Service Date: April 23, 2008

DEPARTMENT OF PUBLIC SERVICE REGULATION
BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MONTANA

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IN THE MATTER of the Petition of Two Dot Wind, LLC to Set Terms and Conditions for Existing Qualifying Small Power Production Facility Pursuant to M.C.A. § 69-3-603	)	UTILITY DIVISION
	)	DOCKET NO. D2007.12.152
	)	ORDER NO. 6886a

FINAL ORDER

Appearances

FOR THE PETITIONER:

Two Dot Wind

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FOR THE INTERVENORS:

NorthWestern Energy

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BEFORE:

GREG JERGESON, Chairman
DOUG MOOD, Vice-Chairman
BRAD MOLNAR, Commissioner
ROBERT H. RANEY, Commissioner
KEN TOOLE, Commissioner

COMMISSION STAFF:

Al Brogan, Staff Attorney
Will Rosquist, Staff Economist

I. INTRODUCTION

In this Order, the Montana Public Service Commission ("PSC") addresses the petition of Two Dot Wind, LLC. ("TDW"), a Qualifying Facility ("QF"), pursuant to § 69-3-601 et seq., MCA, and PSC Order No. 6501g, to establish the rates and conditions of a contract between it and NorthWestern Energy ("NWE"). Initially, TDW disputed six contract terms. The parties have resolved several of those issues The primary issues of dispute between TDW and NWE relate to whether TDW should be assessed an integration rate and, if so, what the rate should be, and whether the contract should allow NWE the right to inspect TDW documents related to its status as a QF.

II. BACKGROUND

In Order No. 6501f, addressing issues in several consolidated NWE QF dockets, the PSC determined that wind-generated electricity production is highly variable and presents particular challenges with regard to day-ahead and hour-ahead system planning, and intra-hour system operations. The PSC stated that it supports NWE's acquisition of wind resources but that wind's production characteristics must be considered in developing standard rates under PURPA.[1/] In Order No. 6501g the PSC reaffirmed the appropriateness of accounting for wind integration in determining standard, avoided cost-based QF payments. The PSC ordered that new contracts between NWE and wind QFs must include specific wind integration provisions. A QF may arrange for integration services on its own. Alternatively, NWE and the QF must attempt to negotiate mutually acceptable contract conditions that reflect the QF's particular size, location, wind regime, production profile, and other project characteristics. The PSC ordered NWE to document its good-faith efforts to negotiate such arrangements, including an assessment of the potential for geographic diversity benefits. Order 6501g provides that if NWE and a QF

[1/] Docket Nos. D2003.7.86, D2004.6.96, and D2005.6.103, Order No 6501f, ¶ 194.

cannot agree to mutually acceptable contract arrangements, the PSC will determine the appropriate arrangement upon a petition from either NWE or the QF under § 69-3-603, MCA.[2/]

III. PROCEDURAL HISTORY

On December 26, 2007, TDW filed a Petition to have Commission Set Contract Terms and Conditions Pursuant to M.C.A. § 69-8-603 ("Petition"). According to the Petition, TDW and NWE exchanged letters but were unable to mutually agree on terms and conditions for new QF contracts for several TDW wind projects, including Sheep Valley, Moe Wind, Martinsdale Colony, and Martinsdale South. The Petition invokes the provisions of § 69-8-603, MCA, which states:

> **69-3-603. *(Temporary)* Required sale of electricity under rates and conditions prescribed by commission.** (1) If a qualifying small power production facility and a utility are unable to mutually agree to a contract for the sale of electricity or a price for the electricity to be purchased by the utility, the commission shall require the utility to purchase the electricity under rates and conditions established under the provisions of subsection (2).
>
> (2) The commission shall determine the rates and conditions of the contract upon petition of a qualifying small power production facility or a utility or during a rate proceeding involving the review of rates paid by a utility for electricity purchased from a qualifying small power production facility. The commission shall render a decision within 120 days of receipt of the petition or before the completion of the rate proceeding. The rates and conditions of the determination shall be made according to the standards prescribed in 69-3-604.

On December 28, 2007, the PSC issued a Notice of Petition. The Notice determined that TDW, NWE, and the Montana Consumer Counsel ("MCC") are parties to this docket.

On December 31, 2007, the PSC issued Procedural Order 6886 establishing dates for discovery on TDW's Petition, testimony from NWE and intervenors, discovery on NWE and intervenor testimony, TDW rebuttal testimony, and discovery on TDW rebuttal testimony. A hearing was tentatively scheduled for March 6, 2008.

On January 8, 2008, at a regularly scheduled and noticed work session called for

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[2/] Docket Nos. D2003.7.86, D2004.6.96, and D2005.6.103, Order No 6501g, ¶ 167.

the purpose, the Commission, by a vote of 4 to 1, delegated to PSC staff the authority to resolve and rule on discovery disputes in this docket.

On February 1, 2008, NWE filed objections to certain TDW data requests. On February 6, 2008, TDW filed a response to NWE's objections. On February 7, 2008, PSC staff issued a Notice of Staff Action ruling on NWE's objections.

On February 11, 2008, TDW filed a Motion to Compel Answers by NWE to certain TDW data requests. On February 13, 2008, PSC staff issued a Notice of Staff Action ruling on TDW's Motion to Compel.

On February 15, 2008, TDW filed Motions for Summary Judgment. On March 3, 2008, the MCC filed a Response in Opposition to the Motions for Summary Judgment. On March 4, NWE filed a Response to [TDW's] Motions for Summary Judgment. On March 4, 2008, TDW filed a Reply in Support of Motion for Summary Judgment. The PSC took the Motions for Summary Judgment under advisement.

On February 19, 2008, TDW filed a Renewed Motion to Compel NWE's Answers to TDW-004. On February 21, 2008, PSC staff issued a Notice of Staff Action denying TDW's Renewed Motion to Compel.

On February 22, 2008, TDW filed a Motion for Reconsideration of PSC staff's February 21, 2008, Notice of Staff Action denying TDW's Renewed Motion to Compel. Also on February 21, 2008, Judith Gap, LLC filed a Motion for Protective Order pertaining to Judith Gap production data requested in data request TDW-016(1)(a) and TDW-017(1)(a).

On February 25, 2008, NWE filed a Motion to Extend Hearing Date. Also on February 25, 2008, TDW filed a response to Judith Gap, LLC's Motion for Protective Order.

On February 26, 2008, the PSC denied Judith Gap, LLC's Motion for Protective Order and NWE's Motion to Extend Hearing Date.

On March 6-7, 2008, the PSC conducted a public hearing in this matter.

IV. TWO DOT WIND'S PETITION

TDW states that it received proposed contracts dated July 1, 2007, from NWE for the four QF projects listed above. TDW wrote to NWE on October 31, 2007, objecting to

portions of the proposed contracts. According to TDW, NWE responded on November 30, 2007, but did not agree to all changes requested by TDW. TDW's Petition seeks relief from the NWE-proposed contract provisions it finds objectionable.

TDW objects to a "whereas" clause in the proposed contract that states NWE will purchase energy from TDW's projects "to the extent required by applicable law or regulation." TDW asserts that this provision incorrectly implies that NWE can terminate the contract if the law or regulations change. TDW maintains that once a QF contract is executed the agreement is in force for its term.

Article 2.2 of the proposed contract allows NWE to request and inspect "documents, agreements, laws, licenses, or regulations necessary for continuous operation of [TDW's project] as a small power production facility or Qualifying Facility." TDW asserts that it is improper and unlawful to grant NWE such authority. TDW also finds such authority unnecessary since its projects are currently operating.

Article 5.1 of the proposed contract requires TDW to either self-provide wind integration services or reimburse NWE for its actual costs of providing these services. TDW states that this provision should be removed because its existing small projects do not cause any incremental integration costs.

Article 6.5 of the proposed contract allows either party to withhold payments to the other party if the other party fails to pay a bill. TDW states that contract provisions should not motivate either party to withhold payments. TDW is particularly concerned about this provision given NWE's recent bankruptcy.

Article 16.2 of the proposed contract establishes the First Judicial District Court in Helena as the place of venue or trial for any claims or actions arising from the contract. TDW asserts that it has a right to venue in the place where it resides and that neither party should be able to force the other to litigate contract disputes in a forum that is not of its own choosing.

TDW states that the insurance requirements set forth in Exhibit Y of the proposed contract are excessive. TDW finds that "the PSC would be a better arbiter of what insurance limits are fair and just."

TDW states that it is most concerned about the wind integration and insurance provisions. According to TDW, these two provisions eliminate most, if not all, of the

recent increase in the QF-1 tariff rate from $32.75 per MWh to $49.90 per MWh. TDW maintains that further negotiation with NWE will not resolve these issues.

V. NWE AND INTERVENOR TESTIMONY

On January 23, 2008, NWE pre-filed testimony from John D. Hines, Michael R. Cashell, and David E. Fine. On the same date, MCC pre-filed testimony from Larry Nordell. At the public hearing, Casey E. Johnston adopted Cashell's pre-filed testimony as his own and stood for cross examination related to that testimony. Mark A. Stauffer adopted Fine's pre-filed testimony as his own and stood for cross examination related to that testimony. This section summarizes all pre-filed testimony, referring only to Johnston and Staffer when discussing the pre-filed testimony they ultimately adopted at the hearing.

A. NorthWestern Energy

John D. Hines

Mr. Hines is NWE's Chief Energy Supply Officer. Hines addresses contract issues, the context of NWE's negotiations with TDW, and wind integration costs attributable to wind projects.

Hines states that NWE provided a proposed contract to TDW as a basis for ongoing negotiation. He maintains that the proposed contract is generally appropriate, but also asserts that had TDW been willing to engage in meaningful negotiation some of the contract issues TDW raises could have been resolved. Hines states that NWE is willing to strike the "whereas" clause to which TDW objects. NWE also agrees to revise Article 16.2 to allow a party bringing suit to choose the venue. With regard to insurance, Hines states NWE is willing to eliminate insurance requirements from the contract provided TDW demonstrates that insurance has been obtained in conjunction with the interconnection agreements for each project.[3/]

Hines maintains that Article 2.2 of the proposed contract, giving NWE the right to request and inspect documents and agreements, would facilitate NWE's administration of

[3/] In response to TDW-033 NWE states that a copy of a certificate of insurance form indicating coverage and time of policy coverage would be sufficient.

the contract and is in customers' interest.[4/] He also states that Article 5.1 of the proposed contract regarding wind integration costs is consistent with PSC orders, NWE's QF-1 tariff, and NWE's operational experience.

Hines proposes to assess wind QFs NWE's actual costs for regulation resources as reflected in three contracts that provide NWE regulation service for 2008. The amount of regulation reserve capacity attributable to TDW's projects would reflect the amount of regulating reserve capacity NWE has determined it needs to accommodate wind in its supply portfolio. Table 1 summarizes the costs associated with NWE's three regulation service contracts, including costs for transmission capacity needed to deliver the service. NWE's Transmission unit has two contracts, one with Avista and one with Powerex. NWE's Supply unit has one contract with Avista. Some contracts provide different quantities at different times throughout the year. More complete descriptions of the contracts follow in summaries of Mr. Johnston's and Mr. Stauffer's testimony.

Table 1. NWE's regulation service costs

Source	Reg. Reserve (MW)	Months of Service	Total MW-mos	Reg. Reserve Cost	Trans. Capacity Cost	Total Annual Cost
Avista-NWE supply	25	9.5	237.5	1,724,250	582,160	2,306,410
Avista-NWE supply	10	2.5	37.5	272,250	90,825	363,075
Avista-NWE Trans.	10	4.0	40.0	290,400	28,000	318,400
Avista-NWE Trans.	10	5.5	55.0	399,300	38,500	437,800
Powerex-NWE Trans.	50	12.0	600.0	5,640,000	3,360,000	9,000,000
Powerex-NWE Trans.	10	2.5	25.0	350,000	140,000	490,000
Totals			**995**			**12,915,685**

Hines divides the total annual cost of regulation resources (regulating reserve capacity cost plus transmission capacity cost) by the total megawatt-months of service to calculate a weighted average cost per megawatt-month of $12,980.59.[5/]

Next, Hines testifies that NWE needs regulating reserve capacity equal to 18% of the installed capacity of TDW's wind projects to integrate those projects. The 18% figure is developed in Mr. Stauffer's pre-filed testimony. Hines states that, according to

[4/] In response to PSC-005 TDW states that prior contracts with NWE contained Article 2.2. In response to PSC-014 NWE states that it did not request documents from TDW pursuant to Article 2.2.

[5/] In response to data request PSC-014c NWE revises its calculation of the weighted average cost of regulation service in 2008 from $13,051/MW-mo to $12,980.59/MW-mo.

Stauffer, the 18% figure is likely conservative with regard to QF wind projects. Hines concludes that for each MW of installed capacity, the cost to integrate TDW's projects is $12,980.59*18% = $2,336.51/MW-mo. Hines converts this cost into a cost per megawatt-hour for various capacity factors as shown in Table 2. Table 2 reproduces Hines's table, but reflects the correction NWE identified in response to data request PSC-014 (see footnote 5).

Table 2. Development of QF integration charge per MWh

Name Plate Capacity (MW)	Regulating Reserve Requirement	Reg. Reserves (MW)	Wtd. Av. Cost of Reg. Res. ($/MW-mo)	Reg. Res. Cost ($/Month)	Capacity Factor	Monthly Production (MWh)	Integration Charge ($/MWh)
1	18%	0.18	12,980.59	2,336.51	0.15	109.5	21.34
1	18%	0.18	12,980.59	2,336.51	0.20	146.0	16.00
1	18%	0.18	12,980.59	2,336.51	0.25	182.5	12.80
1	18%	0.18	12,980.59	2,336.51	0.30	219.0	10.67
1	18%	0.18	12,980.59	2,336.51	0.35	255.5	9.14
1	18%	0.18	12,980.59	2,336.51	0.40	292.0	8.00

Hines notes that the integration charge per MWh depends on the QF's capacity factor. He proposes to annually true up TDW's capacity factor to reflect the running average actual capacity factor over the term of the contract. In addition, he proposes to annually update NWE's regulation reserve costs to reflect actual costs.

Hines states that NWE's negotiations with TDW were guided by Tariff Schedule No. QF-1 and PSC orders 6501f and 6501g. He notes that the QF-1 tariff requires QFs to either self-provide integration services or negotiate a rate reduction that reflects NWE's cost to provide those services. PSC order 6501g, paragraphs 165-167, states that contracts between NWE and wind QFs must include specific wind integration provisions. Hines also points out that § 90-4-1201 et seq., MCA, the Montana Clean Renewable Energy Bond Act (Act), authorizes NWE to deduct the cost of ancillary services provided for QFs from energy payments if the QF is financed under the Act. Hines maintains that the Act further illustrates a policy that cost-causers should pay their full costs.[6/] Hines

[6/] In response to PSC-015c NWE states that TDW's projects were not financed under 90-4-1201 et seq., MCA, but that this law illustrates a Montana policy that cost causers should pay their full costs. NWE states that a QF's size is irrelevant to whether it should pay its share of wind integration costs.

reports that NWE tried to explain to TDW the basis for including wind integration provisions in the proposed contract during negotiations.

According to Hines, wind QFs cause incremental regulation requirements and, consequently, incremental costs on NWE's system. NWE purchases regulating reserves in order to achieve the required balance between resources and loads on a moment-to-moment basis. Hines maintains that NWE's experience with the Judith Gap wind project illuminates the causal effect of wind generation on the need for additional regulating reserves. He reports that another NWE witness, Mr. Johnston, testifies that NWE's need for regulating reserves increased following construction of the Judith Gap project. Hines states that if TDW does not pay its share of wind integration costs, customers will have to pay TDW the full QF-1 rate plus associated wind integration costs. In addition, he states that the PSC's decision on the TDW contract will be precedent-setting with regard to whether other QFs will be assessed regulating reserve costs and, if so, the amount. Hines states that 80 MW worth of new QFs have expressed interest in contracting with NWE, requiring at least 9 to10 MW of additional regulating reserve capacity (9 to 10 MW of regulating reserve assumes 50 MW of new QF capacity. See p. 9 of Hines's testimony). Ultimately, Hines concludes, a decision in favor of TDW's position would result in subsidizing QF wind ventures.

Hines disagrees with TDW that a QF's size is relevant to whether or not it should pay for costs it imposes on NWE's system. Hines maintains that, in total, QF wind projects will likely cause substantial regulating reserve costs within the electricity supply portfolio unless the QFs self-provide the reserves or NWE factors reserve costs into the QF payment. Hines states that NWE would certainly factor in the need for additional regulating reserves if it were purchasing or building a 50 MW wind project and QFs should be treated the same way.[7/]

Casey E. Johnston

Mr. Johnston is NWE's Chief Transmission Officer. Johnston's testimony addresses NWE's regulating reserve requirements and recent procurement efforts and results.

[7/] In response to PSC-015e NWE affirms that the need for additional regulating reserves was explicitly factored into the cost-effectiveness evaluation of the Judith Gap contract.

Johnston explains that NWE operates a balancing authority (previously known as a control area) but does not own any generation resources. Within its balancing authority footprint, NWE must match electrical loads and generating resources on a moment-to-moment basis to meet operating criteria and provide reliable service to customers. As a transmission provider, NWE is also required to provide ancillary services under its Open Access Transmission Tariff ("OATT"). In the past, NWE has purchased regulating reserves and load following services from third parties in order to perform system balancing and provide OATT ancillary services. Johnston states that for many years Idaho Power Company supplied NWE with these products.

Johnston states that without regulating reserves NWE could not comply with Federal Energy Regulatory Commission-approved ("FERC"), mandatory reliability standards set by the North American Electric Reliability Council ("NERC") and Western Electricity Coordinating Council ("WECC") for instantaneously balancing loads and resources. In turn, NWE's failure to comply with the reliability standards could adversely affect wholesale and retail customers, potentially the entire Western Interconnect, and result in NERC-imposed sanctions and/or civil penalties. Johnston states that in recent years third parties have become less willing to provide these services because of resource constraints, transmission constraints and greater demand for such services to integrate intermittent generation within their own balancing authorities.

Johnston testifies that historically NWE required 60 MW of regulating reserve capacity to follow the moment-to-moment differences between loads and resources within its balancing authority and to provide ancillary services under its OATT. Since the mid to late 1990s, NWE has acquired this regulating reserve capacity from Idaho Power Company. In late 2005 and early 2006 the Judith Gap wind project began generating within NWE's balancing authority. NWE's retail supply unit purchased 25 MW of regulating reserve capacity to adequately integrate Judith Gap into the supply portfolio. Thus, Johnston concludes, NWE's balancing authority currently requires 85 MW of total regulating reserve capacity.

Johnston states that NERC and WECC performance criteria further support NWE's 85 MW regulating reserve capacity requirement. NWE is required to "pass" Control Performance Standard 2 ("CPS2") for instantaneously balancing loads and

resources in at least 90% of the 10-minute periods in each month.[8/] Johnston states that before Judith Gap, NWE consistently met the CPS2 criteria. In December, 2005, NWE's retail supply unit purchased 15 MW of regulating reserve capacity to integrate Judith Gap, but NWE failed to meet CPS2 criteria during the first and second quarters of 2006. In June, 2006, NWE's retail supply unit purchased an additional 10 MW of regulating reserves. Since then NWE has satisfied mandatory control criteria.[9/]

Johnston explains that Idaho Power Company terminated its long-time supply of regulating reserve capacity on December 31, 2007. To prepare for the loss of this source of regulating reserves, NWE issued an RFP on November 30, 2006. NWE requested bids for up to 90 MW of regulating reserve capacity and specifically solicited all members of the Northwest Power Pool, nearby transmission providers and balancing authorities, and various power marketers. Ultimately, only two offers satisfied NWE's technical requirements.

NWE executed agreements with Avista Utilities and Powerex to replace the Idaho Power Company regulating reserve capacity. Avista will provide 10 MW of Dynamic Capacity and Energy Service to NWE from January 1 through April 30, 2008, and from July 16 through December 31, 2008; no service will be provided from May 1 through July 15, 2008. Costs under the Avista contract include $7.26 per kW per month for regulating capacity and $1.40 per kW per month for the associated firm transmission service across Avista's transmission system. Powerex will provide NWE 50 MW of regulating reserve capacity from January 1 through December 31, 2008 at a price of $9.40 per kW per month. In addition, for the May 1 through July 15, 2008 period when no service is provided by Avista, Powerex will provide 10 MW of regulating reserve capacity at a price of $14.00 per kW per month. In order to deliver Powerex's regulating reserve capacity to NWE's system NWE will pay Powerex $5.60 per kW per month for firm transmission service across the British Columbia Transmission Corporation and Bonneville Power Administration transmission systems. Under both the Avista and Powerex contracts energy transferred as a result of the regulation process will be settled

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[8/] In response to TDW-013 NWE explains the calculation of CPS2 performance.

[9/] In response to TDW-001, NWE provided historical CPS2 compliance information from 2003 through 2007.

using a Dow Jones Daily Mid-C price index. For comparison, Johnston notes that the price of regulating reserve capacity NWE formerly purchased from Idaho Power Company was $3.625 per kW per month. Johnston states that the result of NWE's RFP process illustrates that the availability of regulating reserve products is diminishing and the costs are greatly increasing. In November, 2007, NWE issued another RFP for regulating reserve service beginning January 1, 2009. Responses were due December 21, 2007.

Mark A. Stauffer

Mr. Stauffer is an analyst in NWE's energy supply unit. Stauffer's testimony discusses NWE's experience with commercial wind energy production from Judith Gap and challenges related to integrating wind energy. He also explains why 18% of installed capacity is a reasonable amount of regulating reserve requirements for TDW and other wind projects.

Stauffer explains that NWE purchases all energy produced by the Judith Gap wind farm and integrates it into an electricity supply resource portfolio. Judith Gap consists of 90 1.5 MW wind turbine generators, 135 MW total installed capacity. In 2007, Judith Gap's average annual capacity factor was 41%. Stauffer says that wind energy production is intermittent and changes quickly and in large amounts. Judith Gap's production can change by nearly its total capacity over a 15-minute period. As a result, NWE does not believe wind production has a capacity value. Stauffer states that NWE's system will experience the cumulative impact of current and future wind energy production as NWE executes QF contracts and acquires resources to satisfy Renewable Portfolio Standards.

Stauffer describes how NWE's energy supply unit follows operational practices that, while separate from the Company's transmission unit, are related to operations within NWE's balancing authority. Through state-of-the-art data and communication interfaces combined with three meteorological towers that supply information to a wind and energy forecasting system, NWE accounts for the production of each 1.5 MW turbine at Judith Gap. Stauffer acknowledges that individual turbine energy production and forecast data are summed, but maintains that the contribution from each wind turbine

creates the total production profile and associated integration challenges. According to Stauffer, forecasting is a key element in NWE's day-to-day integration of wind energy production and projects that don't have forecasting systems prevent NWE from scientifically estimating site-specific wind energy production.

Stauffer testifies that NWE's supply unit determines the amount of day-ahead energy purchases and sales to make by evaluating the next-day hourly load forecast, wind energy forecast and each of the other resources contributing to the electricity supply portfolio. Wind turbine availability and other factors that affect turbine output are incorporated into the wind energy forecast. Stauffer states that NWE's real-time agent balances loads and resources hour-to-hour each day by buying and selling short-term energy. The real-time agent monitors actual output from Judith Gap, short-term trends, and the wind energy forecast. Stauffer says this information helps the real-time agent decide how to change pre-scheduled volumes for the up-coming hour in order to minimize imbalance errors and associated costs. According to Stauffer, wind energy variation can be a major source of imbalance volumes (the after-the-fact difference between load and resource). He notes that Judith Gap is more variable, on both an absolute and a percentage basis, than any other resource in NWE's supply portfolio.[10/] Imbalances within an hour are managed solely by NWE's transmission unit using regulating reserve services.

Stauffer explains that in addition to the regulating reserve contracts discussed by Johnston, NWE's energy supply unit separately negotiated an extension of a 25 MW regulating reserve contract with Avista through the end of 2008. Stauffer states that this contract specifically addresses the need to integrate wind resources currently in NWE's electricity supply resource portfolio. Under the contract, Avista will provide 25 MW of regulating reserve capacity from December 1, 2007 through April 30, 2008 and from July 16 through December 31, 2008. Avista will provide 15 MW of regulating reserve capacity from May 1 through July 15, 2008. The costs of this service include $7.26 per kW per month for the regulating reserve capacity, $1.40 per kW per month for firm transmission service across Avista's system and $3.59 per kW per month for firm

[10/] In response to TDW-020 NWE states absolute variability refers to MW variability measured as the standard deviation of a resource's 15-minute outputs over time. Percentage variability refers to the ratio of absolute variability to installed capacity.

transmission service on NWE's transmission system.

Stauffer states that the ratio of the 25 MW of regulating reserves required to integrate Judith Gap to Judith Gap's 135 MW total installed capacity is 18%. He says this ratio of regulating reserve capacity to installed capacity is adequate for the Judith Gap project, which uses state-of-the-art SCADA (supervisory control and data acquisition), communications, and forecasting systems to optimize the integration process and improve operational decision-making. Given that TDW's projects do not use such communication and forecasting systems, Stauffer concludes that using 18% of TDW's installed capacity to determine regulation reserve requirements is reasonable and perhaps conservative.

B. Montana Consumer Counsel

Larry Nordell

Larry Nordell is MCC's staff economist. Nordell's testimony focuses on wind integration issues. First, Nordell finds unsupportable TDW's assertion that it does not cause measurable integration costs because its projects are small. Second, in response to TDW's request that the PSC calculate integration costs, Nordell states this would be an impossible burden for the PSC. He maintains that the PSC can adequately oversee NWE's calculations. Third, Nordell asserts that providing TDW certainty with respect to integration costs would place unwarranted risk on NWE and its customers because NWE relies on market purchases for shaping and regulation services.

Nordell asserts that TDW's projects impact NWE's need for integration services. TDW's projects produce between zero and 3.915 MW along side generation from Judith Gap that varies from a few 10s of MW up to 135 MW, plus other existing and planned QFs. According to Nordell, while the exact relationship between wind and the need for shaping services in not yet known, the more wind capacity on NWE's system the greater is the need for shaping services to adjust for variable wind output. NWE will need to accommodate TDW's contribution to system variability.

Nordell identifies two ways in which NWE could calculate annual shaping and regulating costs associated with TDW's output, with PSC oversight. NWE could estimate a forward-looking annual cost or, alternatively, NWE could calculate the

previous year's cost for all wind on the system and allocate the costs to each project. In both cases, the PSC could review the calculations as it does with other aspects of NWE's operations. Nordell reiterates that the PSC does not have the information needed to calculate integration costs for the TDW contracts.

Nordell states that a stakeholder process would not settle disputes over actual shaping costs. He says history shows that stakeholders who favor wind tend to project overly optimistic, low shaping costs, and oppose periodic review or efforts to cap risk. Consumer representatives and utilities seek to ensure that wind does not result in excessive costs. Nordell maintains that, in the case of wind QFs under the Public Utility Regulatory Policies Act ("PURPA"), customers must be no worse off with the QF than without it. Consequently, he asserts, wind contract-related risks cannot be imposed on customers and wind QFs cannot be paid more than the net cost reduction resulting from the QF's power production.

Nordell opposes setting a long-term fixed integration rate. He finds that a fixed rate would be too speculative at this time and would impose a large amount of risk on NWE and its customers because of the uncertainty inherent in the market for integration services. Absent some overriding benefit to NWE and its customers from accepting such risk, Nordell says it should remain with the wind developer.

Nordell recommends that NWE calculate its annual total cost for shaping and integrating wind on its system and divide that amount by the annual kilowatt-hours of wind energy delivered to its system. The resulting shaping cost would set the tentative shaping charge for the following year. Thereafter, on an annual basis, NWE would recalculate its actual shaping cost and true up the prior year's payments to QFs. Nordell states that this method would remove TDW's fear of NWE arbitrarily setting a shaping cost. Nordell finds TDW's frustration in this matter justified and recommends that the PSC direct NWE to provide TDW a revised contract, using his integration charge calculation method, within 30 days of a PSC order.

VI. TWO DOT WIND REBUTTAL TESTIMONY

On February 20, 2008, TDW pre-filed rebuttal testimony from Richard Lauckhart. Lauckhart discusses the scope of the proceeding, the nature of output from the TDW

wind projects, and NWE's wind integration cost estimates.

Lauckhart states that TDW did not ask that this proceeding include a study of wind integration costs. Instead, TDW initiated the proceeding because it objected, in part, to contract language that would allow NWE to unilaterally impose potentially inappropriate wind integration-related charges on TDW. According to Lauckhart, for several reasons NWE's wind integration proposals should not be litigated in this proceeding. First, this proceeding is on a fast track and no wind integration cost study can be reasonably completed within the time limit. Second, this proceeding involves limited parties and TDW cannot compete with NWE's financial resources. Third, NWE's wind integration studies and data do not meet industry standards. Fourth, NWE has not answered some TDW discovery and without the information TDW cannot perform the analysis required by any wind integration study.

Lauckhart identifies five reasons necessary information has not been produced in this proceeding: 1) the time involved in addressing discovery disputes, 2) NWE did not find a way for TDW to access voluminous material related to NWE's CPS2 performance, 3) NWE's conclusion that Judith Gap production data is confidential, 4) NWE had little time to respond to disputed discovery questions and/or did not understand questions. Consequently, NWE did not provide the one-hour ahead load resource balancing for the hours in the four weeks in April, May, June, and July, 2006, with the most CPS2 violations TDW requested, 5) NWE provided conflicting data and TDW does not have time in this proceeding to sort out the discrepancies.

Lauckhart provides two recent examples of reasonable wind integration cost studies; one of the studies was done by Bonneville Power Administration ("BPA"), the other by the other by the California Energy Commission. According to Lauckhart, such studies require a lot of data and a lot of time, and NWE should conduct a similar study to understand the regulating reserve requirements of wind projects. He notes that these studies find lower wind integration costs than NWE has proposed. He also advises the PSC not to endorse overly simplistic studies that make wind power look more expensive than it really is.

Lauckhart maintains that NWE has not shown that TDW's wind projects impose incremental integration costs on NWE. NWE has provided information on CPS2

violations that coincided with the commercial operation of the Judith Gap project and information about the correlation of Judith Gap output and load, but has not provided similar information for TDW's wind projects. Lauckhart states that 15 minute production data from TDW's projects shows that they do not provide a significant amount of power, but that the output is diversified. He states that the projects' coincident highest 15-minute peak generation averaged 2.8 MW, while the non-coincident 15-minute peak was 3.3 MW. He observes that the coincident peak of 2.8 MW occurred November 10, 2007, at 7:00 pm, likely a period of high load for NWE. Table 3 is a table Lauckhart included in his testimony to summarize his evaluation of 15-minute output data for the TDW projects.

Table 3. Two Dot Wind project output information

Project	15 min interval Maximum aKW	Time of Maximum	
Sheep Valley Ranch	479	8/30/06	22:45
Martinsdale Wind Farm	744	2/2/07	06:15
Martinsdale 2 (South)	1369	12/3/07	23:45
Moe Wind	356	1/7/07	22:30
MT Marginal	233	11/30/06	13:30
Mission Creek	80	1/6/07	07:30
Non-Coincident Peak	3,261		
Coincident Maximum	2,794	11/10/07	19:00

Lauckhart explains that NWE violates CPS2 standards when more than 10% of the 10-minute periods in a month show power flows on tie lines that are 24 MW more or less than scheduled power flows. He states that utilities develop schedules of specific resources used to meet forecast control area load. Schedules can reflect imports to and exports from the control area. Utilities constantly monitor the lines that move power into and out of the control area. Lauckhart states that utilities maintain regulating reserves that automatically adjust generation if actual load or supplies vary from the forecast so that flows on tie lines match the schedule. If regulating resources do not adjust perfectly, a deviation from scheduled power flows results. NWE violates CPS2 standards if the deviation of actual power flows compared to scheduled power flows in one of the 10-minute periods in a month varies by more than 24 MW (average during the 10-minute period). Lauckhart then poses the question, by how much does output from TDW's

projects vary from scheduled output, possibly contributing to CPS2 violations?

Lauckhart maintains it is not possible to determine how actual TDW project output varies from scheduled output because NWE does not to schedule TDW's output. According to Lauckhart, NWE appears to believe that TDW's output is so small that it falls within the uncertainty range of load forecasts. He asserts that in developing its preschedules NWE most likely assumes TDW's output will be zero because load forecast uncertainty swamps the possible TDW output.

Lauckhart states that if NWE were to forecast TDW's output at 1.4 MW for every 15 minute period in a year, the error between the forecast and actual output would be no larger than 1.4 MW in any 15-minute period, i.e., when coincident output reaches the two-year maximum of 2.8 MW or when output is zero. He also maintains that a 1.4 MW error could reduce CPS2 violations if actual load in a 10-minute period was 25 MW more than forecast while TDW's projects were generating at 2.8 MW (1.4 MW above the scheduled amount). In this case the wind generation deviation would offset some of the load deviation and reduce the load deviation below the 24 MW level NWE must maintain to avoid violations.

Lauckhart states that NWE has not provided sufficient information to show whether TDW's output variation increases or decreases CPS2 violations. However, if NWE were to show that TDW output variation increased CPS2 violations, Lauckhart states that NWE should then begin forecasting the TDW output on an hour-ahead basis. According to Lauckhart, NWE's behavior suggests that it does not believe TDW's projects impose material incremental integration costs. First, none of the original power purchase agreements between NWE and TDW even mentioned wind integration costs. Second, that NWE does not forecast TDW's output suggests NWE does not think it is important. Third, if TDW's output imposed material incremental wind integration costs on NWE its testimony and exhibits would have focused on TDW instead of Judith Gap.

Lauckhart disagrees that NWE's CPS2 analysis is relevant to TDW. He notes that NWE conducted its CPS2 study for the period in which Judith Gap came on line so it is only relevant to Judith Gap. NWE did not conduct a similar study when the TDW projects came on line. Lauckhart asserts that the TDW projects are small, diversified, and do not generate in the same pattern as Judith Gap. In addition, he states that TDW's

coincident peak output is a small fraction of the allowable CPS2 limit.

Lauckhart states that NWE's CPS2 analysis is not legitimate for determining wind integration charges for TDW's projects, partly because NWE's 2007 Electric Default Supply Plan does not evaluate planning and operating reserve needs. He asserts that because NWE's 2007 Default Supply Plan does not identify the planning reserve margin NWE needs for resource adequacy, NWE does not line up enough power supply to meet resource adequacy and, consequently, must purchase regulating reserves. He states that most utilities have sufficient resources to cover their peak load plus another 15% to assure resource adequacy. But NWE does not even line up enough supply to meet its peak load. As a result, NWE is subject to buying power in short-term markets that exhibit price volatility. Lauckhart states that it is particularly important for a utility that is short on reserve resources to analyze ways of integrating the provision of reserves along with energy and capacity. He maintains that resources that provide regulating reserves may also be a source of resource adequacy. The cost of such resources would be allocated among the two functions: regulating reserve and resource adequacy. Lauckhart asserts that by failing to identify resource adequacy needs, NWE has allocated the entire cost of its regulating reserve resources to meeting regulating reserve needs, which drives up the cost of regulation NWE attributes to wind projects.

Lauckhart also criticizes NWE for ignoring the fact that Judith Gap should reduce the need for contingency reserves. He states that NWE should credit additional costs with additional benefits.

Lauckhart states that NWE nonsensically implies that any single monthly CPS2 violation must be followed by a purchase of additional regulating reserves. According to Lauckhart, NERC, FERC, and WECC reliability criteria do not prohibit monthly CPS2 violations. He notes that there are four levels of CPS2 violations of increasing severity: Level 1, CPS2 value less than 90% but greater than or equal to 85%, Level 2, CSP2 value less than 85% but greater than or equal to 80%, Level 3, CPS2 value less than 80% but greater than or equal to 75%, Level 4, CPS2 value less than 75%. Lauckhart states that the CPS2 violations NWE experienced in 2006 were all Level 1 and the associated sanctions were quite small, totaling $6,635. He concludes that NERC, FERC, and WECC do not believe NWE's violations were serious and that it would not make sense

for NWE to spend millions of dollars to avoid fines of less than $10,000.

Lauckhart asserts that NWE has not sufficiently investigated what caused the CPS2 violations in 2006. He notes that the largest CPS2 violation occurred in July after all the additional regulating reserves had been acquired. Because no CPS2 violations occurred after July 2006, he concludes that the July violation must have been caused by something other than Judith Gap and, further, that it is probable that things other than Judith Gap contributed to the earlier CPS2 violations. According to Lauckhart, it is possible to determine what caused the CPS2 violations, but NWE has not done that. Besides Judith Gap, Lauckhart states that NWE's CPS2 violations could have been caused by inaccurate load forecasts, deviations of actual generation from forecast levels, resources tripping off-line, ramping needs in the change-over period when hourly schedules change, and outages on the wires system. He also states that it is possible NWE's contracted-for regulating reserves did not operate as intended.

Lauckhart maintains that until NWE performs an industry standard wind integration study, and subjects it to appropriate review, the PSC should not reach any conclusions on the integration costs imposed on NWE by wind projects. He reiterates that, based on TDW production data, TDW does not impose material incremental integration costs on NWE.

VII. DISCUSSION, DECISION, AND FINDINGS

At hearing the parties represented that they had reached agreement with respect to the "whereas" clause, the Exhibit Y insurance limits, and Articles 6.5 and 16.2. The PSC must determine appropriate language for Articles 5.1 and 2.2.

A. The PSC's policy on wind development in Montana

TDW begins its post-hearing brief by asserting that the central question the PSC must decide in this case is whether it wishes wind development to go forward in Montana. According to TDW, if the PSC adopts NWE's proposal it will drive wind development out of Montana. TDW Br., p 1. In making this assertion, TDW ignores the narrow scope of the issues to be decided in this docket and attempts to collaterally attack prior PSC orders.

Regarding the general issue of NWE's inclusion of wind resources in its supply

portfolio, and the more specific issue of wind QFs, the PSC stated its views in Order No. 6501f:

> "The PSC continues to support wind resources within NWE's default supply resource portfolio. However, wind's unique production characteristics must be considered in developing standard rates under PURPA. NWE's experience with Judith Gap demonstrates that there are incremental costs unique to integrating wind resources. In order to preserve the principle of customer indifference to a utility's purchase of QF power in place of the power the utility would otherwise have acquired but for purchasing from the QF, the PSC finds that it is reasonable to establish an estimate of incremental integration costs for QFs using wind generators." Order No. 6501f, ¶¶ 194-195.

In this case, the issues the PSC must decide are: (1) whether power purchase contracts between NWE and TDW should include charges for wind integration services provided by NWE and, if so, what the charges should be, and (2) whether power purchase contracts between NWE and TDW should allow NWE to examine documents related to TDW's QF status and, if so, under what conditions.

B. Two Dot Wind should be assessed an integration charge

In this Order, the PSC finds that power purchase contracts between TDW and NWE executed under the provisions of NWE's Tariff Schedule QF-1 must contain provisions for a wind integration charge. This Order adopts both an annually adjusted integration charge and long-term fixed charge. As explained later in the Order, TDW may choose the integration option to include in its contracts. The remainder of this Order explains the basis for these decisions.

1. Order Nos. 6501f and 6501g

PSC Order No. 6501f determined that wind-generated electricity production is highly variable and presents challenges for system planning and intra-hour system operations. The PSC found that NWE faces particular challenges due to its relatively small balancing authority area, lack of owned, dispatchable resources, and a limited and relatively expensive ancillary services-integration market. The PSC specifically noted that NWE's balancing authority area has experienced reduced system stability and reliability due to the intra-hour variability of wind generation. Order No. 6501f, ¶ 194. The PSC determined that NWE incurs incremental costs unique to integrating wind

resources. In order to preserve customer indifference to NWE's purchase of QF power in place of power it would otherwise acquire but for QF purchases, the PSC sought to set a rate that NWE would assess wind QFs that do not separately arrange for integration services. Id, ¶ 195.

Ultimately, in Order No. 6501g the PSC determined that it did not, at that time, have sufficient evidence to set a specific rate for wind integration services. However, evidence showed that integrating wind, including QFs, is not costless and accounting for wind integration in determining standard avoided cost-based QF payments is appropriate. Id, ¶ 167. The PSC ordered NWE to include wind integration provisions in new contracts with wind QFs. NWE filed, and the PSC approved, Tariff Schedule QF-1 which requires wind QFs to either self-provide integration services or negotiate with NWE a reduction in the tariff rate to reflect NWE's provision of integration services. Ex. NWE-2, p. 7.

TDW is a wind QF seeking new contracts with NWE under Tariff Schedule QF-1. Tr. p. 23. TDW must either self-provide wind integration services or accept a reduction to the tariff rate to reflect NWE's provision of integration services. Since NWE and TDW could not successfully negotiate the wind integration rate, the PSC determines reasonable options in this Order.

Contrary to Lauckhart's assertion that this is not the proper forum for litigating NWE's integration proposal, Order No. 6501g specifically contemplates this forum for determining integration rates when a QF and NWE are unable to negotiate the rate. In that regard, Lauckhart's contention that TDW did not intend this proceeding to be about wind integration costs is not persuasive. Ex. TDW-1, pp. 3-4. Although the 120 day time frame is short, Order 6501g contemplates a more thorough negotiation process than what preceded TDW's petition in this case. Without assigning blame, the PSC finds that good faith negotiations might have narrowed the scope of issues in this case.

2. Two Dot Wind's integration rate should not be zero

TDW asserts that existing, small QF wind projects should not be subject to an integration rate because they do not cause significant reliability concerns or change NWE's need for ancillary services. Data Resp. PSC-001. Lauckhart testifies that data for 2006-2007 show that TDW's output is so small that it falls within the uncertainty

range of NWE's load forecast. Ex. TDW-1, p. 10. He also testifies that TDW does not cause significant integration-related costs. Tr. p. 77. TDW concludes that its small wind projects have a *de minimis* effect on NWE's load/resource variability which renders absurd NWE's assertion that TDW and other small projects must pay for integration. TDW Br., p. 11.

The PSC rejects as fundamentally flawed TDW's argument that the relatively small size of its projects, their relatively smaller output range compared to larger wind projects, or their relative contribution to NWE's need for within-hour balancing services justifies setting a zero integration rate. TDW's project characteristics might justify attributing to it less responsibility for integration costs than a larger wind project, as discussed later, but they do not indicate that TDW bears no cost responsibility.

If the PSC were to adopt TDW's position in this case, multiple small projects could develop which, together, cause significant integration-related costs but are not charged for integration service. Ex. NWE-2, p. 9. If, on the other hand, a few large projects cause the same integration-related costs, each would be subject to integration rates. The PSC finds no evidence that supports this sort of discriminatory treatment of wind projects given the potential for similar integration cost impacts. Although Lauckhart postulates that geographic diversity from multiple small projects could lead to dissimilar cost impacts, the PSC has no way of knowing how the ultimate distribution of wind resources in NWE's balancing authority area will develop. In addition, while geographic diversity might reduce integration costs, there is no evidence that it would eliminate those costs entirely.

Application of TDW's logic would produce unreasonable results. Using TDW's logic, a residential or small business customer should not be billed for supply service because the customer's presence or absence does not change the total amount of supply NWE acquires and his contribution to NWE's total supply costs is immaterial. MCC Resp. Br., p. 7, NWE Resp. Br., p. 8. The amount of energy a single residential customer consumes in any hour is insignificant compared to the total energy NWE must supply that hour, well within the uncertainty range of NWE's load forecast. If TDW's logic holds for one small customer, it must hold for all small customers. But here the logic falls apart because if none of the small customers should be billed, significant supply costs either

shift to large customers or go unrecovered.

A typical residential customer's instantaneous load may range from near zero to five kilowatts, much less than the zero to 2.8 megawatt range Lauckhart attributes to TDW's output. Ex. TDW-1, pp. 8-10. Still, all residential customers pay rates that include an allocation of costs for regulating reserves used to manage within-hour load variation. Data Resp. PSC-023. In setting retail rates, the PSC does not exempt some customers from cost responsibility because of their small size or because their individual cost responsibility is *de minimis* in relation to total cost of service. Although TDW implies, without explanation, that cost allocation methods applied in retail ratemaking are not relevant to allocating costs to wind producers (id.), in this case, with regard to integration-related cost responsibility, the PSC finds no reason to exempt small producers because they are small while simultaneously charging small customers for identical services.

TDW observes that NWE did not acquire additional regulating reserves when TDW's projects came on line. TDW Br., p. 9. From an economic perspective, whether or not NWE acquired additional regulating reserves specifically to integrate TDW's projects is irrelevant; as Nordell testified, when TDW's projects were developed, NWE could accommodate the variation introduced by those projects with the latent capacity from its preexisting 60 MW regulating contract. Tr. pp. 293-296. NWE incurs on-going opportunity costs as it uses the regulating reserves it has; regulating reserve capacity NWE uses to integrate TDW's projects could otherwise be used to accommodate new customers' loads or integrate other wind resources. In fact, TDW's 4 MW total project capacity is roughly the size of a single community renewable energy project under Montana's Renewable Power Production and Rural Economic Development Act ("Act"). Data Resp. TDW-020 and § 69-3-2003, M.C.A. NWE must acquire several community projects to comply with the Act. Given the opportunity costs NWE incurs by using its scarce regulating reserves to integrate TDW, it is economically correct to assign appropriate integration costs to TDW irrespective of its small size.

Finally, TDW's position is not supported by empirical studies of wind integration costs. In 2001, Eric Hirst authored the paper *Interactions of Wind Farms with Bulk-Power Operations and Markets*. Data Resp. TDW-031, Attach. 8. In analyzing wind

integration costs in that paper, Hirst writes:

> "In some cases, utilities have estimated the cost of such integration equal to a large fraction of the wind-farm's capital costs, based on essentially no data. Wind advocates, on the other hand, sometimes argue that the small size of a typical wind farm implies that its energy output will be largely invisible (and therefore cost free) to a large utility control area. **Neither perspective is correct."** Hirst p. 2. (Emphasis added)

In this case, TDW makes a similar, if not the same, argument. The PSC rejects that position, as explained above.

3. Two Dot Wind proposes an unreasonable standard for imposing an integration charge on its projects

TDW maintains that there is no need to study small projects like TDW because small projects do not impose material integration costs. Data Resp. PSC-021. But if a study is used to determine TDW's integration costs, TDW states that it must be a study of TDW's projects. Until NWE performs a study specifically showing that TDW causes incremental integration costs, TDW says the appropriate integration charge is zero. TDW Br. pp. 7-8. Lauckhart further asserts that any wind integration study NWE uses to set an integration charge for TDW's projects must conform to standards that NWE's study in this case does not meet. Ex. TDW-1, p. 6. He identifies several studies that he considers reasonable including one performed by BPA, (see Ex. TDW-1, Exhibit 2) and another by EnerNex Corp. for Idaho Power Company ("IPC," see Data Resp. PSC-026, Exhibit 1). However, these two studies are simulation studies; they do not focus on a single, small wind project, but on relatively large blocks of wind resource additions. Data Resp. PSC-026. The studies make assumptions about the amount, location, and generation profile of incremental wind resources and then simulate system operations to determine the cost of integrating the incremental wind resources. Even if NWE had presented a similar study for its balancing authority area it appears TDW still would not have been satisfied because the study would not have focused specifically on its projects. Assuming the simulation studies Lauckhart finds acceptable could be modified to focus solely on TDW's projects, Lauckhart testifies that such studies take a year to complete and cost perhaps $500,000. Tr. p. 88. Therefore, under TDW's standard, NWE is constrained to

either charging small wind projects nothing for integration services or conducting a lengthy, expensive, project-specific integration study for each small wind project. The PSC is not persuaded that these two extremes are the only alternatives available.

C. Existing wind projects increase within-hour variability that NorthWestern Energy must manage

Other wind studies have determined that adding wind to a utility system increases the net variability the utility must manage. For example, the Northwest Wind Integration Action Plan ("NWIAP") states that wind energy behaves like negative load and increases net system variability and uncertainty. NWIAP, p. 20, see Data Resp. TDW-031. The NWIAP further states that one MW of wind is significantly more variable and less predictable than one MW of load and that wind increases the demand for additional regulating (several second response time) and load following (several minute response time) reserves in the within-hour time frame. Id. p. 21.

The BPA wind integration study Lauckhart includes with his pre-filed testimony states:

> "Wind increases the demand for reserve capacity needed to meet within-hour balancing requirements because its unpredictability imposes greater operating challenges than traditional, more constant output generators….Wind dramatically affects BPA's within-hour balancing requirements because of the significant minute-to-minute oscillation in the output at each generator as the wind velocity changes."

Ex. TDW-1, Exhibit 2, p. 3. Evidence in this case confirms that NWE's net system variability has increased with the addition of wind generation in its balancing authority area. Stauffer testifies that Judith Gap's wind energy output is more variable than any other resource in NWE's portfolio. Ex. NWE-4, p. 6. NWE quantified the variability of Judith Gap's energy output, by month and on an annual basis, in data response TDW-012. In data response TDW-020 NWE explains that Judith Gap's variability can be expressed in terms of its absolute variability and percentage variability. Absolute variability is the standard deviation of Judith Gap's 15-minute output over time (e.g., one month, one year). Percentage variability is absolute variability divided by the installed capacity, times 100. Other evidence allows the PSC to calculate the variability of NWE's

total balancing authority load and the net variability of balancing authority load combined with total wind production; NWE's post-hearing Provides 3 and 4 contain 15-minute total balancing authority load and 15-minute total wind output. Table 4 shows both absolute (MW) variability and percentage variability for NWE's total balancing authority load in each of the years 2005 through 2007. The PSC calculated balancing authority peak load by averaging the four 15-minute load observations for the one-hour period with the highest 15-minute load.

Table 4. Variability of NWE's total balancing authority load

	2005 Balancing Authority Load			2006 Balancing Authority Load			2007 Balancing Authority Load		
	Standard Deviation MW	Peak Load	% variability	Standard Deviation MW	Peak Load*	% variability	Standard Deviation MW	Peak Load	% variability
January	139.0	1626	8.5%	116.9	1651	7.1%	132.2	1739	7.6%
February	107.1	1626	6.6%	124.5	1651	7.5%	121.0	1739	7.0%
March	104.0	1626	6.4%	100.9	1651	6.1%	119.8	1739	6.9%
April	103.8	1626	6.4%	109.8	1651	6.7%	115.3	1739	6.6%
May	106.1	1626	6.5%	126.2	1651	7.6%	113.9	1739	6.5%
June	132.4	1626	8.1%	153.6	1651	9.3%	156.4	1739	9.0%
July	172.6	1626	10.6%	190.7	1651	11.6%	187.1	1739	10.8%
August	155.5	1626	9.6%	152.1	1651	9.2%	153.1	1739	8.8%
September	117.1	1626	7.2%	122.2	1651	7.4%	123.5	1739	7.1%
October	108.8	1626	6.7%	119.0	1651	7.2%	111.6	1739	6.4%
November	127.0	1626	7.8%	147.4	1651	8.9%	131.7	1739	7.6%
December	142.6	1626	8.8%	134.6	1651	8.2%	125.3	1739	7.2%
Annual	**147.0**	**1626**	**9.0%**	**153.1**	**1651**	**9.3%**	**159.9**	**1739**	**9.2%**

* In analyzing NWE's load data the PSC discovered an erroneous data point. The data contain a load observation of 1,930 MW on December 15, 2006 at 06:00. Observations at 05:45 and 06:15 are 1,047 MW and 1,131 MW respectively. PSC staff confirmed with Casey Johnston that the 1,930 MW figure was an error. The PSC substituted a value of 1,089, the mid-point of two observations on either side of 06:00.

Table 4 shows that NWE's balancing authority load variability differs from month to month. Variability is higher in months with higher loads, i.e., summer and winter. In each of these three years, July had the highest MW and percentage variability. July 2006 had the highest observed load variability, nearly 191 MW or 11.6% of peak load. On an annual basis, balancing authority load variability was about 9%.

In 2006, NWE saw a large amount of wind capacity develop in its balancing authority area. Both the Judith Gap and Horseshoe Bend projects were on line in February, 2006. Ex. NWE-4, p. 3 and Data Resp. PSC-017. In December, 2006, TDW's Moe Wind project entered service. TDW's Martinsdale South (aka Martinsdale 2) project

came on line in April 2007. Tables 5 and 6 show the PSC-calculated variability of total wind generation in NWE's balancing authority area alongside balancing authority load variability for 2006 and 2007, respectively. The tables also show the net variability that results when total wind generation is subtracted from balancing authority load; as discussed above, the NWIAP states that wind behaves like negative load. Since other types of resources vary predictably and cause only trivial effects on within-hour balancing requirements, balancing authority load net of total wind reasonably reflects NWE's net system variability. See Ex. TDW-1, Exhibit 2, p. 3 and Tr. p 219. Again, the PSC uses data from NWE Provides 3 and 4 to make these calculations.

Table 5. 2006 total wind variability and NWE net system variability

	2006 Total Wind			**2006 Balancing Authority Load**			**Net system variability (BA load less total wind)**		
	Standard Deviation MW	Capacity	% variability	Standard Deviation MW	Peak Load	% variability	Standard Deviation MW	Load less wind capacity	% variability
January	37.5	147	25.5%	116.9	1651	7.1%	118.1	1504	7.9%
February	47.1	147	32.0%	124.5	1651	7.5%	132.5	1504	8.8%
March	46.8	147	31.8%	100.9	1651	6.1%	115.3	1504	7.7%
April	49.0	147	33.3%	109.8	1651	6.7%	114.3	1504	7.6%
May	45.7	147	31.1%	126.2	1651	7.6%	132.5	1504	8.8%
June	45.9	147	31.2%	153.6	1651	9.3%	165.5	1504	11.0%
July	40.0	147	27.2%	190.7	1651	11.6%	192.9	1504	12.8%
August	39.4	147	26.8%	152.1	1651	9.2%	154.3	1504	10.3%
September	47.7	147	32.4%	122.2	1651	7.4%	131.9	1504	8.8%
October	52.7	147	35.9%	119.0	1651	7.2%	121.7	1504	8.1%
November	53.9	147	36.7%	147.4	1651	8.9%	158.1	1504	10.5%
December	51.1	147	34.8%	134.6	1651	8.2%	143.8	1504	9.6%
Annual	**49.0**	**147**	**33.3%**	**153.1**	**1651**	**9.3%**	**158.3**	**1504**	**10.5%**

Table 6. 2007 total wind variability and NWE net system variability

	2007 Total Wind			2007 Balancing Authority Load			Net system variability (BA load and total wind)		
	Standard Deviation MW	Capacity	% variability	Standard Deviation MW	Peak Load	% variability	Standard Deviation MW	Load less wind capacity	% variability
January	44.3	149	29.7%	132.2	1739	7.6%	144.7	1590	9.1%
February	58.6	149	39.3%	121.0	1739	7.0%	137.4	1590	8.6%
March	52.6	149	35.3%	119.8	1739	6.9%	123.6	1590	7.8%
April	49.4	149	33.2%	115.3	1739	6.6%	115.0	1590	7.2%
May	45.4	149	30.5%	113.9	1739	6.5%	165.9	1590	10.4%
June	43.1	149	28.9%	156.4	1739	9.0%	185.4	1590	11.7%
July	34.4	149	23.1%	187.1	1739	10.8%	185.4	1590	11.7%
August	42.4	149	28.5%	153.1	1739	8.8%	162.4	1590	10.2%
September	49.9	149	33.5%	123.5	1739	7.1%	126.5	1590	8.0%
October	53.3	149	35.8%	111.6	1739	6.4%	117.3	1590	7.4%
November	55.8	149	37.4%	131.7	1739	7.6%	141.6	1590	8.9%
December	51.8	149	34.8%	125.3	1739	7.2%	139.1	1590	8.7%
Annual	**53.4**	**149**	**35.8%**	**159.9**	**1739**	**9.2%**	**165.3**	**1590**	**10.4%**

Tables 5 and 6 show two things: First, total wind generation is more variable than NWE's balancing authority load. On a percentage basis, total wind generation variability is over 30% in 2006 and 2007, while load variability is about 9%. Second, due to the higher variability of wind generation, the net variability for balancing authority load and total wind generation is higher than the variability of load alone, about 10.5% versus 9%. These results are consistent with both the NWIAP and BPA's wind integration study.

D. Output from Two Dot Wind's projects resembles output from other wind projects

Lauckhart testifies that NWE's analysis of Judith Gap's impact on system balancing and regulating reserve requirements is not applicable to TDW's projects. He states that the TDW projects are small, demonstrate diversity benefits, and do not generate in the same pattern as Judith Gap. Although Lauckhart does not provide data or analysis comparing TDW's generating pattern to Judith Gap, evidence in this case includes data that allow this analysis.

The PSC finds important the question of whether the variability of TDW's 15-minute output is similar to other wind generation in NWE's balancing authority area; as discussed above, prior wind studies find that the variability of wind output increases net system variability and the need for additional regulation and load following capability.

To answer this question, the PSC applies NWE's method for calculating the variability of Judith Gap's 15-minute output to 15-minute output from TDW's projects and the Horseshoe Bend project. NWE provided 15-minute output data for TDW's projects and the Horseshoe Bend project, respectively, in data response TDW-016 and post-hearing Provide 1. Table 7 shows the variability for Judith Gap, TDW's projects, Horseshoe Bend and total balancing authority wind in 2006 and 2007. For 2006, TDW's variability reflects just the Martinsdale and Sheep Valley wind projects since Moe wind was not on line until December 2006 and Martinsdale 2 was not on line until April 2007. In 2007, Martinsdale 2 capacity is not included until June because output in April and May was limited.

Table 7 shows that, together, TDW's projects, while more variable than balancing authority load, are also noticeably less variable than Judith Gap and Horseshoe Bend. On an annual basis Judith Gap and Horseshoe Bend demonstrate similar variability, but with differences month-to-month. Total wind is less variable, on an annual basis, than Judith Gap's and Horseshoe Bend's individual annual variability, possibly indicating diversity effects. Variability calculations for TDW's combined projects in 2007 may not be accurate going forward due to start-up issues experienced by the Martinsdale 2 project. Although Martinsdale 2 represents 2 MW of installed capacity, its maximum output in 2007 was about 1.37 MW. Data Resp. PSC-022. In any case, the PSC finds that in setting an appropriate integration rate for TDW, NWE should account for TDW's relatively lower output variability.

Table 7. Wind project variability

	Judith Gap			TDW Martinsdale+Sheep			HorseShoe Bend			Total Wind		
2006	Standard Deviation MW	Capacity MW	% variability	Standard Deviation MW	Capacity MW	% variability	Standard Deviation MW	Capacity MW	% variability	Standard Deviation MW	Capacity MW	% variability
January	37.2	135	27.6%	0.32	1.21	26.5%	2.76	9	30.7%	37.5	147	25.5%
February	46.7	135	34.6%	0.36	1.21	29.7%	3.32	9	36.9%	47.1	147	32.0%
March	46.3	135	34.3%	0.28	1.21	23.4%	2.44	9	27.1%	46.8	147	31.8%
April	47.6	135	35.3%	0.28	1.21	23.4%	2.64	9	29.3%	49.0	147	33.3%
May	44.2	135	32.7%	0.27	1.21	22.3%	2.70	9	30.0%	45.7	147	31.1%
June	44.0	135	32.6%	0.27	1.21	22.0%	2.80	9	31.1%	45.9	147	31.2%
July	38.9	135	28.8%	0.16	1.21	13.5%	2.21	9	24.6%	40.0	147	27.2%
August	39.0	135	28.9%	0.13	1.21	10.8%	2.00	9	22.2%	39.4	147	26.8%
September	46.8	135	34.7%	0.25	1.21	20.4%	2.06	9	22.9%	47.7	147	32.4%
October	50.9	135	37.7%	0.29	1.21	24.3%	3.31	9	36.8%	52.7	147	35.9%
November	51.5	135	38.1%	0.32	1.21	26.3%	3.78	9	42.0%	53.9	147	36.7%
December	49.6	135	36.7%	0.32	1.21	26.7%	3.23	9	35.9%	51.1	147	34.8%
YTD	**47.5**	**135**	**35.2%**	**0.31**	**1.21**	**25.7%**	**3.13**	**9**	**34.8%**	**49.0**	**147**	**33.3%**

	Judith Gap			TDW Four Projects			Horseshoe Bend			Total Wind		
2007	Standard Deviation MW	Capacity MW	% variability	Standard Deviation MW	Capacity MW	% variability	Standard Deviation MW	Capacity MW	% variability	Standard Deviation MW	Capacity MW	% variability
January	43.3	135	32.1%	0.41	1.56	26.5%	3.22	9	35.8%	44.3	149	29.7%
February	56.0	135	41.5%	0.48	1.56	30.7%	3.82	9	42.4%	58.6	149	39.3%
March	50.8	135	37.6%	0.42	1.56	27.1%	3.50	9	38.9%	52.6	149	35.3%
April	48.2	135	35.7%	0.36	1.56	23.3%	2.66	9	29.6%	49.4	149	33.2%
May	44.5	135	33.0%	0.24	1.56	15.4%	2.40	9	26.7%	45.4	149	30.5%
June	42.1	135	31.2%	0.36	2.69	13.2%	2.48	9	27.6%	43.1	149	28.9%
July	34.2	135	25.3%	0.11	2.69	4.0%	1.68	9	18.7%	34.4	149	23.1%
August	41.2	135	30.5%	0.30	2.69	11.0%	2.42	9	26.9%	42.4	149	28.5%
September	48.4	135	35.9%	0.55	2.69	20.6%	2.88	9	32.0%	49.9	149	33.5%
October	50.9	135	37.7%	0.67	2.69	24.8%	3.52	9	39.1%	53.3	149	35.8%
November	53.9	135	39.9%	0.71	2.69	26.4%	3.65	9	40.6%	55.8	149	37.4%
December	49.8	135	36.9%	0.74	2.69	27.7%	3.53	9	39.2%	51.8	149	34.8%
YDT	**51.3**	**135**	**38.0%**	**0.55**	**2.22**	**24.6%**	**3.39**	**9**	**37.7%**	**53.4**	**149**	**35.8%**

E. NorthWestern Energy's assessment of total regulating reserves needed to manage the combination of customer load and existing wind projects is reasonable

The objective of prior wind studies, including the BPA study endorsed by Lauckhart, has been to identify the incremental amount of regulation and load following reserves a balancing authority needs to maintain the same level of system balance and reliability after integrating additional intermittent wind generation. FERC-approved standards developed by NERC and WECC measure how well a utility maintains system

balance and reliability in its balancing authority area. These standards are referred to as Control Performance Standards ("CPS"). CPS2 is a monthly standard that sets control-area specific limits on the maximum permitted 10-minute Area Control Error ("ACE"). Hirst, p. 5, see Data Resp. TDW-031, Attachment 8. ACE is the instantaneous difference between actual and scheduled flow on tie lines between a control area and surrounding control areas, taking into account the effects of frequency. Id, see also Ex. TDW-1, p. 9. CPS standards measure the aggregate performance of a control area, not the behavior of individual loads and generators. Hirst, p. 5. With regard to wind integration Hirst finds:

> "…to meet the CPS requirements, the system operator need not acquire regulation and load following resources to exactly counter each and every change in wind output. All the system operator need do, when unscheduled wind output appears on its system, is maintain its average CPS performance at the same level it would have without the wind resource." Hirst pp. 5-6.

BPA's wind integration study describes NERC's CPS2 standard as a reliability requirement for within-hour balancing. To determine the amount of reserve capacity it needs for within-hour balancing for wind, BPA uses a residual approach. Using a system operations simulation model, BPA first estimates its total reserve requirements. Next, BPA estimates reserve requirements for its balancing authority area load. BPA attributes the difference between total reserve requirements and reserve requirements for balancing authority load alone to wind generation. Ex. TDW-1, Exhibit 2, pp. 1-2 and 4.

IPC's study also compares two system operations model runs to determine the cost of integrating wind generation. The IPC study compares a "flat wind case" to a "variable wind case." The "variable wind case" reflects the cost of additional reserves "necessary to maintain a consistent level of system control performance (CPS1 and CPS2)." Data Resp. PSC-026, Exhibit 1, pp. 19-20.

Instead of a forward-looking system operations simulation study, NWE has, essentially, analyzed actual system impacts and operations coincident with the appearance of significant wind generation in its balancing authority area to estimate the amount of regulating and load following reserves it needs to integrate wind. NWE's presentation, while somewhat incomplete and too narrowly focused on Judith Gap, is

basically the same residual approach used in the BPA and IPC studies.

Evidence of NWE's actual system balancing and reliability performance is found in data response TDW-001, which provides monthly CPS2 measurements for the period January 2003, through December 2007. In analyzing these data, the PSC excludes the CPS2 measurement for February 2003, based on Johnston's testimony at the hearing that the measurement was adversely affected by implementation of a WECC time error correction process. Tr. pp. 240-241. The PSC also excludes the first seven months of 2006 when NWE was attempting to integrate about 147 MW of wind with 15 MW of additional regulating and load following reserves (Ex. NWE-3, p. 5) and incurred CPS2 violations. These data show that prior to 2006 NWE's monthly CPS2 measurements average 97.17%. For August 2006 through December 2007, when a large amount of wind generation capacity was on line, NWE's average monthly CPS2 performance dropped to 93.94%. A statistical test of the equality of these two averages, using Student's t-test, shows a statistically significant difference between the two averages at the 99% confidence level (The t value for the two samples is 8.32[11/]. The t distribution shows the probability of t > 2.42 = 1% with 40 degrees of freedom). This statistical test, by itself, does not show that wind caused NWE's CPS2 performance to decline; it simply indicates a meaningful difference in NWE's performance following the addition of wind generation capacity from Judith Gap, Horseshoe Bend, and the new TDW projects. However, as discussed below, prior wind studies, including those Lauckhart finds credible, predict a decline in a utility's CPS2 performance coincident with significant wind generation absent simultaneous acquisition of sufficient additional within-hour regulating and load following reserves.

The difference between NWE's CPS2 performance before and after January 2006 can be illustrated graphically by showing the 99% confidence intervals surrounding the average CPS2 performance levels for each sample period. Statistically, assuming the true CPS2 average lies within the 99% confidence interval, the probability of obtaining a

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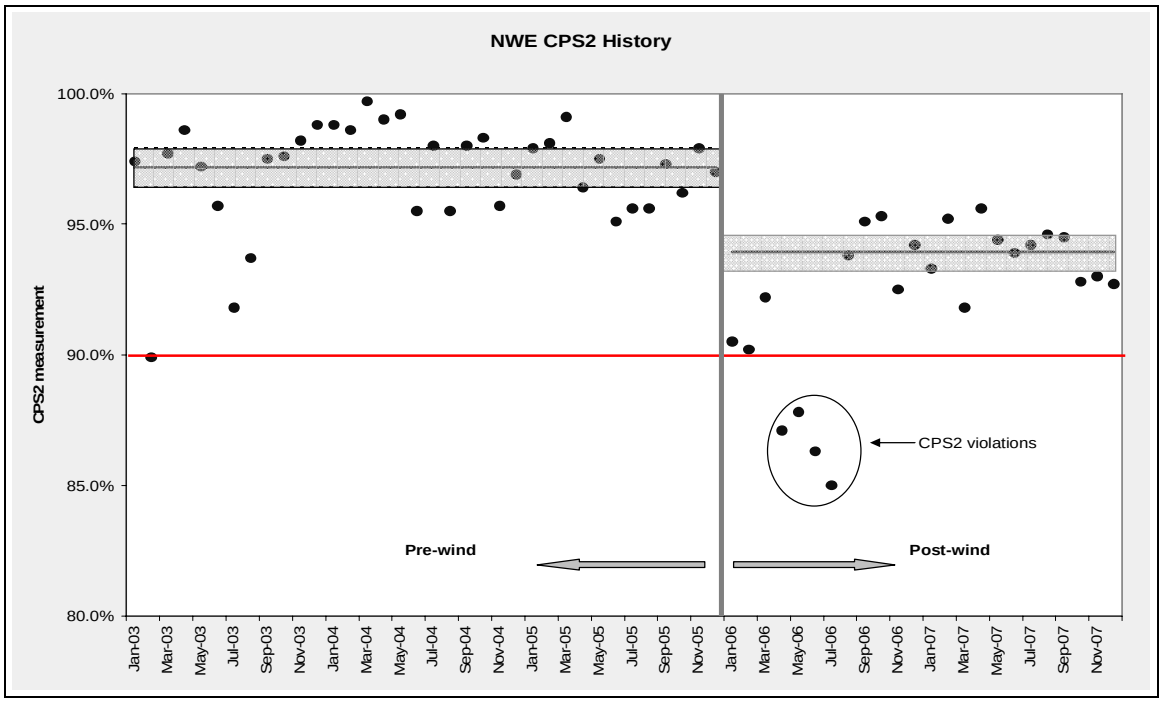
[11/] $t = (X_{pre\text{-}2006} - X_{post\ 2006}) / ((Var_{pre\text{-}2006}/n_{pre\text{-}2006})+(Var_{post\text{-}2006}/n_{post\text{-}2006}))^{0.5}$

Where:

X = Mean monthly CPS2 performance
Var = Variance in monthly CPS2 observations
n = number of CPS2 observations

sample average outside the confidence interval is less than 1%. The 99% confidence interval for the pre-2006 period ranges from 97.9% to 96.4%. For the 2006-2007 period, the 99% confidence interval, again excluding the first seven months of 2006, ranges from 94.6% to 93.2%. Despite NWE's acquisition of between 23 and 25 MW (on an annual basis) of additional regulating and load following reserve capacity, NWE's system balancing and reliability performance, as measured by CPS2 data, was statistically lower in the 2006-2007 period than it was in the period before production from Judith Gap, Horseshoe Bend and two additional TDW projects. Graph 1 illustrates these statistics.

Graph 1. NWE CPS2 performance pre- and post-wind development



* The grey bands surrounding the dark line through the scatter plots define the 99% confidence intervals for the CPS2 averages in the two time periods. The post-wind period excludes the first 7 CPS2 measurements in 2006.

Johnston applies the basic residual approach described above to determine the amount of regulating and load following reserve capacity NWE attributes to integrating wind generation in its balancing authority area. Ex. NWE-3, p. 5. Prior to 2006, NWE relied on 60 MW of within-hour balancing reserves to manage balancing authority loads and maintain an average CPS2 performance level of 97.2%. Since January 2006, when

substantial wind resources were added, NWE has used 83-85 MW of within-hour balancing reserves (on an annual basis) and appears to have stabilized its average CPS2 performance level at about 94%. The within-hour reserve requirement post-wind minus the requirement pre-wind is 23-25 MW. Compared to the residual method used in prior wind studies, NWE's method is conservative given that it does not fully restore average CPS2 performance to the 97.2% pre-wind level.

Lauckhart testifies that industry standard wind integration studies generally find lower wind integration costs than does NWE's analysis. Ex. TDW-1, p. 6. In data response PSC-026, Lauckhart states that Section 6 of the IPC wind integration study is consistent with industry standards. He notes that the IPC study shows a need for 3.7 MW of additional regulation reserve for 300 MW of additional wind. Since 3.7 MW is a bi-directional need (3.7 MW up and 3.7 MW down), he counts it as 7.4 MW. He observes that the ratio of 7.4 MW to 300 MW is 2.5%, significantly less than the ratio of 25 MW to 135 MW of Judith Gap wind capacity, from which NWE calculates its 18% figure in this case. Based on this comparison, Lauckhart concludes that NWE's numbers are out of line with IPC's study.

In fact, IPC's results are consistent with NWE's conclusion that 23-25 MW of within-hour regulating and load following reserves are needed to integrate about 149 MW of wind, or 15.4% -16.8% of the installed wind capacity. Lauckhart overlooks one of the two parts of IPC's study of within-hour impacts of wind generation. The IPC study explains that:

> "The analytical process consists of two primary parts. In the first, high-resolution load and wind data were analyzed to estimate the additional reserve needed to manage fast fluctuations in wind generation. In the second part, 10-minute load and wind data were analyzed to calculate the reserve component needed to accommodate wind on the 10-minute time step." IPC study, p. 37, see Data Resp. PSC-026, Exhibit 1.

The 3.7 MW bi-directional reserve requirement Lauckhart identifies results from the first part of IPC's study. In the second part, IPC finds that it needs an additional 26 MW of bi-directional reserves to maintain its CPS2 compliance at approximately the 98% level. Id, pp. 40-42. The two reserve requirements are combined in a mathematical operation

that results in a total incremental bi-directional reserve requirement of 24.2 MW for 300 MW of wind generation. The appropriate IPC ratio to compare is 48.4 MW (24.2 MW up and 24.2 MW down) to 300 MW of wind generation, or 16% of installed wind capacity. Three hundred MW of wind represents 9.7% of IPC's 2006 system peak of 3,084 MW. For NWE, 149 MW of wind represents 9.0% of its 2006 system peak of 1,651 MW. So, although its balancing authority area is smaller and it lacks its own dispatchable generation, NWE determines that needs roughly the same amount of within-hour regulating and load following reserves as IPC for a comparable level of wind penetration.

The PSC finds that 25 MW is a reasonable, and likely conservative, approximation of the amount of within-hour balancing and reliability reserves NWE needs to integrate Judith Gap, Horseshoe Bend and existing QF wind projects that total to about 149 MW. Twenty-five MW is likely conservative for two reasons: (1) NWE also uses capacity from the Basin Creek project for within-hour adjustments, and (2) 25 MW has not been sufficient to restore NWE's average CPS2 performance to what it was in the pre-wind period.

TDW points out that NWE did not study its CPS2 performance for the period when the TDW projects came on line and did not purchase additional regulating reserves when those projects came on line. Ex. TDW-1, p. 12, TDW Br., p. 7. This is not surprising. The NWIAP states:

> "At low penetration levels, the amount of variability introduced by a small amount of wind is virtually lost in the larger fluctuations of loads. As the amount of wind increases, the effects of wind variability dominate the effects of load variability and the ranges of net system variability and net system uncertainty increase." NWIAP, p. 20.

As discussed above, NWE's preexisting regulating contract had capacity to accommodate the variation introduced by TDW's projects. TDW's projects, by themselves, are small and studying their impact on within-hour variation, in isolation, would likely be difficult, like studying the impact of a single small customer. Notably, the BPA and IPC studies do not attempt to simulate the impact of 5 MW of incremental wind. Instead, these studies use incremental blocks of wind that are large enough to produce measurable

results.

Lauckhart focuses heavily on the four months in which NWE incurred CPS2 violations. He implies that the violations could have been caused by other factors, including inaccurate load forecasts, generating unit outages, outages on the wire system, and deficiencies in NWE's supply planning process which results in improper dependence on regulation reserves to meet peak needs. Ex. TDW-1, pp. 13 and 18. The PSC finds no evidence that any of the other factors TDW identifies are responsible for the overall decline in average monthly CPS2 performance since January 2006. NWE has always had to contend with uncertain load forecasts and the potential for generating and wire system outages in managing within-hour variability. Furthermore, NWE's supply unit has managed to acquire adequate resources without owning generation since 2002. The PSC is not persuaded by TDW's suggestion that these factors suddenly lead to a significant decline in NWE's CPS2 performance while the addition of large wind projects had little or no effect. The evidence in this case indicates that NWE's system balancing and reliability performance reflects normal and predictable behavior associated with integrating a large amount of wind with an initially insufficient amount of within-hour balancing reserve capacity.

F. NorthWestern Energy's proposed integration charges are not reasonable

Hines proposes an integration rate calculation in his pre-filed testimony, which is updated in data response PSC-014. Ex. NWE-2, pp. 5-6. The rate calculation is based, in part, on NWE's weighted average cost of regulation services and associated transmission costs. The weighted average cost of regulation services includes services acquired by NWE's supply unit to integrate wind resources and services acquired by NWE's transmission unit to provide the balancing historically needed for load variability. Hines recommends updating integration rates on an annual basis to reflect actual costs and TDW's actual capacity factors. Id, p. 6.

The PSC finds that NWE's weighted average cost approach is flawed. As Table 8 shows, if NWE's proposed rates were charged to all the wind energy generated in its balancing authority area, NWE would over-collect the actual regulation service costs incurred by its supply unit by over $1.5 million.

Table 8. NWE's proposed integration rates compared to 2008 projected costs

Wind Generators	Capacity (MW)	Capacity Factor*	Annual MWh	NWE integration rate ($/MWh)	Integration revenue	Projected integration cost in 2008
Judith Gap	135	38%	449,388	$8.42	$3,784,437	NA
Horseshoe Bend	9	38%	29,959	$8.42	$252,296	NA
All QF wind	5	26%	11,511	$12.31	$141,674	NA
Total	**149**		**490,858**		**$4,178,406**	**$2,671,058**

* Horseshoe Bend is assumed to have the same annual capacity factor as Judith Gap.

Since NWE's transmission unit recovers its regulation-related costs from all transmission customers, including NWE's supply unit (Tr. pp. 238-9), under FERC tariffs, the PSC finds that including the transmission unit's costs and quantities in a weighted average cost calculation would over-recover total regulation-related costs and overstate the actual costs NWE's supply unit expects to incur in 2008 to integrate wind resources. In addition, NWE's rate calculation does not account for TDW's relatively lower output variability.

Nordell recommends dividing NWE's total cost to integrate wind by the total kilowatt-hours of wind energy generated in a year to calculate the average per unit integration cost for the year. He recommends recalculating the cost each year and truing up over- and under-payments based on actual information. Ex. MCC-1. p. 5.

Applying Nordell's approach in this case results in an average per unit integration rate of $5.44/MWh ($2,671,058/490,858 MWh) in 2008. However, like NWE, Nordell's approach does not account for TDW's lower output variability compared to Judith Gap and Horseshoe Bend. To account for this difference, the PSC finds that NWE's projected 2008 integration costs should be allocated to Judith Gap, Horseshoe Bend and existing QF wind projects based on their variability weighted capacity. In other words, NWE should multiply each project's nameplate capacity by its percentage variability to calculate factors for allocating supply unit regulation service costs, as shown in Table 9.

Table 9. Development of project integration rates

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
Wind generators	**Capacity (MW)**	**Capacity factor**	**Annual MWh**	**% variability**	**Variability wtd capacity (B*E)**	**Allocate regulating capacity**	**Allocate regulating cost**	**Integration rate ($/MWh)**
Judith Gap	135	38%	449,388	38%	51.3	22.914	$2,448,192	$5.45
Horseshoe Bend	9	38%	29,959	38%	3.42	1.528	$163,213	$5.45
All QF wind	5	26%	11,511	25%	1.25	0.558	$59,654	$5.18
Total	**149**		**490,858**		**55.97**	**25.000**	**$2,671,058**	

TDW's allocation factor is its proportional share of total variability weighted capacity, 1.25 divided by 55.97, or approximately 2.23%. As Table 9 shows, with this approach existing wind QFs are treated as a single project and are allocated 0.558 MW (2.23%) of the total 25 MW of within-hour balancing and reliability services NWE's supply unit needs to integrate wind resources. All existing wind QFs' share of NWE's expected total 2008 integration costs is $59,654, implying an integration rate in 2008 of $5.18/MWh, based on a 26% capacity factor. Assessing a capacity charge for integration services would be more consistent with how NWE incurs regulating reserve costs and would eliminate the need for rate adjustments to correct estimates of energy production. For 2008, TDW's within-hour regulating reserve capacity rate is $8.90/KW-mo for its share of the 558 kilowatts of Allocated Regulating Capacity. This is equal to $11.92/KW-mo based on installed capacity.

NWE's 2007 electric supply resource procurement plan includes cost estimates for a natural gas-fired resource able to provide within-hour balancing and reliability reserves. NWE estimates that the annual levelized capital cost for such a resource, constructed in 2010, is $108/KW. Fixed operation and maintenance costs add $8.41/KW, for a total capacity cost of $116.41/KW-yr, or $2,910,250 for 25 MW. Using this long-term cost estimate, and the rate calculation method described above, TDW's long-term integration rate is $5.65/MWh, as shown in Table 10, or $13.00/KW-yr of TDW's installed capacity.

Table 10. Alternative long-term integration rate

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
Wind Generators	**Capacity (MW)**	**Capacity Factor**	**Annual MWh**	**% variability**	**Variability Wtd Capacity (B*E)**	**Allocate Regulating Capacity**	**Allocate Regulating Cost**	**Integration rate ($/MWh)**
Judith Gap	135	38%	449,388	38%	51.3	22.914	$2,667,426	$5.94
Horseshoe Bend	9	38%	29,959	38%	3.42	1.528	$177,828	$5.94
All QF wind	5	26%	11,511	25%	1.25	0.558	$64,996	$5.65
Total	**149**		**490,858**		**55.97**	25.000	**$2,910,250**	

The PSC rules that NWE must offer TDW several contract options regarding integration rates. If TDW's contract reflects Tariff Schedule QF-1, Option 1 rates, TDW may select either an annually adjusted integration rate, or a long-term, fixed integration rate. If TDW's contract reflects Tariff Schedule QF-1, Option 2 rates, the contract must include an annually adjusted integration rate. TDW must lock in whichever integration rate option it selects for the term of its contract. If TDW selects the long-term option, contract provisions must allow for one prospective revision to the integration rate within the first five years of the contract for: 1) updated output variability calculations for TDW's combined projects, and 2) updated long-term regulating and load following reserve costs.

Although MCC and NWE objected to setting a long-term rate option for TDW due to cost uncertainty, the PSC finds that the availability of a long-term, fixed integration rate is consistent with the availability of a long-term, fixed QF-1 rate option. In addition, long-term integration cost estimates are no more uncertain than other long-term cost estimates on which NWE must base resource acquisition decisions. For example, in 2008 NWE plans to acquire the equivalent of TDW's project capacity in demand-side resources based on market forecast-based avoided costs. The opportunity to adjust the integration rate once during the contract provides a measure of protection against an inaccurate rate.

If TDW selects an annually adjusted integration rate, Article 5.1 of the Power Purchase Agreement should be as follows:

> 5.1 TDW must either self-provide Wind Integration Services or pay NorthWestern an annual capacity-based Wind Integration Services Charge calculated as follows: Total Nameplate Capacity

> in megawatts divided by 5 multiplied by .558 divided by 25 multiplied by NorthWestern's Total Incurred Cost of acquiring 25 MW of Regulating Reserve Capacity. NorthWestern shall deduct one-twelfth of the annual charge from each month's payment to TDW. The Total Incurred Cost of acquiring 25 MW of Regulating Reserve shall be adjusted in January of each year to reflect the regulating reserve contracts for that year.

If TDW selects a long-term, fixed integration rate, Article 5.1 of the Power Purchase Agreement should be as follows:

> 5.1 TDW must either self-provide Wind Integration Services or pay NorthWestern an annual capacity-based Fixed Wind Integration Services Charge of $13.00 per kilowatt-year of Total Nameplate Capacity. NorthWestern shall deduct one-twelfth of the annual charge from each month's payment to TDW. Either TDW or NorthWestern may petition the Montana Public Service Commission once during the second through the fifth year of this Agreement to modify the Fixed Wind Integration Services Charge. The Montana Public Service Commission shall calculate an updated Fixed Wind Integration Services Charge based on an updated variability weighted capacity and annual long-term integration costs using the methodology established in Docket No. D2007.12.152, Order No. 6886a. The updated Fixed Wind Integration Services Charge shall be effective on January 1 of the year following the Montana Public Service Commission's decision on the petition.

G. Contingency reserves

TDW suggests that NWE's method for determining integration-related costs fails to account for a reduced need for contingency reserves that accompanies acquisition of wind resources. Ex. TDW-1, pp. 7 and 14, TDW Br., p. 2. The PSC will not adjust the above integration rates based on TDW's contingency reserve argument. First, given that NWE's 2007 electricity supply procurement plan anticipates additional wind acquisition, it is not clear that contracting with TDW has any impact on the amount of contingency reserves NWE would otherwise maintain. Second, to the extent there are any avoidable contingency reserve-related costs associated with acquiring TDW's energy production, those costs are already reflected in NWE's Tariff Schedule QF-1 rate options. The Option 1 rate is based on NWE's contract with PPL Montana, which provides firm service, i.e., contingency reserves are included with the service and, therefore, reflected

in the price. Similarly, the product underlying the Option 2 index market price is a firm product. Tr. pp. 152, 256-257. As a result, TDW's avoided cost payment reflects the cost of contingency reserves.

H. Article 2.2

Article 2.2 of the proposed contract is as follows:

> 2.2 This Agreement shall not exceed the term of any other agreements, laws, licenses, or regulations necessary for continuous operation of Facility as a small power production facility and or a Qualifying Facility. NorthWestern reserves the right to request and to inspect such documents and agreements and to determine if such is consistent with this Agreement. If NorthWestern determines that any other agreement, law, license, or regulation necessary for the continuous operation of the Facility as a Qualifying Facility is repealed, cancelled, or voided, NorthWestern may at its sole discretion, terminate this Agreement. NorthWestern may terminate this agreement at its sole discretion, if Seller has a suspension of generation of 90 days or longer.

TDW asserts that it is improper and unlawful to grant NWE such authority. TDW also finds such authority unnecessary since its projects are currently operating. NWE maintains that Article 2.2 provides a reasonable mechanism, short of litigation, for resolving issues related to QF status.

The PSC finds that proposed Article 2.2 does not provide mechanism for resolving issues, but rather grants NWE unbridled discretion and power to terminate the agreement. The provision regarding requesting and inspection of documents does not appear to be onerous or overly burdensome. NWE does not appear to have abused such a provision in prior contracts with TDW. However, NWE should not have power to determine that TDW is not a QF. The proper body to determine if TDW is not a QF is the Federal Energy Regulatory Commission. The proper body to determine that TDW is not a qualifying small power producer as defined in § 69-3-601(3), MCA, is the PSC. NWE should not have the sole discretion to terminate the agreement. Article 2.2 of the Power Purchase Agreement should be as follows:

> 2.2 The term of this Agreement shall not be affected by the repeal or cancellation of NorthWestern's obligation to purchase power from a Qualifying Facility or a qualifying small power producer. NorthWestern has the right to request and inspect all documents

> related to TDW's status as a Qualifying Facility or a qualifying small power producer. If because of a change in ownership, operation, or size, the Federal Energy Regulatory Commission determines that TDW is not a Qualifying Facility and the Montana Public Service Commission determines that TDW is not a qualifying small power producer, NorthWestern may terminate this Agreement.

VIII. CONCLUSIONS OF LAW

1. NorthWestern Energy is a public utility subject to the Commission's jurisdiction. § 69-3-101, MCA.

2. NorthWestern Energy has an obligation to purchase power from Qualifying Facilities and qualifying Small Power Producers. 16 U.S.C. § 824a-3, 18 C.F.R. § 292.303, § 69-3-603, MCA.

3. Two Dot Wind, LLC operates qualifying small power production facilities. § 69-3-601(3), MCA.

3. The Public Service Commission has to authority to determine conditions of a contract between a public utility and a qualifying Small Power Producer. § 69-3-603(2), MCA.

ORDER

1. NorthWestern Energy shall offer Two Dot Wind, LLC a power purchase agreement containing Articles 2.2 and 5.1 as provided above.

2. The specific wind integration services charge determined in this Order is unique to Two Dot Wind, LLC's projects and does not apply to any other Qualifying Facility or qualifying Small Power Producer.

3. Two Dot Wind, LLC's Motion for Summary Judgment is denied.

DONE IN OPEN SESSION at Helena, Montana, this 22nd day of April 2008 by a vote of 4 to 1.

BY ORDER OF THE MONTANA PUBLIC SERVICE COMMISSION

_____
Greg Jergeson, Chairman

_____
Doug Mood, Vice Chairman

_____
Brad Molnar, Commissioner (dissenting)

_____
Robert H. Raney, Commissioner

_____
Ken Toole, Commissioner

ATTEST:

Connie Jones
Commission Secretary

(SEAL)

NOTE: Any interested party may request the Commission to reconsider this decision. A motion to reconsider must be filed within ten (10) days. See ARM 38.2.4806.

Service Date: May 14, 2008

DEPARTMENT OF PUBLIC SERVICE REGULATION
BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MONTANA

*****

IN THE MATTER of the Petition of Two Dot Wind, LLC to Set Terms and Conditions for Existing Qualifying Small Power Production Facility Pursuant to M.C.A. § 69-3-603	)))))	UTILITY DIVISION DOCKET NO. D2007.12.152

DISSENT OF COMMISSIONER BRADLEY A. MOLNAR
ON BEHALF OF THE PEOPLE OF DISTRICT TWO

Two Dot Wind LLC contended that the Commission erred when adopting a policy of "cost causers would be cost payers." The evidence given by Two Dot Wind as to why the Commission should place all expense on consumers for line imbalance caused by their facilities was non existent. Rather their arguments were that because consumers had always paid this cost the Commission had erred by deciding to have small wind projects bare the cost of removing wind generation caused variations as they entered the transmission system. It occurs to me that the hearing was more about getting around the thirty day limitation to challenge a Commission order than an attempt to prove they were being over charged. No person could honestly argue that a contract amount of zero was contemplated PSC Order No. 6501g.

John Hines convincingly argued for NorthWestern Energy that the Montana Clean Renewable Energy Bond act authorizes NWE to deduct ancillary services provided (MCA 90-4-1221).

The legislature also mandated that renewable energy projects should pay the cost of ancillary services in the Renewable Energy Portfolio.

With the legislature weighing in twice and the Commission weighing in once I fail to see the basis for the argument that zero dollars was the correct contract amount. The only logical argument is that the cost is what it is and the cost causer should be the

cost payer. Nothing else is fair to all concerned; especially consumers that have no choice.

Larry Nordell of the Montana Consumer Council was spot on when he reminded the Commission that under the "Public Utility Regulatory Policies Act" consumers must be no worse off with the QF than without it. Therefore wind contract-related risks cannot be imposed on customers. Why would we even need a law to tell us that? Why did we ignore it…again?

The Commission has consistently put Two Dot Wind LLC in the position of being able to pick from multiple methods of payments and multiple methods of choosing an ancillary services contract price. What other supplier of goods gets to tell its customers that they will choose the highest rate of return and the customer must pay it?

The assumed amount of about $5.65 per MWh is below current cost. And the long term cost is unknown. The argument that the cost may come down because NWE may build a gas fired plant to follow load was actually painful to hear. We have no idea what the cost of the plant may be, if or when it will actually be built, or what the cost of the gas will be. Yet we give TDW a 16 year option with only two possible adjustments. Why don't we give this option to residential and commercial customers if it is such a risk free option? I assume it's because it would be ridiculous to even contemplate.

The argument advanced by staff that a contract price of $49.90 to TDW minus ancillary costs to be bout $44.25 and therefore in compliance with "long term total costs requirements" (MCA 69-8-419 (2) (d)) fails completely when one recognizes that all four of the micro wind farms compromising the Two Dot Wind Farms are located in Co-op territory yet the Coops will not buy the power…because the value does not approach $49.50 or any other number. Government mandates do not denote value. In this case it creates it. By testimony none will deal with TDW to sell them ancillary services or buy their power except for NWE and only then when ordered to by several government agencies.

In conclusion the Commission has violated the "no harm" provisions of the federal PURPA Act, the lowest long term cost provisions of state law and has once again created risks for consumers as opposed to "managed and mitigated risks" as required by MCA 69-8-419 (c).

Perhaps “justice” would be to give the four Commissioners that voted for this scheme the $5.55 per MWh for the next 16 years and let them pay the actual costs and keep the balance; assuming there is some. This would be in keeping with the concept of the cost causer is the cost payer and shield the public from risk as required by state and federal law….and the next set of Commissioners would be more carful with the consuming publics money while cutting sweet heart deals for favored special interests.