of the forward prices.
- c. Provide a MS Excel version of the AECO Forecast Changes table on p. 193 of 408, in Volume 2, Chapter 1, of the 2013 Plan. If NorthWestern has data for time periods after May 28, 2013, provide that data.

RESPONSE:

- a. Please see Attachment, the forward price information updated to reflect market expectations on or about February 7, 2014 as requested. See also Attachment - First Update, which provides the requested forward price information updated to reflect market expectations as of March 5, 2014. Please note that NorthWestern is relying on the “fair use” exemption of federal copyright law to supply these attachments for purposes of this docket only. No copies should be made, nor should the parties receiving this copyrighted information use it for any purposes other than for this docket. These documents have not been e-filed on the Commission website. NorthWestern will continue to update this Attachment on or about the 7th of each month until the hearing in this proceeding as requested.

The forecasts are different due to the PowerSimm modeling feature that maintains structural relationships between related variables such as electricity and natural gas prices. This relationship is known as the implied market heat rate and must be kept within a reasonable range for planning work so that modeled generating resources are dispatched realistically and can, therefore, be properly evaluated. Although the mean natural gas price forecast referred to on page 5-2 in Volume 1 is structurally related to the

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electricity price forecast, which is based on the June 7, 2013 forward price curve, it is actually derived as a function of this model attribute.

- b. Please see the Excel file titled PSC-156(b)_PowerSimm Mean Monthly Nat Gas Price Forecast_Vol 2 Ch 3.xlsx in the "PSC-156" folder on the CD attached to PSC-147.
- c. Please see the Excel file titled PSC-156(c)_Term Trading Price Meeting AECO Forwards.xlsx in the "PSC-156c" folder on the attached copyright protected CD. NorthWestern is relying on the "fair use" exemption of federal copyright law to provide this information for purposes of this docket only. No copies should be made, nor should the parties receiving this information use the copyrighted material for any purposes other than for this docket.

Because they are copyright-protected, PSC-156a Attachment and PSC-156a Attachment – First Update have not been efiled. Paper copies have been provided under the Fair Use Doctrine for purposes of this docket only.

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PSC-157

Regarding: Avoided Costs
Witness: Fine

- a. Provide a copy of the Excel spreadsheet model used to update QF-1 rates in Docket D2012.1.3 in July, 2013, in compliance with Order 7199d.
- b. Provide the Excel spreadsheet underlying Exhibit__(JBB-2) in the prefiled direct testimony of John Bushnell in Docket No. D2014.1.5, with all formulas intact.
- c. Provide the avoided cost(s) NorthWestern currently plans to use to evaluate the cost effectiveness of future electric energy efficiency measures and programs, including supporting work papers and thorough explanations of economic assumptions.

RESPONSE:

- a. Please see the file titled PSC-157(a)_Final_D2012_1_3_Compliance_Filing_Aug13.xlsx in the "PSC-157a" folder on the copyright protected CD attached to PSC-156c. The following two tabs in this file contain copyright-protected information: Mid-C 2013-06-07 and AECO 2013-06-07. NorthWestern is relying on the "fair use" exemption of federal copyright law to provide this information for purposes of this docket only. No copies should be made, nor should the parties receiving this information use the copyrighted material for any purposes other than for this docket.
- b. Please see the Excel file titled PSC-157(b)_Exhibit__(JBB-2) - Final_D2014 1 5.xlsx on in the "PSC-157" folder on the CD attached to PSC-147.
- c. The avoided cost of electricity used to determine the value of DSM activity is currently \$44.32/MWh, which is the 20-year levelized avoided cost filed in Docket No. D2014.1.5. The avoided costs filed in Docket No. D2014.1.5, including the one used to evaluate DSM programs, assume the inclusion of the Hydros in NorthWestern's supply portfolio.

Please see the Excel file titled PSC-157(c)_Resource Value Spreadsheet 2014 FINAL 20140217_DSM Avoided Cost.xlsx in the "PSC-157" folder on the CD attached to PSC-147.

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PSC-158

Regarding: Powersimm Modeling And Results, CO₂ Cost Assumptions
Witness: Fine, parts a, b, & d / Hines, part c

- a. Confirm that, for purposes of supporting its application in this proceeding, NorthWestern did not perform, and did not ask Ascend Analytics to perform, sensitivity or scenario analyses with PowerSimm of the impact on average net present value portfolio costs of different CO₂ emissions cost assumptions, such as different assumptions for the expected cost or distribution of costs. Otherwise, please explain.
- b. Did NorthWestern intend in August, 2013 to model at least three different greenhouse gas cases in PowerSimm to capture a variety of carbon futures and provide insight into how resources and portfolios would perform. If so please explain, why it did not do so.
- c. Has NorthWestern made investments in any aspect of its Montana utility operations based on any CO₂ cost or risk analysis which were not pre-approved by the Commission and which put investors' capital at risk? If so, please provide the CO₂ cost or risk analysis performed in advance of the investment(s).
- d. Confirm that NorthWestern did not perform, and did not ask Ascend Analytics to perform, sensitivity or scenario analyses with PowerSimm of the impact on average net present value portfolio costs of the following fixed and variable cost assumptions: timing of CO₂ costs, magnitude of CO₂ costs, expected hydro capital upgrades and operations and maintenance costs. Otherwise, please explain.

RESPONSE:

- a. NorthWestern did not ask Ascend to perform sensitivity or scenario analysis. This does not mean that the analysis is incomplete or lacking thoroughness with regard to an examination of carbon costs and risks. The use of a stochastic variable for carbon is consistent with the method of evaluation of other key variables such as electricity price and natural gas price to model and consider cost and risk. The derivation of carbon as a stochastic variable is well documented and explained in Volume 1, Chapter 6 of the 2013 Plan.

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- b. Prior to the definition of the carbon stochastic variable NorthWestern had planned to model multiple greenhouse gas scenarios. The need to employ multiple carbon scenarios was eliminated and no longer needed after Ascend successfully defined, tested, and validated the carbon stochastic variable in PowerSimm.
- c. NorthWestern believes pre-approval lessens risk; it does not eliminate risk to investors. Therefore, all of NorthWestern's pre-approval investments still place investors' capital at risk. NorthWestern has invested in three supply generation resources: Colstrip Unit 4, Spion Kop, and the Dave Gates Generating Station ("DGGS"). Colstrip Unit 4 and Spion Kop included carbon analyses. DGGS included a carbon mitigation plan as part of its costs.
- d. Confirmed for expected hydro capital upgrades and operations and maintenance costs. See the responses to Data Requests PSC-132 and PSC-133.

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PSC-159

Regarding: PowerSimm Modeling And DCF Model
Witness: Dorris, part a / Stimatz, parts b-e

- a. Confirm that NorthWestern did not perform, and did not ask Ascend Analytics to perform, sensitivity or scenario analyses with PowerSimm of the impact on average net present value portfolio costs of different market expectations for natural gas and electricity prices, such as a natural gas price expectation consistent with the Northwest Power and Conservation Council's 2013 Medium Case shown in Figure 5-1, p. 5-3 in Volume 1 of NorthWestern's 2013 Electricity Supply Resource Procurement Plan. Otherwise, please explain.
- b. How would the DCF value of the Hydros change if NorthWestern assumed a \$15/ton CO₂ emissions cost starting in 2021 and escalating at 5% per year?
- c. How would the DCF value of the Hydros change if NorthWestern assumed a \$10/ton CO₂ emissions cost starting in 2021 and escalating at 5% per year?
- d. How would the DCF value of the Hydros change if NorthWestern assumed no cost of CO₂?
- e. How would the DCF value of the Hydros change if NorthWestern used the natural gas forecast method approved in Order 7199d and June 7, 2013 to project forward gas and electricity prices?

RESPONSE:

- a. Neither NorthWestern nor Ascend Analytics has performed sensitivity or scenario analyses with PowerSimm. The methodology used to develop and substantiate the integrity of the input values and resulting simulations has been documented in Volume 1 Chapter 6 and Volume 2 Chapter 4 of the 2013 Electricity Supply Resource Procurement Plan. The modeling approach applied does not provide the latitude to develop ad-hoc scenarios or probability weights as inferred by the question.
- b. The carbon price in NorthWestern's DCF analysis is \$21.11/ton beginning in 2021 and escalating at 5% per year. All else equal, a carbon price higher than what was used in that analysis would lead to a higher valuation, and a carbon price lower than what was used in that analysis would lead to a lower valuation.

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However, NorthWestern has not performed this analysis. Consistent with the decision reflected in the Notice of Commission Action dated February 20, 2014, NorthWestern is not creating a new document or performing new analysis.

- c. Please see the response to part b, above.
- d. Please see the response to part b, above.
- e. Please see the response to part b, above.

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PSC-160

Regarding: PowerSimm Modeling And DCF Model
Witness: Dorris, part a / Stimatz, parts b-d

- a. Is PowerSimm capable of performing sensitivity or scenario analyses of the type described in part (a) of the previous data request?
- b. If NorthWestern has not performed the analyses described in parts (b) – (e) of the previous data request, is the Excel spreadsheet “Exhibit_(JMS-1) and (JMS-2) & p. JMS-20” in the “Joseph Stimatz” folder on the CD labeled “Witnesses Electronic Supporting Data” the appropriate model with which to perform such analyses? If not, please explain.
- c. If the answer to part (b) of this data request is “yes” how should the Excel spreadsheet be modified to determine how the DCF value of the Hydros would change if NorthWestern assumed an alternative CO₂ emissions cost?
- d. If the answer to part (b) of this data request is “yes” how should the Excel spreadsheet be modified to determine how the DCF value of the Hydros would change if NorthWestern assumed an alternative natural gas price forecast?

RESPONSE:

- a. Yes, however the rigors of the process applied to determine input values and validate simulations do not comport well with ad-hoc sensitivities.
- b. Yes, the Excel spreadsheet “Exhibit_(JMS-1) and (JMS-2) & p. JMS-20)” (“DCF Workbook”) would be the appropriate model to make the net present value calculation. The file “Curve Calculator 6-7-13.xls” provided in response to Data Request MCC-154 (“Curve Calculator Workbook”) would also be helpful in this analysis.
- c. The on-system, on-peak and off-peak forward prices that drive the DCF calculation are located in Columns S and T on the “Exhibit_(JMS-2)” tab of the DCF Workbook. The prices in these columns can be changed to calculate the effect of alternative pricing assumptions, including alternative CO₂ pricing assumptions, on the net present value.

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Alternative on-system prices can be calculated in the Curve Calculator Workbook. Alternative CO₂ pricing assumptions can be entered in the "GHG15 Carbon" tab of that workbook. The resulting on-system prices in columns AB and AC on the "GHG15 Forwards" tab can be copied into Columns S and T of the "Exhibit_(JMS-2)" tab in the DCF Workbook to calculate the net present value.

- d. Alternative natural gas prices could be input into Column B of the "GHG15 Forwards" tab of the Curve Calculator workbook. The resulting on-system prices in Columns AB and AC in that tab can be copied into the DCF Workbook as described in the response to part c, above.

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PSC-161

Regarding: PowerSimm Modeling And DCF Model
Witness: Stimatz

Regarding the table labeled Net Present Value of Portfolio Costs, 2015-2043, in your supplemental testimony, please confirm that the difference in the Current + Hydro costs compared to the corresponding table in your prefiled direct testimony (\$5,851 vs. \$5,856) is due to the updated wind production data set described on p. 3 of your supplemental testimony. Otherwise, please explain.

RESPONSE:

Confirmed.

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PSC-162

Regarding: PowerSimm Model Results
Witness: Dorris

- a. For the best performing Current + Hydro portfolio simulation please provide the randomly drawn values for the following explanatory variables: natural gas market price, on-peak electricity market price, off-peak electricity market price, CO₂ cost per ton, hydro generation, wind generation, thermal plant generation and availability, and load. Please provide these data for each week for each year of the simulation.
- b. For the worst performing Current + Hydro portfolio simulation please provide the randomly drawn values for the following explanatory variables: natural gas market price, on-peak electricity market price, off-peak electricity market price, CO₂ cost per ton, hydro generation, wind generation, thermal plant generation and availability, and load. Please provide these data for each week for each year of the simulation.
- c. For an average performing Current + Hydro portfolio simulation please provide the randomly drawn values for the following explanatory variables: natural gas market price, on-peak electricity market price, off-peak electricity market price, CO₂ cost per ton, hydro generation, wind generation, thermal plant generation and availability, and load. Please provide these data for each week for each year of the simulation.

RESPONSE:

- a. NorthWestern is preparing the response to this data request. Pursuant to discussions with Commission Staff, NorthWestern will provide its response during the week of March 10, 2014, according to the modified timeline agreed to by Staff and NorthWestern.
- b. See response to part a, above.
- c. See response to part a, above.

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PSC-163

Regarding: PowerSimm Model Results
Witness: Dorris

- a. For the best performing Current + CCCT + Wind 2025 portfolio simulation please provide the randomly drawn values for the following explanatory variables: natural gas market price, on-peak electricity market price, off-peak electricity market price, CO₂ cost per ton, hydro generation, wind generation, thermal plant generation and availability, and load. Please provide these data for each week for each year of the simulation.
- b. For the worst performing Current + CCCT + Wind 2025 portfolio simulation please provide the randomly drawn values for the following explanatory variables: natural gas market price, on-peak electricity market price, off-peak electricity market price, CO₂ cost per ton, hydro generation, wind generation, thermal plant generation and availability, and load. Please provide these data for each week for each year of the simulation.
- c. For an average performing Current + CCCT + Wind 2025 portfolio simulation please provide the randomly drawn values for the following explanatory variables: natural gas market price, on-peak electricity market price, off-peak electricity market price, CO₂ cost per ton, hydro generation, wind generation, thermal plant generation and availability, and load. Please provide these data for each week for each year of the simulation.

RESPONSE:

- a. See the response to Data Request PSC-162a.
- b. See the response to Data Request PSC-162a.
- c. See the response to Data Request PSC-162a.

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PSC-164

Regarding: PowerSimm Model Results
 Witness: Dorris

- a. How many simulations were performed for each portfolio?
- b. Does NorthWestern believe the number provided in part (a) is sufficient? If so, please explain why.
- c. For each year of the analysis period provide the percentage of simulations for which the Current + Hydro portfolio has a lower cost than the Current + CCCT + Wind 2025 portfolio.
- d. For each year of the analysis period provide the percentage of simulations for which the Current + Hydro portfolio has a lower cost than the Current portfolio.

RESPONSE:

- a. The simulation count shown in the table below articulates the number of simulations per month.

Time Block	Simulation Count per Month
Monthly forward prices & annual carbon	100
Daily T_{min}/T_{max} weather, Daily gas price	3,000
Hourly load, wind gen, hydro gen, price of power, fossil gen operations	72,000

- b. Yes, over the full planning horizon, the simulation count has been shown to achieve full convergence with the 95th percentile of the NPV distribution (i.e., adding more simulations does not substantively change the 95th percentile). The 95th percentile value has also been shown to be extremely stable at the annual level. Furthermore, the risk premium calculation applied an integral over the distribution of costs from the mean to the upper tail, reducing the potential influence of extreme upper tails of the cost distribution. Recognizing these factors, there is very little reason or cause to believe the analysis would change from adding a larger sample size.

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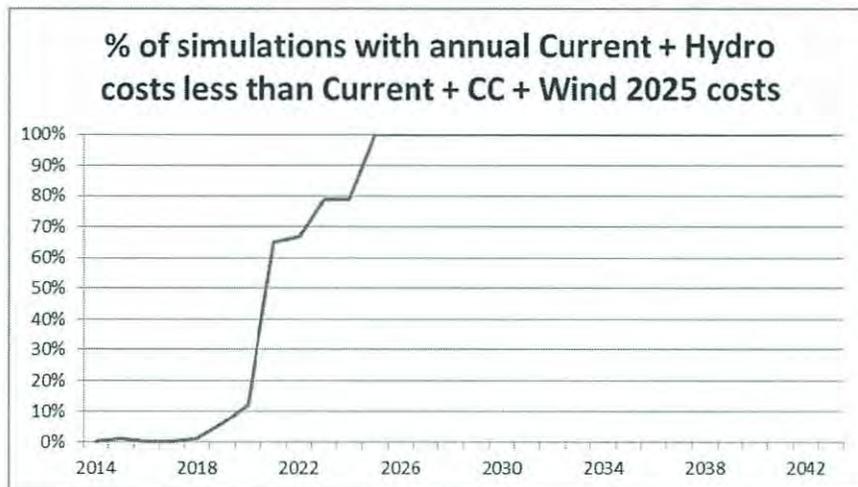
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- c. The graph below shows, for each year of the simulation, what percentage of simulations have annual costs for Current + Hydro less than costs for Current + CC + Wind 2025. The table below also summarizes this information. For each year, the percentage shown in the graph and table represents the percent of individual simulations for which annual costs are lower for the Current + Hydro portfolio than for the Current + CC + Wind 2025 portfolio. The Current + Hydro starts out in the first 6 years of the study horizon generally more expensive than the Current + CC + Wind 2025 portfolio. In 2020, Current + Hydro is least-cost for 12% of simulations; by 2025, this advantage rises to 100% and remains at 100% for the remainder of the study horizon.

The portfolio costs each year include the annualized incremental residual value of the assets in the portfolio above what is present in the Current portfolio. This keeps the comparison consistent with the approach illustrated in Figure 6-1 of the 2013 Plan of crediting the NPV of each portfolio with the present value of 2043 residual value of the assets added.



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Year	Percent of simulations with annual Current + Hydro portfolio costs less than Current + CC + Wind 2025 portfolio costs:
2014	0%
2015	1%
2016	0%
2017	0%
2018	1%
2019	6%
2020	12%
2021	65%
2022	67%
2023	79%
2024	79%
2025	100%
2026	100%
2027	100%
2028	100%
2029	100%
2030	100%
2031	100%
2032	100%
2033	100%
2034	100%
2035	100%
2036	100%
2037	100%
2038	100%
2039	100%
2040	100%
2041	100%
2042	100%
2043	100%

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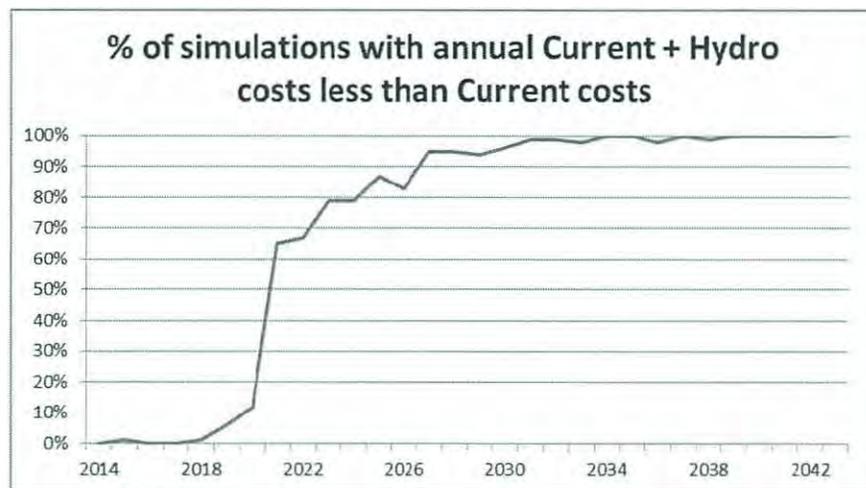
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It should be noted that on a study horizon NPV basis, the Current + Hydro portfolio is lower cost than the Current + CC + Wind 2025 portfolio for *every* simulation.

- d. The graph below shows, for each year of the simulation, the percentage of simulations with annual costs for Current + Hydro less than costs for Current. The table below also summarizes this information. For each year, the percentage shown in the graph and table represents the percent of individual simulations for which annual costs are lower for the Current + Hydro portfolio than for the Current portfolio. The Current + Hydro starts out in the first 6 years of the study horizon generally more expensive than the Current portfolio. In 2020, Current + Hydro is least-cost for 12% of simulations; by 2025, this advantage rises to 87%, and after 2027, Current + Hydro is least-cost for more than 94% of simulations in all remaining years.

The portfolio costs each year include the annualized incremental residual value of the assets in the portfolio above what is present in the Current portfolio. This keeps the comparison consistent with the approach illustrated in Figure 6-1 of the 2013 Plan of crediting the NPV of each portfolio with the present value of 2043 residual value of the assets added.



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Year	Percent of simulations with annual Current + Hydro portfolio costs less than Current portfolio costs:
2014	0%
2015	1%
2016	0%
2017	0%
2018	1%
2019	6%
2020	12%
2021	65%
2022	67%
2023	79%
2024	79%
2025	87%
2026	83%
2027	95%
2028	95%
2029	94%
2030	96%
2031	99%
2032	99%
2033	98%
2034	100%
2035	100%
2036	98%
2037	100%
2038	99%
2039	100%
2040	100%
2041	100%
2042	100%
2043	100%

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It should be noted that on a study horizon NPV basis, the Current + Hydro portfolio is lower cost than the Current portfolio for *every* simulation.

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PSC-165

Regarding: Powersimm Model Capability
Witness: Dorris

- a. Is PowerSimm capable of supporting optimal capacity expansion planning, based on a dynamic programming model that considers all potential capacity “states” for a specific iteration?
- b. If the answer to part (a) is “yes,” was this capability used in the actual analysis, or was new capacity (e.g., hydros or CCCT) assigned manually in specific years of the study horizon?
- c. If the answer to part (b) is that new capacity was assigned manually in specific years, please explain how the timing of new capacity was determined and why NorthWestern believes the chosen date is optimal.

RESPONSE:

- a. Yes, PowerSimm Planner Resource Selection module does provide dynamic programming across all future states.
- b. The dates were assigned manually.
- c. The Hydros were placed into the portfolio according to the terms of the Purchase and Sale Agreement. The CCCT was placed into service for modeling purposes according to an estimate of the time to construct this type of facility. NorthWestern’s substantial exposure to the market suggests that resources be inserted into the portfolio as early as it is practical to do so to reduce market exposure. The in-service dates for the CCCT in the supplemental modeling were selected by Commission staff.

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PSC-166

Regarding: Insurance Coverage
Witness: Bird

NorthWestern's September 2013 "Corporate Risk Appetite Statement" filed in the response to MCC-006 lists as item #6 under the column titled "Project Mustang II Analysis" a statement that the transaction will not be closed without proper insurance coverage. Please describe fully what constituted "proper insurance coverage" in NorthWestern's opinion that allowed the transaction to be closed.

RESPONSE:

Proper insurance coverage on the hydro assets is much like we have on our existing assets. We will add the hydro assets to our current coverages upon the closing of the transaction and ensure that the transition from PPLM policies to NorthWestern policies is seamless. The hydro assets, upon closing, will be added to NorthWestern's current property, general liability and worker's compensation policies.

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PSC-167

Regarding: Newfoundland Clean Room
Witness: N/A

Provide the documents in the Newfoundland clean room as well as an index to the clean room.

RESPONSE:

On March 3, 2014, NorthWestern objected to this data request. NorthWestern will respond, if necessary, after the Commission has ruled on the objection.

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PSC-168

Regarding: Purchase And Sale Agreement
Witness: Rhoads

Are there warranties and/or guarantees of any sort that remain in effect relating to the equipment and materials involved in the major upgrades undertaken by PPLM in the last five years? If so, please describe them.

RESPONSE:

Yes. See Attachment for a list of the warranties and/or guarantees which will extend beyond July 1, 2014.

PPL Montana - Hydro Facilities
Major equipment warranties
in effect beyond 7/1/2014

Facility	Project Description	Component
Black Eagle	Black Eagle GSU	Generator step-up transformer
Black Eagle	Medium Voltage Upg - Tie 100kv	Relays
Black Eagle	Static Excitation with Voltage	Exciter and associated equipment
Cochrane	Medium Voltage Upgrade	Relays
Cochrane	Medium Voltage Upgrade	Switchgear
Cochrane	Station Service Upgrade	Automatic transfer switch
Hauser	PCS Upgrade	PCS Hardware
Holter	Relay Protection Design	Relays
Holter	Unit #2 Alignment & Overhaul	Support bearing general workmanship
Madison	PCS Upgrade	PCS Hardware
Morony	#1 Generator Upgrade	Generator and associated equipment
Morony	Relay Protection Upgrade	Relays
Rainbow	Redevelopment / #9 build	Turbine/generator components manufactured in India
Rainbow	Redevelopment / #9 build	General turbine/generator components
Rainbow	Redevelopment / #9 build	Transit time flowmeter
Rainbow	Redevelopment / #9 build	Flapgate and seals
Rainbow	Redevelopment / #9 build	Generator step-up transformer
Rainbow	Intake Concrete	General workmanship
Rainbow	Rainbow Retirements	General workmanship
Rainbow	Rainbow Rubber Dam	Rubber dam bladders
Ryan	Relay Protection Eval & Upgrad	Relays
Thompson Falls	T Falls PCS Upgrade	PCS Hardware

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PSC-169

Regarding: Impact Of Depreciation On Revenue Requirement
Witness: Kliewer

- a. NorthWestern has based its Application on a 40 year depreciable life for the hydro assets. If one or more hydro units cannot be cost effectively relicensed or fails to remain operational for the full 40 year depreciable life of that hydro asset, how does NorthWestern anticipate addressing that possible situation in subsequent rate cases or compliance filings? Please describe the anticipated actions by NorthWestern if this situation occurs.
- b. If a hydro unit fails to remain operational for the full 40 year depreciable life please explain in detail if the remaining depreciation will be written off and if NorthWestern will request that the remaining depreciation be recovered from ratepayers?
- c. Has NorthWestern undertaken independent depreciation studies to verify on average the 11 hydro units have a useful remaining life of 40 years? If yes, please provide that documentation. If not, why not?

RESPONSE:

- a. Based upon the possible situation described above, NorthWestern would request that any unrecovered costs associated with the hydro units be amortized in rates over a reasonable period of time.
- b. See the response to part a, above.
- c. No. See the response to Data Request PSC-102a.

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PSC-170

Regarding: Energy Supply Participation in Project Mustang
Witness: Hines, parts a-c / Stimatz, part d

- a. Please specify the names of NorthWestern Energy Supply function employees who were aware of or participated in Project Mustang before NorthWestern issued its Request for Proposals for firm electricity supply on May 9, 2013.
- b. Did NorthWestern's knowledge of Project Mustang inform its description of resource needs described in the May 2013 RFP? Please explain in detail.
- c. Please explain why NorthWestern did not request proposals for firm electricity supply for periods beyond December 31, 2017.
- d. Does NorthWestern believe that power purchase commitments to provide firm electricity supply for periods of five years or more are less reliable or otherwise less desirable than owned and rate-based resources? Please explain thoroughly.

RESPONSE:

- a. John Hines, Bleau LaFave, Todd Guldseth, Dave Fine, John Bushnell, Frank Bennett, William Rhoads, Mary Gail Sullivan, Pat Asay, William Thompson, John VanDaveer, Mike Barnes, Kevin Markovich, Doug Peoples, and Joe Stimatz.
- b. This RFP was developed to acquire necessary power for the portfolio in a measured manner. NorthWestern began development of this RFP in April, 2013. At that time looking forward, NorthWestern had no certainty that any of the PPLM assets would be owned by NorthWestern and therefore was taking measured steps to ensure electricity supply reliability after the expiration of the seven-year PPL transaction (June 30, 2014). NorthWestern anticipated releasing additional RFPs in the future in a manner that would be consistent with the 'plodding investor approach' that NorthWestern has previously taken – that is not trying to time the market.
- c. See the response to part b, above, and part d, below.

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- d. Power purchase agreements (“PPAs”) have been a necessary component of NorthWestern’s supply portfolio. They do, however, have drawbacks. These drawbacks are generally exacerbated for PPAs consisting of higher volume and/or longer term. Among these drawbacks (which are not relevant to all PPAs) are counterparty credit risk, liquidity risk, lack of dispatchability, and the tendency to provide less cost certainty and therefore price stability for the portfolio over the long-term.

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PSC-171

Regarding: Historic Hydro Generation
Witness: Fine

Please provide the PowerSimm input of historic hourly generation for the hydro facilities.

RESPONSE:

Please see the Excel files titled PSC-171_Hydro Hourly Production Data 01012009-08312013.xlsx and PSC-171_Hydro Hourly Production Data 01012004-12312008.xlsx in the folder labeled "PSC-171" on the CD attached to PSC-147.

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PSC-172

Regarding: Transaction Risk and Pre-Approval
Witness: Rowe

Please explain why “NorthWestern cannot assume the risk of closing a transaction of this size in advance of the Commission’s approval while continuing to meet [its] other obligations to customers.”

RESPONSE:

Based on past Commission actions, I cannot imagine that the Commission would not have wanted to review this large and important transaction. Financial strength is essential for NorthWestern to meet its obligations to its customers. If the Commission issues an order in connection with this docket that has an adverse financial impact on NorthWestern, our ability to meet our customers’ needs is jeopardized. As a result, we were not willing to proceed with closing this transaction, and we will not close this transaction, without a favorable Commission Order. See also the Prefiled Direct Testimony of Brian B. Bird at page BBB-27.

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PSC-173

Regarding: Regulatory Approval, Competitive Disadvantage
Witness: Bird

On pages 13 and 14 of your testimony, you refer to required regulatory approvals and “the time required to obtain regulatory approval.” You state, “NorthWestern needed to ensure that it made a competitive bid for the hydros to overcome this concern” that it was “at a competitive disadvantage” compared to other buyers.

- a. Please explain why NorthWestern believes this proceeding involves a regulatory approval that is required.
- b. Please describe each of the “regulatory risks” to which you are referring at BBB-14:5.
- c. Please confirm that NorthWestern’s need “to overcome this concern” caused it to increase its bid for the Hydros.
- d. Please quantify how much was added to NorthWestern’s final bid “to ensure that it made a competitive bid for the hydros to overcome this concern.”

RESPONSE:

- a. As a regulated entity NorthWestern ultimately needs regulatory approval to earn on the investment it makes for the benefit of its customers. NorthWestern believes an asset purchase of this size requires certainty in order to raise \$900 million of capital in a cost-effective manner. Therefore, it has requested pre-approval to provide that certainty to both debt and equity investors to acquire cost-effective capital for the benefit of customers.
- b. Risk that the MPSC would not approve the transaction is the primary risk I was addressing.
- c. NorthWestern increased its bid because it was told its first bid was unacceptable to the seller. We were led to believe that these hydro assets could be sold for as much as \$1 billion from the seller’s advisor, our advisor, and from articles that were written about the sale. At the end of the day, we felt the most we could bid was \$900 million, and we believed that was a competitive bid and hoped that it would be sufficient to the seller.
- d. See the response to part c, above.

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PSC-174

Regarding: Capacity and Ancillary Services
Witness: Stimatz

- a. Given that “[T]he Hydros are primarily run-of-river facilities,” what is the capacity value of each? In other words, how much of the nameplate capacity of each plant can be counted on as available firm capacity for purposes of long-term planning?
- b. Following up on your response to PSC-044, when and how does NorthWestern intend to determine “whether the Hydros are capable of providing other ancillary services”?

RESPONSE:

- a. For purposes of the DCF and revenue requirements modeling, NorthWestern used historical average output, adjusted for upgrades related to the Rainbow redevelopment. The historical capacity factors for each plant are shown in the file “Stimatz-Historical Generation Table p. JMS-9” that was included in the Witnesses’ Electronic Supporting Data CD provided on December 23, 2013. Specifically, please see the tab “Summary By Plant.” In total for all plants, the historical capacity factor is approximately 65%. NorthWestern expects to use historical average output by month (adjusted for the Rainbow redevelopment upgrades) as a starting point for long-term planning purposes, with consideration given to output levels in low-water years.
- b. NorthWestern expects to begin the process of assessing the additional capabilities of the Hydros as soon as practicable after the asset purchase closes.

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PSC-175

Regarding: Employees
Witness: Kliewer

How many of the employees listed in Schedule 3.12(a) in Exhibit_(APP-2) (*see* p. 131-132) will not be offered positions at NorthWestern?

RESPONSE:

Schedule 3.12(a) in Exhibit_(APP-2) has been updated pursuant to the terms of the Purchase and Sale Agreement. All employees on the updated Schedule will be offered positions.

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PSC-176

Regarding: Surplus Electricity Supply
Witness: Hines

- a. Following up on your response to PSC-069a, how would the “mix of counterparties, delivery terms, delivery points, and pricing” for selling excess power differ from NorthWestern’s current hedging strategy for purchases, if at all?
- b. Specifically, what proportion of the excess power does NorthWestern intend to sell at spot market prices, if any?
- c. Specifically, what proportion of the excess power does NorthWestern intend to sell at fixed prices over quarterly, monthly, and daily terms?

RESPONSE:

- a. The mix of counterparties for sales of excess power will likely overlap for the most part with NorthWestern’s current counterparties for purchases. Some parties that have not been suppliers may be added to the mix. Regarding delivery points, when NorthWestern buys power the seller can deliver to any point on our system where transmission is available. When NorthWestern sells power, the delivery point or points will be dependent on the needs of the individual counterparties.
- b. We have no updated information beyond what was provided in response to Data Request PSC-069a.
- c. See the response to part b, above.

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PSC-177

Regarding: Concerns about Surplus Electricity Supply
Witness: Stimatz, parts a-d / N/A, part e

Graph 1 on JDH-6 shows that acquisition of the Hydros will cause NorthWestern's electricity supply to exceed demand in certain hours.

- a. Please confirm that NorthWestern has previously had concerns about supply exceeding demand, and briefly summarize those concerns.
- b. Please explain how those concerns relate to the Hydro acquisition, if at all.
- c. Please confirm that, based on the forward market prices NorthWestern used to evaluate the Hydro, there will be losses (i.e., a net cost) associated with sales of excess supply into the market (i.e., that a less than volumetrically-proportional amount of the revenue requirement is expected to be offset by revenue from sales of excess power).
- d. Please describe the conditions, if any, under which NorthWestern will curtail production from the hydro facilities in order to avoid having to sell excess power, and how that curtailment policy differs from existing curtailment provisions that apply to other resources in NorthWestern's current portfolio.
- e. NorthWestern recently stated, "The Commission also needs to consider the impact of § 69-8-426, MCA (2013)," which "provides that any assets acquired by NorthWestern pursuant to Title 69, Chapter 8 'must be used by the public utility to serve and benefit customers with the public utility's Montana service territory.'" NWE Br. Regarding Discovery Issues pp. 9-10 (Feb. 12, 2014). NorthWestern then expressed concern about having "significantly more resources than needed to serve customers in its service territory, [which] would have made NorthWestern a merchant generator, and would therefore violate the bankruptcy stipulation. Arguably, this section would preclude the Commission from approving any transaction that included the hydro and coal assets." *Id.* To what extent do these concerns not apply to the Hydro acquisition?

RESPONSE:

- a. NorthWestern has expressed concerns regarding supply exceeding demand in the context of variable wind generation being unexpectedly high. In those situations, NorthWestern has limited alternatives for sales and is subject to the hourly market price and most often incurs transmission expense.

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- b. We do not have the same concerns with respect to the hydro acquisition. While generation from the Hydros will vary year to year, on a monthly, daily, and hourly basis, it is very predictable. Because of this, NorthWestern will be able to manage periods where supply exceeds demand on a monthly and daily level rather than having to deal with hourly variability. This predictability provides a significant advantage in marketing any excess energy.
- c. NorthWestern does not agree with the statement that there will be losses associated with excess volumes. The concept of “losses” is not applicable to the Hydros in the context of the supply portfolio. Since the variable cost of generation from the Hydros is near zero, any revenue from sales of excess energy benefits customers in the form of revenue credits that help reduce the cost of the facilities. For generation assets used to serve load, the key metrics are the cost and risk of those resources. As demonstrated throughout NorthWestern’s application and testimony, the Hydros are the best alternative available to meet customers’ baseload needs in terms of cost and risk. Further, it should be noted that in the DCF modeling, the output of the Hydros was valued based on the seasonal generation pattern and seasonal market prices, so the total levelized cost of the Hydros reflects expected forward prices, including prices in the periods when there will be supply in excess of load.
- d. NorthWestern dispatches each of its resources economically within the operating or contractual constraints of the resource. When the market price is higher than the variable cost to generate, the unit is dispatched; when the market price is lower than the variable cost to generate, the unit is not dispatched. Since the hydro units have near zero variable costs, they will be dispatched in the vast majority of hours.
- e. This request calls for a legal conclusion and invites legal argument. Legal arguments are not made in testimony and are not an appropriate subject for discovery. To the extent necessary, NorthWestern will make its legal arguments on this issue in its briefs, which are the proper mechanism for making such.

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PSC-178

Regarding: Levelized Hydro and Market Purchases
Witness: Meyer

Referring to Exhibit_(TEM-2):

- a. Please confirm that the 5, 10, 20 and 30-year levelized price of the Hydros is higher than the 5, 10, 20 and 30-year levelized price of market purchases.
- b. Please confirm that the 5-year levelized price of market purchases is \$29.43/MWh less than the 5-year levelized price of the Hydros.

RESPONSE:

- a. Confirmed, on a non risk-adjusted basis as discussed in the Meyer Direct Testimony at page TEM-18, line 18 through page TEM-19, line 4.
- b. Confirmed, on a non risk-adjusted basis as discussed in the Meyer Direct Testimony at page TEM-18, line 18 through page TEM-19, line 4.

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PSC-179

Regarding: Project Drawings
Witness: Rhoads

Please provide the following drawings on each Project:

- a. General Arrangement (GA) of the Project
- b. GAs of the powerhouse including Plan & Section views
- c. 1-Line diagrams
- d. Nameplate data, in-service-date, and relevant test data for all Generator Step-up Units.

RESPONSE:

- a. These drawings provided by PPLM are CEII documents and are being provided on a protected CD to the Commission and the parties who signed the appropriate non-disclosure agreement pursuant to Protective Order No. 7323. Drawings requested in this subpart and under parts b and c below can all be found in the specific project folders on the attached protected CD.
- b. See response to part a, above.
- c. See response to part a, above.
- d. See Attachment.

Generator Step-Up Transformer Summary

Rev. 2014-02-26

Plant	Transformer Bank #	Configuration	MVA Size	Date in Service	% Imp	Ratio	Tap A or 1	Tap B or 2	Tap C or 3	Tap D or 4	Tap E or 5	Tap Setting	Temp Rise °C	High Winding Configuration	Low Winding Configuration	Date Last Tested	Tests Performed	Results
Black Eagle	1	Three-phase	18.6	2012	9.81	102000 to 6600	107100	104550	102000	99450	96900	102000-3	65	WYE	DELTA	8/24/2012	Complete Power Factor, Turns Ratio, Insulation Resistance, Winding Resistance (7/20/12) Liquid Analysis (12/23/13) & Infra- Red (5/01/12)	All test results were rated as Good.
Cochrane	1	Three-phase	100.0	2002	11.45	102000 to 13800	107100	104550	102000	99450	96900	102000-3	65	WYE	DELTA	11/7/2011	Power Factor, Turns Ratio, Insulation Resistance, Liquid Analysis (11/07/13) & Infra-Red (2012)	Power Factor of H2 bushing C2 rated Deteriorated (due to constant river spray or contaminated C2 tap) DGA meets condition 3 of IEEE. All other test results were rated Good.
Hauser	1	Three-phase	12.5	2003	7.85	69000 to 2400	72450	70725	69000	67275	6550	70725-2	65	WYE	DELTA	5/12/2009	Power Factor, Turns Ratio, Liquid Analysis (10/23/13) & Infra-Red (2013)	Power Factor & TTR results were rated Good. Liquid Analysis DGA rated Condition 2 per IEEE
Hauser	2	Three-phase	12.5	2003	7.62	69000 to 2400	72450	70725	69000	67275	6550	70725-2	65	WYE	DELTA	5/13/2009	Power Factor, Turns Ratio, Liquid Analysis (10/23/13) & Infra-Red (2013)	C1 Power Factor test rates H1 bushing as Deteriorated . TTR is Good, Liquid Analysis DGA rated Condition 2 per IEEE
Holter	1	Three-phase	20.0	1990	7.34	102000 to 6600	107100	104550	102000	99450	96900	104552-2	55	WYE	DELTA	6/7/2007	Power Factor, Turns Ratio, Insulation Resistance, Liquid Analysis (10/24/13) & Infra-Red (10/24/13)	Power Factor, TTR & Insulation Resistance results were rated Good. Liquid Analysis DGA rated condition 3 per IEEE
Holter	2	Three-phase	20.0	1991	7.55	102000 to 6600	107100	104550	102000	99450	96900	104552-2	55	WYE	DELTA	12/7/2009	Power Factor, Turns Ratio, Insulation Resistance, Liquid Analysis (12/30/13) & Infra-Red (2012)	C1 Power Factor for H1 bushing is rated Deteriorated . TTR & Insulation Resistance is rated Good. DGA is rated condition 3 per IEEE
Holter	3	Three-phase	20.0	1990	7.42	102000 to 6600	107100	104550	102000	99450	96900	104552-2	55	WYE	DELTA	3/2/2010	Power Factor, Turns Ratio, Insulation Resistance, Liquid Analysis (10/24/13) & Infra-Red (2012)	C1 Power Factor for H1 & H2 bushings are rated Deteriorated , C2 Power Factor for H2 bushing is rated Deteriorated . TTR & Insulation Resistance is rated Good. DGA is rated condition 3 per IEEE
Holter	4	Three-phase	20.0	1990	7.36	102000 to 6600	107100	104550	102000	99450	96900	104552-2	55	WYE	DELTA	8/26/2010	Power Factor, Turns Ratio, Insulation Resistance, Liquid Analysis (10/24/13) & Infra-Red (10/24/13)	Power Factor, Turns Ratio & Insulation Resistance are rated Good. Liquid Analysis DGA is rated Condition 2 per IEEE
Kerr	1	Three-phase	95.2	1987	13	120000 to 13800	126000	123000	120000	117000	114000	114000-5	65	WYE	DELTA	9/9/2009	Power Factor, Turns Ratio, Insulation Resistance, Liquid Analysis (12/11/13) & Infra-Red (2012)	Power Factor of "H" winding to "F" winding the Clg - Clt is rated Deteriorated . The TTR, Insulation Resistance & Liquid Analysis is rated Good.
Kerr	2	Three-phase	95.2	1995	10.5	120000 to 13800	126000	123000	120000	117000	114000	114000-5	65	WYE	DELTA	10/8/2008	Power Factor, Turns Ratio, Insulation Resistance, Liquid Analysis & Infra-Red (12/11/13)	Power Factors of Clg & H2 bushing - C2 are rated Deteriorated (corrosion in C2 tap housing) Turns Ratio, Insulation Resistance & Liquid Analysis are rated Good.
Kerr	3	Three-phase	95.2	1988	13	120000 to 13800	126000	123000	120000	117000	114000	114000-5	65	WYE	DELTA	2/22/07 & 3/09/07	Power Factor, Turns Ratio, Liquid Analysis (12/11/13) & Infra-Red (12/11/13)	Power Factor & TTR results were rated Good. Liquid Analysis DGA rated Condition 3 per IEEE
Madison	1	Three-phase	12.5	1999	8.7	102000 to 4000	107100	104550	102000	99450	96900	102000-3	65	WYE	DELTA	11/6/2013	Power Factor, Turns Ratio, Insulation Resistance, Liquid analysis (8/27/13) & Infra-Red. (8/27/13)	Power Factor of X2 bushing "C1" is rated Deteriorated . TTR & Insulation Resistance is rated Good. Liquid Analysis DGA is rated condition 3 per IEEE
Morony	1	Three-phase	70.0	2011	9.89	102000 to 13800	107100	104550	102000	99450	96900	102000-3	65	WYE	DELTA	9/30/2011	Power Factor, Turns Ratio, Insulation Resistance, Liquid Analysis (8/26/09) & Infra-Red (12/23/13) & Infra-Red (2012)	All test results were rated as Good.
Mystic	1	Three-phase	12.5	2002	7.36	52000 to 6600	54600	53200	52000	50700	49400	52000-3	65	WYE	DELTA	11/18/2010	Power Factor, Turns Ratio, Insulation Resistance, Liquid Analysis (9/17/13) & Infra-Red (2013)	Liquid Analysis DGA is rated as Condition 4 per IEEE. All other test results were Good
Mystic	2	Three-phase	12.5	2002	7.41	52000 to 6600	54600	53200	52000	50700	49400	52000-3	65	WYE	DELTA	11/19/2010	Power Factor, Turns Ratio, Insulation Resistance, Liquid Analysis (9/17/13) & Infra-Red (2013)	Liquid Analysis DGA is rated as Condition 4 per IEEE. All other test results were Good
Rainbow	1	Three-phase	8.5	1994 - retired	7.1	70350 to 6600	73700	72025	70350	68675	67000	68675-D	55	DELTA	DELTA	1/11/2007	Power Factor, Turns Ratio, Insulation Resistance, Liquid Analysis (5/20/12) & Infra-Red (2012)	Liquid Analysis DGA is rated as Condition 4 per IEEE. All other test results were Good
Rainbow	2	Three-phase	8.5	1955 - retired	9.9	100000 to 6600	105000	102500	100000	97500	95000	100000-3	55	DELTA	DELTA	5/1/2012	Liquid Analysis & Infra-Red (2012)	DGA rated as Condition 2 per IEEE
Rainbow	3	Three-phase	10.0	1966 - retired	9.8	100000 to 6600	105000	102500	100000	97500	95000	100000-3	55	DELTA	DELTA	5/2/2012	Liquid Analysis & Infra-Red (2012)	DGA rated as Condition 3 per IEEE
Rainbow	4	Three-phase	10.0	1976 - retired	0.7	100000 to 6600	105000	102500	100000	97500	95000	100000-3	55	DELTA	DELTA	4/11/1994	Power Factor, Liquid Analysis (5/02/12) & Infra-Red (2012)	Power Factor rated as Good. Liquid Analysis DGA rated as condition 3 per IEEE

Plant	Transformer Bank #	Configuration	MVA Size	Date in Service	% Imp	Ratio	Tap A or 1	Tap B or 2	Tap C or 3	Tap D or 4	Tap E or 5	Tap Setting	Temp Rise °C	High Winding Configuration	Low Winding Configuration	Date Last Tested	Tests Performed	Results
Rainbow Unit # 9	1	Three-phase	70.0	2012	10.01	102000 to 13800	107100	104550	102000	99450	96900	102000-3	65	WYE	DELTA	5/7/2012	Power Factor, Insulation Resistance, Turns Ratio Liquid Analysis (8/01/13)	All test results were rated as Good.
Ryan	1	Three-phase	85.0	2007	8.95	102000 to 6600	107100	104550	102000	99450	96900	102000-3	65	WYE	DELTA	7/20/2007	Power Factor, Insulation Resistance, Turns Ratio Liquid Analysis (12/23/13) & Infra-Red (2012)	Liquid Analysis DGA is rated as Condition 2 per IEEE. All other test results were Good
Ryan	2	Three-phase	85.0	2008	8.93	102000 to 6600	107100	104550	102000	99450	96900	102000-3	65	WYE	DELTA	6/2/2011	Power Factor, Insulation Resistance, Turns Ratio, Liquid Analysis (12/23/13) & Infra-Red (2012)	Power Factor test rates H2 & H3 bushings "C2" tests as deteriorated. Liquid Analysis DGA is rated as Condition 3 per IEEE. All other tests rated as Good
Thompson Falls	1	Three-phase	30.0	1997	7.9	115000 to 6600	120750	117875	115000	112125	109250	115000-3	65	WYE	DELTA	10/9/2013	Power Factor, Insulation Resistance, Turns Ratio, Liquid Analysis (9/10/13) & Infra-Red. (10/09/13)	Liquid Analysis DGA is rated as Condition 2 per IEEE. All other test results were Good
Thompson Falls	2	Three-phase	30.0	1997	7.88	115000 to 6600	120750	117875	115000	112125	109250	115000-3	65	WYE	DELTA	12/1/2013	Power Factor, Insulation Resistance, Turns Ratio, Liquid Analysis (9/10/13) & Infra-Red. (10/09/13)	Liquid Analysis DGA is rated as Condition 2 per IEEE. All other test results were Good
Thompson Falls	3 (#7)	Three-phase	63.0	1995	8.4	115000 to 13800	120750	117875	115000	112125	109250	115000-3	65	WYE	DELTA	10/19/2010	Power Factor, Insulation Resistance, Turns Ratio, Liquid Analysis (9/10/13) & Infra-Red. (10/09/13)	All test results were rated as Good.
Spare in Rainbow	Spare	Three-phase	60.0	Rebuilt Cochrane GSU Transformer	11.46	115000 to 13200	115000	112115	109250	106375	103500		55	WYE	DELTA	11/11/2012	Power Factor, Excitation, Turns Ratio, Insulation Resistance, Winding Resistance, Sweep Frequency Response, Liquid Analysis	All test results were rated as Good.

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PSC-180

Regarding: Compliance Obligations in CapEx
Witness: Rhoads

Pages 8-10 of the 9-06-2013 Due Diligence Report (Exhibit (WTR-2.3)) outline various license compliance obligations and associated MOUs.

- a. Have you accounted for the anticipated costs of these compliance obligations in your CapEx projections?
- b. If so, please provide details.

RESPONSE:

- a. No. License compliance obligations are included in O&M projections.
- b. See the response to Data Request MCC-057.

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PSC-181

Regarding: Thompson Falls Relicensing Cost
Witness: Rhoads

- a. Has NWE estimated costs for the FERC relicensing process for the Thompson Falls facility in 2025?
- b. If yes, please provide details.
- c. If no, from which category of expenditure – CapEx, O&M, or other – does NWE anticipate that relicensing costs would be made, and during which years?

RESPONSE:

- a. No. A specific cost estimate was not performed, but due to the expected limited scope of the Thompson Falls relicensing effort, we expect these costs to be covered by the projected 2020-2025 license administration costs for the project. License administration costs are part of the O&M budgets. Please also see the response to Data Request MCC-057.
- b. N/A
- c. Please see the response to part a, above.

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PSC-182

Regarding: Environmental Protection Improvement Cost
Witness: Rhoads

Page 12 of the 9-06-2013 Due Diligence Report (Exhibit (WTR-2.3)) notes that there are areas where environmental protections, particularly related to the storage and treatment of oils and other potential contaminants could be improved.

- a. Has NWE incorporated costs for making such improvements and reducing the risk of environmental spills in CapEx, O&M, or other budget projections?
- b. If so, please provide details.

RESPONSE:

- a. No. The areas identified for improvement did not represent a material cost.
- b. N/A

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PSC-183

Regarding: Kerr Sale Contingencies
Witness: Meyer

- a. Has NWE conducted any analysis to examine the potential implications if the Kerr project is not sold and annual rent payments are continued as a project expense?
- b. If so, please provide details.

RESPONSE:

- a. No. NorthWestern believes that the possibility that CSKT will not exercise its option to purchase is remote based on CSKT's prior statements. However, given the Kerr facility is estimated to generate in excess of one million MWhs annually with operating expense (including lease expense and property taxes) of approximately \$25 million, excess power sales of approximately \$25 per MWh would cover the operating expenses, mitigating the impact of the excess power position.
- b. N/A

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PSC-184

Regarding: Aging Equipment and Structures
Witness: Rhoads, parts b & c / Stimatz, parts a & d

- a. Has NWE considered the impact of the “aging equipment and structures,” referred to in the Independent Engineer’s Report, in its forecast of costs for the DCF model?
- b. If so, what investigations and analyses were performed to develop the cost estimates?
- c. Has NWE evaluated how the aging of certain equipment groups, such as seal clearances, wicket gate leakage, changes in runner blade profiles, and others, may affect facility performance and decrease production?
- d. Did NWE take into consideration the new power plant and generating unit at Rainbow in developing the DCF cost forecast?

RESPONSE:

- a. Yes.
- b. Some of the reference to aging equipment and structures can be addressed through routine annual O&M and capital expenditures. Those items are historically budgeted in annual basic O&M, special maintenance O&M, or capital expenditures and may include as examples certain concrete repairs, protective painting, generator maintenance, or replacement of a deteriorated storage building.
- c. Yes.
- d. Yes.

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PSC-185

Regarding: Hydrologic Data
Witness: VanDaveer

- a. In developing average annual generation production for 10-, 25-, and 60-year historical periods cited in response to PSC-012(b), did NWE evaluate hydrologic and streamflow data to correlate annual production values to the variability in river flows?
- b. Has NWE considered the possibility that the “more conservative system production” during the 10-year period of 2002-2011 (see response to PSC-012(b)) may have occurred due to climate change or other large-scale environmental changes?
- c. Has NWE investigated the potential for future changes in regulatory requirements or environmental conditions to alter generation output of the hydro facilities, considered either individually or as a system? If so, what were the scope and results of the investigation?

RESPONSE:

- a. We did consider the variability of hydrology in the basins regarding production. The variability in flows is included in the average annual production development. The average annual generation production is the direct result of the yearly generation produced from the actual yearly streamflow/hydrologic runoff for that year.
- b. Climate change was considered in the evaluation of the system production and was determined to not be a negative factor. The U.S. Department of Energy 2013 evaluation of climate change impacts indicates that the system’s drainages should produce average or above average water in the future. The historic hydrologic cycle recorded by the U.S. Geological Survey (USGS) supports patterns of variability, but not extended drought or high water trends. The current year snowpack and volume runoff forecasts are above average for the Missouri and Clark Fork river drainages.
- c. Our due diligence process, which is described in the Prefiled Direct Testimony of William T. Rhoads and in numerous data responses, did not identify any regulatory requirement or likely environmental condition that would alter the generation output of the hydro facilities, either individually or as a system.

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PSC-186

Regarding: Capital Expenditures
Witness: VanDaveer

- a. The response to PSC-018(b) states that PPLM provided a detailed account of the projects and costs for the years 2008-2012. If that account differs from the information presented on pages 175-176 of the January 2013 Shaw Report (Ex. WTR-2.1), please provide a copy of the PPLM detailed account of the projects and costs for the years 2008-2012.
- b. Referring to the January 2013 Shaw Report (Ex.WTR-2.1), the historic total capital expenditures for the period 2008 through 2011 that are presented on pages 172-174 average \$6.4 million per year (all values exclude Kerr and are rounded to the nearest \$0.1 million). Subtracting out the historic major capital expenditures presented on pages 175-176 leaves an average “base” capital expenditure of \$5.2 million per year, or \$6.4 million in 2018 dollars. The capital budget presented in Ex. JMS-1 includes overhauls and rewinds for the years 2018-2026. The cost of overhauls and rewinds in some years approaches or exceeds the “base” capital budget in some years (\$5.3 million in 2020, \$6.7 million in 2021). Is NWE’s analysis robust enough to absorb the cost of overhauls, rewinds, and the “base” capital budget without materially affecting the DCF results?

RESPONSE:

- a. The historical capital expenditure information for 2008-2012 referred to in the response to Data Request PSC-018b is generally the same information that was used for the Shaw Report. This information was provided in the response to Data Request MCC-057.
- b. Yes.

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PSC-187

Regarding: Unanticipated Capital Expenditures
Witness: VanDaveer

- a. The response to PSC-076, parts (a) and (b), states that significant unanticipated expenditures are generally not modeled into the cap-ex forecasts and that, to the extent possible, the existing cap-ex budget will be used to assimilate these types of unanticipated costs. Is this approach reasonable given the experience with the Hebgen intake failure?
- b. The response to PSC-064(c) states that past O&M and capital programs have proven successful for the hydro system and the programs going forward are consistent with those efforts. Further, in the “Executive Summary – Hydro Plants” of the “Shaw’s Independent Engineer’s Report,” on pages 2-3 (NWE response to MCC-006) states the following about the civil structures:

These structures do incur damage related to environmental conditions and aging. Recently, there has been a rock fall at Madison, and damage at Thompson Falls due to ice formation in the reservoir. Also, stop logs have failed at Thompson Falls and the Hebgen Intake Tower. These situations have been remediated, but it is likely that similar conditions can produce a continuing and varying level of unplanned maintenance and unexpected costs throughout the system.

Does this reliance on historic costs adequately capture the expenditures that your independent engineer said will likely be necessary to maintain the structures as the hydro system ages?

RESPONSE:

- a. Yes. It is reasonable to manage capital budgets and forecasts to address a certain level of unanticipated expenditures whether planned or otherwise. Major events, planned or unplanned, that are of scope and cost that cannot reasonably be absorbed in annual plans, are addressed at the corporate level.
- b. Yes.

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PSC-188

Regarding: Follow-up to PSC-064, Industry Practices
Witness: Wiseman

- a. In the due diligence assessments of several hydro projects that you conducted for banks (Ex. WTR-1, p. 5), did you forecast short- and long-term capital expenditures for the projects in the same manner as NWE has done in this case, which is described generally in NWE's response to PSC-018(b)?
- b. Please explain fully the analysis and review you have conducted in those past hydro-related engagements in order to develop your cap-ex forecasts for your bank clients.
- c. In your experience as a due diligence assessment project manager, have your clients required you to obtain or to develop independent opinions of forecasted capital expenditures? If so, please provide details.
- d. In your experience as a due diligence assessment project manager, would your bank clients have considered NWE's method of forecasting short- and long-term capital expenditures for the hydro facilities it proposes to purchase to be one of robust analysis?
- e. Would a cap-ex forecast arrived at by using NWE's approach and then corroborated or adjusted by obtaining an independent forecast of capital expenditures be considered more robust? Please explain why or why not.

RESPONSE:

- a. Generally, yes. Consideration of recent available detail of cap-ex, condition of assets, status of rehabilitation/upgrade programs, and reasonableness based on professional knowledge and experience are all bases for identifying longer-term capital projections.
- b. See the response to part a, above. As independent engineer/consultant, cap-ex forecasts were usually not developed by SSW/CB&I. Cap-ex forecasts are developed by the Buyer or Seller (depending on the client) and reviewed by SSW/CB&I for reasonableness and acceptability.

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- c. If you mean independent of the due diligence entity, no. A forecast obtained from a third party would not be considered more robust. SSW/CB&I was retained to provide an independent review and opinion. On some assignments, SSW/CB&I has run a check analysis or run scenarios using the existing model. To be clear, SSW/CB&I's assignment for this NWE hydro acquisition due diligence did not include detailed review of the financial model. We did provide input and opined on cap-ex and O&M projections, however.
- d. See the response to part c, above. Although SSW/CB&I is not familiar with all aspects of the model, the cap-ex forecast seems reasonable.
- e. For this transaction, independent input to the capital expenditures forecast was provided by SSW/CB&I.

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PSC-189

Regarding: Follow-up to PSC-064, Industry Practices
Witness: Wiseman

In your experience of conducting due diligence assessments of multiple hydro projects that are proposed to be acquired in one transaction, is it your usual practice when developing a long-term cap-ex forecast to aggregate the hydro facilities and provide an aggregated cap-ex forecast, as opposed to providing a forecast for each facility separately?

RESPONSE:

An aggregated cap-ex forecast is usual and acceptable. This seems to be an item simply of presentation. For transactions with multiple hydro projects, and as was done for the PPLM hydro assets, the aggregated cap-ex forecast is backed up by line-item details for cap-ex items for each of the hydro facilities. For this transaction, this is based on consideration of the details of actual cap-ex expenditures since 2008 and PPLM's projected cap-ex costs through 2017.

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PSC-190

Regarding: Arctic Grayling
Witness: Mary Gail Sullivan

The NWE response to MCC-009, page MCC_009_00000213, an email message from William T. Rhoads to Dan Rausch, identifies the Arctic grayling issue as a topic for further discussion between NWE and PPLM. Mr. Rhoads states: "We anticipate that at some point in the next few years the Arctic grayling will be listed, triggering a Section 7 consultation process, requiring major studies of the impacts of plant operations on Arctic grayling, and eventually leading to significant changes in plant operations and major construction projects (e.g., fish ladder)." However, in response to PSC-031, NWE states no allowance for possible Arctic grayling-related costs was made in the models because of uncertainty about the listing and the owner's responsibility, and the time period that would elapse before costs were incurred, which would occur over several years.

- a. Please explain fully PPLM's response to NWE's initial concern that this issue could result in significant future costs being incurred that led to NWE not including them as potential future costs in the models.
- b. Have you completed any contingency planning or sensitivity analyses on the potential for future fish passage requirements associated with an Arctic Grayling listing?
- c. If so, please provide details.

RESPONSE:

- a. The comment quoted above was made before we completed our due diligence. During our evaluation of the potential listing of the Arctic grayling, it became apparent it would be premature to conclude a fish ladder or any other specific mitigation measures for fish passage would be required. If a listing is made, it is likely extensive studies would be necessary and it would be several years before a final plan for management of Arctic grayling would be put in place. Nonetheless, we did consider the possibility of a fish ladder at Madison. In doing so, we considered the cost to install a fish ladder on Thompson Falls Dam and concluded that because of the configuration of Madison Dam – its low head, long apron, next to solid substrate – it would be much cheaper to install a fish ladder at Madison than it was at Thompson Falls. As such, and because of the uncertainty of what mitigation would be required and when it might be required, we are comfortable that an Arctic grayling listing could be managed as part of ongoing operations.

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b. No.

c. N/A

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PSC-191

Regarding: Arctic Grayling
Witness: Sullivan

- a. Does the “status review” begun in Nov. 2013 of the arctic grayling’s status under the Endangered Species Act affect the waterway(s) on which the Hydros are located?
- b. What have NWE and PPLM done to monitor this proceeding and did either submit comments by the Dec. 2013 deadline?
- c. The fish’s current designation under the ESA is “warranted but precluded.” Please describe your understanding of what this designation means.
- d. Has NWE considered the types of remedial actions that could be required of the Hydros’ owner if the arctic grayling is listed as an endangered species? Please discuss the results of that consideration.

RESPONSE:

- a. The Status Review includes the Upper Missouri system, which includes the Missouri River upstream of Great Falls, Montana.
- b. NorthWestern has analyzed and monitored issues relating to the Arctic grayling, including this proceeding, through closely working with its outside environmental counsel. In addition, NorthWestern reviewed the November 26, 2013 Federal Register, 50 CFR Part 17 [Docket No. FWS–R6–ES–2013–0120; 4500030113] Endangered and Threatened Wildlife and Plants; Initiation of Status Review of Arctic Grayling in the Upper Missouri River System. NorthWestern did not submit comments on the docket as it was a call for information regarding Arctic grayling in the upper Missouri River basin, of which NorthWestern had none. NorthWestern does not know what PPLM did or did not do relative to this proceeding.
- c. The Arctic grayling is listable under the Endangered Species Act, but listing is precluded by higher priority listing actions. For a description of the United States Fish and Wildlife Service’s interpretation of “warranted but precluded” as it applies to the Arctic grayling see *Endangered and Threatened Wildlife and Plants*, 75 Fed. Reg. 54,708 54,742-54,752 (September 8, 2010).
- d. See the response to Data Request PSC-190.

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PSC-192

Regarding: Unforeseen Capital and O&M Expenses
Witness: Hines

You note in response to PSC-076b that “significant unanticipated expenditures are generally not modeled into the cap-ex forecast,” and are therefore presumably not incorporated into the estimated levelized cost of the facilities.

If the Commission concludes in this proceeding that the forecast levelized price is reasonable based on NWE’s representations about the capital and operations budget, but subsequently the capital or operational needs turn out to be greater, would it be appropriate for the Commission to expect that the difference would be paid by shareholders as a risk associated with their investment?

RESPONSE:

No, it would not be appropriate for the Commission to expect that shareholders will bear the cost of any future capital or operational needs that are higher than expected. If there are unanticipated expenses, NorthWestern expects to make its case before the Commission at that point in time. Please also see the response to Data Request PSC-187a.

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PSC-193

Regarding: Rainbow Development
Witness: Rhoads

- a. In response to PSC-079b, NWE confirms that it believes that the Rainbow Upgrade was undertaken as a cost-effectiveness project. Please provide any evidence that you possess that forms the basis for this contention.
- b. In your experience, is it ordinary for investors in hydroelectric projects to spend nearly \$10 million per megawatt of installed capacity, as PPLM apparently did in its Rainbow Upgrade (\$245 million capital expenditure, for a 25-MW incremental capacity improvement, according to PPLM's website:
<http://www.pplmontana.com/producing+power/power+plants/Rainbow+Dam.htm>)

RESPONSE:

- a. PPLM, as an ongoing business concern, had every reason to confirm the cost-effectiveness of this upgrade before undertaking it.
- b. Yes, it has been done, but I do not know if it is "ordinary." An understanding of the cost for each project used in the comparison should be obtained before a credible comparison can be made. The \$245 million may include costs not directly attributable to the Rainbow #9 powerhouse. For instance the cost includes the design and construction of the Crooked Falls Switchyard and replacement of the intake at the dam – work which would have been done regardless of if the new powerhouse was built or not. The \$245 million figure does not account for the federal grant proceeds received by PPLM for the project, which reduced the project's overall cost. The 25 MW capacity referenced in the question does not recognize the condition of the equipment in the old powerhouse consisting of 36 MW of capacity that would have to be retired nor the increase in output from Cochrane as a result of increasing the Cochrane pond elevation after Rainbow #9 was built. As the units in the Rainbow powerhouse wore out, the O&M \$/MWh would continue to increase. With Rainbow #9, the operating cost for Rainbow will either remain the same or decrease.

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PSC-194

Subject: Liabilities of Potential Failure Modes
Witness: Rhoads

- a. What has NWE done to identify and quantify the financial exposure associated with the Potential Failure Modes (“PFMs”) identified for the hydro facilities in WTR-5.4?
- b. Please provide estimates of potential financial liabilities in your possession, if any, relating to the risks associated with PFMs referred to in (a).
- c. Has NWE established an upper bound for the cost of remedial measures to meet FERC safety criteria for the Hydros?
- d. Please identify the entities, if any, that will insure NWE against potential liabilities associated with the identified in (a).
- e. Has NWE assigned a percentage risk of any of the risks spelled out in the PFMs actually occurring in the future? If so, please identify that percentage and describe how it was calculated.

RESPONSE:

- a. The financial exposure to the Category I PFM at Hebgen is identified and quantified. The potential financial liability for the Hebgen Category I PFM is included in the 5-year budget forecast (2013-2017). The budget forecast for the completion of the Hebgen intake tower rehabilitation is \$7M, coffer dam removal reinstallation \$4.3M, replacement of the outlet tunnel liner is \$3M, and the spillway remediation is \$3.4M.

The risk of the remaining PFMs is low, and therefore no financial exposure associated with them was identified. If the Part 12 Consultant or FERC believed the risk to be of concern, then the PFM rating would be increased to a Category I and a financial estimate for remediation, if necessary, would be made.
- b. See the response to part a, above
- c. As the system exists today, the Category I risk and financial exposure at Hebgen was identified.
- d. Please see the response to Data Request PSC-166.
- e. No.

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PSC-195

Subject: Hebgen Potential Failure Mode
Witness: Rhoads

What will NWE do to manage and mitigate potential liabilities associated with the subject of Potential Failure Mode (“PFM”) No. 2, described in WTR-5.4, pp. 29-31?

RESPONSE:

Management and mitigation of this PFM is in progress. Please see the response to Data Request PSC-194. This PFM will be reclassified after construction is complete.