BEFORE THE NORTH DAKOTA PUBLIC SERVICE COMMISSION
STATE OF NORTH DAKOTA

In the Matter of the Application of Northern States Power Company,
A Minnesota Corporation
For Authority to Increase Rates for
Electric Service in North Dakota
Case No. PU-12-813

SUPPLEMENTAL DIRECT TESTIMONY OF KARL RICHARD PAVLOVIC AUGUST 2013

On Behalf of the Advocacy Staff of the North Dakota Public Service Commission

August 22, 2013

DIRECT TESTIMONY OF

KARL R. PAVLOVIC

QUALIFICATIONS

Q. PLEASE STATE YOUR NAME, POSITION AND BUSINESS ADDRESS.

A. My name is Karl Richard Pavlovic. My business address is 8100 Professional Place, Suite 306, Hyattsville, MD 20785. I am a Senior Consultant with Snavely King Majoros & Associates, Inc. ("Snavely King"). I am the same Karl Richard Pavlovic who submitted Direct Testimony in this proceeding on July 17, 2013. My qualifications were submitted as Attachments A and B to that Direct Testimony.

Q. WHAT IS THE PURPOSE OF YOUR SUPPLEMENTAL TESTIMONY?

A. In my direct testimony I assessed the 12 Coincident Peak (12CP) demand allocator that Northern States Power (NSP) uses to effect its jurisdictional allocation of production and transmission costs and recommended that NSP use a Single Coincident Peak (1CP) demand allocator. My assessment was based on my review of cost allocation and system planning documents and other information provided by NSP in testimony and discovery.[1] In response to my recommendation Scott B. Brockett submitted on behalf of NSP Rebuttal Testimony that provides a technical defense of NSP's 12CP allocation, the grounds of which are nowhere to be found in NSP's direct testimony and responses to discovery. The purpose of my supplemental testimony is to provide the Commission with additional information with which to evaluate Mr. Brockett's assertion regarding technical allocation matters and issues that were not referenced, described, or explained in NSP's direct testimony and responses to discovery.

[1] Schedule 12 of Exhibit (AEH-1) and responses to Staff Data Requests NDPSC-1-019, NDPSC-6-016, and NDPSC-11-005. See Exhibit KRP-SD1.

Q. HAVE YOU PREPARED ANY EXHIBITS IN SUPPORT OF YOUR SUPPLEMENTAL TESTIMONY?

A. Yes. I have attached as Exhibit KRP-SD2 a copy of the National Association of Regulatory Utility Commissioners' Electric Utility Cost Allocation Manual, January 1992 (NARUC Manual), to which I refer in my supplemental testimony.

Q. HOW IS YOUR SUPPLEMENTAL TESTIMONY ORGANIZED?

A. My supplemental testimony organized into two sections. In the first section I summarize the full range of accepted methods for allocation of electric production costs and the basis for selection of each method. In the second section I summarize the full range of accepted methods for allocation of electric transmission costs and the basis for selection of each method.

I. SUMMARY OF TESTIMONY

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. There are 13 generally accepted methods for the allocation of electric production costs and 6 generally accepted methods for the allocation of electric transmission costs. The primary factor considered in selection of an allocation method is cost causation as reflected in the planning and operation of an electric utility's production and transmission facilities. The primary drivers/metrics of cost causation on electric production and transmission facilities are demand and energy. Selection of an allocation method consists of determining which method best reflects the utility's actual system planning and operation. My testimony provides explanations and illustrations of each of these points drawn from the NARUC Manual.

II. DISCUSSION

METHODS FOR ALLOCATION OF ELECTRIC PRODUCTION COSTS

Q. FROM A TECHNICAL PERSPECTIVE HOW MANY METHODS ARE THERE FOR ALLOCATING ELECTRIC PRODUCTION COSTS?

A. The goal of cost allocation is accurately to reflect cost responsibility. In the case of jurisdictional cost allocation the goal is accurately to reflect cost responsibility to a utility's regulatory jurisdictions. In theory then, there are as many methods as human ingenuity can devise. As a practical matter, there is general agreement that there are 13 distinct methods, organized into three distinct types that can be used for allocation of electric production costs. There are 5 methods that consider peak demand to be the primary driver of electric production costs. These methods are referred to as Peak Demand Methods.[2] There are 4 methods that consider both peak demand and energy load to be the primary drivers of electric production costs. These methods are referred to as Energy-Weighting Methods.[3] Finally, there are 4 methods that consider peak demand, energy load, and time of day as the primary drivers of electric production costs. These methods are referred to as Time-Differentiated Methods.[4] These 13 methods are summarized in Table 1.

[2] Exhibit KRP-SD2, NARUC Manual at 41-8.
[3] Exhibit KRP-SD2, NARUC Manual at 49-59.
[4] Exhibit KRP-SD2, NARUC Manual at 59--8.

TABLE 1: Production Cost Allocation Methods

Peak Demand Methods	**Energy Weighting Methods**	**Time-Differentiated Methods**
Single Coincident Peak (1CP)	Average and Excess	Production Stacking
Summer and Winter Peak Method	Equivalent Peaker	Base-Intermediate-Peak (BIP)
Twelve Monthly Coincident (12CP)	Base and Peak	LOLP Production Cost
Multiple Coincident Peak	Judgmental Energy Weightings	Probability of Dispatch
All Peak Hours		

Q. WHAT FACTORS SHOULD BE TAKEN INTO ACCOUNT IN SELECTING AN ALLOCATION METHOD?

A. The full range of factors that can be taken into consideration is put succinctly by the NARUC Manual at page 66.

> "the analyst chooses a method after considering many complex factors: (1) the utility's generation system planning and operation; (2) the cost of serving load with new generation or purchased power; (3) the incidence of new load on an annual, monthly and hourly basis; (4) the availability of load and operations data; and (5) the rate design objectives."

As a practical matter, most analysts, utilities, and regulatory commissions consider cost causation as reflected in the way in which the utility constructs and operates its system to be the primary factor. On page 38 the NARUC Manual explains cost causation with regarding electric production costs as follows.

> "Cost causation is a phrase referring to an attempt to determine what, or who, is causing costs to be incurred by the utility. For the generation function, cost causation attempts to determine what influences a utility's production plant investment decisions. Cost causation considers: (1) that utilities add capacity to meet critical system planning reliability criteria such as loss of load probability (LOLP), loss of load hours (LOLH), reserve margin, or expected unserved energy (EUE); and (2) that the utility's energy load or load duration curve is a major indicator of the type of plant needed. The type of plant installed determines the cost of the additional capacity. This approach is well represented among the energy weighting methods of cost allocation."

On page 21 the NARUC Manual explains the drivers or metrics of electric production costs.

> "Costs that are based on the generating capacity of the plant, such as depreciation, debt service and return on investment, are demand-related costs. Other costs, such as cost of fuel and certain operation and maintenance expenses, are directly related to the quantity of energy produced. In addition, capital costs that reduce fuel costs may be classified as energy related rather than demand related. In the case of purchased power, demand charges are normally assumed to be demand related and energy charges are normally assumed to be energy related. Fuel inventory may be either demand or energy related."

Q. WHAT ARE THE METRICS OF DEMAND AND ENERGY USED IN THE VARIOUS PRODUCTION COST ALLOCATION METHODS?

A. All of the various production cost allocation methods use the metrics of demand and/or energy to estimate cost responsibility. They differ only as to (1) whether one or both of the two metrics, demand and energy, are used, (2) how the specific measures of demand and energy used, and (3) the relative weights they give to demand and energy measures. For example, the 1CP method uses only the demand metric, measures demand at the system peak, and as a consequence gives no weight to energy. The Average and Excess method uses both demand and energy metrics, measures demand as non-coincident peak (ncp) demand, measures energy as average demand, and weights them on ncp and average demand.

Q. IN PRACTICE WHAT IS INVOLVED IN SELECTING A PRODUCTION ALLOCATION METHOD FOR A UTILITY'S PRODUCTION COSTS?

A. The selection of an allocation method comes down to determining which method best reflects the utility's actual system planning and operation. That in turn requires analysis of, not how utilities in general plan and operate their systems, but rather how the specific utility

whose production costs are being allocated plans and operates its system. Each of the allocation methods rests on assumptions about how the system is planned and operated. The method whose assumptions best fit the utility's planning and operation is the one that should be selected. For example, the 12CP Method can be said to rest on either of two system planning and operation assumptions: (1) that the utility experiences very little variation in its monthly system peaks and plans and operates its system accordingly or (2) that the utility plans and operates its maintenance activities so as to have equal reliability index values in all months.[5] The Base and Peak Method assumes that the utility decides to build and operate baseload power plants on the difference between on-peak and off-peak energy loads.[6] On the other hand, the Base-Intermediate-Peak (BIP) method assumes that the utility plans and operates its system so as to minimize its production costs.[7]

Q. DO THE DATA REQUIREMENTS OF THE VARIOUS PRODUCTION ALLOCATION METHODS PLAY A ROLE IN THE SELECTION OF A METHOD?

A. Generally, no. If the utility plans and operates production facilities in the manner assumed by a method, the information and data collected and analyzed by the system planners are the same information and data required by the method. General data requirements are discussed on pages 66-7 of the NARUC Manual. Any additional data required for specific methods are found in the NARUC Manuals description and explanation of the specific method.

<u>METHODS FOR ALLOCATION OF ELECTRIC TRANSMISSION COSTS</u>

Q. FROM A TECHNICAL PERSPECTIVE HOW MANY METHODS ARE THERE FOR ALLOCATING ELECTRIC TRANSMISSION COSTS?

[5] Exhibit KRP-SD2, NARUC Manual at 46.
[6] Exhibit KRP-SD2, NARUC Manual at 56.
[7] Exhibit KRP-SD2, NARUC Manual at 60-1.

A. As a practical matter, there is general agreement that there are 6 distinct methods, five of which consider demand to be the primary driver of cost responsibility and one of which considers both demand and energy to be the primary drivers.[8] These 6 methods are summarized in Table 2.

TABLE 2: Transmission Cost Allocation Methods

Peak Demand Methods	**Energy Weighting Methods**
Single Coincident Peak (1CP)	Average and Excess
Average Seasonal System Coincident Peak	
Twelve Monthly Coincident (12CP)	
Single Non-Coincident Peak (NCP) Demand	
Monthly Average NCP Demand	

Q. WHAT FACTORS SHOULD BE TAKEN INTO ACCOUNT IN SELECTING A TRANSMISSION ALLOCATION METHOD?

A. The full range of factors for transmission costs is the same as for production costs. As with production costs most analysts, utilities, and regulatory commissions consider cost causation as reflected in the way in which the utility constructs and operates its system to be the primary factor. As with production costs the primary drivers for transmission costs are demand and energy. [9]

Q. WHAT ARE THE METRICS OF DEMAND AND ENERGY USED IN THE VARIOUS TRANSMISSION COST ALLOCATION METHODS?

[8] Exhibit KRP-SD1, Exhibit KRP-SD2, NARUC Manual at 77-82.
[9] Exhibit KRP-SD2, NARUC Manual at 75.

A. All of the various transmission cost allocation methods use the metric of demand and/or energy to estimate cost responsibility. Unlike production costs, however, there is only one method, Average and Excess, that uses both demand and energy. The other 5 methods use only demand and differ only in how they measure demand. For example, as with production costs, the 1CP method uses only the demand metric and measures demand at the system peak. The Non-Coincident Peak method measures demand as customer, class, or jurisdiction peak demand.

Q. IN PRACTICE WHAT IS INVOLVED IN SELECTING AN ALLOCATION METHOD FOR A UTILITY'S TRANSMISSION COSTS?

A. As with production costs, the selection of an allocation method comes down to determining which method best reflects the utility's actual system planning and operation. That in turn requires analysis of how the specific utility whose transmission costs are being allocated plans and operates its system. For example, the transmission 1CP method assumes that the utility plans and installs its transmission facilities to meet the system peak demand.[10] The transmission 12CP Method rests on either of two planning assumptions: (1) that the transmission system experiences no significant variation in monthly peak demands or (2) that the utility plans and installs transmission facilities so as to maintain reasonably constant level of reliability through the year.[11]

Q. DO THE DATA REQUIREMENTS OF THE VARIOUS TRANSMISSION ALLOCATION METHODS PLAY A ROLE IN THE SELECTION OF A METHOD?

[10] Exhibit KRP-SD2, NARUC Manual at 77.
[11] Exhibit KRP-SD2, NARUC Manual at 79.

A. As with production costs, if the utility plans and installs transmission facilities in the manner assumed by a method, the information and data collected and analyzed by the system planners are the same information and data required by the method.

Q. DO THE DATA REQUIREMENTS OF THE VARIOUS ALLOCATION METHODS PLAY A ROLE IN THE SELECTION OF A METHOD?

A. Generally, no. If the utility plans and operates production facilities in the manner assumed by a method, the information and data collected and analyzed by the system planners are the same information and data required by the method.

Q. DOES THIS CONCLUDE YOUR SUPPLEMENTAL TESTIMONY?

A. Yes.

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A Minnesota Corporation for authority to
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AFFIDAVIT OF
Karl Richard Pavlovic

I, the undersigned, being duly sworn, depose and say that the foregoing is the Supplemental Direct Testimony of the undersigned, and that such Supplemental Direct Testimony and the exhibits or schedules sponsored by me to the best of my knowledge, information and belief, are true, correct, accurate and complete, and I hereby adopt said testimony as if given by me in formal hearing, under oath.

Karl Richard Pavlovic

Subscribed and sworn to before me, this 22nd day of August, 2013

Notary Public

DONNA ANN JEFFRIES
NOTARY PUBLIC DISTRICT OF COLUMBIA
My Commission Expires July 14, 2015