



December 9, 2015

Mr. Will Rosquist  
Montana Public Service Commission  
1701 Prospect Ave.  
P. O. Box 202601  
Helena MT 59620-2601

RE: Docket D2015.8.64 – Greycliff Petition  
Greycliff Set 1 Data Requests (001-011)

Dear Mr. Rosquist:

Enclosed for filing is one copy of NorthWestern Energy's responses to Greycliff Wind Prime's Set 1 Data Requests (001-011).

The responses will be hand delivered to the PSC and MCC, e-filed with the PSC, emailed to counsel of record and mailed to the service list.

If you have any questions, please call Joe Schwartzenberger at (406) 497-3362.

Sincerely,

Pam LeProwse  
Administrative Assistant  
Regulatory Affairs

**CERTIFICATE OF SERVICE**

I hereby certify that a true and correct copy of NorthWestern Energy's responses to Greycliff Wind Prime, LLC's Set 1 Data Requests (001-011) in Docket No. D2015.8.64 has been hand delivered to the Montana Public Service Commission and the Montana Consumer Counsel this date. It has also been e-filed on the PSC website, emailed to counsel of record, and mailed to the remainder of the service list as follows:

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Date: December 9, 2015



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Pam LeProwse  
Administrative Assistant  
Regulatory Affairs



**NorthWestern Energy**  
**Docket No. D2015.8.64**  
**Greycliff's Petition to Set Terms and Conditions**

**Greycliff Wind Prime, LLC**  
**Set 1 (001-011)**

Data Requests received November 25, 2015

GWP-002 RE: Witness: Bleau J. LaFave  
Page BLJ-8  
Subject: "Intermittency" Adjustment

On Page BLJ-8 of NWE's response testimony, NWE states that "[t]his difference in price represents the market value between firm dispatchable resources and intermittent resources delivered by Greycliff that Greycliff would receive in the market."

Please provide all studies and/or analyses relied upon in identifying, evaluating, validating and implementing the analytic approach used in adjusting the avoided cost to "represent the intermittency of wind."

RESPONSE:

No studies are needed to support this approach. In the Montana market, energy delivered from a wind resource is priced when the energy is delivered.

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GWP-003 RE: Witness: Bleau J. LaFave  
Page BLJ-8  
Subject: "Intermittency" Adjustment

Please explain why the adjustment for intermittency of wind is not already reflected in NWE's proposed wind integration charge. Please provide all studies and/or analysis identifying, evaluating, validating and implementing the analytic approach justifying why the adjustment for intermittency of wind is not reflected in NWE's proposed integration charge.

RESPONSE:

The wind integration charge provides support for the real time market. Regulation supports system reliability in real time, and supplemental services support system stability and load service in real time. These services do not ensure that the day-ahead forecast is accurate and that a generator delivers the energy contracted to be provided. In a day-ahead market, if a generator delivers too little or too much energy from that which it agreed to provide, the generator will be a price taker, i.e., energy priced in real time versus day-ahead, during the next day in order to make up the short fall or for over delivering into the market. This is why the real time price most accurately reflects the value of the energy delivered from an intermittent resource.

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GWP-004 RE: Witness: Bleau J. LaFave  
Page BLJ-17  
Subject: Alternative approaches to calculating avoided cost

On Page BLJ-17 of NWE's response testimony, you state that the approach used by NWE is "the most effective means to calculate the forecasted avoided cost for a QF project."

- (a) Please provide all studies and/or analyses evaluated by NWE as alternative approaches to calculate avoided cost. Please identify each alternative considered, and why it was considered less effective than the approach that NWE chose. If there were no alternatives evaluated or considered by NWE, please explain the basis for the statement that this is the most "effective means to calculate the forecasted avoided cost for a QF project."
- (b) Please provide any independent studies (i.e., non-NWE) or sets of independent (i.e., non-NWE studies) analyses reviewed or relied upon by NWE in adapting the specific avoided cost approach being used, and specifically any independent study or independent analyses that outlines this approach as consistent with what is commonly referred to in the power industry as a differential revenue requirements, or a "QF-In/QF-Out" methodology.

RESPONSE:

- (a) Alternative approaches like the "proxy" method and the "component/peaker" method are estimates that assume certain characteristics that may or may not be part of the NorthWestern Energy portfolio. These methods use the same assumptions as those used in the differential revenue requirement method for market price forecasts, load forecast, and generation capabilities, but they do not reflect a forecasted economic dispatch of the existing portfolio. Starting with an economic dispatch of the existing portfolio provides a better base to evaluate the forecasted effect of adding a new resource. See also the response to subpart b, below.
- (b) See the "GWP-004b" folder on the attached CD.

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GWP-005 RE: Witness: Bleau J. LaFave  
Page: Exhibit \_\_ (BJL- 1)  
Subject: Wind integration costs associated with regulation and  
operating reserves

On Exhibit (BJL-1), you propose adjustments to the avoided cost calculation to reflect wind integration costs related to regulation and operating reserves.

Please provide a description and data inputs detailing how operating reserves are modeled in your characterization and setup of the PowerSimm™ model used to estimate avoided cost in this proceeding.

**RESPONSE:**

The adjustments for regulation and operating reserves were calculated outside of PowerSimm. The economic dispatch in PowerSimm is calculated hour by hour. Regulation is a sub-hour reliability service. Operating reserve requirements are identified in the NorthWestern Energy OATT in Schedule 5 and Schedule 6. The worksheet for calculating regulation and the operating reserve requirements is attached to the response to Data Request PSC-012a. See also the response to Data Request PSC-016a for copies of Schedules 5 and 6.



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GWP-007 RE: Witness: Luke P. Hansen  
Page: LPH-4  
Subject: PowerSimm Dispatch Assumptions

On Page LPH-7 of NWE's response testimony, you state that the "market forecasts for carbon dioxide, coal, natural gas, and electricity were also updated" for the avoided cost calculations.

Please provide the hourly, monthly and annual price series for electricity, natural gas, coal and carbon dioxide, as those series were used in external modeling and in the PowerSimm™ simulation and derivation of NWE's avoided cost estimate.

RESPONSE:

NorthWestern has objected in part to this data request. See NorthWestern's Objections to Data Requests Served on November 25, 2015 filed on December 7, 2015.

See the response to Data Request PSC-012b for monthly forward prices. Annual prices are simulated in PowerSimm™ using the monthly forward prices as a basis for the simulations. The annual prices are a weighted average of the monthly prices.



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GWP-008 cont'd

(b) See the table below:

Facility	Dated	Class	Plant MW	Negotiations	Queue #
Flint Creek Hydroelectric LLC	16-Jan-2012	Hydro	2.0	13-Dec-2006	61
Lower South Fork LLC	16-Jan-2012	Hydro	0.5	13-Dec-2006	129
Fairfield Wind LLC	22-Mar-2012	Wind	10.0	25-May-2010	133
Sleeping Giant Power LLC	13-Nov-2013	Hydro	8.0	2-Oct-2013	167
United Materials of Great Falls Inc	28-Apr-2014	Wind	9.0	11-Dec-2012	23
Wisconsin Creek LTD LC	1-Jul-2014	Hydro	0.6	14-Feb-2013	Rollover
Donald Fred Jenni (Hanover Hydro)	1-Jul-2014	Hydro	0.2	Mid 2013	Rollover
Greenfield Wind LLC	19-Nov-2014	Wind	25.0	27-Feb-2013	134
Green Meadow Solar LLC	5-Oct-2015	Solar	3.0	7-May-2014	179
River Bend Solar LLC	5-Oct-2015	Solar	2.0	7-May-2014	203
Deer Creek Road Solar 1 LLC	18-Nov-2015	Solar	3.0	7-May-2014	184
Ragen Ranch Solar 1 LLC	18-Nov-2015	Solar	3.0	7-May-2014	199
South Mills Solar 1 LLC	18-Nov-2015	Solar	3.0	7-May-2014	193

- (c) Order No. 6444c contains only 17 paragraphs. NorthWestern believes this request is referring to Order No. 6444e paragraph 47. With the exception of Greenfield, the QFs that have power purchase agreements with NorthWestern have done so in mutual negotiations or are entitled to the standard offer rate and were not attempting to sell to NorthWestern pursuant to a legally enforceable obligation (“LEO”). Regarding Greenfield, it alleged that it had established an LEO, which NorthWestern refuted. This issue was never decided by the Commission because Greenfield and NorthWestern mutually agreed to execute a contract.
- (d) All except one of the QF contracts were negotiated as standard offer contracts under QF-1 tariffs that were effective at the time of execution. Thus, competitive solicitation requirements are not required. Greenfield was a negotiated settlement during a contested filing and thus the Commission found that it was not subject to the then-current administrative rule (which requirement has now been repealed by the Commission). Order No. 7347a, ¶ 36 in Docket No. D2014.4.43.
- (e) Except the QFs noted above as rollover QFs, NorthWestern has FERC Form 556 for each QF listed in response to subpart b above. QFs with a net power production less than 1 MW are exempt from filing a FERC Form 556. 18 C.F.R. § 292.203(b)(2)(d).

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GWP-009 RE: Witness: Bleau LaFave  
Page: Generally  
Subject: PowerSimm Dispatch Assumptions

Please provide a description and data inputs detailing how operating reserves are modeled in your characterization and setup of the PowerSimm™ model used to estimate avoided cost in this proceeding.

RESPONSE:

As stated before, the operating reserve requirements are identified in Schedule 5 and Schedule 6 of the NorthWestern Energy OATT. Prices for services are based on the latest executed contract at the time the analysis is posted on OASIS. The calculation for future years is included in my exhibit file provided in response to Data Request PSC-012a. The operating reserves were calculated outside of PowerSimm. For copies of Schedules 5 and 6, see the response to Data Request PSC-016a.

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GWP-010 RE: Witness: Luke P. Hansen  
Page: LPH-4  
Subject: PowerSimm Dispatch Assumptions

On Page LPH-4 of NWE's response testimony, you state that "PowerSimmTM first calculates the hourly dispatch of NorthWestern's supply portfolio and then compares the Greycliff energy production to that supply portfolio. Only after this comparison is made can the value of the 8 Greycliff wind resource be calculated." Please answer the following questions regarding this statement:

- (a) Please provide the hourly, monthly and annual demand levels, and the hourly, monthly and annual generator dispatch levels for each NWE supply resource modeled in PowerSimmTM.
- (b) Please provide the input fuel costs, emissions rates and costs, variable operating and maintenance costs, heat rates, and other parameters used by NWE in modeling its system using PowerSimmTM for purposes of estimating avoided cost in this proceeding.
- (c) Please provide the hourly, monthly and annual energy and/or capacity market prices used in the PowerSimmTM simulation for purposes of estimating avoided cost in this proceeding.
- (d) Please provide all workpapers, calculations and PowerSimmTM simulation output for your assessment and derivation of avoided cost in this proceeding.
- (e) Please make a copy of the PowerSimmTM model and input dataset available for inspection and review. Greycliff and its consultants will enter into an NDA, if needed, in order to access and review proprietary software.

RESPONSE:

- (a) NorthWestern has objected in part to this data request. See NorthWestern's Objections to Data Requests Served on November 25, 2015 filed on December 7, 2015. See the response to Data Request GWP-006a
- (b) See the response to Data Request GWP-006b.
- (c) NorthWestern has objected to this data request. See NorthWestern's Objections to Data Requests Served on November 25, 2015 filed on December 7, 2015. See the response to Data Request GWP-006c.

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GWP-010 cont'd

- (d) See the response to Data Request GWP-006d.
- (e) NorthWestern cannot provide a copy of the model due to its contract with Ascend Analytics. However, Ascend Analytics has proposed to provide hosted access to the NorthWestern's PowerSimm model to all parties and the Commission staff according to the terms included in the attached proposal. If such hosted access is provided, the signing of non-disclosure agreements may be required by Ascend Analytics. Please refer to the response to Data Request PSC-012b for the input dataset.

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MEMORANDUM

Date: December 8, 2015  
To: Dave Fine  
From: Gary Dorris  
RE: Access to PowerSimm

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Ascend is willing to support independent parties in their review and access to PowerSimm. Ascend hosts PowerSimm in a private cloud with servers in Billings, MT. The most pragmatic and cost-effective approach to reviewing PowerSimm inputs and outputs will be to have Ascend staff serve as user experts on behalf of the independent party. With Ascend serving as the operational tour guide, independent parties will be able to readily review portfolio configuration, modeling assumptions, and output results.

Ascend will work cooperatively with the independent parties if they have a desire to review input assumptions, model mechanisms, validation activities, and access results. Reviewer will have the ability to view relevant input configurations for the avoided cost study through the PowerSimm user interface used to generate the results including market forward curves, generation asset characteristics, wind generation history, weather, etc. The output results will include variables generated from the avoided cost study. The output data from the avoided cost study will likely have already been delivered to the independent party, but can be verified via the PowerCube to better understand the software mechanics.

The fee for the guided tour of PowerSimm will be an estimated \$3,000. Creating a software tour requires creation of an independent reviewing environment that costs \$2,000 in labor effort to establish. There will be approximately another \$1,000 for a two hour review session run by two Ascend staff members billed at Ascend standard commercial consulting rates (approximately \$250/hr \* 2hr \*2 staff) for a total cost of \$3,000 for the preliminary review. The review sessions will be conducted at either Ascend's offices in Bozeman or Boulder or remotely at the options of the reviewer.

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GWP-011      RE:      Witness: Luke P. Hansen  
   Page: LPH-4  
   Subject: PowerSimm Dispatch Assumptions

On Page LPH-7 of NWE's response testimony, you state that the "market forecasts for carbon dioxide, coal, natural gas, and electricity were also updated" for the avoided cost calculations. Please provide the following information:

- (a) Please provide the hourly, monthly and annual price series for electricity, natural gas, coal and carbon dioxide, as those series were used in external modeling and in the PowerSimm™ simulation and derivation of NWE's avoided cost estimate.
- (b) Please provide the U.S. EIA natural gas price series and supporting documentation used by NWE in developing its natural gas price forecast.
- (c) Please explain why your avoided cost estimate does not reflect marginal compliance costs of meeting carbon dioxide emissions rate or mass based goals as published in the final rule of the U.S. Environmental Protection Agency's Clean Power Plan? For example, in its comments on the U.S. EPA's proposed Clean Power Plan rules, NWE argued that complying with the requirement would substantially increase its cost to produce electricity and may lead to retirement of coal generators.
- (d) Please explain why CPP compliance costs and resource impacts are not fundamentally reflected in NWE's avoided cost estimate.

RESPONSE:

- (a) Please see the response to Data Request GWP-007.
- (b) See the "GWP-011b" folder on the CD attached to Data Request GWP-004b.
- (c) The final rule of the U.S. Environmental Protection Agency's Clean Power Plan does not provide NorthWestern with explicit cost information. NorthWestern has included a carbon cost adder that is intended to address the costs of compliance without definitively knowing how these costs will manifest themselves.
- (d) See the response to part c, above.