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BEFORE THE UTILITY FACILITY REVIEW BOARD

ROCKY MOUNTAIN POWER, Petitioner, vs. WASATCH COUNTY, Respondent.	**DIRECT TESTIMONY OF KENNETH M. SHORTT**

BACKGROUND OF WITNESS

Q. Please state your name, business address, and present position.

A. My name is Kenneth M. Shortt. My business address is 70 North 200 East, American Fork, UT 84003. I am currently employed as Director—Planning and Field Engineering for PacifiCorp. I have held my present position since May 2012. I have been with the Company since 1979.

Q. What are the primary duties of your present position?

A. The primary duties of my present position include management and oversight of Transmission Area Planning and Field Engineering for Rocky Mountain Power, a business unit of PacifiCorp. (PacifiCorp and Rocky Mountain Power are referred to herein as the "Company.") My responsibilities include ensuring that proper planning activities are performed as necessary for the Company's medium transmission (161 kilovolt (kV) – 46kV) system and distribution system (under 35 kV).

Q. Please describe your education and business experience.

A. I have a Bachelor of Science degree in Electrical Engineering from the University of Utah and a Masters in Business Administration from Brigham Young University. My experience spans more than 35 years in the electric utility business. I have experience in and have been responsible for a number of functional organizations at the Company, including Dispatch Support, Field Engineering, Engineering Standards, Distribution Studies, Operations, Capital Delivery, Compliance, and Area Planning.

PURPOSE AND SUMMARY OF TESTIMONY

Q. What is the purpose of your testimony?

A. My testimony will demonstrate the need to upgrade a 67 mile transmission line from 46 kV to 138 kV. This line runs from the Railroad substation north of Evanston, Wyoming, to the Silver Creek substation located near Park City, Utah. This line and the substations interconnected to this line are collectively referred to hereafter as the "Project."

The Project is required to ensure safe, reliable, adequate, and efficient delivery of electricity to the Company's customers[1].

Q. Please summarize your testimony.

A. In summary, the Project was developed for the express purpose of resolving immediate reliability needs and to meet increased capacity demands in the Load Area defined below. This Project supports and is being installed in conjunction with other future projects that will provide capacity for long-term energy growth and is an overall essential component of the energy delivery system.

Currently, the existing transmission system has limited capability to deliver reliable energy into the "Load Area," which includes all or portions of Summit, Wasatch, Morgan, Utah, and Salt Lake Counties. See Exhibit KMS-1 (Load Area). Energy is transmitted to the Load Area via medium voltage transmission lines. Due to existing and expected growth within the Load Area, the current transmission system cannot provide service to customers during peak load periods if either of the two primary transmission lines is taken out of service (an "N-1 condition") due to an unscheduled outage or for maintenance. An additional 138 kV transmission line is required to maintain reliable service to the Company's customers (including Heber Light & Power) when the existing transmission system is operated in an N-1 state.

The Load Area is one of the faster growing areas in Utah, averaging 3.4% annual load growth. Projections indicate the Load Area will continue to grow. See Exhibit KMS-2 Load Area Load Growth. Providing adequate energy demand is critical and given the continued load growth, time is of the essence to provide an additional 138 kV transmission line into the Load Area.

During peak loading periods, typically late November – early March, the Company has been operating the transmission system serving the Load Area as three separate

[1] "Customers" as used in this Testimony shall be defined to include all retail and network customers of the Company.

transmission systems to minimize potential customer interruptions in the event of an outage.

Since 2007, 15 separate outage or maintenance events have occurred on the two 138 kV lines and 21 events have occurred on the 46 kV line serving the Load Area. Three of the 138 kV line events occurred during a period where the system may have been in a radial configuration. An event on the 46 kV line occurred during a period where the system may have been in a radial configuration. In order to mitigate the need to serve the Load Area radially and support the forecasted load growth the Company must permit and construct the Project as soon as possible. Otherwise, customers within the Load Area will be subject to outages and continued degradation in reliability, particular during winter peaking months. For those reasons, the Project is needed immediately.

EXISTING SYSTEM CONCERNS AND PLANNED SOLUTION

Q. Please provide an overview of Rocky Mountain Power's transmission system supporting the Load Area prior to the Project.

A. Prior to the Project the Load Area has been served by three transmission lines: the Cottonwood-Silver Creek 138 kV line, the Hale-Midway 138 kV line, and the Cottonwood/LeGrande-Park City 46 kV line. See Exhibit KMS-3 Transmission Lines Serving Load Area Prior to Project. The two 138 kV lines serve as the primary sources into the Load Area. These two 138 kV sources and one 46 kV source are normally interconnected in the Load Area by 46 kV lines between Silver Creek substation (Summit County), Park City substation (Summit County), and Midway substation (Wasatch County). Other 46 kV lines leave these substations and provide power to other communities in Morgan, Summit, Wasatch, and Salt Lake Counties.

Q. Describe the existing reliability issues in serving the Load Area.

A. The Load Area is winter peaking .When the load is above 160 Mega-Volt-Amps (MVA), the loss of either existing 138 kV line or the Midway 138-46 kV transformer results in low voltages at best and cascading outages at worst.

To mitigate the low voltage and cascading outage scenarios, the Load Area transmission system is separated into three radial systems during peak loading periods. See Exhibit KMS-4 Radial Transmission Operation. Each radial system has a single source of power. The operation of the radial configuration is required to maintain service until the winter Load Area consistently falls below the 160 MVA limit. Exhibit KMS-5 Days Load Area Operated in Radial Configuration. Since the 2007-2008 winter, the days the Load Area was operated in a radial configuration has increased from 15 to 98 days, an annual increase of 69% and has reached an unacceptable level of reliability.

The Project provides a third 138 kV transmission source in the Load Area which mitigates the need to operate in a radial configuration, reducing the number of outage events that impact customers.

Q. What analysis did the Company perform to develop the need for the line?

A. The Company's analysis has been extensive and has been conducted and completed over a number of years. PacifiCorp's Open Access Transmission Tariff provides details regarding PacifiCorp's planning requirements and obligations to provide safe, reliable, adequate and efficient transmission service. Section 28.2 defines PacifiCorp's responsibilities;

> "The Transmission Provider will plan, construct, operate and maintain its Transmission System in accordance with Good Utility Practice and its planning obligations … The Transmission Provider, on behalf of its Native Load Customers, shall be required to designate resources and loads in the same manner as any Network Customer under Part III of this Tariff."

These requirements and needs must be met via the Project and future supporting projects. These projects are critical to PacifiCorp's overall transmission plan for the Load Area.

Q. Has the Company experienced outages and/or system disturbances that would have had a different outcome had the Project been in service?

A. Yes. As identified previously four outage events have occurred in the time frame the Company typically operates the transmission system in a radial configuration. Three of these events were before the Company was operating in a radial transmission configuration.

The fourth event occurred earlier this year. On February 14, 2016, the Cottonwood-Silver Creek 138 kV line experienced three momentary trips associated with a contaminated insulator. This condition required immediate attention before the insulator suffered a complete failure. During the winter season, while operated radially, this line is the sole source to Snyderville, Silver Creek, Oakley, Coalville, Kamas, and Park City substations. The repair required the Cottonwood-Silver Creek line be de-energized. The remaining two sources; Cottonwood/LeGrande-Park City 46 kV line, Hale-Midway 138 kV line, and a new source, made available through incremental work performed on the Project, Croydon-Park City 46 kV line, could not supply enough energy to keep all substations in service. Over 8,000 customers served from Snyderville substation were out of power for one and a half hours during the repair procedure. If the Project were in service, no outage would have occurred during this emergency repair.

Q. Is the Load Area subjected to unique risks in providing reliable electrical service, which would be mitigated by the Project?

A. The relative location of the Load Area to generation sources requires the lines to pass through rugged terrain with increased potential for prolonged outages. Historically, Company lines in rugged or remote locations are subject to outages caused by fire and smoke, high winds, flooding, severe storms, and landslides as well as human interference or action. The following are some examples of outages in the Load Area that have occurred as a result of similar conditions:

- April 22 – 23, 2014 – A severe spring storm resulted in the loss of a structure carrying the 138 kV and 46 kV lines from Cottonwood substation. The remaining source was inadequate to serve the Load Area. Distribution feeders were subjected to rolling blackouts until the issue was mitigated.
- September 17, 2013 – A lightning strike at the Midway substation caused the Hale-Midway 138 kV line to open. The Cottonwood-Silver Creek 138 kV line was out of service for scheduled maintenance. With both 138 kV sources out of service the remaining Cottonwood/Le Grande-Park City 46 kV line tripped on overload, resulting in a total outage to the Load Area..

COMPANY LOAD AREA SOLUTION

Q. What are the Company's plans to address the immediate reliability and future load requirements in the Load Area?

A. The Company has a multi-project solution to address the reliability and future load requirements in the Load Area:

1. Upgrade an existing 46 kV line to 138 kV from Railroad substation to Croydon substation to Silver Creek substation (Project)
2. Convert the Cottonwood –Silver Creek 138 kV line into two 138 kV lines; Cottonwood-Snyderville 138 kV line and Snyderville-Silver Creek 138 kV line. Install a 138 – 46 kV transformer at Snyderville substation. (Separate project currently under construction)
3. Construct a 138 kV line from Midway substation to Jordanelle substation. This will provide a third 138 kV source to Silver Creek substation and provide a second 138 kV source to both Jordanelle and Midway substations. (Planned future project)

The Project constitutes item 1 on the multi-project Load Area solution. All three projects improve reliability and add capacity to the Load Area.

Q: Please describe the Project.

A: The Company proposes to rebuild 61 miles of an existing 46 kV transmission line as a 138 kV single-circuit transmission line between the existing Railroad substation located near Evanston, Wyoming, and a transmission structure (Brown's Canyon Tap) located near Peoa, Utah. A 6.5 mile 138/46 kV double-circuit transmission line, replacing an existing 46 kV line, will also be constructed from the Brown's Canyon Tap to the existing Silver Creek substation. The existing Coalville substation will be converted from 46 kV to 138 kV. A new 138/46/12.5 kV substation will also be constructed near Croydon. See Exhibit KMS–6 Project Scope.

Q. Please describe what sections of the Project have been placed in service.

A. The 138 kV line from Railroad substation to Coalville substation and the new Croydon substation have been completed. The 138/46 kV and 138/12.5 kV transformers have been

placed in service at Croydon substation. The line between Croydon and Coalville will operate at 46 kV until the voltage conversion at Coalville substation is complete, at which point the line from Croydon to Coalville line will operate at 138 kV. See Exhibit KMS-7, Current Load Area Transmission Configuration.

Q. What sections of the Project have not yet been placed in service?

A. The conversion of the Coalville substation from 46 kV to 138 kV is currently in design, and is scheduled to be placed in service in 2017. Construction on the 138 kV line from Coalville substation to the Brown's Canyon tap and the double circuit 138/46 kV line from Brown's Canyon tap to Silver Creek substation will begin once permits are obtained.

Q. To what extent is Wasatch County affected by the siting of the line?

A. The section of line going through Wasatch County constitutes .26 miles (0.38%) of the 67 mile Railroad to Silver Creek line.

Q. Pursuant to Mr. Chad Ambrose's testimony, Promontory Investments, LLC, requested the existing line route be relocated from its existing location to the southeast corner of its property. Did the Company determine this relocation request was technically feasible?

A. Yes. The Company studied the line route and found the agreed to route meets Company technical requirements and meets National Electrical Code Safety (NESC) requirements. The NESC "sets the ground rules for practical safeguarding of persons during the installation, operation, or maintenance of electric supply & communication lines & associated equipment. It contains the basic provisions that are considered necessary for the safety of employees & the public."[2]

Q. Briefly describe the other projects planned to improve reliability and increase capacity to the Load Area.

[2] Institute of Electrical and Electronics Engineers - http://standards.ieee.org/about/nesc

A. The Company is currently expanding the Snyderville substation to include another 138/46 kV source. This project is scheduled to be placed in service in January 2017.

In conjunction with Heber Light & Power Company, the Company plans to build a 138/46 kV double circuit line between Midway substation and a new Heber Light & Power substation and continue the 138 kV side of the line as a single circuit line to the Jordanelle substation. This tentative in-service date for this project is 2019. See Exhibit KMS-8 Future Planned Projects in the Load Area.

CURRENT TRANSMISSION SITUATION IN LOAD AREA

Q. Are there other justifications driving the need to execute and complete the Project?

A. Yes. As part of the Project a 138-46 kV transformer and a 138–12.5 kV transformer were installed in the new Croydon substation to provide support to the 46 kV system in the Morgan County area and serve customers in Henefer, UT. These transformers are supplied by the Project's completed 138 kV transmission line from Railroad substation to Croydon substation. Since the Project is only partially complete, the Croydon transformers rely on the single source from Railroad substation. If an outage were to occur on this 33 mile transmission line between Railroad substation and Croydon substation, the new transformers at Croydon substation would be out of service with limited restoration options until repairs to the 138 kV line are complete. Completing the final segment of the Project from Croydon substation to Silver Creek substation will provide redundant sources to the transformers at Croydon. Redundant sources will mitigate the risk of outages and provide restoration options not available with a single source.

Q. Will the Project provide increased reliability for the Company's wholesale transmission customers?

A. Yes. Utah Associated Municipal Power Systems relies on the Company's transmission system to serve Heber Light & Power Company. Completing the Project provides additional reliability for both short-term and long-term load service to Heber Light & Power Company.

Q. How is this Project critical to Wasatch County, and how will its citizens benefit?

A. The Project is critical to both short-term and long-term energy to Wasatch County. The existing transmission system's ability to provide load support in Wasatch County during contingencies has been exhausted by growth in the Load Area. Growth is expected to continue in Wasatch County. The Project will improve reliability and provide additional capacity to the Load Area.

Q. Can the full Project benefit be realized without a conditional use permit to install the 0.26 mile line segment in Wasatch County?

A. No. The full benefit of the Project cannot be realized without completing all parts of the Project. The transmission system supporting the Load Area will continue to be operated in a radial configuration during peak load periods until the Project is placed in service.

CONCLUSIONS AND RECOMMENDATIONS

Q. Please explain why the Company is approaching the Utility Facility Review Board

A. Large transmission projects require long lead times to complete the siting and permitting processes and construction. With this in mind, the Company has been proceeding with the Project scope, right of way acquisition, the siting and permitting process since 2008.

The Company has an obligation to serve its customers with safe, reliable, adequate, and efficient energy and must meet the increasing energy needs of its customers. Failure to construct the Project will expose the Company's customers to unacceptable reliability risks during significant portions of the year and inability to meet customers' energy demand. Because time is of the essence the only prudent and reasonable solution to this problem is to permit and construct this new transmission line.

Q: Does this conclude your direct testimony?

A: Yes.

EXHIBITS TO DIRECT TESTIMONY OF KENNETH M. SHORTT

EXHIBIT KMS-1: Load Area

EXHIBIT KMS-2: Load Area Load Growth

EXHIBIT KMS-3: Transmission Lines Serving Load Area Prior to Project

EXHIBIT KMS-4: Radial Transmission Operation

EXHIBIT KMS-5: Days Load Area Operated in Radial Configuration.

EXHIBIT KMS-6: Project Scope

EXHIBIT KMS-7: Current Load Area Transmission Configuration

EXHIBIT KMS-8: Future Planned Projects in the Load Area