**STATE OF MINNESOTA**
**BEFORE THE**
**MINNESOTA PUBLIC UTILITIES COMMISSION**

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*In the Matter of Petition of Northern States Power Company to Initiate a Competitive Resources Acquisition Process*

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MPUC Docket No.: E-002/CN-12-1240
OAH Docket No.: 8-2500-30760

Exhibit No.: ____ (TT-1)

# DIRECT TESTIMONY OF TODD THORNTON

## ON BEHALF OF CALPINE CORPORATION

September 27, 2013

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## I. INTRODUCTION

**Q. Would you please state your name, business address, and occupation?**

A. My name is Todd Thornton. My business address is 717 Texas Avenue, Houston, Texas 77002. I am Vice President of Commercial Development for Calpine Corporation ("Calpine").

**Q. Please describe your background and experience at Calpine.**

A. I joined Calpine in October 2000 and have held positions of increasing responsibility within the organization, including being named Vice President of Finance in 2007 and Treasurer in 2009. I was named Vice President of Commercial Development in 2013 to lead Calpine's development of electric generation resources throughout the U.S. and Canada. I earned a Bachelor of Science degree in Finance from Northern Illinois University and hold the Chartered Financial Analyst designation.

## II. PURPOSE OF TESTIMONY

**Q. What is the purpose of your testimony?**

A. The purpose of my testimony is to provide additional context with respect to Calpine's April 15, 2013 Proposal to supply a portion of the estimated 500 megawatts of Xcel Energy's forecasted resource need for the 2017 to 2019 timeframe that has been approved by the Minnesota Public Utilities Commission ("Commission").

Q. **What is the Nature of Calpine's Proposal?**

A. Calpine's Proposal involves the planned completion of its existing Mankato Energy Center through the addition of one natural gas-fired combustion turbine generator ("CTG"), an additional heat recovery steam generator ("HRSG"), and related ancillary equipment. Calpine's bid would result in an incremental 345 megawatts ("MW") of

integrated combined-cycle and peaking capacity, as measured under winter conditions.

**Q. What are the primary benefits of Calpine's Proposal?**

A. As discussed in my testimony below, Calpine's Proposal achieves the goal of installing additional electric generation capacity to help meet customer demand with state-of-the-art, environmentally responsible technology. Selection of Calpine's Proposal as one of the resources to meet Xcel's future capacity and energy needs will provide Minnesota ratepayers with a fuel-efficient energy resource that is ideally suited to complement the State's strong interest in promoting intermittent wind and other renewable resources. In addition, installing combined-cycle capacity at this time will provide a valuable hedge against the risk of intermediate and baseload resource retirements in light of anticipated environmental regulation or unforeseen factors.

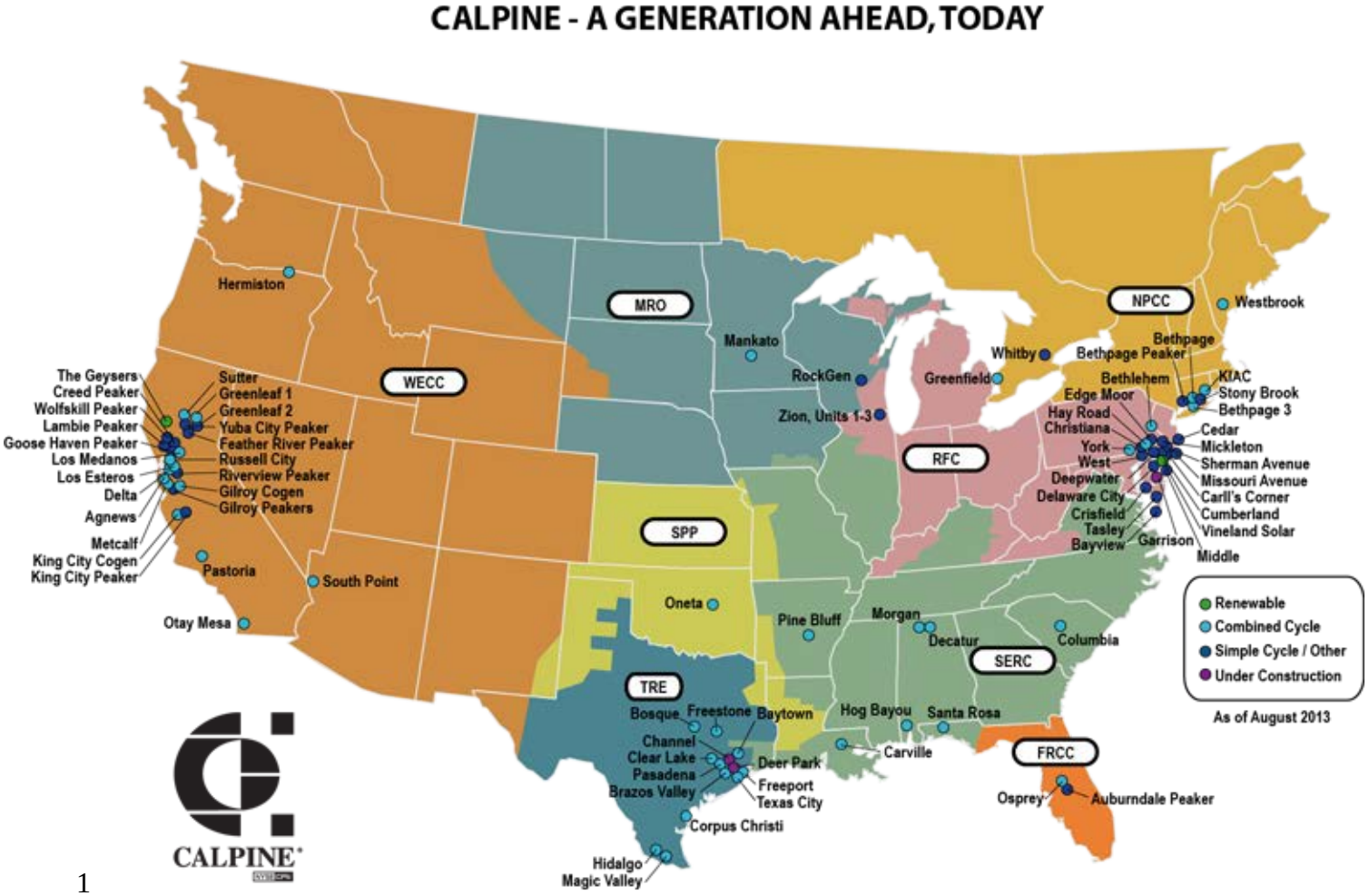
**Q. What topics will you cover in your testimony?**

A. First, I will provide a description of Calpine, its breadth, depth of experience and track record. Second, I will comment on the overall ratepayer benefits of allowing Calpine and other parties to participate in a competitive resource acquisition proceeding that allows independent power producers to compete with proposed utility self-build projects. Third, I will provide a discussion of the background of the existing Mankato Energy Center, which was originally designed to accommodate installation of additional combined-cycle generation. Fourth, I will discuss the benefits of Calpine's bid in the context of managing ratepayer risk. Finally, I will describe how Calpine's Proposal provides Xcel and its ratepayers with an opportunity to secure uniquely cost-effective and environmentally superior combined-cycle capacity due to the inherent synergies associated with completing the planned build-out of the existing facility.

## III. CALPINE CORPORATION

**Q. Please briefly describe Calpine Corporation.**

A. Calpine is an independent power producer that specializes in the development, construction, ownership, and operation of wholesale electric generating facilities. Calpine owns and operates the largest and most modern fleet of clean, reliable and fuel-efficient gas-fired and geothermal power plants in North America, with a portfolio of 92 operating power plants located throughout the U.S. and Canada with a combined total of more than 28,000 megawatts of electric generating capacity. Calpine currently has three new electric generation projects under construction and its existing fleet produced more than 100 billion kilowatt-hours of electric energy during 2012. A map showing Calpine's existing North American generation fleet is shown below:




More information about Calpine, its industry expertise, and its financial strength is included in Appendix A of Calpine's April 15 Expansion Proposal.

**Q. Please describe Calpine's presence in, and commitment to, Minnesota.**

A. Calpine is an active participant in the wholesale power market in Minnesota. As previously noted, Calpine owns and operates the Mankato Energy Center, a 375-megawatt natural gas-fired combined-cycle generating facility located in the City of Mankato, Blue Earth County, Minnesota, the output of which is sold to Xcel Energy under a long term Power Purchase Agreement ("PPA") approved by the Commission.

**Q. Please describe Calpine's commitment to competition and competitive energy markets.**

A. As an independent power producer ("IPP"), Calpine maintains a strong commitment to fostering competition in wholesale electric markets throughout the country. Calpine is a member of the Midcontinent Independent System Operator, Inc. ("MISO") and owns, operates and maintains two (2) generating power plants totaling 878 MW within the MISO footprint. As I previously noted, in Minnesota, Calpine owns the Mankato Energy Center. In Wisconsin, Calpine owns the RockGen Energy Center in Cambridge, Wisconsin.

## IV. BENEFITS OF COMPETITIVE PROCUREMENT

**Q. Please explain your views on the benefits of selecting new generating resources based on a formal competitive procurement mechanism.**

A. Calpine commends the Commission for establishing a competitive resource acquisition process to meet Xcel's future resource need. Calpine firmly believes that consumers benefit when capital-intensive investments are made through a market-based approach or subject to an open and transparent competitive procurement process. Historically, investor-owned utilities have been largely insulated from competitive forces with respect to investment in new generation. However, as power markets have evolved, utility regulators have developed proven methods of ensuring resource adequacy that provide consumers with the inherent benefits of competitive market forces. Some regions across the United States address resource adequacy through centralized capacity markets. In regions such as MISO, new capacity is typically developed on a self-build basis by the local utility or through bilateral contract, such as a Power Purchase Agreement.

**Q. What are the expected ratepayer benefits of this type of proceeding?**

A. Regulators are continually evaluating the most efficient way to secure new generating capacity to ensure resource adequacy at the lowest possible cost. This contested case will result in a decision that the Commission can be assured is a competitive and prudent outcome. Calpine believes that subjecting utility self-build proposals to third party competition will always ensure that new resources are acquired at the lowest possible cost. The bottom line is that there is simply no reason not to subject proposed capacity additions to competitive review based on actual market-based alternatives rather than hypothetical modeling assumptions.

## V. MANKATO ENERGY CENTER

**Q. Please provide background on Calpine's development of the Mankato Energy Center.**

A. The existing Mankato Energy Center is a 375-MW natural gas fired, combined cycle plant consisting of one Siemens 501FD combustion turbine generator ("CTG"), one Nooter/Erikson heat recovery steam generator ("HRSG"), a Toshiba TCDF 40L steam turbine generator ("STG") and other ancillary equipment needed for the plant's safe, reliable and efficient operation. The existing Facility is located within the City of Mankato, Minnesota.

**Q. Was the existing Mankato Energy Center designed to accommodate the proposed expansion?**

A. Yes. The Mankato Energy Center was designed and built with the expectation that it would be expanded into a 720-MW natural gas-fired, combined-cycle facility by adding an additional CTG and HRSG ("power train"), which will be fully integrated with

the existing STG and balance of plant. Indeed, a significant reason why Calpine was able to offer such a competitive bid price is because the existing STG is oversized relative to current operations and can accommodate the steam output of an additional power train. Calpine's bid reflects the ability to avoid the purchase and installation of expensive equipment that otherwise would be required in the development of new combined-cycle capacity.

Calpine originally sought and received a Certificate of Need and Site Permit from the Commission and the Environmental Quality Board ("EQB") for the entire expanded Facility. *See* Order Granting Certificate of Need issued September 22, 2004 in Docket No. IP-6345/CN-03-1884, and Site Permit issued September 16, 2004 in MEQB Docket No. 04-76-PPS-CALPINE. Calpine's bid, therefore, is more appropriately characterized as the completion of the original facility as planned and permitted, rather than being strictly an "expansion" of an existing power plant.

As part of the application process to receive Commission and EQB approval for the construction of the Mankato Energy Center in 2004, Calpine also designed the water, gas and electrical systems as well as the site layout to accommodate the ultimate completion of the plant. For example, the existing 20-inch gas pipeline lateral is capable of delivering the requisite gas for a 720-MW facility and the award-winning water agreement with the City of Mankato (discussed further, below) is sufficient for the completion of the plant. As such, Calpine has the opportunity to add a CTG and HRSG for an additional 345 MW at an incremental cost that is far lower than the cost of adding new combined-cycle generation on a stand-alone basis. As discussed below, Calpine's

bid reflects these cost savings and passes the benefits of those economies of scale to Xcel and its ratepayers.

**Q. Does the initial design of the Mankato Energy Center provide benefits to Minnesota and Xcel's ratepayers?**

A. Yes. In addition to the pass-through of the cost savings noted above, and as set forth in Calpine's bid, completion of the existing Facility has several benefits compared with the other proposals submitted in this proceeding. For example, Calpine's bid:

- Utilizes an existing brownfield site already used for electric power generation, with no additional land use impacts;
- Avoids proliferation of additional pipeline and transmission corridors;
- Enjoys strong community support in the greater Mankato region; and
- Takes advantage of an award-winning water recycling agreement with the City of Mankato that reduces phosphorus loading in the Minnesota River.

**Q. Please describe how the Expansion utilizes an existing brownfield site already dedicated to electric power generation.**

A. As described above, Calpine's proposal represents the completion of the originally proposed Mankato Energy Center and represents incremental capacity that will be developed entirely within the footprint of the Mankato Energy Center's existing 25-acre site. No additional land requirements are necessary.

**Q. Please describe how the Expansion avoids proliferation of additional pipeline and transmission corridors.**

A. Calpine's Proposal utilizes existing natural gas and electric power transmission infrastructure. In particular, natural gas is currently provided to the Mankato Energy

Center via a 20-inch gas pipeline lateral that interconnects with Northern Natural Gas' ("NNG") interstate pipeline facilities. This existing pipeline lateral is sufficiently sized to accommodate the fuel requirements of the full 720-MW plant.

With respect to the electrical interconnection, the additional generation will use the existing plant's transmission outlets and interconnections to Xcel's Mankato substation. The existing plant switchyard and adjacent substation are appropriately sized for the incremental plant output.

**Q. Please describe how Calpine's bid takes advantage of an award-winning water recycling agreement with the City of Mankato that reduces phosphorus loading in the Minnesota River.**

A. During development of the existing Facility, Calpine helped fund construction of a new water reclamation facility adjacent to the City's existing wastewater treatment plant. The Mankato Energy Center uses the reclaimed water (*i.e.*, treated wastewater) for processing and cooling and plant discharge is subsequently returned to the City's treatment plant.

This agreement was the first of its kind in Minnesota and results in considerable environmental benefits. Most importantly, this water use agreement allows the City to more effectively manage the quality of its water discharge, particularly with respect to phosphorus load to the Minnesota River. This water agreement, therefore, serves the dual purpose of providing a cost-effective and environmentally appropriate water supply for Calpine and supports the City's need to control the quality of its wastewater discharge.

Calpine's use of reclaimed water replaces the more typical practice of using surface or ground water for processing and cooling. Use of reclaimed water also

eliminates the need for Calpine to create new water collection or discharge points along the Minnesota River.

**Q. Please describe the strong community support for Calpine's Proposal.**

A. Calpine places a high value on the relationships it has in the numerous local communities in which it operates power generation facilities. Calpine has developed a strong relationship with the plant's neighbors and Mankato public officials throughout the planning, construction and operation of the Mankato Energy Center. Through their August 8, 2012 Comments in Docket No. E002/RP-10-825 related to Xcel's integrated resource plan, the Greater Mankato Growth Association and the City of Mankato already have communicated their strong support for the expansion of Calpine's Mankato Energy Center and urged the Commission to include that additional capacity in Xcel's approved resource plan.

## VI. CALPINE'S BID

**Q. Please describe how Calpine's bid provides Xcel Energy's ratepayers with a combined-cycle resource where Calpine bears construction, delivery date and long term performance risk.**

A. In its March 5, 2013 *Order Extending Bidding Deadline And Refining Procedural Framework* issued in this proceeding, the Commission found that a fair bidding process and a least-cost outcome demanded that all bidders be held to the cost information provided in their bids. Calpine's bid is consistent with the Commission's directive and includes long-term performance guaranties wherein Calpine assumes the construction, delivery date and long-term operating risk of the Mankato Expansion. This construct provides numerous benefits and protections to Xcel Energy's ratepayers and exemplifies

one of the crucial benefits associated with IPP projects that operate pursuant to well-designed PPAs.

## VII. CALPINE PRICING

**Q. How did Calpine approach developing its bid in this proceeding?**

A. The initial engineering, permitting and design effort that was undertaken during development of the existing plant provides Calpine with the opportunity to offer Minnesota ratepayers an energy efficient and environmentally responsible resource option at a uniquely low price. Said differently, Calpine's Proposal is a low-cost alternative that takes advantage of the economies of scale associated with the investment that has already been made in the existing asset. Those economies of scale are reflected in Calpine's bid.

**Q. What is your response to suggestions that peaking rather than combined-cycle generation is needed in the 2017-2019 timeframe?**

**A.** As demonstrated in the Direct Testimony of Mr. Paul Hibbard, Calpine's bid represents a cost-effective source of capacity and, unlike the proposed Xcel and Invenergy combustion turbine peaking projects, also represents a lower cost and environmentally superior source of energy production. Peaking units are often selected not because they provide greater value to the market in terms of energy production or operational flexibility, but simply because they typically require a lower capital investment than a combined-cycle unit. In this instance, however, and as Mr. Hibbard's testimony demonstrates, Calpine's bid is both a less expensive overall option and will provide numerous additional benefits compared with the Xcel and Invenergy bids.

Specifically, combined-cycle units provide the same capacity benefits as peaking units but provide additional value due to their more efficient use of fuel. This translates directly into lower cost energy for consumers as well as superior environmental performance, because the ability to use less fuel per megawatt-hour of electricity production directly results in lower air emissions per megawatt-hour of electricity production. Calpine believes these advantages are particularly relevant in this proceeding because: a) any new capacity selected as a result of this contested case may well be the only fossil-fired resource addition in Xcel's generation portfolio this decade; b) the selected resource(s) will have a useful life of 30+ years; and c) any new thermal capacity that is built in Minnesota will play an increasingly important role in balancing and complementing the development of new intermittent renewable resources.

Calpine encourages the Commission to consider the view that, given the state's emphasis on developing clean renewable energy, any and all new fossil fuel-fired resources should be based on the cleanest technology that is commercially available, which is combined-cycle generation. In this respect, Calpine also encourages the Commission to recognize that the proposed Xcel and Invenergy projects do not include the use of back-end environmental control technology, whereas Calpine's bid includes the cost of such emissions control technology. As Mr. Hibbard's testimony will discuss, the economic advantages of Calpine's bid are even more pronounced if the respective bids are evaluated on a level playing field with respect to the cost of commercially available air emission control technology. Failing to recognize this important fact would place Calpine at an unfair competitive disadvantage.

## VIII. CONCLUSION

**Q. Why does Calpine believe the Commission should choose its bid as part of the solution to filling the current resource need?**

A. Acceptance of Calpine's bid will allow Minnesota to take advantage of what is widely predicted to be a sustained era of low natural gas prices, and will provide flexible load following capability to support the State's continued investment in intermittent wind and other renewable resources. Calpine's Proposal is a comparatively lower cost and more energy efficient resource than the other gas-fired bids in this proceeding. Moreover, securing additional combined-cycle capacity at this time will provide a valuable hedge against the risk of potential resource retirements in light of anticipated environmental regulation, the State's environmental objectives, and unforeseen circumstances affecting the operation of existing generating resources.

Calpine's bid reflects the inherent economies of scale associated with the design of the existing plant and provides Xcel's ratepayers with an opportunity to realize the benefit of what is a uniquely cost effective combined-cycle resource addition that represents superior environmental performance and is more consistent with the state's strong interest in promoting environmentally responsible sources of energy. Minnesota should complement its investment in renewable energy with only the cleanest types of thermal energy projects, which in this case is represented by Calpine's proposal to complete the build-out of the existing Mankato Energy Center.

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

A. Yes it does. Calpine appreciates the opportunity to participate in this process and is confident this contested case will achieve a desirable result for Xcel's ratepayers from the perspective of both cost and environmental performance.