

Docket No. 20000-__-ER-11
Witness: Darrell T. Gerrard

BEFORE THE WYOMING PUBLIC SERVICE
COMMISSION

ROCKY MOUNTAIN POWER

Direct Testimony of Darrell T. Gerrard

December 2011

1 **Q. Please state your name, business address, and present position with**
2 **PacifiCorp dba Rocky Mountain Power (the “Company”).**

3 A. My name is Darrell T. Gerrard. My business address is 825 NE Multnomah, Suite
4 1600, Portland, Oregon 97232. I am Vice President of Transmission System
5 Planning for the Company.

6 **Qualifications**

7 **Q. Please describe your education and business experience.**

8 A. I have a Bachelor of Science degree in Electrical Engineering (Electric Power
9 Systems Major) from the University of Utah and Certificate of Completion with
10 Honors in Electrical Technology from Utah Technical College at Salt Lake. My
11 experience spans more than 30 years in the electric utility business and electric
12 power industry in general. I have working experience and have had management
13 responsibility for a number of functional organizations at PacifiCorp, including:
14 Area Engineering, Area Planning, Region Engineering, T&D Facilities
15 Management, Transmission, Substation and Distribution Engineering, System
16 Protection and Control, T&D Project Management and Delivery, Asset
17 Management, Electronic Communications, Hydro System Engineering,
18 Transmission Grid Operations, and most recently Transmission System Planning.

19 **Q. What are your responsibilities as Vice President of Transmission System**
20 **Planning?**

21 A. I am responsible for transmission planning activities required to support
22 PacifiCorp’s existing and future bulk transmission system and to ensure a safe and
23 reliable transmission system to provide adequate service to our customers

1 economically. I am also responsible for the conceptual and detailed system
2 planning and architecture associated with the Company's long-term Energy
3 Gateway Transmission Expansion Plan ("Energy Gateway").

4 **Q. What is the purpose of your testimony in this proceeding?**

5 A. The purpose of my testimony is to provide the Commission with information
6 regarding the Company's interconnected transmission system in Wyoming. In
7 particular my testimony will address transmission system planning requirements,
8 capabilities, operational limits, utilization and congestion points. My testimony is
9 respectfully submitted in compliance with the Commission's Order dated
10 September 22, 2011, in Docket No. 20000-384-ER-10, Paragraph 131 ("2010
11 General Rate Case Order"), which states:

12 "In its next general rate case application, for the purpose of
13 informing the Commission regarding aspects of the Company's
14 transmission planning, the Commission directs the Company to
15 prepare and submit congestion charts, including at least a U95
16 chart and a U75 chart, similar to those provided by Rocky
17 Mountain Power witness Gerrard in his rebuttal testimony."

18 **Q. Please summarize your testimony.**

19 A. My testimony will:

20 • Provide a brief summary of the North American Electric Reliability
21 Corporation ("NERC") and Western Electricity Coordinating Council
22 ("WECC") mandatory performance standards and criteria for the Bulk
23 Electric System ("BES") with which the Company must comply in regards
24 to planning, designing and operating its transmission system. Application
25 of these mandatory standards and criteria is the basis for determining
26 transmission system path capacity and respective system operating limits

1 (SOLs).

2 • Discuss some of the current operating limitations and congestion points
3 existing on the transmission system interconnected to Wyoming.

4 • Discuss how Energy Gateway mitigates these operating limitations and
5 congestion points.

6 **Performance Standards and Criteria used in Planning the Bulk Electric System**

7 **Q. Please provide a summary of the mandatory transmission performance**
8 **requirements and criteria driving the need for the Company's planned**
9 **transmission investments.**

10 A. The Company must maintain a minimum level of system reliability to provide
11 adequate transmission service. The NERC and WECC have recently enacted a
12 significant number of standards and guidelines that specify in detail the levels of
13 system performance that utilities must maintain during the planning, operation
14 and ongoing maintenance of their bulk electric systems. NERC's reliability
15 standards were approved by the Federal Energy Regulatory Commission
16 ("FERC") and are mandatory for all FERC-jurisdictional entities. These reliability
17 standards are targeted at improving the security and reliability of the nation's bulk
18 electric system. The Company's existing and proposed Energy Gateway
19 transmission projects and related investments are required for the Company to
20 comply with these mandatory reliability standards and to provide safe, reliable
21 and efficient transmission service to customers.

1 **Q. What specific reliability performance standards and criteria are associated**
2 **with planning the Company's transmission system?**

3 A. PacifiCorp plans, designs and operates its transmission system to meet or exceed
4 NERC standards for the Bulk Electric Systems and WECC regional standards and
5 criteria. The NERC standards are found in 18 CFR Part 40 (Mandatory Reliability
6 Standards for Bulk-Power Systems). The WECC standards and criteria are
7 deemed necessary for the WECC region to reliably meet or in some cases exceed
8 NERC standards where necessary. There are currently more than 120 approved
9 NERC standards with which the Company must comply. The Company is
10 required to fully comply with the following standards:

- 11 • NERC TPL-001 – System Performance Under Normal Conditions;¹
- 12 • NERC TPL-002 – System Performance Following Loss of a Single BES
13 Element;²
- 14 • NERC TPL-003 – System Performance Following Loss of Two or More
15 BES Elements;³
- 16 • NERC TPL-004 – System Performance Following Extreme BES Events;⁴
- 17 1. TPL 001-WECC-1-CR – System Performance Criteria Normal
18 Conditions;⁵
- 19 • TPL 002-WECC-1-CR – System Performance Criteria Following Loss of
20 a Single BES Element;

¹ NERC TPL-001 can be found at: <http://www.nerc.com/files/TPL-001-0.pdf>.

² NERC TPL-002 can be found at: <http://www.nerc.com/files/TPL-002-0.pdf>.

³ NERC TPL-003 can be found at: <http://www.nerc.com/files/TPL-003-0.pdf>.

⁴ NERC TPL-004 can be found at: <http://www.nerc.com/files/TPL-004-0.pdf>.

⁵ TPL 001-WECC-1-CR – TPL 004-WECC -1-CR can be found at:
<http://www.wecc.biz/Standards/WECC%20Criteria/TPL-001%20through%20004%20-WECC-1-CR%20-%20System%20Performance%20Criteria%20Effective%20April%2018%202008.pdf>.

- 1 • TPL 003-WECC-1-CR – System Performance Criteria Following Loss of
- 2 Two or More BES;
- 3 • TPL 004-WECC-1-CR – System Performance Criteria Following Extreme
- 4 BES Events;
- 5 • NERC TOP-002 – Normal Operations Planning;⁶
- 6 • NERC TOP-004 – Transmission Operations;⁷
- 7 • NERC TOP-007 – Reporting SOL and IROL Violations;⁸

8 The above-referenced standards dictate minimum levels of reliability, redundancy
9 and performance required for the transmission system.

10 **Q. Please discuss further how these standards and criteria influence the timing**
11 **and need for the Company’s transmission plans.**

12 A. These mandatory standards require the Company to have a forward-looking
13 transmission plan to reliably serve current and anticipated future customer energy
14 demands under all expected operating conditions. These conditions include
15 normal system operations (assuming all system elements are in service) and
16 system contingencies (where elements of the transmission system are assumed to
17 be out of service), either planned or otherwise. NERC Transmission Planning
18 Standard TPL 002 states (*emphasis* added):

19 **A. Introduction**

20 **Purpose:** System simulations and associated assessments are
21 needed periodically to ensure that reliable systems are developed
22 that *meet specified performance requirements with sufficient lead*
23 *time*, and continue to be modified or upgraded as *necessary to meet*
24 *present and future system needs*.

⁶ NERC TOP-002 can be found at: <http://www.nerc.com/files/TOP-002-2.pdf>.

⁷ NERC TOP-004 can be found at: <http://www.nerc.com/files/TOP-004-2.pdf>.

⁸ NERC TOP-007 can be found at: <http://www.nerc.com/files/TOP-007-0.pdf>.

1 **B. Requirements**

2 **R1.** The Planning Authority and Transmission Planner shall each
3 demonstrate through valid assessment that its portion of the
4 interconnected transmission system is planned such that the
5 Network can be operated to supply projected customer demands
6 and projected Firm (nonrecallable reserved) Transmission
7 Services, at all demand levels over the range of forecast system
8 demands, under the contingency conditions as defined in Category
9 B of Table I. To be valid, the Planning Authority and Transmission
10 Planner assessments shall:

11 **R1.1.** Be made annually.

12 **R1.2.** Be conducted for near-term (years one through five)
13 and longer-term (years six through 10) planning horizons.

14 **R2.** When System simulations indicate an inability of the systems
15 to respond as prescribed in Reliability Standard TPL-002-0 R1,
16 the Planning Authority and Transmission Planner shall each:

17 **R2.1.** Provide a written summary of its plans to achieve the
18 required system performance as described above
19 throughout the planning horizon:

20 **R2.1.1.** Including a schedule for implementation.

21 **R2.1.2.** Including a discussion of expected required in-
22 service dates of facilities.

23 **R2.1.3.** Consider lead times necessary to implement plans.

24 In summary, the Company is required to have both short-term and long-
25 term transmission plans to reliably meet all expected current and forecasted
26 customer electrical demands. The requirement to have such a plan is not optional
27 for the Company. The Company conducts annual load and resource forecasting
28 analyses and revises its investment timing as a result of identified changes in
29 forecasted demand where appropriate. Transmission projects require long range
30 multi-year planning, permitting and construction processes, and the Company
31 must consider the lead times and schedules necessary for transmission facility
32 additions in advance of customer demand.

1 **Transmission System Congestion and Operating Limitations**

2 **Q. Are there currently operating limitations and congestion points on the**
3 **transmission system serving Wyoming?**

4 A. Yes, there are operating limitations and congestion points both on the internal
5 transmission system (within the state of Wyoming) and on the transmission
6 systems interconnecting Wyoming to systems outside the state. Some of these
7 limits and congestion points are reviewed by the Company and WECC seasonally
8 to confirm reliable system operation and to help ensure the system can be
9 operated at its highest capacity.

10 **Q. How are these limits and constraint points determined and what information**
11 **is used to determine those limits?**

12 A. The transmission path limits and resulting constraints are established on
13 individual transmission lines or on groups of lines which operate electrically in
14 parallel with each other. The limit and resulting constraint on each respective path
15 is determined by the maximum electrical power flow that can reliably be
16 transported across the path while maintaining full compliance with all applicable
17 NERC/WECC mandatory reliability standards, which I discussed above.
18 Transmission path limits and system constraints are not arbitrarily established by
19 the Company, they are established following WECC reliability policy and
20 procedures and through compliance with mandatory system reliability standards.

21 **Q. Please describe these congestion points and limitations on the transmission**
22 **system.**

23 A. In an effort to provide this Commission with additional information on the

1 Company's transmission system in Wyoming, please refer to my Exhibit
2 RMP__(DTG-1) (2010 Wyoming Load Bubbles and Transmission Paths) which
3 depicts the WECC rated transmission paths and other internal system limits and
4 constraint points on the interconnected system existing in Wyoming today. They
5 are shown on the exhibit and listed below:

- 6 • Path 37 – TOT 4A (WECC Path)
- 7 • Path 38 – TOT 4B (WECC Path)
- 8 • Path 19 – Bridger West (WECC Path)
- 9 • Path 20 – Path C (WECC Path)
- 10 • West of Rock Springs (Internal System Limit)
- 11 • Monument West (Internal System Limit)
- 12 • Evanston West (Internal System Limit)
- 13 • West of Naughton (Internal System Limit)
- 14 • South of Yellowtail (Internal System Limit)

15 **Q. Can you describe generally how these path limits and internal system limits**
16 **impact the energy flow in Wyoming and how they influence planning the**
17 **future of the system?**

18 A. Yes. The limits depicted in Exhibit RMP__(DTG-1) are established through
19 application of the NERC/WECC reliability and performance standards to the
20 transmission system as discussed above. The WECC paths listed above have limits
21 approved by WECC and are monitored in real time operations by both the WECC
22 Reliability Center ("RC") and by the Company's Grid Operations Center. The
23 internal system limits are established using the same standards, however these

1 limits are not required to be approved by WECC and are not necessarily monitored
2 in real-time by the WECC RC. The Company monitors internal system limits as
3 necessary to ensure reliable system performance during outages or maintenance.

4 Typically, under normal system conditions the internal system limits
5 cannot be exceeded as the WECC path limits dictate the more severe constraint. In
6 general the energy supply in Wyoming flows from east to west and any generation
7 in excess of load in each “load bubble” must flow westward into the next adjacent
8 bubble to the extent that flow at any time does not exceed the WECC path rating or
9 internal system limit. The system cannot be scheduled or operated real-time above
10 these ratings or limits for reliability reasons. As can be seen in Exhibit
11 RMP___(DTG-1) several of these paths and internal limits are “located in series”
12 from east to west and therefore, the limits may impact each other and the lowest
13 limit may dictate the system’s ability to move energy.

14 In regards to planning the future of the system the Company must consider
15 all paths and internal system limits when adding or upgrading existing
16 transmission lines as an increase in one path or limit does not guarantee energy
17 flow across each bubble or guarantee increased energy flow out of the state of
18 Wyoming. The Company must have a comprehensive plan that addresses not only
19 each path rating and internal system limit individually, but it must also address
20 them as a combined system. The Company’s proposed Energy Gateway Project
21 addresses these constraints and limits over time.

1 **Q. Please describe how the Company prepared the U75 and U95 Path utilization**
2 **charts provided in this case?**

3 A. The path utilization charts submitted by the Company as Exhibit RMP___(DTG-
4 2R) in my rebuttal testimony of the 2010 general rate case, and referenced by the
5 Commission Order dated September 22, 2011, in that Docket, were developed by
6 WECC in 2010 using 2009 WECC historical system data. WECC published those
7 results in 2010 as part of a WECC 2009 Western Interconnection Transmission
8 Path Utilization Study dated June 24, 2010. At the time of the Commission's
9 recent 2010 General rate case Order, the WECC had not published similarly new
10 or revised utilization charts for historical year 2010. In an effort to provide this
11 Commission with the requested "congestion chart" information, the Company has
12 prepared charts using historical information contained in the Company's Energy
13 Management and Scheduling Systems for calendar year 2010. Please refer to
14 Exhibit RMP___(DTG-2) for WECC rated path utilization charts, including Chart
15 #1 which shows the percentage of time each WECC path had flow utilization at 75
16 percent or above, and at 95 percent or above. Chart #2 shows the percentage of
17 time each transmission path was scheduled at 75 percent or above and at 95
18 percent or above. Chart #3 shows the path Total Transmission Capacity ("TTC")
19 and the Available Transmission Capacity ("ATC"), transmission service that was
20 available for purchase in 2010 under the Company's Open Access Transmission
21 Tariff (OATT) approved by FERC.

1 **The Company's Plan to Alleviate or Reduce Congestion**

2 **Q. Does the Company have a plan to alleviate or to help reduce these congestion**
3 **points on the system?**

4 A. Yes. As discussed above, segments of the Company's Energy Gateway Project are
5 planned to add new incremental transmission capacity across these constraint
6 points and to alleviate or reduce congestion across the WECC paths described
7 earlier in my testimony. The first segment of Energy Gateway (Populus to
8 Terminal) was placed into service in November 2010 and the second segment
9 (Mona to Oquirrh) is currently under construction. Further information on the
10 Company's Energy Gateway Project can be found at
11 www.pacificorp.com/energygateway.

12 **Conclusion**

13 **Q. Please summarize your testimony.**

14 A. The transmission system in Wyoming and its interconnections to Idaho and Utah
15 are constrained on several points across the interconnected system from east to
16 west, and is limited in its ability to move generation resources to customer load
17 centers. The system has limits established as necessary to facilitate reliable system
18 operation both within the state and for the wider interconnected system. These
19 limits assure a minimum level of transmission system reliability not only for
20 Wyoming customers, but also for the Company's interconnection to other
21 transmission providers in the region. The system has high utilization in constrained
22 areas which have not been upgraded or where new transmission facilities have not
23 been added. In addition, the major WECC paths within the state of Wyoming are

1 fully subscribed (zero Available Transmission Capacity) and currently cannot
2 move additional generation resources between certain “load bubbles” or increase
3 exports out of the state. The Company has a comprehensive and long term
4 “segmented and phased” plan to address these major system constraints and
5 limitations. One initial segment of Energy Gateway is now in service and has been
6 operating for just over a year, and has provided significant benefits to customers,
7 including those in Wyoming. Additional Energy Gateway segments are currently
8 in various stages of planning, construction or permitting.

9 **Q. Does this conclude your direct testimony?**

10 A. Yes.