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March 7, 2018

—Via Email and Federal Express—

Mr. Darrell Nitschke
Director of Administration and Executive Secretary
North Dakota Public Service Commission
State Capitol Building, Dept. 408 - 600 East Boulevard
Bismarck, ND 58505-0480

RE: RELIABILITY PERFORMANCE PLAN AWARD
CASE NO. PU-10-657

Dear Mr. Nitschke:

Northern States Power Company, doing business as Xcel Energy and operating in North Dakota, submits to the North Dakota Public Service Commission an original and 10 copies of the enclosed Petition notifying the Commission of the Company's achievement of a \$1.5 million Reliability Performance Plan (RPP) award, and requesting approval of an alternative award funding approach.

The reliability award is a result of the Company's achievement in 2017 of the RPP award threshold for outage duration performance, as measured by the System Average Interruption Duration Index (SAIDI). In this Petition, the Company proposes the SAIDI award be amortized over two installments in 2018 and 2019 such that the 2018 amount be fully offset by the eighth Department of Energy payment credit of \$788,140 received November 13, 2017,¹ with the remaining amount of the SAIDI award reflected in 2019 and generally offset by the amount of the ninth DOE payment.

Please contact Cynthia Harrington at cynthia.d.harrington@xcelenergy.com or (612) 330-5953 or me if you have any questions regarding this filing. Thank you.

Sincerely,

DAVID H. SEDERQUIST
SR. CONSULTANT, REGULATION & FINANCE
XCEL ENERGY

Enclosure

cc: Mr. Pat Fahn

¹ See NDPS Case No. PU-16-019, COMPLIANCE FILING - NOTICE OF RECEIPT OF EIGHTH DOE SETTLEMENT PAYMENT, (December 8, 2017).

STATE OF NORTH DAKOTA
BEFORE THE
PUBLIC SERVICE COMMISSION

Randy Christmann
Julie Fedorchak
Brian Kroshus

Chair
Commissioner
Commissioner

IN THE MATTER OF THE PETITION OF
NORTHERN STATES POWER COMPANY FOR
COMMISSION ACKNOWLEDGEMENT OF A
RELIABILITY PERFORMANCE PLAN AWARD

Case No. PU-10-657

PETITION

INTRODUCTION

Pursuant to North Dakota Century Code § 49-02-03 and the terms of the Reliability Performance Plan (RPP) approved in Case No. PU-10-657 and extended twice in Case No. PU-12-813, Northern States Power Company, doing business as Xcel Energy (the Company), operating in North Dakota, petitions the North Dakota Public Service Commission (Commission) for acknowledgement of the Company's achievement of a \$1.5 million Reliability Performance Plan (RPP) award, and approval of an alternative award funding approach.

The reliability award is a result of the Company's achievement in 2017 of the RPP award threshold for outage duration performance, as measured by the System Average Interruption Duration Index (SAIDI). SAIDI is a measure of the total amount of time the average customer is without power during the calendar year. Xcel Energy's normalized North Dakota SAIDI score in 2017 was 43.7 minutes, which was well under the award threshold of 57.0. The RPP's SAIDI award was designed to be a sliding scale financial incentive that ensures the award proceeds do not produce, by themselves, Company earnings in excess of the authorized level. Since the Company's regulated return on equity (ROE) for 2017 is projected to be in the range of 8.0 - 9.0 percent (well below the authorized level of 10.25 percent), revenues are estimated to be deficient by about \$6.0 – \$10.0 million. Thus, the maximum award of \$1.5 million is triggered.

As discussed below, the Company proposes to partially fund this reward by using the eighth and upcoming ninth payments from the extended settlement with the Department of Energy (DOE) regarding its failure to provide permanent storage of spent nuclear fuel. On December 8, 2017, the Company notified the Commission of the receipt of the eighth payment with a North Dakota jurisdictional allocation of \$788,140 (not including interest earned, less bank fees). Rather than increasing Fuel Cost Rider charges by \$1.5 million to collect the SAIDI award (and implementing separate billing credits to issue the DOE proceeds), the Company proposes to net the award with the eighth and ninth DOE settlement payments to essentially fund the award without materially impacting rates.

In support of this filing, Xcel Energy provides:

- Background of the Reliability Performance Plan;
- Information on 2017 SAIDI results; and
- Proposed SAIDI award funding mechanism.

A. Name, Address and Telephone Number of Utility Attorney

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B. Utility Employee Responsible for Filing

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- C. The Company also requests the following person be placed on the Commission's official service list for this proceeding:

Carl J. Cronin
Regulatory Records
Xcel Energy
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Minneapolis, MN 55401
regulatory.records@xcelenergy.com

Any information requests in this proceeding should be submitted to the Regulatory Records email address above.

I. BACKGROUND

A. *2010 Settlement Agreement*

As part of the Settlement Agreement in Case No. PU-10-657, which was approved on February 29, 2012, the Company committed to developing and filing a reliability-focused performance-based plan which included financial incentives. The Settlement outlined the parameters of the Reliability Performance Plan, or RPP, as follows:

Develop and Propose a Reliability Service Quality Plan.

The Commission expressed interest in a reliability "service quality plan" focused more specifically on localized reliability performance. The Commission referenced the reliability metrics used in the Company's prior "Plan Linking Utility Stakeholders" or "PLUS" performance-based rate plan as a possible basis for a new service quality plan. The parties agree to jointly develop and file, within 90 days of the Order in this proceeding, recommendations regarding a reliability "service quality plan" to include a focus on localized reliability performance. The development of this plan and recommendations will be guided by the following principles:

- Industry standard performance indicators (SAIFI, CAIDI, and SAIDI) will be considered along with other metrics relating to "customer experience" level (i.e., customers with multiple outages, customer satisfaction survey scores, etc.).*
- Performance targets will be constructed as ranges to acknowledge normal levels of performance variability and create more meaningful targets.*
- Performance incentives will be symmetrical, such that any financial impact would be based on both above-target and below-target performance.*
- The duration of the plan term and other plan exceptions will be clearly defined to allow for flexibility in the operation, review, and amendment of the plan.*
- The Company's ability to seek rate recovery of its prudent investments and operating costs will be maintained during the term of the plan.*

B. Reliability Performance Plan

After many weeks working closely with the Commission Staff, the Company filed its proposed RPP with the Commission on June 1, 2012. The proposed RPP complemented the reliability initiatives and reporting commitments already included in the rate case Settlement Agreement by establishing financial incentives to help drive reliability performance improvement in North Dakota. The discussions between the Company and Staff led to a trio of key reliability metrics which measure performance using very different approaches. In addition, the financial incentives proposed in the RPP were substantive enough to influence the Company's plans and efforts regarding reliability. The three key components of the filed RPP included:

- 1) Establishing an "excellence threshold" and related financial award for outstanding outage duration performance, as measured by the System Average Interruption Duration Index (SAIDI),
- 2) Compensation to customers, in the form of annual one-time billing credits, for *Customers Experiencing Multiple Interruptions* (CEMI) in a given year, and
- 3) Reporting to the Commission of customer perceptions of Xcel Energy's reliability as measured by an annual reliability-focused survey.

Subsequent to the filing, Company representatives and Staff entered into settlement negotiations during which certain elements of the proposed plan were refined. The resulting RPP Settlement was filed on October 12, 2012.

The key terms of the approved RPP Settlement included:

1. A SAIDI excellence threshold of 57.0 minutes. The stringent excellence threshold created a stretch goal that reflected the installation of new Intelliteam switches and other actions the Company was undertaking to improve its electric reliability.
2. An award range from \$250,000 to \$1,500,000 for achieving the SAIDI excellence threshold. A base incentive amount of \$250,000 would be awarded in any year the Company achieved the SAIDI excellence threshold, regardless of its reported earnings for the year. The base incentive amount, however, would be increased one dollar for every dollar that actual reported revenues for the plan year were deficient (i.e., resulting in earnings below the authorized Return on Equity of 10.4 percent), capped at \$1,500,000.
3. In addition to the reliability reporting the Company committed to in the rate case Settlement, the Company was to provide documentation of any outage days¹ excluded for purposes of normalizing SAIDI results under the IEEE²

¹ Formally referred to as "Major Event Days" or MEDs.

normalization method. The Parties agreed to discuss in good faith the appropriateness of excluding any outage day questioned or contested by Staff.

The RPP Settlement was approved by the Commission on December 12, 2012. The RPP metrics and targets are summarized in Table 1 below:

Table 1
RPP Metrics and Targets

Metric	Target	Incentive	Potential Impact
SAIDI	Achieve average annual outage time per customer \leq 57.0 minutes	Award	\$250,000 - \$1,000,000
CEMI	Issue \$50 credits to all customers experiencing $>$ 3 sustained outages	Penalty	\$20,000 - \$220,000
Survey	Report customer ratings (0-10) of reliability and outage services	--	\$0

C. System Average Interruption Duration Index

The Company proposed to use SAIDI as the primary electric system reliability metric because of its wide industry use and capability to broadly measure performance relating to both outage frequency and restoration time. As stated previously, SAIDI is a measure of the total amount of time the typical customer is without power during a calendar year. It is also the product of the average number of sustained outages (at least 5 minutes long) experienced on average by each customer³ and the average duration of each of these sustained outages.⁴

The Company measures both actual and “normalized” SAIDI performance for its various geographic divisions. Normalized results are based on an industry-standard method of excluding unusual outage events that are typically caused by storms, lightning, ice build-up, high winds, or other weather-related events. They may also include extended or expansive outages due to major equipment failures, fire, public damage, or other unusual events. Normalizing allows the utility to more clearly identify reliability trends over time, develop reliability action plans to address outage

² Institute of Electrical and Electronics Engineers.

³ As measured by the System Average Interruption Frequency Index, or SAIFI.

⁴ As measured by the Customer Average Interruption Duration Index, or CAIDI.

causes that are more on the “controllable” end of the spectrum, and separate out the most extreme outage events for closer analysis and more specific action plans. The SAIDI score for a given year is essentially the aggregation of the various sustained outages during the year, the number of customers impacted, and the time in minutes to restore power. During each sustained outage, the Company records the number of customers who were impacted and - as the restoration work is performed - the amount of time that each group of customers is without service (typically outage restoration is achieved in phases). For example, if there was a fault that interrupted service to 3,000 customers, and 2,000 customers were restored in 30 minutes and the remaining 1,000 customers were restored in 50 minutes, then the total amount of “customer minutes out” (CMOs) for the outage would be:

$$\begin{aligned} 2,000 \text{ customers} \times 30 \text{ minutes} &= 60,000 \text{ CMOs} \\ 1,000 \text{ customers} \times 50 \text{ minutes} &= 50,000 \text{ CMOs} \\ 60,000 \text{ CMOs} + 50,000 \text{ CMOs} &= 110,000 \text{ total outage CMOs} \end{aligned}$$

The total CMOs for each outage that occurs during the calendar year is calculated and summed into a total CMO amount for each month and for the calendar year. The monthly totals are divided by the customers served each respective month to arrive at a monthly SAIDI. The monthly SAIDI values are summed to produce the annual SAIDI result. On a normalized basis, in 2017 the Company had a total of 601 sustained outages in North Dakota resulting in 4,021,382 total CMOs. Dividing this by the average monthly customer count produced a 43.7 minute SAIDI score in 2017.

D. IEEE Normalization Method (Standard 1366)

In recent years, utilities like Xcel Energy have responded to customers' increasing power needs by looking for ways to maintain or improve reliability without increasing costs. At the same time, utility regulators have shown heightened interest in electric service reliability and how to ensure the utilities they regulate are performing well. As a result, there has been a push to establish consistent reliability metrics that can be used both internally and externally to set goals, measure progress, and make comparisons among utilities more meaningful. One key shortfall in reliability measurement was the lack of a uniform methodology for normalizing SAIDI, SAIFI, and CAIDI results. Specifically, there were various methods used by utilities for identifying and removing outage events that were outside the normal bandwidth in terms of their impact on reliability performance (i.e., “outliers”). While there was general agreement that including such events in the measurement of reliability performance creates variations too great to set meaningful targets on, there was not industry consensus on defining which events should be excluded.

About 15 years ago, however, the Institute of Electrical and Electronics Engineers (IEEE) Working Group on System Design developed a statistics-based approach called the “Beta Method” for identifying outlying outage events (later referred to as Major Event Days or MEDs). This Working Group was comprised of over 100 active members from universities, utilities, consulting firms, and regulatory agencies from thirty-one states and six countries. The group sought to create a methodology that would:

- Be fair to all utilities regardless of size,
- Allow segmentation of reliability data into “normal” and “abnormal” categories, based on identifying outlier events that cause Major Event Days,
- Allow use of normalized indices for internal and external goal setting,
- Be consistent for various amounts of data availability and for all utilities, and
- Be easy to understand and execute.

The chosen Beta Method employs the naturally occurring “log normal” distribution because it fits best the experience of utility outage data and gives utilities a way to objectively and uniformly calculate normalized index results. Normalized indices provide metrics that can and should be used for both internal and external goal setting. Normalized results more clearly reveal trends in normal operations that could otherwise be hidden by the large statistical effect of major events.⁵ Attachment A to this filing, which provides more information on the IEEE normalization process, was also an attachment to the original RPP application.

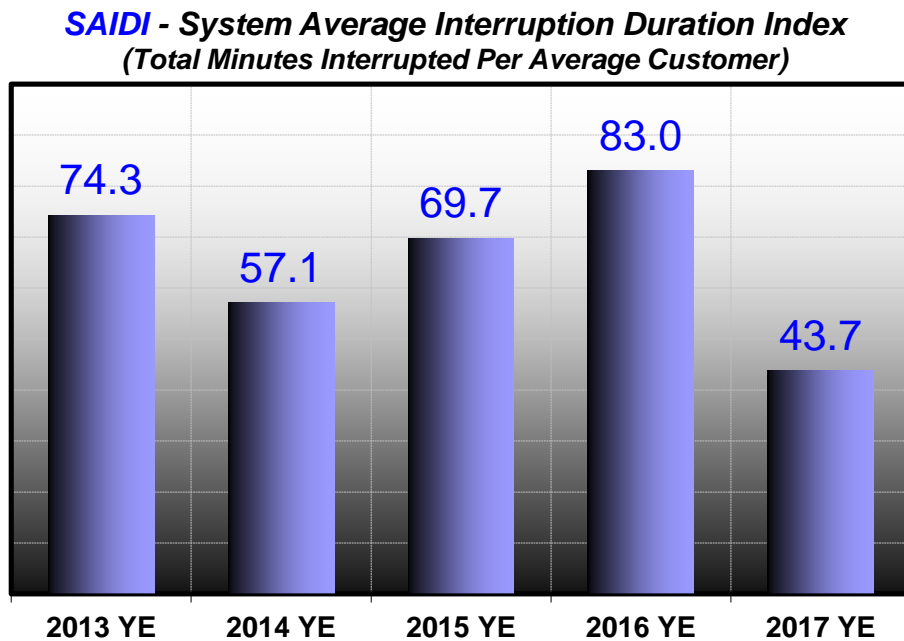
II. 2017 PERFORMANCE

A. SAIDI Results

In 2017, the Company achieved a normalized SAIDI score of 43.7 minutes. As shown in the graph in Figure 1 below, this result represents a material improvement compared to previous historical SAIDI results:

⁵ By definition, the Beta Method also provides a way to identify abnormal reliability events. These major events are generally beyond the design and operational limits of a utility system. This allows utilities to scrutinize restoration efforts during a major event differently than it might normally and take appropriate action, if appropriate, to mitigate its future occurrence and impact on reliability. In some cases action may not be prudent, as with an event that is very rare and/or clearly beyond the utility’s control and design limits of the system.

Figure 1



Note: reflects all levels of normalized, sustained outages (> 5 minutes) impacting only North Dakota customers, using meter-based customer counts. IEEE Normalized based on State.

An analysis of 2017 outages indicates that the very low SAIDI result was driven primarily by:

- A 57 percent reduction in CMO's resulting from underground cable faults compared to historical averages, driven by a 15 percent reduction in the number of underground cable faults,⁶
- A 90 percent reduction in tree-related CMO's driven by a 52 percent reduction in tree-related outages relative to their historical average, and
- A 39 percent reduction in public damage CMO's, as public damage events were down 28 percent compared to past history.

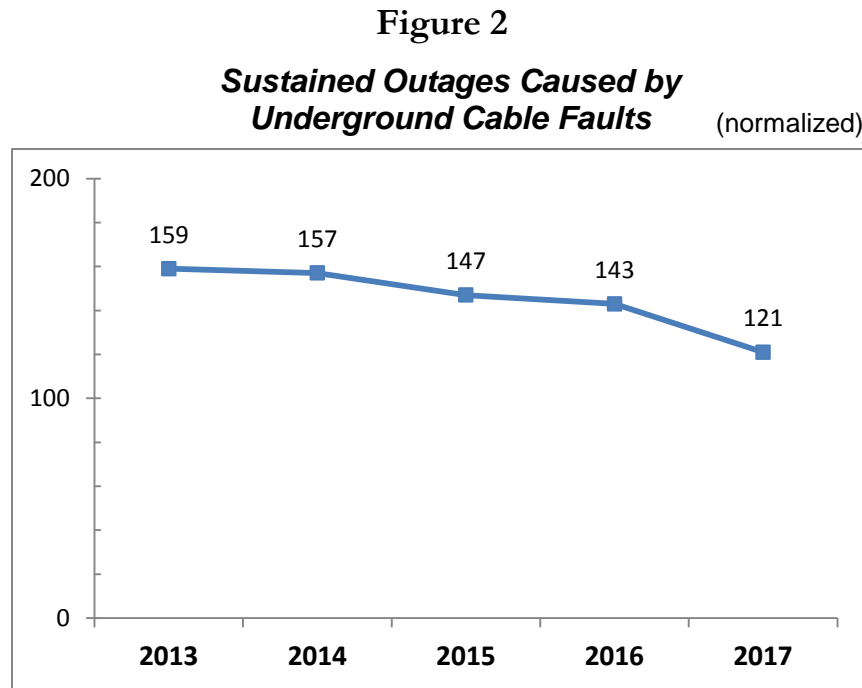
These improvements reflect, at least in part, the Company's efforts to proactively replace failing underground cable (specifically non-jacketed 500 MCM cable), increase its vegetation management efforts, and communicate "call before you dig" messaging. These marked reductions were partially offset, however, by a 21 percent increase in animal contacts in 2017.

⁶ The reductions cited are in comparison to the average results for the period 2009 – 2016.

For reference, Attachment B, Chart 1 shows how favorably the reliability of the Company’s North Dakota jurisdiction compares to the other seven states Xcel Energy operates in.⁷ The graph shows the Company’s average SAIDI result in each state over the past five years, from 2013-2017. North Dakota annual outage time per customer for the period was 16 percent lower than the next best-performing jurisdiction, South Dakota. Chart 2 on Attachment B shows the most recent comparative results available (2016) for the Midwestern utilities participating in the annual IEEE reliability survey. Again, the Company’s North Dakota operations were among the upper third of the group in terms of normalized SAIDI performance.

B. Outage Causes

In spite of the improvement shown, the primary cause of sustained outages in 2017 was underground cable faults, accounting for 121 sustained outages, or one out of every five outages for the year. Underground cable faults were the leading cause of outages in each of the previous four years as well, though their occurrence has shown a downward trend with a statistically significant reduction in 2017, as shown in Figure 2 below:



The reduction in underground cable outages has undoubtedly contributed to the improved SAIDI results in 2017, particularly given that the 907,302 CMO’s generated

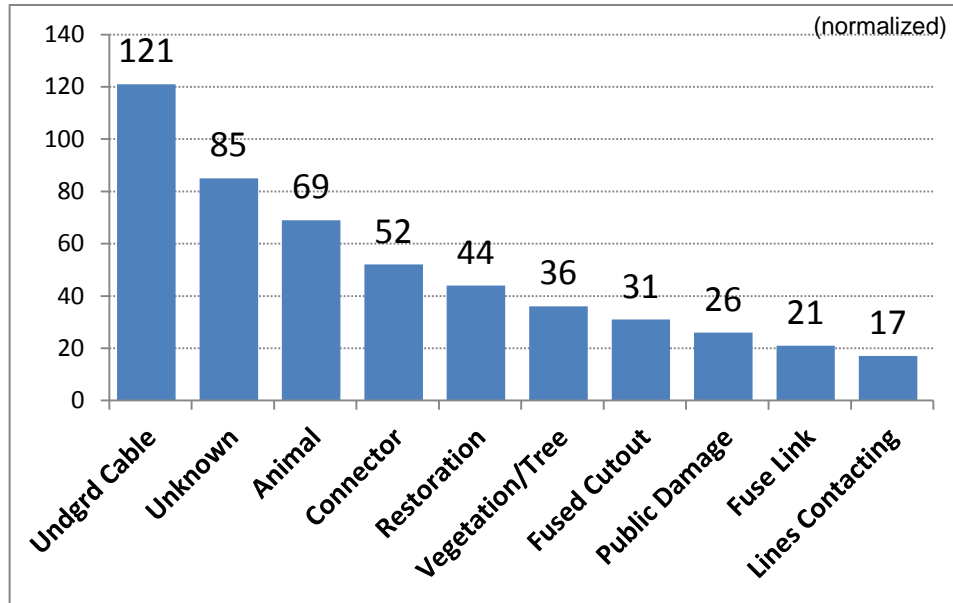
⁷ On Attachment A, Chart 1 the very small service area in Michigan is included in the Wisconsin result.

by underground cable faults were less than half of what the average annual CMO impact (about 2.1 million) from cable faults has been for the previous eight-year period from 2009-2016.

The top ten outage causes in 2017 were as shown in Figure 3 below:

Figure 3

Top Ten Outage Causes (2017)



Note: “Unknown” cause signifies that a follow-up investigation revealed no known cause. “Connector” refers to failure of devices used to connect or splice electric wires. “Intentional” refers to intentional interruptions necessary to perform needed maintenance, etc. A “Fused Cutout” is an overhead line device that combines a fuse and switch that can disconnect a line from a transformer either via a melted fuse link or manually by a line person. A “Fuse Link” is the element in a fuse that melts to stop current flow in an overloaded circuit. “Lines Contacting” refers to two or more conductors contacting each other.

C. Major Event Days in 2017

There were 2 MEDs that were removed from the data to normalize the results pursuant to the IEEE standard discussed above: June 13, 2017 and December 17, 2017. Forty-three outages occurred in the Fargo and Grand Forks areas on June 13th resulting in 2,160,946 CMOs (i.e., customer minutes out). The outage cause codes on that day indicated primarily rain, high winds, and lightning. The CMOs generated for the day were 2.7 times the MED threshold for 2017. On December 17th wet, foggy conditions combined with chemical contamination (primarily from the atomization in road spray of snow- and ice-melt treatments) and dust on a distribution pole contributed to a pole fire. The fire caused extensive damage to the transformer,

cross-arms, pole top, and other equipment which impacted two feeder lines. The outages resulted in 1,415,661 CMOs for the day or 1.8 times the MED threshold.

D. Award Computation

The SAIDI award is a function not only of the Company's outage frequency and restoration times during the year, but also - to a degree - its regulated earnings. The award is limited by the proximity of the Company's 2017 earnings to its authorized ROE. In other words, the award amount is limited so that it does not cause the Company to exceed its authorized ROE for the year. The maximum SAIDI award is achieved only if there is enough "headroom" between the Company's actual 2017 ROE and its Commission-authorized ROE.

Since the Company's 2017 SAIDI result of 43.7 minutes is below the RPP's award threshold of 57.0 minutes, the minimum award of \$250,000 is earned. This base level award is increased, however, for every dollar of revenue the Company is deficient relative to its authorized ROE (up to an RPP-defined maximum of \$1,500,000). In 2017, the Company's weather-normalized ROE is anticipated to be between 8.0 and 9.0 percent. Compared to the authorized level of 10.25 percent, this represents at least a \$6,000,000 revenue shortfall. Since this revenue deficiency is clearly much higher than the maximum allowed SAIDI award of \$1,500,000, the full award amount is allowed in 2017.

III. AWARD IMPLEMENTATION

A. Key Considerations

The original RPP proposed by the Company required Xcel Energy to file, on or before May 1 of the year following the given Plan year, an RPP summary report showing:

- Annual SAIDI performance, normalized under the IEEE methodology and compared to the RPP award threshold;
- The number of CEMI credits to be issued and total CEMI payout for the year;
- The results of the reliability-focused customer satisfaction. Customer ratings of our reliability, on a scale of zero to ten, will be shown on an overall basis;
- The calculation of the SAIDI award, if achieved. This information was to include the actual (not weather normalized) amount of any revenue deficiency reported to the Commission for the Plan year and its impact, if any, on the determination of the final award amount. An award recovery (surcharge) plan was also to accompany the report, if applicable; and

- A brief commentary of the reporting year’s SAIDI, CEMI, and survey results will also accompany the summary report.

Upon receiving this annual RPP report, the Commission Staff would review the information and indicate whether it concurred with the results or not. In the event an award was achieved and confirmed by Staff, the Company was to collect the funds via a one-time, one-month surcharge beginning on or near September 1 of the following year. By recovering the surcharge during a low energy use “shoulder month,” like September, it was felt that the customer impact would be minimized.

Since the RPP first went into effect in 2013, the Company has provided the reliability reporting described above as part of its annual Regulated Earnings Report filed each May of the following year. For years 2013 through 2016, the Company did not achieve the SAIDI award threshold.⁸ The 2017 SAIDI result represents the first time an award has been earned under the RPP.

It was generally contemplated that any achieved SAIDI award was to be recovered through a one-time surcharge incorporated into the Fuel Cost Rider (assuming Commission approval of any needed FCR variance).⁹ The Company is filing this SAIDI award notification with the Commission in advance of its annual Regulated Earnings Report so that the Commission has additional time to review the results and consider an alternative award recovery method, which we propose below. The Company also proposes, for the Commission’s consideration, a dedicated use for the award funds as discussed below.

B. Alternative Recovery Approach

As previously mentioned, the default funding approach for the SAIDI award has been to collect the award amount through the Fuel Cost Rider. However, the Company would like to propose a more efficient and administratively streamlined method for implementing SAIDI award cost recovery in this case, which we believe will provide benefits to customers as well.

Currently pending before the Commission is the Company’s proposed \$788,140 customer credit relating to the North Dakota portion of a November 2017 payment from the Department of Energy (DOE).¹⁰ This is the eighth and most recent

⁸ During this same period, however, Xcel Energy did pay out over \$415,000 to customers in North Dakota who experienced more than three outages during a given plan year.

⁹ See lines 16-20, page 18 and line 24, page 19 of Direct Testimony of Company witness Mr. David H. Sederquist supporting the Reliability Performance Plan Settlement (Case No. PU-10-657).

¹⁰ Case No. PU-16-19.

payment Xcel Energy has received from the DOE stemming from a lawsuit settlement. The payments are compensation for damages incurred as a result of the DOE's failure to take the Company's spent nuclear fuel and provide permanent storage. Recently, Xcel Energy has been receiving the series of DOE payments on a nearly annual basis and expects to receive a ninth payment late in 2018.

Rather than increase 2018 Fuel Cost Rider billings by \$1.5 million to collect the SAIDI award, the Company proposes that the SAIDI award be amortized over two installments in 2018 and 2019 such that the 2018 amount is fully offset by the eighth DOE payment credit of \$788,140, with the remaining amount of the SAIDI award reflected in 2019 and offset by the ninth DOE payment credit. It is expected that the amount of the ninth payment will be similar to that of the eighth payment.

If we assume, for example, that the ninth DOE payment credit in North Dakota will be \$750,000, this approach would work as follows:

1. In 2018, the SAIDI award amount to be collected from customers would be set equal to the eighth DOE payment, or \$788,140.
2. Since the 2018 SAIDI award amount and the eighth DOE payment credit would exactly offset each other, no adjustments would need to be made to customer bills for the purpose of either collecting the award amount or issuing the DOE payment proceeds.
3. In 2019, the remaining SAIDI award amount to be collected from customers would be calculated as: $\$1,500,000 - \$788,140 = \$711,860$.
4. Since the 2019 SAIDI award amount and ninth DOE payment credit of \$750,000 net to a \$38,140 customer credit ($\$750,000$ DOE credit less the $\$711,860$ SAIDI award amount for 2019), a smaller, single "true-up" credit of \$38,140 would be included in the September Fuel Cost Rider. No other bill adjustments would be implemented.

There are several advantages to using this "net" approach vs. implementing separate rate decreases and increases for the DOE proceeds and SAIDI award, respectively:

- Customers would not incur a \$1,500,000 rate surcharge for purposes of funding the SAIDI award in 2018;
- Rate changes are minimized by netting the SAIDI award against the offsetting DOE credits *prior* to any making any billing adjustments;
- The calculations to properly allocate the appropriate 2018 and 2019 DOE credit to individual customers and run the SAIDI award amount through the FCR are avoided;

- The process of setting up the one-time billing adjustment for the DOE credit in 2018 and 2019 is eliminated as well as any potential – though very remote – for a billing error;
- There is no need to add potentially confusing messaging to customer bills in an attempt to explain both the DOE credits and the award surcharge.

In summary, the “netting” of an impending charge with upcoming customer credits before making any changes to customer bills saves time and resources, avoids detailed billing adjustments, and helps keep rates more stable.

C. Dedicating Award Funds to Reliability Improvement

Should the Commission prefer that the award be applied directly into reliability improvement, the Company is also amenable to dedicating use of the SAIDI award funds toward targeted reliability improvement projects or investments. The Company could direct the funds toward a number of initiatives such as expanding its use of automated distribution switching (i.e., Intelliteam technology), refreshing distribution infrastructure, increasing its vegetation management efforts, replacing poorer performing underground cable, enhancing lightning protection, and/or supporting efforts to utilize drones in outage restoration or system maintenance, among other things. Similarly, the funds could be directed toward grid modernization projects that support future economic development, customer service, or infrastructure automation. Regardless, Xcel Energy would commit to tracking the award-funded expenditures made in 2018 and 2019 that would be incremental to the reliability initiatives already in place, and providing a summary report of the SAIDI award-funded projects to the Commission.

IV. CONCLUSION

Xcel Energy respectfully requests the Commission acknowledge the Company’s \$1.5 million financial incentive for achieving its SAIDI award threshold in 2017, as outlined in the Commission-approved Reliability Performance Plan. The Company also requests the Commission approve its alternative SAIDI award funding approach, which eliminates the need for three material billing adjustments in 2018 and 2019, promotes rate stability, and reduces administrative efforts. Finally, Xcel Energy requests that the Commission provide direction with respect to a preference that the award proceeds be employed only for purposes of enhancing reliability and/or grid modernization.

Dated: March 7, 2018

Northern States Power Company

IEEE Normalization Standard Overview

IEEE standard 1366-2003 was developed in an effort to foster uniformity in the development of reliability indices and to facilitate consistent reporting practices among utilities. IEEE standard 1366-2003 uses a statistical approach to define and identify Major Event Days (MEDs). MEDs are days in which outage events exceed reasonable design and or operational limits of the electric power system. When a MED is identified all outages originating on that day are excluded from the annual SAIDI calculation and are analyzed separately. This method allows for easier identification of reliability trends in daily operations that would otherwise be hidden by the statistical effects of major and/or unusual outage events.

It has been shown that utility outage data does not follow a “normal distribution” but instead generally follows a “log-normal distribution.” The threshold (T_{MED}) used to determine if a day is a MED is based on 2.5 standard deviations above the average natural-log of daily SAIDI over the previous five year period. Any day with a SAIDI result that exceeds the T_{MED} is considered a MED and is not used in calculating the annual SAIDI. T_{MED} is calculated at the end of each year for use in the following year’s normalization of reliability indices.

Specifically, the calculation is made as follows:

- Collect values of daily SAIDI for the five sequential years ending on the last day of the year prior to the SAIDI reporting year. So, to determine T_{MED} for 2017, daily SAIDI data from 2012-2016 is used.
- Exclude days that do not have a SAIDI value (i.e., days that do not have any interruptions)
- Take the natural logarithm (\ln) of each daily SAIDI value in the data set.
- Find α (Alpha), the average of the logarithms (also known as the log-average) of the data set.
- Find β (Beta), the standard deviation of the logarithms (also known as the log-standard deviation) of the data set.
- Compute the major event day threshold, T_{MED} , using the following equation:
$$T_{MED} = e^{(\alpha + 2.5 \beta)}$$

All outages not originating on a MED and not due to public damage are then used to calculate SAIDI.

$$SAIDI = \frac{\sum \text{Customer Minutes Out}}{\text{Total Number of Customers Served}}$$

Chart 1

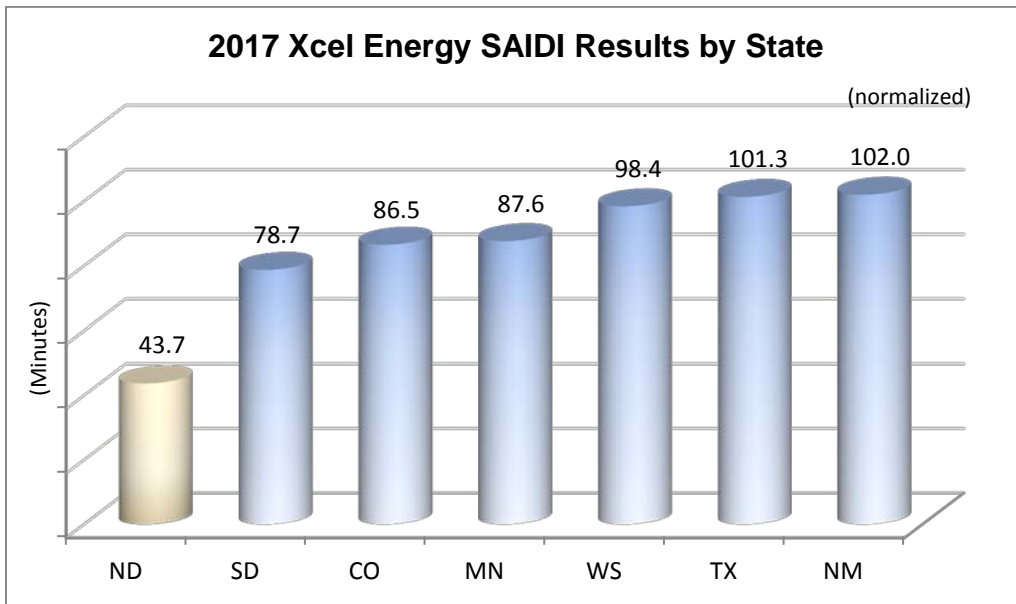
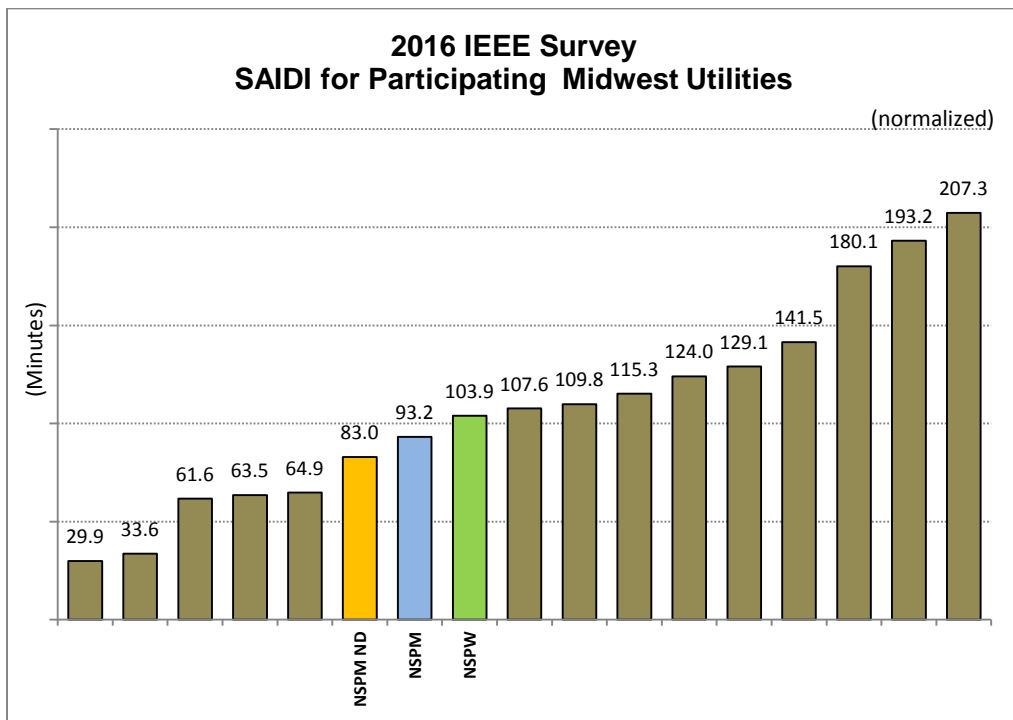


Chart 2



The Midwest region includes ND, SD, NE, MN, IO, WI, IL, MI, IN and Ontario. There were 16 survey participants from this region in the 2016 survey. Participation is voluntary and varies from year to year. Results may be reported by total company, opco, or state jurisdiction. The IEEE reliability committee does not provide public reporting of participating utilities to maintain anonymity.