Before the North Dakota Public Service Commission

State of North Dakota

In the Matter of the Application of

Northern States Power Company – North Dakota

a Division of Xcel Energy

For Authority to Establish Increased Rates for

Electric Service

Case No. PU-20-441

Direct Testimony of James Garren

April 23, 2021

89 PU-20-441 Filed 04/23/2021 Pages: 24
Prefiled Direct Testimony of James Garren and Exhibits
Public Service Commission Advocacy Staff
Mitch Armstrong, Advocacy Staff Counsel

DIRECT TESTIMONY AND EXHIBITS
OF JAMES S. GARREN

INTRODUCTION

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

A. My name is James S. Garren. I am an analyst with the economic consulting firm of Snavely King Majoros & Associates, Inc. ("Snavely King").

Q. HAVE YOU PREPARED A SUMMARY OF YOUR QUALIFICATIONS AND EXPERIENCE?

A. Yes. Attachment A is a summary of my qualifications and experience.

Q. Q. PLEASE DESCRIBE YOUR BACKGROUND IN UTILITY DEPRECIATION.

A. Since my employment at Snavely King in 2010, I have participated as an analyst in approximately 30 separate depreciation studies of electric, gas and water utilities on behalf of the firm's clients, most of which are state commissions or state-funded consumer advocate agencies. In that role, I have worked closely with the firm's principals in performing life and net salvage analyses, calculation of depreciation rates, and preparation of testimony. Additionally, I am familiar with the firm's proprietary depreciation software, the Snavely Comprehensive Investment Analysis System ("**SCIAS**"). I am also recognized as a Certified Depreciation Professional by the Society of Depreciation Professionals.[1]

Q. FOR WHOM ARE YOU APPEARING IN THIS PROCEEDING?

A. I am appearing on behalf of the North Dakota Public Service Commission Advocacy Staff. ("PSC")

Q. WHAT IS THE OBJECTIVE OF YOUR TESTIMONY?

A. The purpose of my testimony is to review and assess the proposed depreciation rates and expenses of Northern States Power in this case. The Company has filed direct testimony from Mr. Moeller in which he proposed depreciation rates and expenses for production, transmission, distribution and general. I am proposing adjustments to these rates based on an independent study of service lives.

Q. ARE YOU SPONSORING ANY EXHIBITS IN CONJUNCTION WITH THIS TESTIMONY?

A. Yes, I am sponsoring two exhibits.

Exhibit JSG-1, Calculation of depreciation rates and accruals

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[1] 1 "The Society of Depreciation Professionals was organized in 1987 to recognize the professional field of depreciation analysis and individuals contributing to this field; to promote the professional development and professional ethics of practitioners in the field of depreciation analysis; to collect and exchange information about depreciation analysis; and to provide a national forum of programs and publications concerning depreciation." http://www.depr.org/?page=AboutUs . For certification, an applicant must have at least 5 years of full time professional depreciation experience, at least 2 years of which must be in the area of depreciation administration. Among other requirements, the applicant must pass a two part (Technical and Ethics) closed book examination which includes questions about, *inter alia,* Plant and Reserve Accounting, Life Analysis Concepts, Life Analysis Using Actuarial Models, Life Analysis Using Simulation Models, Salvage and Cost of Retiring Analysis, Technology Forecasting and Depreciation Calculations." http://www.depr.org/?page=Certification

Exhibit JSG-2: Life Analysis

Q. WHAT IS THE RESULT OF YOUR PROPOSED DEPRECIATION PARAMETERS?

A. Depreciation accruals based on my proposed depreciation parameters produce a depreciation expense of $215.5 million, which is a $4.4 million reduction from the $219.1 million depreciation expense listed by the Company. These amounts are based on the current and proposed parameters calculated on a January 1, 2020 plant balance. This total expense adjustment is based on individual adjustments I have made on four accounts, two transmission accounts, 352.00 Structures and Improvements, 353.00 Station Equipment, 364 Poles Towers and Fixtures, and 369.01 Services, Overhead. The impact on depreciation expense of each of these adjustments is shown in the table below.

TABLE 1
Summary of Depreciation Rates and Expenses
($) in millions
Based on December 31, 2020 Plant Balances

	Company Proposed		Garren Proposed		Difference
	Life/Curve	Expense	Life/Curve	Expense	Expense
352.00	70-R5	$1,831,898	80-R4	$1,544,152	$287,746
353.00	56-R2	$25,762,300	60-R1.5	$22.599,402	$3,162,898
364.00	47-R1	$729,914	60-S3	$581,482	$148,432
369.10	42-R1.5	$250,557	52-R3	$197,619	$52,938

The Jurisdictional allocation for Transmission is 5.1744% for Transmission, which means that the adjustment to the depreciation expense for transmission in North Dakota is $178,548.5. This makes the total revenue requirement adjustment to depreciation expense $379,918.5 after allocating the transmission expense adjustment.

SUMMARY

Q. WHAT INFORMATION HAVE YOU REVIEWED IN PREPARATION FOR THIS TESTIMONY?

A. Having reviewed both Mr. Moeller's testimony as well as the Company's 2017 depreciation study, prepared by Mr. Watson. Based on my review of both, I prepared numerous data requests which the PSC Staff propounded to NSP. I have now had the opportunity to review the Company's responses to these data requests as well as the documents attached to the Company's filing. NSP's responses to these data requests provided the data used by Mr. Watson to prepare his depreciation study. Utilizing this data and applying my own analysis, I have proposed adjustments to the depreciation rates and accruals utilized for plant depreciation.

DEPRECIATION – GENERAL

Q. WHAT IS DEPRECIATION?

A. In 1958, the National Association of Regulatory Utility Commissioners ("NARUC") sanctioned the following definition of depreciation: "Depreciation," as applied to depreciable utility plant, means the loss in service value not restored by current maintenance, incurred in connection with the consumption or prospective retirement of utility plant in the course of service from causes which are known to be in current operation and against which the utility is not protected by insurance. Among the causes to be given consideration are wear and tear, decay, action of elements, inadequacy, obsolescence, changes in the art, changes in demand, and requirements of public authorities.[2] Another commonly cited definition of depreciation is that of the American Institute of Certified Public Accountants[3]:

> Depreciation accounting is a system of accounting which aims to distribute the cost or other basic value of tangible capital assets, less salvage (if any) over the estimated useful life of the unit (which may be a group of assets) in a systematic and rational manner. It is a process of allocation, not of valuation. Depreciation for the year is the portion of the total charge under such a system that is allocated to the year. Although the allocation may properly take into account occurrences during the year, it is not intended to be a measurement of the effect of all such occurrences.

In short, depreciation is the process of recovering the initial investment in tangible capital assets in a systematic fashion over the useful service life of the plant, recognizing that utility plant is typically a group of investments.

Q. CAN DEPRECIATION BE CALCULATED WITH PRECISION?

A. No, but to ensure that the analysis is as accurate as is reasonably possible, it requires the knowledge and informed judgment of an expert trained in the field of utility depreciation. The judgment pertains to the estimation of the future surviving life of plant as indicated by past patterns of retirements, industry trends, and corporate investment plans.

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[2] *Uniform System of Accounts for Class A and Class B Electric Utilities,* 1958, rev. 1962.
[3] American Institute of Certified Public Accountants, *Accounting Research and Terminology Bulletin #1.*

Q. HOW DOES THIS JUDGMENTAL CHARACTERISTIC OF DEPRECIATION ACCOUNTING INFLUENCE THE COMMISSION'S APPROACH TO THESE SUBJECTS?

A. The Commission must recognize that the development of depreciation and rates is not a refined science subject to mathematical precision. Because depreciation analysts use judgment in their estimation of depreciation, the Commission must necessarily exercise its own judgment, based on the analyses and evidence before it, in assessing the rationale and data that underlie alternative depreciation rates.

Q. WHAT ARE THE BASIC PARAMETERS REQUIRED TO DEVELOP A DEPRECIATION RATE?

A. At its simplest level, the only parameter that is absolutely required is an estimate of the service life of the asset being retired. The reciprocal of that number can be used as the depreciation rate. However, because most utility depreciation is applied to accounts that are *groups* of assets which have varying lives, virtually all utilities use "remaining life" depreciation. This procedure computes the depreciation rate by dividing the unrecovered net investment by the estimated remaining years of the asset's (or group of assets') service life. It is intended to ensure that any past under- or over-accruals of depreciation are recovered during the remaining life of the asset.

The remaining life procedure requires an estimate of the dispersion of retirements around an average service life. In the electric utility industry, this dispersion is usually described in terms of "Iowa Curves," so named because they were developed at Iowa State

University. These curves describe how closely the retirements are grouped around the average service life and whether they tend to occur more rapidly before, after or coincident with the average service life.[4] I discuss Iowa curves in more detail in a later section of this testimony.

Q. PLEASE ILLUSTRATE HOW THE PARAMETERS YOU HAVE JUST DESCRIBED ARE USED TO DEVELOP DEPRECIATON RATES.

A. Beginning with the simplest example, assume a single asset with a 20 year life[5] Its depreciation rate is the reciprocal of 20:

$$1/20 = 5\%$$

Now, let us assume that the asset is expected to have salvage value equivalent to 5 percent of its investment value. The depreciation rate declines:

$$\frac{1-.05}{20} = \frac{.95}{20} = 4.75\%$$

This is called a "whole life" rate because it is based on the whole life of 20 years. To develop the remaining life rate, we must identify some additional items of data: the original cost of the asset, the depreciation reserve (the amount of depreciation that has already been recovered), and the remaining life of the asset.

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[4] For a complete discussion of Iowa Curves, see Appendix A, part 3 of *Public Utility Depreciation Practices*, National Association of Regulatory Utility Commissioners, August 1996.

[5] This example is only to illustrate *basic principles*. As I explain in the next section, there are primarily *groups* of assets rather than a single asset, with each asset group assigned to an account. Thus, this example is not illustrative of how depreciation is actually calculated in current practice.

In this illustration, let us assume that the asset originally cost $1 million and that past depreciation charges have recovered $400,000. This means that we have yet to recover $600,000 in original cost less 5 percent positive salvage, or $50,000. The total amount yet to be recovered is thus $550,000. Let us further assume that the asset is 10 years old, leaving 10 years of remaining life. In remaining life depreciation, the unrecovered amount is divided by the remaining life:

$$\frac{\$550{,}000}{10 \text{ years}} = \$55{,}000 \text{ required annual accrual}$$

The depreciation rate is then calculated by dividing the annual amount to be recovered by the gross investment, in this case:

$$\$55{,}000 / \$1{,}000{,}000 = 5.5\%$$

<u>DISCUSSION OF SERVICE LIVES</u>

Q. PLEASE DEFINE "AVERAGE SERVICE LIFE" AS IT IS USED IN UTILITY DEPRECIATION CALCULATIONS?

A. The "average service life" for a given account is a projection of the number years that a new unit of plant can be expected to remain used and useful on average. This concept is useful because modern depreciation utilizes what we call "group depreciation". That is, rather than depreciate the value of an individual unit or units over the lifetime of those units, we depreciate the value of a collection of units all together. This group depreciation assumes that many units in each account will be retired at earlier ages, and thus have a shorter than average life, and many units will retire at later ages, and thus have a longer than average life. Average service life is used to calculate the average remaining life, which, in turn, is the denominator in the calculation of depreciation expense. Group depreciation is also why we do not study the lives of units in an account, but rather, the lives of dollars in these accounts. Therefore, all else being equal, a longer average service life directly results in a lower depreciation expense.

Q. **DO THE LENGTH OF SURVICE LIVES OF PLANT AFFECT WHAT RATEPAYERS ARE OBLIGATED TO PAY TO UTILITY COMPANIES?**

A. Yes. As I go through the analysis below, it is important for the Commission to remember that, all else held constant, shorter service life estimates result in higher depreciation rates and expense for customers.

Q. PLEASE DESCRIBE THE PROPER WAY TO DETERMINE THE AVERAGE SERVICE LIFE COMPONENT OF DEPRECIATION RATES.

A. I have analyzed NSP's distribution accounts using an actuarial life analysis process called the Retirement Rate method. Actuarial methodologies were developed initially in the 17th and 18th centuries, primarily by life insurance companies that needed mathematical means of estimating the mortality risk of individuals over a long period of time. This resulted in the development of "life tables," which show the mortality risk of a group of individuals with similar risk factors at each age.

The Retirement Rate method is an actuarial technique used to study plant lives, much like the actuarial techniques used in the insurance industry to study human lives. It requires a record of the dates of placement (birth) and retirement (death) for each asset unit studied. Retirement data that contains this date of placement and retirement is referred to as "aged data" because it tells the analyst the age of the plant at the time it was retired. The Retirement Rate method is the most sophisticated of the statistical life analysis methods because it relies on the most refined level of data.

In the Retirement Rate method, aged retirement data as described above, and total plant in service at a given age (referred to collectively as "exposures") from a company's records are used to construct an observed or original life table. I discuss the composition of an observed life table in detail below. These tables are important because they result in data points showing the percentage of a given unit of plant that is expected to survive to a given age. The actuarial analysis smooths and extends the observed life table by fitting it to a family of 31 standardized survivor curves ("Iowa curves"). The curve-fitting uses the least squared differences approach to find a best fit life for each curve. The "sum of least squared difference" is a common means of fitting curves (in this case the Iowa curves) to a set of data (in this case the observed life table data). The difference between each point of data and a point on a line is squared,[6] and the square of all those differences is summed to provide the total difference between the set of data and the line. The line that produces the least difference from the set of data is considered the "best fit." The purpose of squaring the difference is to ensure that negative differences contribute to the overall difference rather than canceling out positive differences.

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[6] "Square" in mathematics means you multiply a quantity by itself. This quantity can be a number, variable or even an algebraic expression. When you square a number, the answer will always be positive; thus, the product of a negative number multiplied by another negative number equals a positive number. Squaring is the same as raising to the power 2, and is denoted by a superscript 2; for instance, the square of 3 may be written as 3^2, which is the number 9.

Numerous iterative calculations are required for a Retirement Rate analysis. In the end, the analysis produces a life and Iowa curve best fit for a single average vintage.

Q. WHAT ARE IOWA CURVES?

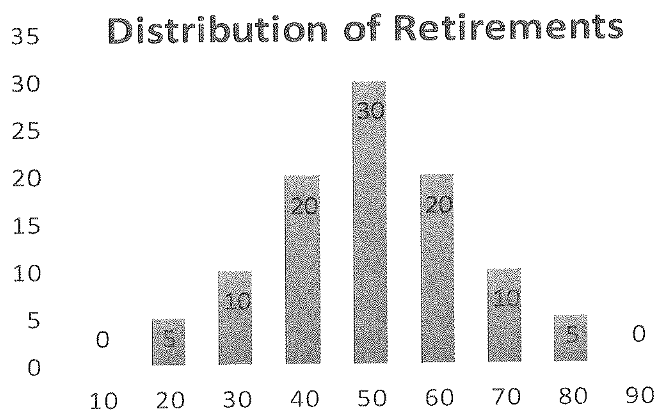
A. An "observed life table" is a table listing the percent surviving (in other words, the "observed life") of a common class of assets, as of a particular calendar year. An Iowa curve is a surrogate or standardized "observed life table" based on a specific pattern of retirements around an average service life. The Iowa curves were devised over 60 years ago at Iowa State University. The curves provide a set of standard patterns of retirement dispersion. Retirement dispersion merely recognizes that accounts are comprised of individual assets or units having different lives. Each curve represents a probability distribution and has a series of attributes. The curves are helpful in a variety of ways, including:

- To make realistic forecasts of the remaining useful life of groups of assets.
- To assist in anticipating the potential failure and functional failure of assets.

For example, imagine an account that begins with a new addition of one hundred units. These units are unlikely to all retire at the same time. Rather, different units within the group will retire at different times. Represented graphically, the result might appear as follows:

Graph JSG-1

Age:	Units Retired
10	0
20	5
30	10
40	20
50	30
60	20
70	10
80	5
90	0

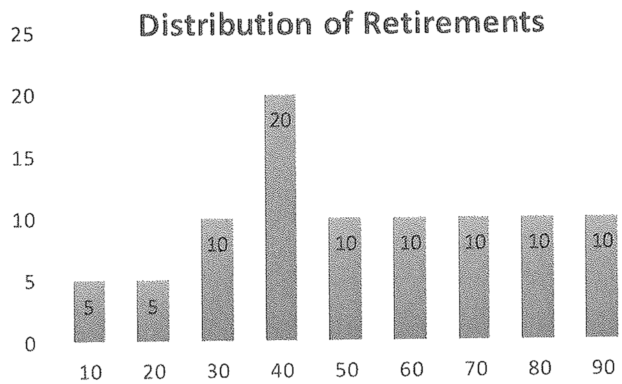


In this example, the average service life would be fifty, and the retirement dispersion curve would tell us how the retirements are arranged around the average service life. As well, the distribution of retirements around the average service life is symmetrical, with the "mode" – that is, the age with the highest number of retirements -- being at the average service life. In this data, the retirements are also relatively tightly grouped around the average service life.

Iowa curves describe many different patterns of dispersions. Returning to our example, imagine a different pattern of retirements as follows:

Graph JSG-2

Age:	Units Retired
10	5
20	5
30	10
40	20
50	10
60	10
70	10
80	10
90	10



In this example, the average service life is still fifty, but the dispersion characteristics are very different. The mode (again, the highest number of retirements) is at age 40, which is an earlier age than the average, and overall the distribution of retirements is more spread out than in the previous example. By using different types of Iowa curves, I can capture these different characteristics that can be seen in retirement data.

One way that Iowa curves illustrate these different patterns is by their orientation as left-skewed ("L curves"), symmetrical ("S curves") or right-skewed curves ("R curves"). The letters describe the location of the "mode," as discussed above, relative to the average service life. Hence, in the first example, I would use an "S curve" because the number of retirements are relatively equal on both sides of the mode. In the second example, however, in which the mode falls <u>before</u> the average service life (that is, the mode falls at a younger age than the average service life), I would use an "L curve." If the mode were to fall after the average service life, then I would use an "R curve."[7]

In addition to the letter that describes the location of the mode (e.g. L curve), Iowa curves are numbered zero (0) through six (6), which identifies the spread of the retirement dispersion. Lower numbers represent a wider retirement dispersion while higher numbers represent a narrower dispersion. Referring to the first example above, in which the retirements were more tightly grouped around the average service life, a higher number would be used, whereas in the second example, in which the retirements were more diffuse, a lower number would be used.

To combine these two concepts, an appropriate Iowa curve for the first example might be an S5, where the "S" indicates a symmetrical curve to either side of the mode and the 5 indicates a relatively narrow dispersion of retirements. In contrast, for the second example, the data indicate a more likely curve of L2, with an "L" because the mode falls before the average service life and a "2" because there is a relatively wider retirement dispersion. This combination of one letter and one number defines a dispersion pattern. Adding an average service life to an Iowa curve (*e.g.*, 5-S0) provides a survivor curve intended to depict a reasonable expectation of how a group of assets will survive, or conversely be retired, over the expected average service life.

Table JSG-2 below compares curves with the same shape (S0) but different average service lives (5- and 10-years) to illustrate different iterations with the same curve. The

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[7] In addition to L, S and R curves, there is a set of Origin Modal, or "O curves," which are so called because the mode for these curves is at age one, or the "origin." Generally speaking, O-shaped Iowa curves are not appropriate for utility plant.

percent surviving represents the amount of plant surviving at each age interval shown in the first column. The 5-S0 life and curve sums to the five-year average service life, while the 10-S0 life and curve sums to a ten-year average service life.

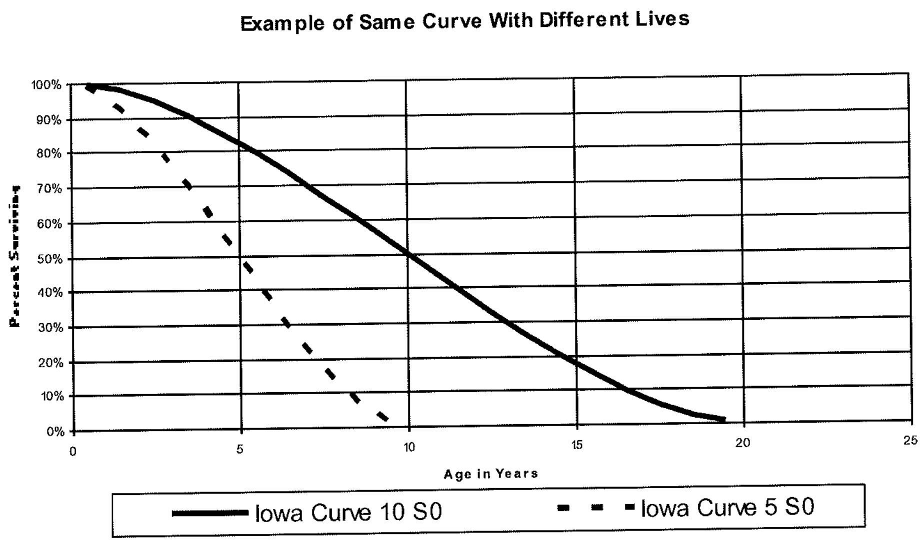
Table JSG-3

Sample Survivor Curves

Age	5-S0 Curve Percent Surviving	10-S0 Curve Percent Surviving
0.5	0.99	1.00
1.5	0.92	0.98
2.5	0.83	0.94
3.5	0.70	0.90
4.5	0.57	0.85
5.5	0.43	0.80
6.5	0.30	0.74
7.5	0.17	0.67
8.5	0.08	0.60
9.5	0.01	0.53
10.5		0.47
11.5		0.40
12.5		0.33
13.5		0.26
14.5		0.20
15.5		0.15
16.5		0.10
17.5		0.06
18.5		0.02
19.5		0.00
Total	**5.00**	**10.00**

These are called "curves" because, when plotted on charts with the x-axis representing "age" and the y-axis representing "percent surviving," they appear as shown below in Graph 3:

Graph JSG-3



Q. HOW DO YOU USE THE IOWA CURVES IN YOUR SERVICE LIFE ANALYSIS?

A. The purpose of Iowa curves is to enable the calculation of an average remaining life. Remaining life calculations take the current age of each vintage within an account and then use the retirement rate projected by the appropriate Iowa curve to project the remaining life of each of these vintages of plant. Ultimately, depreciation accruals for plant investment are calculated from remaining lives, so it is important to select the correct average service life and the correct Iowa curve.

Q. CAN YOU WALK THROUGH THE ANALYSIS OF A PARTICULAR ACCOUNT AS AN EXAMPLE?

A. Yes. Understanding how a life table functions is crucial to understanding life analyses. Therefore, let us take 364.00 – Poles Towers and Fixtures, as an example. Below, I have reproduced ages 0 to 4.5 of the observed life table for Account 364 using an experience band of 2001-2016.

Table JSG-4

Observed Life Table for Account 364

Age	Exposures	Retirements	Retirement Ratio (%)	Survivor Ratio (%)	Cumulative Survivors
BAND		2001 - 2016			
0	215,768,363	18,759	0.0087	99.9913	1.0000
0.5	202,211,848	479,014	0.2369	99.7631	0.9999
1.5	192,025,423	194,614	0.1013	99.8987	0.9975
2.5	187,515,281	131,212	0.0700	99.9300	0.9965
3.5	174,081,320	881,362	0.5063	99.4937	0.9958
4.5	168,193,350	35,756	0.0213	99.9787	0.9908

The first column shows the age. The observed life table groups data from all vintages together and analyzes the mortality characteristics based on the age of the plant. In the next column are exposures. This is the total plant in service exposed to retirement at a given age. *Exposures decrease as age increases* because the most recent vintages have not yet had time to attain higher ages. Next, we have retirements, which are total retirements on all vintages that occur at a given age. Earlier, we discussed aged retirement data, and this is where that data comes into play. To review, the age of the retirement equals the year that it was taken out of service <u>minus</u> the age that it was put into service. The next column, retirement ratio, is simply retirements divided by exposures. Broadly, this tells you what the odds of a given unit retiring at this age should be. The survivor ratio is then 100% minus the retirement ratio, which, converse to retirement ratio, tells you what percent of the exposures should survive this age. Finally, cumulative survivors are an iterative calculation that begins at 100% and then is multiplied by the previous year's survivor ratio.

This measures the chance that a unit will survive at the beginning of its life, which is 100%, and then subjects that percentage to the risk of retirement at each subsequent age.

The cumulative survivors at each age become the data points that are then compared to the points on each Iowa curve by an algorithm to arrive at the best fit.[8] For Account 364, the life-curve combination with the lowest sum of squared differences is a L3 curve with a 65-year average service life with a sum of squared differences of 142.406. The curve fitting results display the average service life that gives the lowest sum of squared differences for each different curve shape. Table JSG-4 presents the top five curve fits for this account:

Table JSG-5

Curve Fitting Results for Account 364

Curve	Life	Sum of Squared Differences
BAND	2001 - 2016	
L3	65.0	142.406
S2	63.0	322.207
S3	61.0	389.458
R3	60.0	428.410
L2	70.0	777.157

Reviewing this table provides a sense of the range of lives that might be appropriate given the curve shape selection. Looking further down the curve fitting results for Account 364, we can see that the best fit average service lives fall in the range between 60 years and

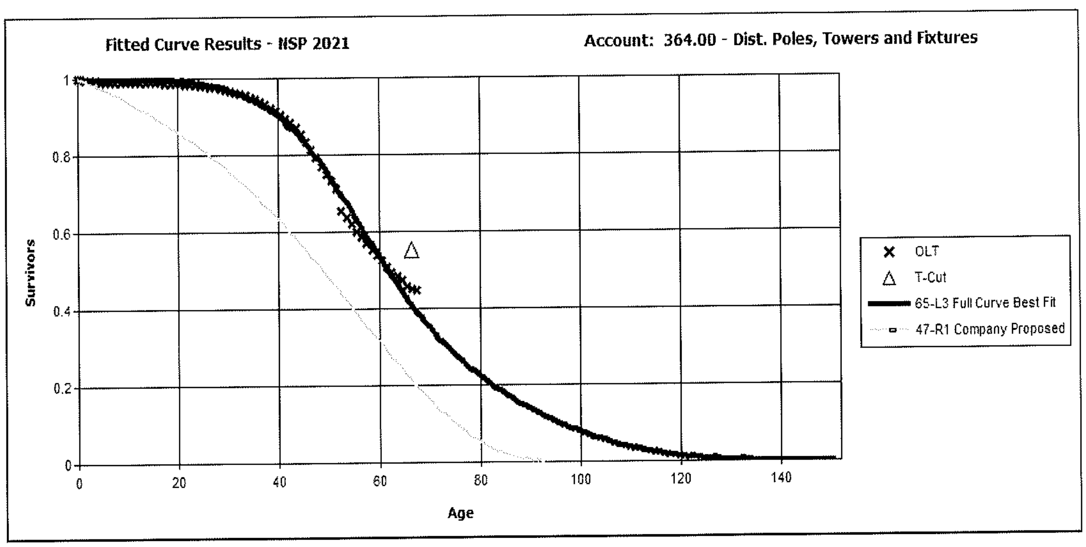
[8] The basic definition of an algorithm is a set of guidelines that describe how to perform a task. In more precise terms, an algorithm is a process or set of rules to be followed in calculations.

70 years. The number components in the best fitting Iowa curves are either a 2 or 3, which means that each of the best fit curves is consistent with an intermediate distribution of retirements around the mode. We can also see that the Company's proposed curve for Account 364, a 47-R1 does not match the data in this account particularly well overall.

The next section of the life analysis is a graph, depicted below as Graph JSG-5, which plots the cumulative survivors from the observed life table against the best fitting Iowa curve and currently approved life and curve.

Graph JSG-4

Best Curve Fit Results for Account 364



This graph clearly shows how necessary it was to perform an updated depreciation study. As we can see, the Company's proposed average service life of 47 is really not a good fit to the available data at any point on the curve, showing retirements that begin much earlier than in the data, and then are fairly broadly distributed across the life of the plant. In contrast, the data shows almost no retirements through the first twenty years of plant, followed by a relatively sharp increase in retirements around age 40.

Q. HAVE YOU PROVIDED THE RESULTS OF YOUR MATHEMATICAL FITTING ANALYSIS?

A. Yes, Exhibit JSG-2 includes a schedule for each account studied titled "Best Fit Curve Results" that shows my mathematical curve fitting analysis. My proposed lives and curves take into account both these best fit curve results as well as information provided by Mr. Watson in his depreciation study, and the various life analyses performed by Mr. Watson and provided in response to NDPSC-6-16.

Q. ARE THERE INSTANCES WHERE THE MATHEMATICAL BEST FIT LIFE AND CURVE ARE NOT APPROPRIATE?

A. Yes. The mathematical best fit is appropriate in most cases in which the future retirement patterns can reasonably be expected to follow historical experience. Future retirement patterns may not always be expected to follow historical experience, however. Numerous factors might lead a utility depreciation expert, familiar with the plant account for a given company for a given account, to conclude that future depreciation expectations are different than historical experience. These factors include major replacement or maintenance projects, differing life expectations of new technologies, and economic or engineering decisions of utility management, any of which could significantly affect the expectations for future retirement rates. Thus, informed judgment is an important component of the service life analysis, but any decision not to follow historical experience must be supported by a reasonable basis.

Q. CAN YOU PROVIDE A DISCUSSION OF THE LIFE ANALYSIS FOR EACH ACCOUNT YOU ARE PROPOSING TO ADJUST?

A. Yes. Below is a brief discussion of my life analysis for accounts

Account 352 – Transmission Structures and Improvements

For account 352, Mr. Moeller has proposed a life and curve of 70-R5. The preponderance of the available actuarial data is consistent with a significantly longer life and a somewhat lower modal curve number. I am proposing to adjust the average service life and curve to this account up to an 80-year average service life and a R4 curve. It should be noted that this can be considered an incremental adjustment, and further adjustments to lengthen the lives may be appropriate if this account continues to experience low retirement rates in the future.

Account 353 – Transmission Station Equipment

For account 353, Mr. Moeller has proposed a life and curve of 56-R2. The best-fitting lives and curves for this account are significantly longer lives. However, the longest-lived exposures in this account, those beyond approximate age 50, begin to show a different retirement pattern than the bulk of the plant in service. If we discount the longest-lived assets, the 60-R2 life and curve appears to be a better fit to the historical data than Mr. Moeller's 56-R2 life and curve. I am proposing a 60-R2 life and curve for this account.

Account 364 – Distribution Poles Towers and Fixtures

For account 364, Mr. Moeller has proposed a life and curve of 47-R1. The available actuarial analysis is limited, however with sixteen years of retirement data, I would consider it more reliable than the Simulated Plant Record analysis Mr. Watson relied upon. Additionally, in my experience, a 47-year average service life is below what I would consider a generally reasonable range for distribution poles. Based on the preponderance of historical experience, incorporating my judgment about this type of plant, I am proposing a 60-S3 life and curve for this account.

Account 369.01 – Distribution Services, Overhead

For account 369.01, Mr. Moeller has proposed a life and curve of 42-R1.5. For this account the best fit according to the historical data is a 52-R3 life and curve. I would generally consider this to be a very reasonable life and curve shape for this account. Therefore, I am proposing a 52-R3 life and curve for this account.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

STATE OF NORTH DAKOTA

PUBLIC SERVICE COMMISSION

Northern States Power Company 2021 Electric Rate Increase Application	**Case No. PU-20-441 OAH No. 20200422**

VERIFICATION

~~STATE OF~~ District of Columbia)
) ss.
~~COUNTY OF~~ City of Washington)

James Garren, being first duly sworn on oath, deposes and states that he has read the testimony and exhibits submitted in the above captioned matters under his name, that they were prepared by him or under his direction, that he knows the contents thereof, and that the same are true and correct to the best of his knowledge and belief.

James Garren

Subscribed and sworn to before me this 22 day of April, 2021.

DANIEL SOLOMONRAJ NOTARY PUBLIC MY COMMISSION EXPIRES 11/14/2021 DISTRICT OF COLUMBIA

Notary Public
My Commission Expires: 11-14-2021