Prefiled Direct Testimony and Exhibits
Dr. Ronald E. White

Before the South Dakota Public Utilities Commission
of the State of South Dakota

In the Matter of the Application of
NorthWestern Corporation, d/b/a NorthWestern Energy

For Authority to Increase Electric Utility Rates
in South Dakota

Docket No. EL14-_____

December 19, 2014

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BEFORE THE
SOUTH DAKOTA PUBLIC UTILITIES COMMISSION

PREPARED DIRECT TESTIMONY OF
DR. RONALD E. WHITE
IN DOCKET NO. _____

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Ronald E. White. My business address is 17595 S. Tamiami Trail, Suite 260, Fort Myers, Florida 33908.

Q. WHAT IS YOUR OCCUPATION?

A. I am Chairman and a Senior Consultant of Foster Associates, Inc.

I. QUALIFICATIONS

Q. WOULD YOU BRIEFLY DESCRIBE YOUR EDUCATIONAL TRAINING AND PROFESSIONAL BACKGROUND?

A. I received a B.S. degree in Engineering Operations and an M.S. degree and Ph.D. (1977) in Engineering Valuation from Iowa State University. I have taught graduate and undergraduate courses in industrial engineering, engineering economics, and engineering valuation at Iowa State University and previously served on the faculty for Depreciation Programs for public utility commissions, companies, and consultants, sponsored by Depreciation Programs, Inc., in cooperation with Western Michigan University. I also conduct courses in depreciation and public utility economics for clients of the firm.

I have prepared and presented a number of papers to professional organizations, committees, and conferences and have published several articles on matters relating to depreciation, valuation and economics. I am a past member of the Board of Directors of the Iowa State Regulatory Conference and an affiliate member of the joint American Gas Association (A.G.A.) – Edison Electric Institute (EEI) Depreciation Accounting Committee, where I previously served as chairman of a standing committee on capital recovery and its effect on corporate economics. I am also a member of the American Economic Association, the Financial Management Association, the

Midwest Finance Association, and a founding member of the Society of Depreciation Professionals.

Q. WHAT IS YOUR PROFESSIONAL EXPERIENCE?

A. I joined the firm of Foster Associates in 1979, as a specialist in depreciation, the economics of capital investment decisions, and cost of capital studies for ratemaking applications. Before joining Foster Associates, I was employed by Northern States Power Company (1968–1979) in various assignments related to finance and treasury activities. As Manager of the Corporate Economics Department, I was responsible for book depreciation studies, studies involving staff assistance from the Corporate Economics Department in evaluating the economics of capital investment decisions, and the development and execution of innovative forms of project financing. As Assistant Treasurer at Northern States, I was responsible for bank relations, cash requirements planning, and short–term borrowings and investments.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE A REGULATORY BODY?

A. Yes. I have testified in numerous proceedings before administrative and judicial bodies in over thirty jurisdictions, including South Dakota. I have also testified before the Federal Energy Regulatory Commission, the Federal Power Commission, the Alberta Energy Board, the Ontario Energy Board, and the Securities and Exchange Commission. I have sponsored position statements before the Federal Communication Commission and numerous local franchising authorities in matters relating to the regulation of telephone and cable television.

II. PURPOSE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. Foster Associates was engaged by NorthWestern Energy (NorthWestern) to prepare a 2014 technical update of a 2012 depreciation study conducted by Foster Associates for NorthWestern's South Dakota electric, gas and common operations. The purpose of my testimony is to sponsor and describe the 2012 study and 2014 electric update. Depreciation rates currently used by NorthWestern for electric and common plant

were developed in the 2012 study and implemented during the second quarter of 2013. The 2012 study was provided to the Commission on July 7, 2013 with notification of implementation provided in 2013 Info EL03.

III. Identification of Exhibits

Q. DO YOU SPONSOR ANY EXHIBITS IN SUPPORT OF YOUR TESTIMONY?

A. Yes. A more detailed description of my professional qualifications is provided in Exhibit REW–1. I also sponsor Exhibit REW–2, a document titled "2012 Depreciation Rate Study" and Exhibit REW–3 titled "2014 Technical Update." These documents were prepared by me or under my direction and supervision.

IV. Development of Depreciation Rates

Q. WHY ARE DEPRECIATION STUDIES NEEDED FOR ACCOUNTING AND RATEMAKING PURPOSES?

A. The goal of depreciation accounting is to charge to operations a reasonable estimate of the cost of the service potential of an asset (or group of assets) consumed during an accounting interval. A number of depreciation systems have been developed to achieve this objective, most of which employ time as the apportionment base.

Implementation of a time–based (or age–life) system of depreciation accounting requires the estimation of several parameters or statistics related to a plant account. The average service life of a vintage, for example, is a statistic that will not be known with certainty until all units from the original placement have been retired from service. A vintage average service life, therefore, must be estimated initially and periodically revised as indications of the eventual average service life become more certain. Future net salvage rates and projection curves, which describe the expected distribution of retirements over time, are also estimated parameters of a depreciation system that are subject to future revisions. Depreciation studies should be conducted periodically to assess the continuing reasonableness of parameters and accrual rates derived from prior estimates.

The need for periodic depreciation studies is also a derivative of the ratemaking process that establishes prices for utility services based on costs. Absent regulation, deficient or excessive depreciation rates will produce no adverse consequence other than a systematic over or understatement of the accounting measurement of earnings. While a continuance of such practices may not comport with the goals of depreciation accounting, the achievement of capital recovery is not dependent upon either the amount or the timing of depreciation expense for an unregulated firm. In the case of a regulated utility, however, recovery of investor–supplied capital is dependent upon allowed revenues, which are in turn dependent upon approved levels of depreciation expense. Periodic reviews of depreciation rates are, therefore, essential to the achievement of timely capital recovery for a regulated utility.

Q. WHAT ARE THE PRINCIPAL ACTIVITIES UNDERTAKEN IN CONDUCTING A FULL DEPRECIATION STUDY?

A. The first step in conducting a depreciation study is the collection of plant accounting data needed to conduct a statistical analysis of past retirement experience. Data are also collected to permit an analysis of the relationship between retirements and realized gross salvage and removal expense. The data collection phase should include a verification of the accuracy of the plant accounting records and a reconciliation of the assembled data to the official plant records of the company.

The next step in a depreciation study is the estimation of service life statistics from an analysis of past retirement experience. The term *life analysis* is used to describe the activities undertaken in this step to obtain a mathematical description of the forces of retirement acting upon a plant category. The mathematical expressions used to describe these forces are known as survival functions or survivor curves.

Life indications obtained from an analysis of past retirement experience are blended with expectations about the future to obtain an appropriate projection life curve. This step, called *life estimation,* is concerned with predicting the expected remaining life of property units still exposed to the forces of retirement. The amount of weight given to the analysis of historical data will depend upon the extent to which past retirement experience is considered descriptive of the future.

An estimate of the net salvage rate applicable to future retirements is usually obtained from an analysis of the gross salvage and removal expense realized in the past. An analysis of past experience (including an examination of trends over time) provides a baseline for estimating future salvage and cost of removal. Consideration, however, should be given to events that may cause deviations from the net salvage realized in the past. Among the factors that should be considered are the age of plant retirements, the portion of retirements that will be reused, changes in the method of removing plant, the type of plant to be retired in the future, inflation expectations, the shape of the projection life curve, and economic conditions that may warrant greater or lesser weight to be given to the net salvage observed in the past.

A comprehensive depreciation study will also include an analysis of the adequacy of the recorded depreciation reserve. The purpose of such an analysis is to compare the current balance in the recorded reserve with the balance required to achieve the goals and objectives of depreciation accounting if the amount and timing of future retirements and net salvage are realized exactly as predicted. The difference between the required (or theoretical) reserve and the recorded reserve provides a measurement of the expected excess or shortfall that will remain in the depreciation reserve if corrective action is not taken to extinguish the reserve imbalance.

Although reserve records are typically maintained by various account classifications, the total reserve for a company is the most important reflection of the company's depreciation practices. Differences between the theoretical reserve and the recorded reserve will arise as a normal occurrence when service lives, dispersion patterns and salvage estimates are adjusted in the course of depreciation reviews. Differences will also arise due to plant accounting activity such as transfers and adjustments, which require an identification of reserves at a different level from that maintained in the accounting system. It is appropriate, therefore, and consistent with group depreciation theory, to periodically redistribute recorded reserves among primary accounts based on the most recent estimates of retirement dispersion and salvage. A redistribution of the recorded reserve will provide an initial reserve balance for each primary account consistent with the estimates of retirement dispersion se-

lected to describe mortality characteristics of the accounts and establish a baseline against which future comparisons can be made.

Finally, parameters estimated from service life and net salvage studies are integrated into an appropriate formulation of an accrual rate based upon a selected depreciation system. Three elements are needed to describe a depreciation system. These elements (*i.e.*, method, procedure and technique) can be visualized as three dimensions of a cube in which each face describes a variety of sub–elements that can be combined to form a system. A depreciation system is therefore formed by selecting a sub–element from each face such that the system contains one method, one procedure and one technique. The sub–elements most widely used in constructing a depreciation system are shown in Table 1 below.

Methods	Procedures	Techniques
Retirement	Total Company	Whole-Life
Compound-Interest	Broad Group	Remaining-Life
Sinking-Fund	Vintage Group	Probable-Life
Straight-Line	Equal-Life Group	
Declining Balance	Unit Summation	
Sum-of-Years'-Digits	Item	
Expensing		
Unit-of-Production		
Net Revenue		

Table 1. Elements of a Depreciation System

V. 2012 DEPRECIATION STUDY

Q. DID NORTHWESTERN PROVIDE FOSTER ASSOCIATES PLANT ACCOUNTING DATA FOR CONDUCTING THE 2012 DEPRECIATION STUDY?

A. Yes. Accounting transactions used in the 2012 study were assembled by NorthWestern and provided to Foster Associates in Excel spreadsheets. The SAP fixed asset system used by NorthWestern was converted to PowerPlant in September 2011 and uploaded with opening age distributions at January 1, 2010. Transactions over the period 2006 through August 2011 were extracted from the SAP system and appended to the database used in conducting a 2006 study. Transactions over the period September 2011 through December 2011 were extracted from PowerPlant. The accuracy and

completeness of the appended data was verified by Foster Associates for activity years 2006 through 2011 by comparing beginning plant balances, additions, retirements, transfers and adjustments, and ending plant balances to the official plant records of the Company.

Q. DID FOSTER ASSOCIATES CONDUCT STATISTICAL LIFE STUDIES FOR NORTHWESTERN PLANT AND EQUIPMENT?

A. Yes. As discussed in Exhibit REW–2, all plant accounts (with the exception of steam production) were analyzed using a technique in which first, second and third degree orthogonal polynomials were fitted to a set of observed retirement ratios. The resulting functions were expressed as survivorship functions and numerically integrated to obtain an estimate of the projection life of a plant category. The smoothed survivorship function was then fitted by a weighted least–squares procedure to the Iowa–curve family to obtain a mathematical description or classification of the dispersion characteristics of the data. Service life indications derived from the statistical analyses were blended with informed judgment and expectations about the future to obtain an appropriate projection life and curve for each plant category. Steam production accounts were identified by location and treated as life–span categories in the 2012 study.

Q. DID FOSTER ASSOCIATES CONDUCT A NET SALVAGE ANALYSIS IN ESTIMATING DEPRECIATION RATES FOR NORTHWESTERN PLANT AND EQUIPMENT?

A. Yes. Five–year moving averages of the ratio of realized salvage and cost of removal to the associated retirements were used in the 2012 study to a) estimate realized net salvage rates; b) detect the emergence of historical trends; and c) establish a basis for estimating future net salvage rates. Cost of removal and salvage opinions obtained from NorthWestern personnel were blended with judgment and historical net salvage indications in developing estimates of the future.

Consideration was also given in the 2012 study to the cost of dismantling the Big Stone and Coyote generating stations. The projected cost of dismantling these

facilities was estimated in a demolition study commissioned by the co–owners in 2008.

Average net salvage rates for an account or plant function are derived from a direct dollar weighting of a) historical retirements with historical (or realized) net salvage rates and b) future retirements *(i.e.*, surviving plant) with the estimated future net salvage rate.

Q. DID FOSTER ASSOCIATES CONDUCT AN ANALYSIS OF RECORDED DEPRECIATION RESERVES?

A. Yes. Statement C (page 23) of Exhibit REW–2 provides a comparison of computed and recorded reserves for South Dakota Electric Operations at December 31, 2011. The recorded reserve was $250,037,802 or 54.6 percent of the depreciable plant investment. The corresponding computed reserve was $231,386,187 or 50.1 percent of the depreciable plant investment. A proportionate amount of the measured reserve excess of $18,651,616 will be amortized over the composite weighted–average remaining life of each rate category using the remaining life depreciation rates proposed in the study.

Q. DID FOSTER ASSOCIATES RECOMMEND A REBALANCING OF DEPRECIATION RESERVES IN THE 2012 STUDY?

A. Yes. A redistribution of recorded reserves was considered appropriate for NorthWestern. Offsetting reserve imbalances attributable to both the passage of time and parameter adjustments recommended in the 2012 study were realigned among primary accounts to reduce offsetting imbalances and increase depreciation rate stability.

A redistribution of the recorded reserve for depreciable plant was achieved by multiplying the calculated reserve for each primary account within a function (or plant location) by the ratio of the function (or location) total recorded reserve to the function (or location) total calculated reserve. The sum of the redistributed reserves within a function (or location) is, therefore, equal to the function (or location) total recorded depreciation reserve before the redistribution. Redistributed reserves for amortizable categories were obtained by setting redistributed reserves equal to com-

puted reserves and distributing differences between recorded and computed reserves to associated depreciable categories.

Q. DID FOSTER ASSOCIATES RECOMMEND A CHANGE IN THE DEPRECIATION SYSTEM USED BY NORTHWESTERN?

A. No. Depreciation rates recommended in the 2012 study were developed using the currently approved system. It is the opinion of Foster Associates that this system will remain appropriate for NorthWestern, provided depreciation studies are conducted periodically and parameters are routinely adjusted to reflect changing operating conditions. It is also the opinion of Foster Associates that amortization accounting currently approved for selected general support asset accounts is consistent with the goals and objectives of depreciation accounting and remains appropriate for these plant categories.

Q. HOW DID DEPRECIATION RATES AND ACCRUALS DEVELOPED IN THE 2012 STUDY COMPARE WITH PREVIOUSLY APPROVED RATES AND ACCRUALS?

A. Table 2 below provides a summary of the changes in annual rates and accruals resulting from an application of the parameters and depreciation system recommended for the NorthWestern's South Dakota Electric Operations.

	Accrual Rate			2012 Annualized Accrual		
Function	Current	Proposed	Difference	Current	Proposed	Difference
A	B	C	D=C-B	E	F	G=F-E
Steam Production	3.86%	1.46%	-2.40%	$5,125,151	$1,943,983	($3,181,168)
Other Production	3.24%	1.88%	-1.36%	904,308	523,220	(381,088)
Transmission	3.10%	3.26%	0.16%	3,327,461	3,493,753	166,292
Distribution	3.66%	3.74%	0.08%	6,492,535	6,634,211	141,676
General Plant	6.87%	6.29%	-0.58%	837,521	767,430	(70,091)
Total	3.65%	2.92%	-0.73%	$16,686,976	$13,362,597	($3,324,379)

Table 2. South Dakota Electric Operations

The composite accrual rate recommended for electric operations was 2.92 percent. The previous equivalent rate was 3.65 percent. The recommended change in the composite rate was a reduction of 0.73 percentage points.

A continued application of previously approved rates would provide annualized depreciation expense of $16,686,976 compared with an annualized expense of $13,362,597 using the proposed rates. The resulting 2012 expense reduction was $3,324,379. The computed change in the annualized accrual includes $986,633 attributable to an amortization of a $18,651,616 reserve excess. The remaining portion of the change is attributable to adjustments in service life parameters recommended in the 2012 study.

VI. 2014 TECHNICAL UPDATE

Q. PLEASE DESCRIBE THE SCOPE OF A TECHNICAL UPDATE.

A. Unlike a full depreciation study in which projection curves, projection lives and future net salvage rates are estimated from a statistical analysis of recorded retirements and net salvage realized in the past, a technical update generally retains the parameters currently used or proposed by the utility and adjusts depreciation rates for known and measurable changes in the age distributions of surviving plant, depreciation reserves, and average net salvage rates due to the passage of time. A technical update, therefore, is intended to align depreciation rates with the accounting year the rates will become effective. The steps involved in preparing a technical update generally include a) data collection; b) calculation of service life statistics; c) computation of average net salvage rates; d) rebalancing of depreciation reserves; and e) development of accrual rates.

Q. WAS THE SCOPE OF THE 2014 UPDATE EXPANDED IN ANY MANNER FROM A CONVENTIONAL TECHNICAL UPDATE?

A. Yes. The NorthWestern update was expanded to align parameters for steam production plants with parameters used by the operator of co-owned facilities. The following adjustments are included in the 2014 update:

1. Extended the estimated year of final retirement for the Big Stone plant to 2046 from 2027 as approved by the Minnesota Public Utilities Commission for Otter Tail Power Company.

2. Extended the estimated year of final retirement for the Coyote plant to 2041 from 2032 as approved by the Minnesota Public Utilities Commission for Otter Tail Power Company.

3. Updated future net salvage rates for Big Stone and Coyote to incorporate terminal dismantlement costs estimated in a 2013 demolition study commissioned by Otter Tail Power Company and approved by the Minnesota Public Utilities Commission.

4. Adjusted final net salvage rates for the Neal plant to correspond with future net salvage rates adopted by MidAmerican Energy Company.

Q. DID NORTHWESTERN PROVIDE FOSTER ASSOCIATES PLANT ACCOUNTING DATA FOR CONDUCTING THE 2014 TECHNICAL UPDATE?

A. Yes. Plant accounting and depreciation reserve transactions recorded over the period 2012–2013 and age distributions of surviving plant at December 31, 2013 were provided to Foster Associates in an electronic format and appended to the database used in conducting the 2012 study. The accuracy and completeness of the assembled data base was validated for activity year 2012 and 2013 by comparing the beginning plant balance, additions, retirements, transfers and adjustments, and the ending plant balance derived for each rate category to the official plant records of the Company. Derived age distributions at December 31, 2013 were also reconciled to the continuing property records of NorthWestern. Annual plant activity prior to 2012 was reconciled in the 2012 depreciation rate study.

Q. DID FOSTER ASSOCIATES CALCULATE SERVICE LIFE STATISTICS IN THE 2014 TECHNICAL UPDATE?

A. Yes. The scope of the update and calculations performed by Foster Associates are described in the Technical Update Procedure section of Exhibit REW–3.

Q. DID FOSTER ASSOCIATES DERIVE AVERAGE NET SALVAGE RATES IN THE 2014 UPDATE?

A. Yes. The average net salvage rate for an account or plant function is derived from a direct dollar weighting of a) historical retirements with historical (or realized) net salvage rates and b) future retirements *(i.e.*, surviving plant) with the estimated future

net salvage rate. Average net salvage rates will change as additional years of retirement and net salvage activity become available and as subsequent plant additions alter the weighting of future net salvage estimates.

Q. DID FOSTER ASSOCIATES REBALANCE DEPRECIATION RESERVES IN THE 2014 UPDATE?

A. Yes. A rebalancing of recorded reserves is consistent with the objectives of a technical update and is considered appropriate for NorthWestern. The rebalancing of reserves provided in the 2014 update will help to stabilize depreciation rates and preserve consistency between measured reserve imbalances and the parameters used in the formulation of updated remaining–life accrual rates.

A redistribution of the recorded reserve was achieved by multiplying the calculated reserve for each primary account within a function (or plant location) by the ratio of the function (or location) total recorded reserve to the function (or location) total calculated reserve. The sum of the redistributed reserves within a function (or location) is, therefore, equal to the function (or location) total recorded depreciation reserve before the redistribution.

Q. HOW DO DEPRECIATION RATES AND ACCRUALS DERIVED IN THE UPDATE COMPARE WITH CURRENTLY APPROVED RATES AND ACCRUALS?

A. Table 3 below provides a summary of the changes in annual rates and accruals resulting from the 2014 update. With the exception of amortization accounts, current and proposed rates have been developed to provide an allowance for net salvage.

	Accrual Rate			2014 Annualized Accrual		
Function	2012 Study	Update	Difference	2012 Study	Update	Difference
A	B	C	D=C-B	E	F	G=F-E
Steam Production	1.29%	1.55%	0.26%	$ 2,120,946	$ 2,556,116	$ 435,170
Other Production	1.79%	2.39%	0.60%	1,376,360	1,842,654	466,294
Transmission	3.22%	3.22%	0.00%	4,099,015	4,096,233	(2,782)
Distribution	3.71%	3.69%	-0.02%	7,213,627	7,173,944	(39,683)
General Plant	6.63%	6.24%	-0.39%	965,227	908,642	(56,585)
Total Utility	2.73%	2.87%	0.14%	$ 15,775,175	$ 16,577,589	$ 802,414

Table 3. 2012 Study vs 2014 Update

The 2014 update produces primary account depreciation rates equivalent to a composite rate of 2.87 percent. The 2012 study produced accrual rates that composite to 2.73 percent. The change in the composite depreciation rate is, therefore, an increase of 0.14 percentage points.

An application of rates developed in the 2012 study would provide annualized depreciation expense of $15,775,175 compared with an annualized expense of $16,577,589 using the rates developed in the 2014 update. The 2014 expense increase is $802,414. The computed change in annualized accruals includes a reduction of $837,383 attributable to an amortization of a $27,426,820 reserve imbalance.

Q. WHY ARE CURRENT RATES DISPLAYED IN COLUMN B OF TABLE 3 (THE 2014 UPDATE) DIFFERENT FROM PROPOSED RATES DISPLAYED IN COLUMN C OF TABLE 2 (THE 2012 STUDY)?

A. The difference is attributable to compositing primary account accrual rates (for summary purposes) at the function level. It can be observed from a comparison of Statement A (page 18) of the 2012 study and Statement A (page 8) of the 2014 update that primary account accrual rates recommended in the 2012 study are those displayed as current rates in the 2014 update. The difference in the weighted average rates at the function level is attributable to the weights (*i.e.*, primary account plant balances) that have changed over the intervening years between 2011 and 2013.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes, it does.