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Direct Testimony and Schedules
Randy A. Capra

Before the Minnesota Public Utilities Commission
State of Minnesota

In the Matter of the Application of Northern States Power Company
for Authority to Increase Rates for Electric Service in Minnesota

Docket No. E002/GR-21-630
Exhibit___(RAC-1)

Energy Supply

October 25, 2021

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Table of Contents

Table of Contents (continued)

Schedules

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND OCCUPATION.

A. My name is Randy A. Capra. I am the General Manager of Power Generation for Xcel Energy Services Inc. (XES), which is the service company affiliate of Northern States Power Company, a Minnesota corporation (NSPM or the Company) and an operating company of Xcel Energy Inc. (Xcel Energy).

Q. PLEASE SUMMARIZE YOUR QUALIFICATIONS AND EXPERIENCE.

A. I have worked for Xcel Energy since 1985, including assignments as an Instrument and Control Specialist, Plant Supervisor, Engineering Manager, Operations Manager, Plant Director and General Manager. In my current position as General Manager of Power Generation, Energy Supply NSP, I am responsible for all fossil and renewable operations throughout the NSP generation fleet. My statement of qualifications is attached as Exhibit___(RAC-1), Schedule 1.

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

A. I present and support the Company's capital and Operations and Maintenance (O&M) budgets for the Energy Supply business unit for purposes of determining the revenue requirements and final rates in this proceeding. I also provide information with respect to the performance of our generation fleet and steps we are taking to continually improve performance and operate this fleet more efficiently.

Q. WHAT ARE THE KEY RESPONSIBILITIES OF THE ENERGY SUPPLY ORGANIZATION?

A. Energy Supply's primary responsibility is to operate and maintain the Company's non-nuclear generation portfolio in a safe, reliable, cost-effective, and environmentally-sound manner. We are also responsible for managing capital construction projects, overseeing environmental compliance, and supporting the coordination of generating unit dispatch with the Midcontinent Independent System Operator, Inc. (MISO).

Q. PLEASE PROVIDE AN OVERVIEW OF KEY FACTORS THAT WILL DRIVE ENERGY SUPPLY'S INVESTMENTS FOR THE NEXT THREE YEARS.

A. Six years ago, in our 2015 Integrated Resource Plan (IRP) approved by the Minnesota Public Utilities Commission (Commission) in January 2017, we set course to change our generation mix to one more focused on renewable generation and less reliant on coal generation.[1] Key components of the 2015 IRP included the addition of at least 1,000 MW of wind resources by 2019 and the retirement of Sherco Units 2 and 1 in 2023 and 2026 respectively.[2]

On July 1, 2019, the Company filed its 2020-2034 Upper Midwest IRP with the Commission and then filed a Supplement Plan in June 2020.[3] We further filed an Alternate Plan in June 2021.[4] This IRP continues on the course set by the

[1] *In the Matter of Xcel Energy's 2016-2030 Integrated Resource Plan*, Docket No. E002/RP-15-21, ORDER APPROVING PLAN WITH MODIFICATIONS AND ESTABLISHING REQUIREMENTS FOR FUTURE RESOURCE PLAN FILINGS (January 11, 2017).
[2] *Id.* at 3.
[3] *See* Docket No. E002/RP-19-368. The Company provided a supplement to its 2020-2034 IRP on June 30, 2020 as required by the Commission's November 12, 2019 ORDER SUSPENDING PROCEDURAL SCHEDULE AND REQUIRING ADDITIONAL FILINGS.
[4] *See Id.* The Company's Alternate Plan is described in its Reply Comments to the 2020-2034 IRP docket, filed on June 25, 2021.

2015 IRP and outlines the Company's proposed generation resource plan for the next 15 years. Both the Supplement Plan presented in June 2020 and the more recently filed Alternate Plan chart a path to the Company achieving one of the most ambitious carbon reduction goals of any U.S. utility. Specifically, the generation retirements and additions set forth in the Supplement Plan would reduce the Company's carbon emissions 80 percent by 2030, by retiring our coal facilities, extending at least one of our nuclear units an additional 10 years, adding substantial new variable renewable generation resources, achieving high levels of incremental demand side management, and adding modest amounts of load-supporting firm dispatchable generation to ensure capacity and energy adequacy on our system.

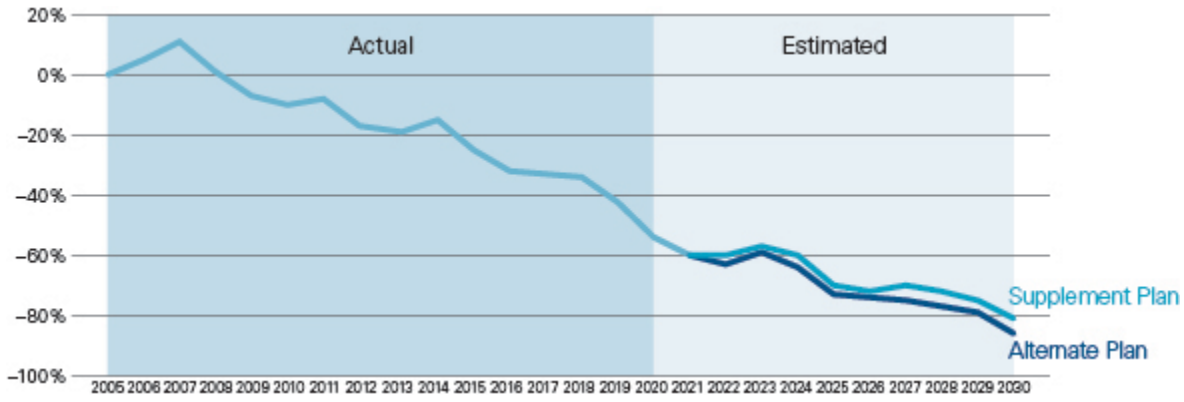
The Alternate Plan has many similar components but goes a step beyond the Supplement Plan presented in 2020, examining the opportunity to reutilize the interconnection rights that will be left open by the retirement of our large coal facilities throughout the 2020s to bring on large quantities of renewable energy, earlier in the planning period and at higher levels of overall customer benefits. In the Alternate Plan, we forego the legislatively authorized Sherco natural gas plant and construct transmission lines out from the existing points of coal unit interconnection to areas where additional renewable generation can be built. In other words, the Alternate Plan integrates transmission solutions to allow us to use those same load-proximate interconnection rights currently utilized by coal facilities to inject large quantities of renewable generation into the system instead. For example, the proposed Sherco Solar[5] project is the first in what we hope to be a large pipeline of projects that can reutilize existing coal interconnections at the Sherco site.

[5] *See* Docket No. E002/M-20-891.

Our analysis shows that this Alternate Plan would achieve even higher levels of decarbonization – over 85 percent reduction from 2005 levels by 2030 and over 80 percent carbon-free generation in total. It also maintains minimal levels of firm dispatchable generation – including some simple cycle units and other as-yet-to-be-determined technology neutral solutions – to ensure our system remains reliable and we mitigate potential customer risk exposure. Both the Alternate Plan and the Supplement Plan set us on a path to achieving our 100 percent carbon-free energy by 2050 goals.[6]

Figure 1

Alternate Plan Carbon Reductions



The Company's Energy Supply business area will be at the forefront of implementing these generation mix changes to allow the Company to meet its long-term carbon reduction goals. Over the next three years, we will continue to see that transformation take shape as the Company shifts to more renewable energy generating facilities while at the same time further reducing our reliance on coal-fired generation.

[6] *In the Matter of Xcel Energy's 2020-2034 Upper Midwest Integrated Resource Plan*, UPPER MIDWEST INTEGRATED RESOURCE PLAN 2020-2034 at 1, Docket No. E002/RP-19-368 (July 1, 2019).

Specifically, the Commission has already approved our development and construction of a number of wind facilities, including the Dakota Range I and II facilities, the recently completed Freeborn County facility as well as repowering at our Nobles, Grand Meadow, Pleasant Valley, and Borders facilities, and our acquisition of the Northern Wind Project.[7] These renewable investments will contribute to our ability to achieve the Company's and the State's policy goals over the long term. In fact, over 85 percent of Energy Supply's capital investments (additions) during this multi-year rate plan (MYRP) will be specifically directed towards advancing our carbon-free goals by adding material amounts of wind and solar to our system.

Additionally, during the term of this multi-year rate plan, we will continue our efforts to wind down coal operations by utilizing seasonal dispatch for Sherco Unit 2 and Allen S. King as recently approved by the Commission,[8] leading up to the retirement of Sherco Unit 2, at the end of 2023, Sherco Unit 1, at the end of 2026, and the proposed retirements of Allen S. King and Sherco Unit 3 at the end of 2028 and 2030 respectively.

Our continued investments in dispatchable natural gas generation on our system will be vital to our ability to manage the retirement of these coal-fired generation units while maintaining reliability. Our natural gas units will also facilitate our ability to successfully integrate large amounts of renewables, because we can ramp the output of these resources up or down in response to

[7] *See* Docket No. E002/PA-18-777.

[8] *In the Matter of the Petition of Northern States Power Company for Approval of a Plan to Offer Generating Resources into the MISO Market on a Seasonal Basis*, Docket No. E002/M-19-809, ORDER APPROVING PLAN AND REQUIRING FILING (July 15, 2020). The projected capital and O&M savings included in the Company's petition for approval of seasonal dispatch for these units have been included in our capital and O&M budgets for this case.

the variability of this renewable generation. In light of these generation shifts, our capital investments in our coal plants continue to decline during this multi-year rate plan, while capital investment in our other plants increases. However, the Company will be making minor capital investments in its coal plants to keep them running until retirement.

These investments will also necessitate a shift in our O&M spending into the future to accommodate these new investments and recognize the pending retirement of our coal fleet. Over the course of this multi-year rate plan, the Company will see its O&M spending on coal-fired generation decline and its spending on renewable generation increase, such that overall O&M on wind will eclipse that for our coal fleet in 2022.

Q. DOES THE SHIFT TO A MORE CARBON-FREE FUTURE IMPACT ENERGY SUPPLY'S CORE PRIORITIES?

A. No. The Company's Energy Supply function remains committed to maintaining the reliable safe operation of the Company's non-nuclear generating fleet. Even as we work to transform our generation fleet, we must continue to support our generation facilities through necessary capital additions to keep our plants in good working order as well as undertaking required O&M tasks to ensure they are operated and maintained effectively. These costs are necessary to provide our customers with economical energy they can rely on. We also support new and existing resources necessary to meet customer demand and keep the Company well-positioned to comply with environmental regulations and the Company's and State's energy policy goals.

Over the next three years, Energy Supply will continue to focus on keeping our plants running safely and efficiently. In order to do that, each year we must make investments in Reliability/Performance Enhancement projects. We must also undertake Environmental Improvement projects to control and reduce the environmental impacts from our existing plants. These reliability, performance enhancement, and environmental improvement projects form the bulk of the routine work performed by Energy Supply to keep our generation plants running.

Q. HOW IS THE COMPANY WORKING TO PRESERVE JOBS AND INVESTMENT OPPORTUNITIES IN THE CITY OF BECKER FOLLOWING THE PLANNED RETIREMENT OF SHERCO UNIT 2 AT THE END OF 2023 AND SHERCO UNIT 1 AT THE END OF 2026?

A. Xcel Energy prides itself on never having laid off an employee as a result of closing a coal plant and intends to maintain that record with regard to the upcoming retirement of Sherco. During the Metro Emissions Reduction Project (MERP) in 2008, when we closed coal operation at our Riverside and High Bridge plants, we found all employees other opportunities. More recently, in 2012, when we shut down coal operation at our Black Dog plant, again all of employees were moved to other plants or other areas within the company.

We have begun a similar plan to support the transition at our Sherco coal site and will ensure all current employees will continue to have jobs. While exact transition plans are still under development, we have done significant planning for the transition and have been in regular communications with plant employees. While we expect attrition and retirement will outweigh our staffing needs at those plants, we also have several transition resources that include, but

are not limited to, internal technical training, internal enterprise-wide learning courses, tuition reimbursement, relocation reimbursement, retention/ premium pay, and external micro-credentials reimbursement, etc. Impacted workers will be able to leverage internal and external resources to upskill or reskill in order to transition into other positions in the Company.

Xcel Energy is also working with Sherburne County and the City of Becker to expand commercial and industrial opportunities in the area.

Q. PLEASE PROVIDE A SUMMARY OF YOUR TESTIMONY.

A. In my Direct Testimony, I provide an overview of the Energy Supply business area and the value it provides to customers. Next, I describe Energy Supply's capital budget planning and oversight. I also describe Energy Supply's capital investments for 2022, 2023, and 2024, followed by a similar discussion for our O&M expenses. Lastly, I discuss the operating performance of our key assets and operating model initiatives.

Q. PLEASE SUMMARIZE THE COMPANY'S CAPITAL ADDITIONS DURING THE 2022 TEST YEAR AND 2023 AND 2024 PLAN YEARS.

A. Over the next three years, we anticipate lower capital additions compared to 2021 ($1.444 billion), which was a relatively high year due to the addition of a large number of wind farms – Dakota Range I and II, Freeborn County, Blazing Star II, and Mower County. These wind projects are currently being recovered in the Renewable Energy Standard (RES) Rider. As discussed by Company witness Benjamin C. Halama, the Company anticipates rolling these projects into base rates coincident with implementation of final rates in this rate case.

In 2022, we plan to place in service a total investment of $454.0 ($330.5) million in new renewable capital additions from the completion of the repowering of Nobles Wind Farm and the acquisition of the Northern Wind Farm project. Throughout my testimony, I note that dollar amounts are first presented on an NSPM basis followed by the State of Minnesota Electric Jurisdiction amount in parenthesis, unless otherwise noted. The Company will seek recovery of these wind projects through the RES Rider. Mr. Halama discusses the RES Rider in greater detail. In addition to the major investments for renewable generation we are making in our system, in 2022 we also plan to place in service significant capital projects at our dispatchable generating plants as part of our ongoing commitment to maintain reliability and performance of our assets and make environmental improvements that are valuable to our customers. Additionally, we are planning to implement other projects at our plants to ensure their long-term safe and reliable operation. These capital additions at our existing plants total approximately $83.9 ($61.1) million for NSPM in 2022. Consequently, our total capital additions for 2022 are expected to total $537.9 ($391.5) million.

In 2023, we plan to place in service total investments of $416.3 ($303.8) million in new renewable capital additions from the completion of the repowering of the Grand Meadow Wind Farm and the first phase of the Sherco Solar Project. In 2023, we plan to place into service capital additions at our existing plants of approximately $74.2 ($53.8) million. The vast majority of these additions, $62.9 ($45.6) million, are Reliability/Performance Enhancement investments, which are needed to maintain our generation fleet in good working order. This includes large projects at High Bridge, Anson, Blue Lake, and Inver Hills for our intermediate and Simple Cycle generation plants. Consequently, our total capital additions for 2023 are expected to total $490.5 million.

In 2024, we plan to place in service a total investment of $305.8 ($221.3) million in new renewable capital additions from the second, and last phase, of the Sherco Solar project. In 2024, we plan to place into service capital additions at our existing plants of approximately $65.7 ($47.5) million. The vast majority of these additions, $50.9 ($36.8) million, are Reliability/Performance Enhancement investments. This includes large projects at Black Dog, High Bridge, Riverside, and Blue Lake.

Q. PLEASE SUMMARIZE ENERGY SUPPLY'S O&M BUDGETS FOR THE 2022 TEST YEAR AND 2023 AND 2024 PLAN YEARS.

A. As I mentioned above, our O&M budgets are tracking the transformation of our generation fleet, which means the O&M spend associated with our coal generation is decreasing while the O&M spend associated with the maintenance of our growing wind fleet is increasing.

In support of our overall mission to maintain a safe and reliable generation fleet, we have budgeted $154.6 ($113.0) million for O&M expenses in 2022. The primary drivers of our 2022 O&M budget are additional costs for Blazing Star II, Mower County Wind, Freeborn Wind, employee annual wage increases, and select planned overhauls.

In 2023, we have budgeted $160.8 ($117.4) million for O&M expenses. The primary drivers of our 2023 O&M budget are additional material costs and labor costs due to large plant overhauls and land easement payment for the new wind asset Northern Wind purchased in 2022.

In 2024, we have budgeted $157.7 ($114.9) million for O&M expenses. The primary drivers of our 2024 O&M budget are additional costs associated with the maintenance and operation of the Sherco Solar project, which is offset by savings in long term wind maintenance contracts and employee attrition.

The O&M jurisdictional values in my testimony do not reflect the interchange offsets to Northern States Power Company-Wisconsin (NSPW); those values are shown in Exhibit___(RAC-1), Schedule 2.

Q. HOW IS THE REMAINDER OF YOUR DIRECT TESTIMONY ORGANIZED?

A. The remainder of my Direct Testimony is organized as follows:

- *Section II* – Energy Supply Business Unit
- *Section III* – Capital Investments
- *Section IV* – Compliance Items
- *Section V* – O&M Budget
- *Section VI* – Operating Performance
- *Section VII* – Conclusion

II. ENERGY SUPPLY BUSINESS UNIT

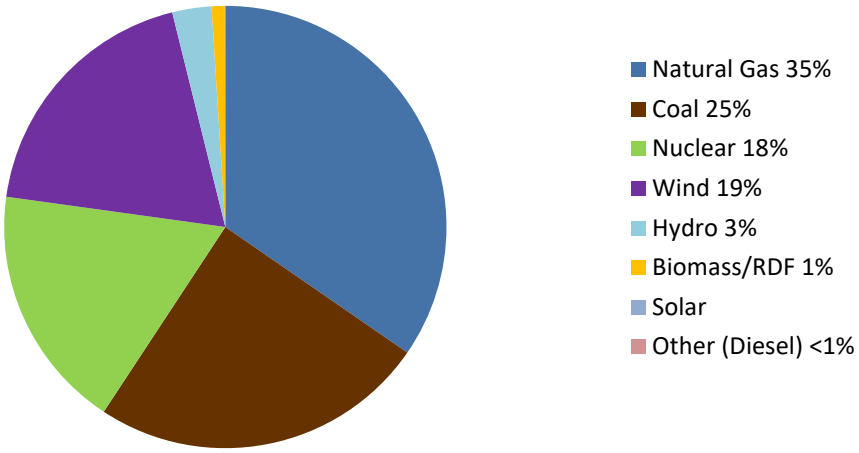
Q. PLEASE PROVIDE AN OVERVIEW OF THE NSP GENERATION PORTFOLIO.

A. The NSP Companies–NSPM and NSPW–own, operate, and maintain the NSP System that serves over 1.6 million electric customers in Minnesota, North Dakota, South Dakota, Wisconsin, and Michigan. Together, the NSP Systems' generating plants have a net maximum capacity of almost 9,700 megawatts (MW). Our generating facilities use a variety of fuel sources including natural

gas, coal, nuclear fuel, water (hydro), wind, biomass, refuse, solar, and oil. Figure 2 below shows the NSP System fuel mix as a percent of December 2020 owned installed capacity.

Figure 2

NSP System Owned Fuel Mix by Installed Capacity (MW) – December 2020

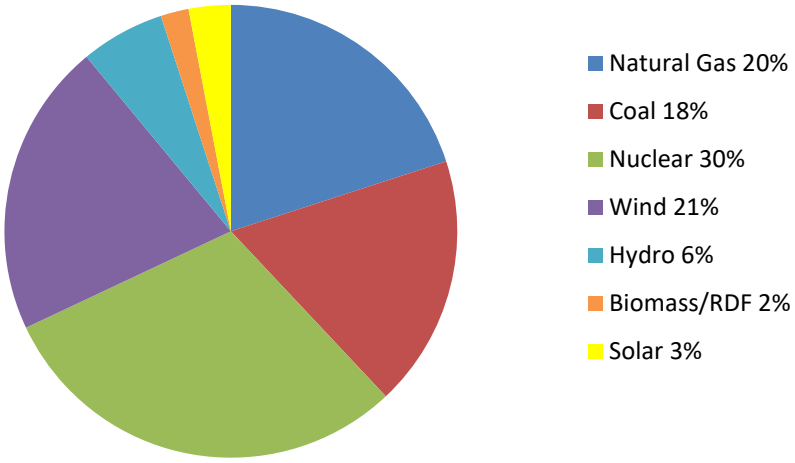


In addition to the owned installed capacity view of our generation facilities, I provide another representative view of how we are meeting customer needs, the actual generation view of our electricity production. While the focus of my testimony is limited to the generation that is owned by the Company, we also serve customer needs with power purchased pursuant to long-term Power Purchase Agreements (PPAs). We recover our energy costs (and some associated capacity costs) associated with our purchased power resources through a combination of base rates and the Fuel Clause Adjustment Rider, which is annually reviewed by the Commission in other proceedings. Figure 3 below shows the fuel mix as a percent of actual 2020 generation including PPAs.

Figure 3

NSP System Energy by Generator Type (MWH)

(Includes PPAs)



Q. HOW HAS THE COMPANY'S GENERATION PORTFOLIO EVOLVED OVER TIME?

A. Our generation portfolio has evolved as a result of state and federal energy policies and regulations and Company-driven efforts to improve efficiencies and environmental performance. Underlying all of that is customer preference, which continues to trend toward a preference for a generation mix that more heavily relies on renewable resources. For example, we have added material amounts of renewable energy to the NSP System from 2017-2020, including wind and solar resources. In 2021 and 2022, we will also see significant investment in new wind facilities. I discuss these investments later in my testimony.

Q. DO YOU EXPECT THE RESOURCE MIX TO CONTINUE TO EVOLVE OVER THE NEXT SEVERAL YEARS?

A. Yes. As discussed in our current IRP, we expect our resource mix to continue

to shift away from coal resources and incorporate higher levels of renewable resources. Our plan also utilizes existing and incremental firm dispatchable resources – including natural gas units – to ensure reliability as we transition away from these legacy coal assets. Our plan is a response to several factors, including our commitment to carbon-free energy, the declining cost of renewable energy, customer preference, and the age of some of our existing generation units. Our proposed framework for meeting future generation needs is further outlined in our 2020-2034 Upper Midwest Resource Plan submitted to the Commission July 1, 2019 in Docket No. E002/RP-19-368, as well as the subsequent Supplement Plan filing submitted June 30, 2020, and our Alternate Plan submitted June 25, 2021.

Q. HOW DOES ENERGY SUPPLY SUPPORT THE COMPANY'S GENERATION PORTFOLIO DESCRIBED ABOVE?

A. Energy Supply makes capital investments and incurs O&M costs to support existing generation plants, maintain and update generation facilities, and invest in new resources where appropriate. As a general matter, we must make investments each year to keep our plants running safely, reliably, and efficiently to support our customers' needs and reduce future financial risk to our customers. However, new generation resources tend to be the largest drivers of our capital budget, while overhauls of existing plants tend to drive O&M and contribute to capital maintenance programs and timing. I discuss our capital investments and O&M trends in more detail below.

III. CAPITAL INVESTMENTS

A. Overview of Energy Supply's Capital Investments

Q. WHAT IS THE PURPOSE OF THIS SECTION OF YOUR TESTIMONY?

A. In this section, I discuss how the Energy Supply business unit develops its annual capital budget, and explain how Energy Supply identifies, prioritizes, and manages capital projects within the confines of the capital budget. I also discuss recent capital budget trends for Energy Supply.

Q. GENERALLY SPEAKING, WHAT TYPE OF CAPITAL INVESTMENTS ARE MADE BY THE ENERGY SUPPLY ORGANIZATION?

A. Energy Supply makes capital investments to bring new generation assets online, to maintain the performance of existing generation assets, and to keep our existing generation assets in good working order. Our capital investments in our existing assets are usually related to replacing degraded equipment or to ensure compliance with changing state or federal environmental regulations.

Q. WHAT ARE THE BASIC CATEGORIES OF ENERGY SUPPLY'S CAPITAL BUDGET?

A. At the highest level, the capital budget can be described as consisting of base capital and major capital. Base capital projects are considered a part of the normal plant operation cycle necessary to preserve and maintain operation of our existing plants. Major capital projects are large, unique projects that have special regulatory requirements and are initiated in support of strategic corporate goals for the addition of generation capacity, or significant extension of the operational life of a generation asset, in support of the Integrated Resource Plan.

Q. HOW DOES ENERGY SUPPLY FURTHER BREAK DOWN ITS CAPITAL ADDITIONS?

A. Our capital projects fall into three capital budget groupings: 1) Renewable and New Generation, 2) Reliability/Performance Enhancement, and 3) Environmental Improvement. In my testimony, I discuss the capital budget from both the capital budget grouping perspective and the individual plant or generation resource perspective for 2022 through 2024.

Q. PLEASE DESCRIBE THE TYPES OF INVESTMENTS THAT FALL INTO THE FIRST CAPITAL BUDGET GROUPING, RENEWABLE AND NEW GENERATION PROJECTS.

A. Various circumstances such as changing system requirements, policy goals, or the opportunity for customer savings may necessitate the construction of new generation units, repowering of existing generating units or the decommissioning of old generating units. In this case, the Company is forecasting material investment in renewable generation that will further our and the State's carbon-reduction goals.

Q. PLEASE DESCRIBE THE TYPES OF INVESTMENTS THAT FALL INTO THE SECOND CAPITAL BUDGET GROUPING, RELIABILITY/PERFORMANCE ENHANCEMENT PROJECTS.

A. Our generating stations are large, complex machines that require regular maintenance to ensure that they are operating reliably and efficiently, consistent with their design. Many of our capital additions take the form of routine investments that may involve replacing worn or obsolete parts of our generating units. We also routinely make safety repairs and improvements at our plants to maintain a safe working environment for our employees and satisfy new codes and regulations. We consider these types of capital additions the baseline of our capital spend, and they make up the majority of our base capital budget.

We also undertake Reliability/Performance Enhancement projects that are intended to improve the functioning of existing plants. An example of a Reliability/Performance Enhancement project is air heater heat transfer surface section replacements at Sherco. As heat transfer surface "baskets" fail, heat transfer decreases and the unit heat rate subsequently suffers, which in turn increases the amount of fuel required to create the same electrical output which increases CO2 emissions on a per MWh basis. Therefore, this type of project reduces CO2 emissions intensity and reduces fuel costs. By replacing these basket sections, the Company enhances performance with more efficient equipment, ultimately providing more efficient production to meet our customers' needs.

Q. PLEASE DESCRIBE THE TYPES OF INVESTMENTS THAT FALL INTO THE THIRD CAPITAL BUDGET GROUPING, ENVIRONMENTAL IMPROVEMENT PROJECTS.

A. Our plants may require new systems and components to continue to operate reliably and consistently with new regulatory requirements. This type of capital addition can include replacing degraded environmental components or the addition of new environmental technology such as mercury sorbent injection and other emissions controls. Such capital projects are generally larger than routine maintenance projects and are planned over a longer period. Many of our capital additions serve multiple purposes, but for budgeting purposes, we classify the capital project according to its primary purpose.

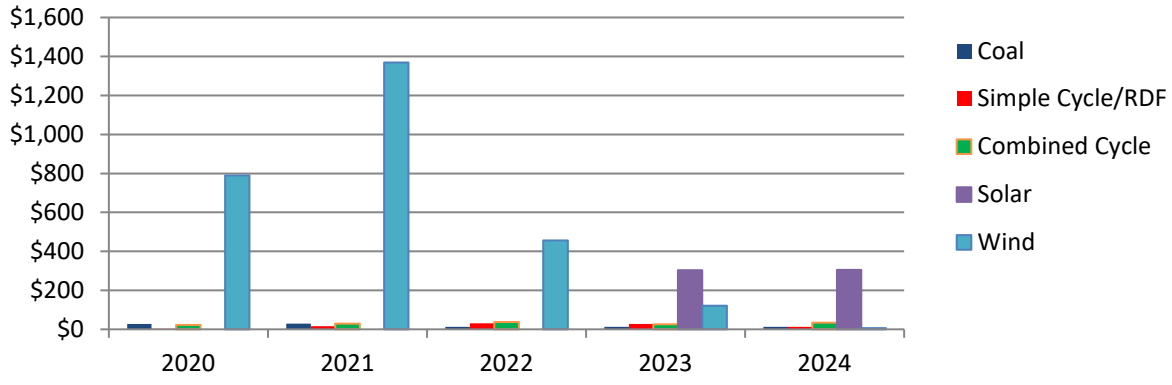
B. Energy Supply Capital Budget Development

Q. PLEASE MAKE THE BUSINESS CASE FOR THE ENERGY SUPPLY CAPITAL PROGRAM.

A. Energy Supply's capital program during the 2022, 2023, and 2024 is built around the implementation of Commission-approved projects and those projects pending Commission approval to propel us into our carbon-free future. The remainder of our capital program supports one of the most fundamental activities of an electric utility: the safe and reliable generation of electricity.

Over 90 percent of our capital investments from 2020-2024 are devoted to placing in service 1,869 MW of new wind and solar projects and 300 MW of repowering projects. Figure 4 below shows this dramatic capital investment in wind generation that is particularly pronounced in 2020 and 2021 and how investments shift toward solar in 2023 and 2024.

Figure 4
Annual Capital Additions by Generation Type
($ millions)



These wind and solar resources benefit customers through reduced fuel costs, reduced carbon emissions, and increasingly as a cost-effective way to meet our capacity needs. The wind repowering and acquisition projects have already been approved by the Commission, and the Sherco Solar project is pending before the Commission at this time in Docket No. E002/M-20-891. Energy Supply's remaining capital investments are necessary, because operating electric generation resources is a complex and capital-intensive process. Generation resources need continual oversight, maintenance, and improvement. As resources age and market conditions change, the needs of the plants change, often shifting to investments in maintaining the plant. We also make the capital investments necessary to remain compliant with all environmental and legal mandates.

We recognize that it is critical to provide our customers with cost-effective electricity. As I discuss below, we manage our capital investments accordingly, by timing investments where possible to keep costs reasonably level over time. I will also discuss processes we have employed to ensure the costs of any given project are reasonable. While we cannot control the timing of investments in every circumstance, we maintain a disciplined capital planning and investment process to support the provision of reliable and safe energy at cost-effective prices.

Q. PLEASE DESCRIBE THE PROCESS THE COMPANY USES TO DETERMINE ITS CAPITAL INVESTMENT PLAN FOR ENERGY SUPPLY.

A. The annual capital budget for Energy Supply is based on the relationship between corporate management of overall finances and the business needs Energy Supply identifies in order to maintain our power plants and address new

generation needs. Company witness Ms. Melissa L. Ostrom explains how the Company establishes overall business area capital spending guidelines and budgets based on financing availability, specific needs of business areas, and overall needs of the Company. Within Energy Supply, we use a rigorous planning process to determine which projects to undertake and when. Multiple factors drive our capital requirements, including the in-service dates of new generation, safety, customer demand, environmental regulations, and unit operational condition. Each year, our plants submit proposed capital projects for the next year based on the requirements, needs, and goals of each plant and planned new generating stations to help us achieve our carbon-free future.

The proposed projects are then evaluated and ranked according to their financial and operational merits, such as costs, benefits, and impact on reliability. Evaluated projects include those that may be completed in a single year, as well as those that will require multiple years to execute and complete. The result of this review process is a ranked list of potential projects for a given year, which is evaluated against the available capital budget for that year, planned new generation, as well as the planned unit outage schedule for the next several years and known regulatory factors, such as new environmental regulations.

Q. WHAT HAPPENS IF THE PROJECTS IDENTIFIED BY ENERGY SUPPLY OUTPACE THE AVAILABLE FUNDING?

A. Often the desired initial budget exceeds the spending guidelines, which then requires review meetings with Company leaders to assess the requested budget and determine a different course of action. Because this happens throughout the Company, a higher or lower percentage of the Company's overall resources may be allocated to Energy Supply in any given year, depending on the priority

of needs of the Company. To determine the urgency of the need for projects not specifically required for compliance, we often rely on performance data, engineering studies, and equipment health and asset data to identify the equipment that presents the greatest risk of failure.

Ultimately, the needs of our generation plants and Company goals with respect to new future generation resources are balanced against the overall funding available to arrive at an appropriate budget for the Energy Supply business area.

Q. PLEASE EXPLAIN THE PROCESS YOU FOLLOW TO MANAGE PROJECT COSTS DURING THE IMPLEMENTATION OF A CAPITAL PROJECT.

A. Capital budgets are finalized at least one year prior to the start of project execution. Part of the project development process includes the identification of key schedule dates and budgetary milestones. Once a capital project has been approved for execution, it is assigned to a Project Manager (PM), typically three to six months in advance of the first planned activity required to commence the project. The PM is responsible for working with the plant to review and more fully develop the schedule and monthly cash flow requirements for the assigned project. The PM will typically contact vendors and contractors to gather cost and schedule data for the anticipated scope of the project, and begin engineering and purchasing activities. If the PM identifies specific information related to changes in cost or the schedule, he or she advises management and recommends options for consideration. Management then responds as appropriate.

Q. PLEASE EXPLAIN THE PROCESS ENERGY SUPPLY FOLLOWS TO MANAGE PROJECT PROCUREMENT COSTS.

A. Part of the responsibilities of the PM is to work with our Supply Chain function

to procure the goods and services we require to meet Energy Supply's mission through competitive supply contracts. Our policies require that all purchases of goods or services greater than $50,000 must be competitively bid. There is an allowance on rare occasions for sole source procurement, but justification for such actions is limited, and we require approval of such sole source contracts at the Director level. The use of competitively-bid Master Services Agreements (MSAs) and other competitively-bid contracts helps to ensure that we receive the best value from our suppliers and contractors, which benefits our customers.

Q. WHAT DOES ENERGY SUPPLY DO TO ADAPT TO CHANGING CONDITIONS THAT MAY OCCUR DURING A PARTICULAR YEAR?

A. As described earlier, when the need to implement unbudgeted projects arises, we try to find ways to fund these needs by deferring comparable but less urgent capital projects. If there are instances where we have an unexpected need to undertake a large project that we cannot offset but which would benefit our customers, a capital budget target adjustment may be requested and reviewed by our Financial Counsel and Board of Directors prior to approval to move forward.

In short, with rare exceptions that must be managed within overall Company limitations, Energy Supply is required to manage projects to match our capital budget in each year.

Q. HAS PROJECT MANAGEMENT AND BUDGET MANAGEMENT BEING ONGOING IN THE YEARS SINCE THE COMPANY'S LAST RATE CASE IN 2016?

A. Yes. It is important to our strategic priority of keeping customer bills low to

ensure that our budgets and projects are managed effectively year over year. In addition, Company witness Mr. Greg P. Chamberlain discusses that the Company's capital true-up has provided additional customer benefits and protections over the last several years, as it ensures customers do not pay for more capital investment than the Company actually makes in a given year. Combined with Energy Supply's attention to its budgets, there are multiple ways by which the Commission can ensure that our total capital budgets are reasonable in any given year.

C. Capital Investment Trends for 2018 to 2020

Q. FOR 2018-2020, WHAT WERE ENERGY SUPPLY'S KEY STRATEGIC GOALS AND FOCUS AREAS THAT DROVE CAPITAL INVESTMENTS?

A. For 2018-2020, our capital addition levels were primarily driven by the completion of several wind generation facilities such as the Blazing Star I wind farm in 2020, $334.4 ($243.2) million, Crowned Ridge II in 2020 $316.2 ($230.0) million, Foxtail Wind Farm in 2020, $245.6 ($178.6) million, Lake Benton Wind Farm in 2019 $165.5 ($120.4), Jeffers Wind Farm in 2020 $72.6 ($52.8) million, Community Wind North in 2020, $66.2 ($48.1) million. We also placed our newest natural gas dispatchable generation unit at Black Dog Unit 6 in-service in 2018, $86.8 ($63.1) million. We continued a steady execution of our investment plan with a focus on overall plant maintenance and support. In total, our 2018-2020 average annual capital additions were approximately $494.4 ($359.6) million. Our 2018-2020 average annual capital additions at existing facilities, excluding new generation, were approximately $64.7 ($47.1) million.

Q. FOR 2018-2021, CAN YOU PROVIDE A SUMMARY OF HOW YOUR INVESTMENTS FELL INTO ENERGY SUPPLY'S THREE CAPITAL BUDGET GROUPINGS?

A. Yes. Table 1 below shows the breakdown of costs by each capital budget grouping for 2018 through 2021.

Table 1

2018–2021 Actual Capital Additions (With AFUDC)

Northern States Power Company-MN ($ millions)				
	2018 Actual	**2019 Actual**	**2020 Actual**	**2021 Forecasted**
Renewable and New Generation	$ 88.8	$ 429.6	$ 789.2	$ 1,364.9
Reliability/Performance Enhancement	$ 90.8	$ 23.4	$ 52.3	$ 71.5
Environmental Improvement	$ 4.7	$ 2.5	$ 1.9	$ 7.8
Total	**$ 184.4**	**$ 455.6**	**$ 843.4**	**$ 1,444.1**

Q. PLEASE EXPLAIN WHAT IS DRIVING THE INCREASE IN CAPITAL ADDITIONS IN 2019 AND 2020.

A. Our increased capital additions in 2019 and 2020 were due to Renewable and New Generation capital additions to complete the Blazing Star I, Foxtail, Lake Benton, Crowned Ridge II, Jeffers, and Community Wind North wind farms.

Q. PLEASE EXPLAIN WHY THE PERCENTAGES OF YOUR INVESTMENTS IN THESE GROUPINGS CHANGED OVER THESE THREE YEARS.

A. Energy Supply must balance the need to make investments to propel us into a carbon-free future, the needs of our existing plants to operate safely and reliably, available capital within the Company, and the overall impact of our capital spend pattern on customers. As I discuss further below, our investments in existing plants so that they continue to operate safely and reliable are generally

steady, and we can manage to the budget by prioritizing necessary projects. That said, our larger investments in new generating facilities can be less consistent in that we make significant capital additions when in-servicing new plants or replacing assets when they reach end of serviceable life. To account for these significant capital additions, we often need to reallocate other work. Consequently, the Company's investments in capital budget groupings vary somewhat by year, and include some amount of work that was deferred from previous years.

Q. PLEASE DISCUSS ENERGY SUPPLY'S FORECASTED CAPITAL ADDITIONS FOR 2021.

A. In 2021, we are forecasting total capital additions of $1.444 ($1.048) billion. Our forecasted Renewable and New Generation capital additions of $1.365 ($0.991) billion in 2021 are primarily for the Dakota Range I and II, Blazing Star II, Freeborn County and Mower County wind farm projects. Reliability/Performance Enhancement and Environmental Improvement capital additions are forecasted at $79.3 ($57.6) million. These include Reliability/Performance Enhancement projects for the auxiliary boilers at Sherco, combustion turbine major overhaul and compressor upgrade at Riverside Unit 10 as well as a project completed during the planned Riverside Unit 7 overhaul to replace the L-1 stage of steam turbine blades. We also replaced control systems on several of our generating units including Riverside Unit 9 and 10, Blue Lake Unit 7 and 8, and Allen S. King.

At Sherco, we replaced the Unit 1 air heater baskets and steam turbine control valve internals during a planned overhaul, and will be finishing the Sherco Unit 3 fabric filter bag replacement project by the end of the year. The Red Wing

Unit 1 generator was re-wound, and the fabric filter bags will be replaced at Wilmarth Unit 1 by the end of the year.

D. Overview of Capital Investments for 2022 to 2024

Q. LOOKING AHEAD, WHAT ARE YOUR CAPITAL ADDITIONS BUDGETS FOR 2022-2024 BY CAPITAL BUDGET GROUPING?

A. Table 2 below illustrates that, overall, our 2022-2024 average capital additions break down into approximately $397.0 ($289.0) million for Renewable and New Generation, $62.4 ($45.4) million for Reliability/Performance Enhancement and $7.3 ($5.3) million for Environmental Improvement.

Table 2

2022 – 2024 Forecasted Capital Additions (With AFUDC)

Northern States Power Company–MN ($ millions)			
	2022 Budget	**2023 Budget**	**2024 Budget**
Renewable and New Generation	$ 455.2	$ 424.6	$ 311.2
Reliability/Performance Enhancement	$ 73.4	$ 62.9	$ 50.9
Environmental Improvement	$ 9.3	$ 3.0	$ 9.5
Total	**$ 537.9**	**$ 490.5**	**$ 371.5**

Q. PLEASE PROVIDE AN OVERVIEW OF ENERGY SUPPLY'S BUDGETED CAPITAL ADDITIONS FOR 2022.

A. In 2022, we are budgeting total capital additions of $537.9 ($391.5) million. Our budgeted Renewable and New Generation capital additions of $455.2 ($331.3) million in 2022 are mainly for repowering of the Nobles and acquisition of the Northern Wind farms. Reliability/Performance Enhancement and Environmental Improvement capital additions are $82.6 ($60.1) million. These

include Reliability/Performance Enhancement projects for combustion turbine hot gas path overhauls at Black Dog unit 5 and Anson Unit 4. We have also undertaken Environmental Improvement projects primarily for construction of landfill cell 4 for Sherco Unit 3.

Q. PLEASE PROVIDE AN OVERVIEW OF ENERGY SUPPLY'S BUDGETED CAPITAL ADDITIONS FOR 2023.

A. In 2023, we are budgeting total capital additions of $490.5 ($356.4) million. Our budgeted Renewable and New Generation capital additions of $424.6 ($308.6) million in 2023 are mainly for the repowering of the Grand Meadow wind farm and the completion of the first phase of the proposed Sherco Solar I project that is currently being reviewed by the Commission. Reliability/Performance Enhancement and Environmental Improvement capital additions are $65.9 ($47.9) million. These include Reliability/Performance Enhancement projects for Hot Gas Path replacements at Blue Lake Unit 8 and Anson Unit 2. We also intend to perform a combustion turbine major overhaul including exhaust system replacement on High Bridge Unit 8.

Q. PLEASE PROVIDE AN OVERVIEW OF ENERGY SUPPLY'S FORECASTED CAPITAL ADDITIONS FOR 2024.

A. In 2024, we are forecasting total capital additions of $371.5 ($269.5) million. Our forecasted Renewable and New Generation capital additions of $311.2 ($225.8) million in 2024 are mainly for the completion of the Sherco Solar II farm. Reliability/Performance Enhancement and Environmental Improvement capital additions are $60.3 ($43.7) million. These include Reliability/Performance Enhancement projects for Hot Gas Path replacements at Blue Lake Unit 7, High Bridge Unit 7, and Riverside Unit 9.

Q. WHAT KEY PROJECTS WILL YOU BE INVESTING IN OVER THE TERM OF THIS MULTI-YEAR RATE PLAN?

A. The investment in Renewable and New Generation projects, namely, the repowering of the Nobles and Grand Meadow wind farms, acquisition of the Northern Wind farm and the proposed Sherco Solar project drives our overall capital investment strategy during the term of this multi-year rate plan. In 2022, we anticipate placing the repowered Nobles and newly acquired Northern Wind farms in service ((approximately $454.0 ($330.5) million with AFUDC)). The remainder of our capital spend is largely driven by the items listed above and our base investments required to keep our generation fleet operating safely and reliably producing electricity, and overhauls required to complete repairs.

Q. WHAT OTHER CAPITAL PROJECTS DO YOU EXPECT TO DRIVE YOUR INVESTMENTS OVER THESE YEARS?

A. Our combined cycle plant and simple cycle capital additions are largely dependent on individual unit overhaul cycles. Equipment and systems that comprise a generating unit have life expectancies and inspection/replacement cycles defined by their manufacturers and prudent industry practices. These cycles may be defined by different measurable criteria, *i.e.,* hours and starts. At intervals throughout the equipment life, inspections are performed to gauge if the actual degradation is following the calculated trend. When the equipment degradation trend approaches end of life, a replacement project is budgeted for the next opportunity that does not affect availability. For most major equipment components, these repairs and inspections must take place during an overhaul when the unit is offline and equipment can be safely disassembled.

Depending on the type of generating unit, the costs will vary. Overhauls at coal generation plants are a combination of O&M costs and capital costs because it is often necessary to clean, inspect, and repair other areas of the plants (an O&M cost) concurrently with undertaking the capital upgrades. Overhauls at combined cycle plants are largely capital costs, due to the replacement of combustion turbine parts. The turbine parts, as part of the inherent design of these plants, are exposed to extremely high temperatures and repeated thermal cycles, and therefore have shorter life expectancies and are more prone to thermal fatigue failure than those in our baseload fleet and therefore require more frequent replacement.

Q. HOW DO ENERGY SUPPLY'S CAPITAL INVESTMENTS FOR 2022 TO 2024 COMPARE TO HISTORICAL TRENDS?

A. Tables 3 and 4 below show Energy Supply's actual and planned capital expenditures and plant additions for 2018 to 2024 separated into two categories. The first category represents the projects related to major investments in new wind, solar, and combustion turbine facilities. This category also includes the repowering projects and some near-term investments to provide a generation tie line from Sherco to southwest Minnesota. The second category "Base" represents the ongoing and routine investments in our existing generation facilities. As these tables illustrate, our capital additions in 2021 peak at levels significantly higher than other years due to the in-servicing of the Dakota Range I and II, Blazing Star II, Mower County and Freeborn wind farms. Our capital additions for 2022, 2023, and 2024 are similar to the previous four-year average as a result of the major investments in repowering wind facilities, new wind acquisition, and the Sherco Solar project.

Table 3

2018-2024 Capital Expenditures (Excludes AFUDC)

Northern States Power Company–MN ($ millions)							
	2018 Actual	**2019 Actual**	**2020 Actual**	**2021 Forecasted**	**2022 Budget**	**2023 Budget**	**2024 Budget**
ES – New Generation and Repowering	$ 316.7	$ 600.2	**$ 991.3**	$ 657.8	$ 565.8	$ 392.5	$ 467.1
MN Jurisdiction	$ 230.3	$ 436.5	**$ 720.9**	$ 477.4	$ 411.8	$ 285.7	$ 340.0
ES – Base	$ 89.6	$ 54.2	**$ 71.1**	$ 97.3	$ 107.6	$ 74.9	$ 73.8
MN Jurisdiction	$ 65.2	$ 39.4	**$ 51.7**	$ 70.6	$ 78.3	$ 54.5	$ 53.7
Total	**$ 406.3**	**$ 654.5**	**$1,062.5**	**$ 755.1**	**$ 673.4**	**$ 467.4**	**$ 540.9**
Total MN Jurisdiction	$ 295.5	$ 475.9	**$ 772.6**	$ 548.0	$ 490.1	$ 340.2	**$ 393.7**

Table 4

2018-2024 Capital Additions (With AFUDC)

Northern States Power Company–MN ($ millions)							
	2018 Actual	**2019 Actual**	**2020 Actual**	**2021 Forecasted**	**2022 Budget**	**2023 Budget**	**2024 Budget**
ES – New Generation and Repowering	$ 86.8	$ 417.4	$ 786.1	$ 1,351.9	$ 449.7	$ 420.1	$ 308.0
MN Jurisdiction	$ 63.1	$ 303.6	$ 571.7	$ 981.2	$ 327.3	$ 305.8	$ 224.2
ES– Base	$ 97.5	$ 38.1	$ 57.3	$ 92.3	$ 88.2	$ 70.4	$ 63.5
MN Jurisdiction	$ 70.9	$ 27.7	$ 41.7	$ 67.0	$ 64.2	$ 51.2	$ 46.2
Total	**$ 184.3**	**$ 455.6**	**$ 843.4**	**$ 1,444.1**	**$ 537.9**	**$ 490.5**	**$ 371.5**
Total MN Jurisdiction	$ 134.0	$ 331.3	$ 613.4	$ 1,048.2	$ 391.5	$ 357.0	**$ 270.4**

Q. WHAT DO THESE TABLES ILLUSTRATE REGARDING CAPITAL EXPENDITURES VERSUS CAPITAL ADDITIONS?

A. Tables 3 and 4 illustrate that our overall capital expenditures in existing plants

(Base) will remain within a range of $74 to $110 million over the three-year plan period. The variations in base expenditures are primarily driven by the timing of investments in the intermediate and dispatchable generating units. The alignment of annual capital expenditures to annual capital additions for base projects illustrates the shorter cycle time from spending to completion and the relatively consistent/routine nature of this work as compared to the new projects which have much longer cycle times (spanning several years) before they are placed in service and counted in the capital additions. The tables also illustrate how the amount of total expenditures and total additions are driven in large part by the new generation and repowering projects, which comprise over 87 percent of the total spend and over 88 percent of the total additions over this seven-year period.

E. Major Planned Investments for 2022 to 2024

Q. WHAT IS THE PURPOSE OF THIS SECTION OF YOUR TESTIMONY?

A. The multi-year rate plan statute, Minn. Stat. § 216B.16, subd. 19, requires that a utility provide "a general description of the utility's major planned investments over the plan period." This section of my testimony discusses the major planned investments Energy Supply anticipates completing in 2022 through 2024.

Q. HOW DID ENERGY SUPPLY IDENTIFY THE PROJECTS THAT FALL WITHIN THIS CATEGORY OF INVESTMENTS?

A. In general, we consider a project to be a major planned investment if it is a unique project that will require a greater than normal quantity of Energy Supply resources to complete. Most often, major capital projects for Energy Supply involve investments in new generation assets. They could also be replacements

at existing sites where older equipment is being retired, new equipment that is replacing the capacity/energy, or new build sites for capacity/energy additions.

Q. WHAT MAJOR PLANNED INVESTMENTS DOES ENERGY SUPPLY ANTICIPATE COMPLETING OVER THE PERIOD OF THIS MULTI-YEAR RATE PLAN?

A. As shown in Table 5 below, we anticipate undertaking three major planned investments: (1) Sherco Solar project; (2) repowering at the Nobles wind farm, and (2) acquisition of the Northern Wind Project. I note that the costs of the Sherco Solar project and the two wind farms are expected to be recovered through the RES Rider. I am including these projects here as they also qualify as major planned investments during the plan period. Mr. Halama will provide additional information on RES Rider recovery for these projects.

Table 5

Energy Supply's Major Planned Investments

	Capital Additions ($ millions)		
	2022	**2023**	**2024**
Sherco Solar Project (Phase I)	$ 0	$304.0	$305.8
Nobles Repowering	$230.4	$2.4	$0.2
Northern Wind	$223.6	$1.4	$0

These four major planned investments, as well as the additional key capital projects we anticipate completing in 2022, 2023, and 2024, are discussed in more detail below.

F. 2022 Key Capital Additions

Q. WHAT CAPITAL PLANT ADDITIONS IS THE COMPANY PROPOSING TO PLACE IN SERVICE IN 2022?

A. For 2022, we are requesting to place in rates the costs associated with approximately $537.9 ($391.5) million of plant additions. Significant (over $2.5 million) capital plant additions include:

- Repowering of the Nobles Wind Farm,
- Northern Wind Project Acquisition,
- Riverside Water Treatment System Replacement,
- HGP Overhaul Black Dog Unit 5, and
- HGP Overhaul Angus Anson Unit 4.

Further, we are seeking to make approximately $65.1 ($47.4) million in 2022 capital additions related to smaller projects (projects under approximately $2.5 million) at our various plants. Exhibit___(RAC-1), Schedule 3 provides a list of all capital projects that we are seeking to include in rate base for 2022, their capital addition costs, and their estimated in-service dates. Exhibit___(RAC-1), Schedule 4 provides a project description and information regarding why each project is needed. I address all of our major capital projects and most of our larger capital projects (above approximately $1 million) in further detail below in my discussion regarding each generating plant.

1. Renewable Facilities

Q. IS THE COMPANY PLACING ANY MAJOR RENEWABLE PROJECTS IN SERVICE IN 2022?

A. Yes. We will be placing two major renewable wind farm projects in service in 2022: the repowering of the Nobles Wind Farm and the acquisition of the

Northern Wind Farm. As noted earlier, the costs for both of these wind farms are expected to be recovered through the RES Rider.

Q. DESCRIBE THE NOBLES REPOWERING PROJECT.

A. The existing Nobles Wind Farm is a 200 MW wind farm currently in operation in Nobles County, Minnesota. The repowering project will replace certain components of the existing wind farm with upgraded components such as blades, hubs, and gearboxes to increase the average annual energy production from the facility. The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession by putting people to work and increasing the amount of low-cost renewable energy customers receive.[9] I summarize all of Energy Supply's Relief & Recovery projects in Section IV. We are forecasting $230.4 ($167.7) million in 2022 capital additions to repower the Nobles Wind Farm. The Company plans to seek recovery for the Nobles Repowering Project in the RES Rider.

Q. DESCRIBE THE NORTHERN WIND PROJECT.

A. The Northern Wind project is a Build, Own, Transfer (BOT) project between Xcel Energy and ALLETE Clean Energy (ACE). ACE currently owns the project elements and will manage the reconstruction of a new 80 percent Production Tax Credit (PTC) eligible wind farm. Xcel Energy will purchase and operate the Northern Wind project following construction. The Northern Wind project consists of repowering two existing wind sites comprised of the existing Chanarambie (85.5 MW) and Viking (12 MW) projects, along with the

[9] *See* Docket No. E,G999/CI-20-492.

adjacent Rock Aetna (20 MW) greenfield wind project, all located in southwest Minnesota along the Buffalo Ridge. Chanarambie and Viking II wind farms are currently under a Power Purchase Agreement (PPA) with Xcel Energy and Rock Aetna is known as the expansion project pursuant to the Purchase and Sales Agreement (PSA) executed by the companies on February 4, 2021. The Northern Wind Project will update the existing generation with new technology providing up to 120 MW of nameplate power. We are forecasting $223.6 (162.8) million in 2022 capital additions to acquire the three elements of the Northern Wind Project. The Company plans to seek recovery for the Northern Wind Project in the RES Rider.

Q. ARE ANY OTHER CAPITAL PROJECTS PLANNED FOR THE COMPANY'S WIND FACILITIES IN 2022?

A. Yes. We are forecasting approximately $2.1 ($1.5) million in 2022 plant additions for our existing wind facilities that consist mainly of gearbox, generator, transformer replacement projects and some project closeout capital additions on new facilities placed in service in earlier years. Schedules 3 and 4 provide additional information regarding these capital projects.

Q. PLEASE DISCUSS THESE GEARBOX, GENERATOR, AND TRANSFORMER REPLACEMENT PROJECTS.

A. Gearbox, generator, and transformer failures have been occurring throughout the wind industry, and we consequently have a need to replace this equipment as failures occur. These types of capital investments are reflected in our projected capital additions at Grand Meadow, Nobles, Pleasant Valley, Border Winds, and Courtenay.

Q. WHAT STEPS HAS THE COMPANY TAKEN TO REDUCE THE NUMBER OF GEARBOX REPLACEMENTS?

A. We have started installation of oil monitoring equipment to help detect potential gearbox failures and limit the amount of damage, thereby increasing the core exchange value of the gearbox or in some cases allowing us to complete repairs as an O&M expense.

Q. PLEASE DISCUSS THE OTHER CAPITAL PROJECTS THAT ARE PLANNED AT THE COMPANY'S NEW WIND FARMS.

A. We have budgeted $2.4 ($1.7) million in 2022 capital additions to complete punch list and project closeout activities from the Crowned Ridge II BOT project that was placed in service in late 2020. This capital addition work is related to punch list activities that could not be completed in 2021 due to COVID-19 pandemic delays in obtaining materials, supplies, and labor to complete the site restoration and blade leading edge protection coating work.

We have also budgeted a credit of $6.9 ($5.0) million in 2022 capital additions related to the State of South Dakota Reinvestment Program sales tax refund which will be refunded to the Dakota Range I and II project account after project completion. This is a South Dakota economic development credit that will flow back to customers through the RES Rider as discussed by the Company in its 2021 RES Rider filing.[10]

[10] *In the Matter of the Petition of Northern States Power, doing business as Xcel Energy, for Approval of an Updated Renewable Energy Standard Rider Factor*, Docket No. E002/M-20-815, PETITION (November 5, 2020).

2. Coal Plants

Q. ARE ANY CAPITAL PROJECTS PLANNED FOR THE SHERCO PLANT IN 2022?

A. Yes. We are planning approximately $10.1 ($7.4) million in plant additions in 2022 for projects at Sherco Units 1, 2, and 3. These projects primarily relate to maintaining environmental compliance, reliability, and efficiency of these units as we prepare them for retirement. In 2022, there is a scheduled overhaul for Sherco Unit 2 consistent with its regular three-year overhaul schedule. With Sherco Unit 2 retirement at the end of 2023, we have materially limited the scope of the overhaul and planned additions to address only the projects that are critical to keep the unit operating through its remaining life. Included in Schedules 3 and 4 is a description of each individual project, its costs, in-service date, and the need for the project. The larger projects include replacement of the rotary plow feeder in the coal yard and the Unit 3 landfill cell 4 project.

Q. PLEASE DISCUSS THE ROTARY PLOW FEEDER CAPITAL PROJECT AT SHERCO.

A. We have budgeted $1.4 ($1.0) million in 2022 capital additions to replace the rotary plow feeder for conveyor 53 in the coal yard. The rotary plow feeder is used to reclaim coal stored in the coal barn and transport it into the plant. The existing rotary plow feeders have a poor performance history and if the rotary plow feeders are not operational, coal can become trapped in the barn and hot spots can form that could allow fires to develop.

Q PLEASE DESCRIBE THE LANDFILL CELL 4 CAPITAL PROJECT AT SHERCO.

A. This project involves the construction of a 24-acre, GCL/HDPE composite lined, ash landfill cell, cell 4, located south of cell 3 at Sherco Unit 3. The project includes an additional sump pump station, extension of fence and permitting (renewal for cell 4 and inclusion of cell 5). The new cell is necessary for the

continued disposal of Air Quality Control System (AQCS) ash from Sherco Unit 3. Without this additional cell, we would need to find an offsite location to dispose of ash generated from operations and pay to have it shipped to and disposed of at that location, which is a more expensive and less optimal solution. This project has total plant additions of $1.9 ($1.4) million in 2022.

Q. WHY IS THE COMPANY PROCEEDING WITH THESE PROJECTS WHILE THE FUTURE OPERATION OF SHERCO UNITS 2 AND 1 IS LIMITED, DUE TO THEIR RESPECTIVE RETIREMENT DATES OF 2023 AND 2026?

A. These investments are needed to preserve the reliable operation of these units in the near term, and to help ensure safe, reliable and environmentally-compliant operations for our customers until their retirement. Thus, it is important that these units are well-maintained until such time as they are removed from service. That said, we are managing spending in recognition of the retirement dates. For instance, Sherco Unit 2, which is scheduled to retire at the end of 2023, has only $1.1 ($.08) million of capital additions over the remaining investment years of 2022-2023, and Sherco Unit 1 has only $5.0 ($3.6) million of capital additions from 2022-2024. This represents a material reduction in the capital spend for these units.

Q. ARE ANY CAPITAL PROJECTS PLANNED FOR THE ALLEN S. KING PLANT IN 2022?

A. Yes. We are planning total capital plant additions of approximately $2.7 ($2.0) in 2022. In 2022, there is no scheduled major overhaul for the Allen S. King plant, and there are no significant (*i.e.,* over $1 million) capital additions. Schedules 3 and 4 identify all of our capital plant additions at the Allen S. King plant.

3. Combined Cycle Plants

Q. ARE ANY CAPITAL PROJECTS PLANNED FOR THE COMPANY'S COMBINED CYCLE PLANTS IN 2022?

A. Yes. We are planning capital additions of approximately $37.9 ($27.6) million at our combined cycle plants. These projects are mainly related to maintaining reliability and environmental performance. The largest (greater than $1 million) project additions are scheduled during the overhaul on Black Dog Unit 5/2. Other significant projects are planned for Riverside to replace the water treatment system and a region-wide project to install a digital asset modeling system. Schedules 3 and 4 provide additional information on these capital additions.

Q. PLEASE DISCUSS THE SIGNIFICANT 2022 CAPITAL PROJECTS AT BLACK DOG.

A. We are planning five significant capital project additions at Black Dog for 2022:

- Combustion Turbine Hot Gas Path Overhaul on Unit 5,
- Steam turbine L-0 blades on Unit 2,
- Digital Control System upgrade on Unit 5,
- 480V load centers, and
- Automated trap bypass valves on Unit 2.

Q. DESCRIBE THE BLACK DOG UNIT 5 COMBUSTION TURBINE HOT GAS PATH OVERHAUL PROJECT.

A. The Unit 5 combustion turbine hot gas path (HGP) overhaul is being performed per the OEM-recommended equivalent operating hours and starts. During a HGP overhaul, combustor parts are replaced, and complete rows of turbine blades and vanes are replaced. Installation work is performed during a planned overhaul. Other components are replaced as required based on

inspections, OEM recommendations and prudent utility practice. Significant inspections are also completed to assess the health of the turbine section and look for signs of long-term issues. This project also includes the replacement of the Row 3 and Row 4 combustion turbine blades, vanes, and ring segments. We have budgeted $11.2 ($8.2) million in 2022 capital additions to purchase parts and perform the HGP Overhaul project.

Q. DESCRIBE THE BLACK DOG UNIT 2 STEAM TURBINE L-0 PROJECT.

A. This project involves the replacement of Unit 2 steam turbine L-0 (last stage) blades. The current L-0 blades were installed in 1987 and will have more than 35 years of operation at the next steam turbine major overhaul. These blades typically have a life expectancy of between 20 and 40 years, or 160,000 to 320,000 equivalent operating hours, depending on operating conditions. This unit is more susceptible to water droplet erosion because of the lower main steam temperatures, especially during winter months. Recent inspections on these blades have shown evidence of more rapid moisture erosion than would be expected with this operating history. Failure of these blades would result in a significant unplanned outage to repair or replace. We have budgeted $2.4 ($1.8) million in 2022 capital additions to replace the Unit 2 steam turbine L-0 blades.

Q. DESCRIBE THE BLACK DOG DCS UPGRADE PROJECT.

A. This project is part of our Emerson Ovation Evergreen program. This is similar to the project in 2021 at Allen S. King, and all of our plants with Emerson Ovation are part of the Evergreen program as part of our efforts to standardize for reduction of costs and risks. We have budgeted $1.2 ($0.9) million in 2022 capital additions to perform Emerson Ovation Evergreen DCS upgrades.

Q. DESCRIBE THE BLACK DOG UNIT 480V LOAD CENTER PROJECT.

A. This project involves replacing the 480V load centers. Low voltage load centers 101, 102, and 103 are in need of replacement due to age and parts availability. Reliable load centers with circuit breakers are critical to personnel safety and equipment protection and must be able to open and shut off circuits/equipment under various operating conditions including overloads and emergencies. If the breakers do not function as expected, they could operate unexpectedly, which could result in a forced outage. More concerning, if the breakers do not operate when called upon, equipment could be damaged and personnel could be injured if the load/circuit is not interrupted quickly. The existing load centers are 1950s and 1960s vintage equipment and are at end of life. We have budgeted $1.1 ($0.8) million in 2022 capital additions to replace the 480V load centers.

Q. DESCRIBE THE BLACK DOG UNIT 2 AUTOMATED TRAP BYPASS VALVES PROJECT.

A. This project involves installing automated trap bypass valves on the Unit 2 steam turbine. More specifically, this project includes installation of automated bypass valves of existing steam traps off the high-pressure steam, low-pressure steam, gland steam, extraction steam, and turbine drain systems to ensure condensate is removed from these systems during startup, operation, and shutdown. With frequent unit cycling, these automated bypasses are critical for ensuring that condensate is drained from steam lines to prevent turbine water induction and other operational issues that could cause significant equipment damage and extended forced outages. We have budgeted $1.1 ($0.8) million in 2022 capital additions to install and automated trap bypass valves on Unit 2 steam turbine.

Q. PLEASE DISCUSS THE SIGNIFICANT 2022 CAPITAL PROJECT AT RIVERSIDE.

A. This project involves replacing the water treatment system. The existing system's serviceability has decreased to the point of requiring replacement. The scope of this project is to install one new Reverse Osmosis (RO) water treatment system within the existing building and reuse ancillary systems from the existing RO system. This water is used for generating steam in the Heat Recovery Steam Generators (HRSG). We have budgeted $2.7 ($2.0) million in 2022 capital additions to replace the water treatment system.

Q. ARE THERE ANY OTHER SIGNIFICANT CAPITAL PROJECTS THAT ENERGY SUPPLY PLANS TO COMPLETE IN 2022?

A. Yes, Energy Supply is implementing a region-wide project to provide Asset Performance Management Software. This project includes design, development, and implementation of a software model program of new digital assets for Energy Supply physical assets. The project creates new digital asset models that are utilized to simulate equipment condition, monitor equipment health, quantify operational risk and prioritize maintenance. This includes the creation of an asset criticality database as the foundation for model development in Asset Performance Management Software (new capital software installation) and digital twin models for wind turbines and combined cycle thermal generation equipment (digital model replication of physical asset). Development of the asset criticality database for utilization in the digital models requires a specific value and classification be assigned to each asset within the project scope to rank the impact a failure of the asset would have on business priorities. We have budgeted $1.3 ($0.95) million in 2022 capital additions for this project.

4. Simple Cycle and Refuse Derived Fuel Plants

Q. ARE ANY CAPITAL PROJECTS PLANNED FOR THE SIMPLE CYCLE AND REFUSE DERIVED FUEL PLANTS IN 2022?

A. Yes. We are planning $31.1 ($22.6) million in 2022 plant additions at our Simple Cycle and refuse derived fuel plants. These projects are mainly related to maintaining reliability and environmental performance. These project additions are scheduled during the overhauls on Angus Anson, Inver Hills, Blue Lake, Red Wing, and Wilmarth. Schedules 3 and 4 provide details on these projects.

Q. PLEASE DISCUSS THE SIGNIFICANT CAPITAL PROJECTS AT THE ANGUS ANSON PLANT.

A. We are planning two significant capital project additions at our Angus Anson plant for 2022:

- Hot Gas Path (HGP) Overhaul on Unit 4, and
- Combustion Turbine (CT) control system on Unit 4.

Q. DESCRIBE THE ANSON HOT GAS PATH (HGP) OVERHAUL PROJECT.

A. The Angus Anson Unit 4 combustion turbine hot gas path (HGP) overhaul is being performed per the Original Equipment Manufacturer (OEM) recommended equivalent operating hours and starts. During a HGP overhaul, combustor parts are replaced, and complete rows of turbine blades and vanes are replaced. Installation work is performed during a planned overhaul. Other components are replaced as required based on inspections, OEM recommendations and prudent utility practice. Significant inspections are also completed to assess the health of the turbine section and look for signs of long-term issues. The project also includes replacing the R0 (1st stage) compressor blades to mitigate a design issue with the OEM blades. The exhaust frame flex

seals will be replaced with a set of Inconel seals. We have budgeted $4.8 ($3.5) million in 2022 capital additions to perform this HGP overhaul on Unit 4.

Q. DESCRIBE THE ANSON CT CONTROL SYSTEM PROJECT ON UNIT 4.

A. This project scope involves the replacement of the current GE Speedtronic Mark V CT control system hardware and software. GE Drives and Controls, Inc. ceased normal production of the Speedtronic Mark V turbine control system on March 31, 2004. As with many products, and particularly with electronics, the Mark V has exceeded its supportable life as parts and components become unavailable and technology resources become scarce. This makes it increasingly difficult to guarantee timely availability/reparability of parts for an extended period of time. Undertaking this project now will provide us with the ability to ensure that we have the necessary replacement parts to make any necessary repairs of this equipment. We have budgeted $1.4 ($1.0) million in 2022 capital additions to replace the Unit 4 CT control system.

Q. PLEASE DISCUSS THE SIGNIFICANT CAPITAL PROJECT AT THE INVER HILLS PLANT.

A. We have budgeted $2.2 ($1.6) million in 2022 capital additions to replace the Combustion Turbine (CT) control system on Unit 3. This project scope is similar to the CT controls replacement projects described in the 2022 additions for Anson Unit 4. Additionally, this project includes integrated balance of plant controls with a modern control system including new microprocessors, HMIs, monitors, historian, EMS-SCADA interface, network switches, dual redundant network, data links, and other relevant networking systems. The project also includes modifying the fuel oil controls with position feedback. This project includes upgrading the vibration monitoring with Bentley Nevada equipment.

Q. PLEASE DISCUSS THE SIGNIFICANT CAPITAL PROJECTS AT THE BLUE LAKE PLANT.

A. We are planning two significant capital project additions at our Blue Lake plant for 2022:

- Generator Step-up Unit (GSU) transformer Capital Emergency Spare Part (CESP), and
- Exhaust silencer on Unit 7.

We have budgeted $1.9 ($1.4) million in 2022 capital additions to purchase a CESP GSU transformer, which is a spare, generator step up transformer that we keep in stock in the event that a transformer fails at one of our intermediate or simple cycle plants. A spare transformer will allow us to more quickly replace a failed transformer thus limiting the impact of such a failure on plant operations. Without a spare transformer on hand, it would take a long period of time to replace a failed transformer, as these types of transformers have long lead times from the time they are ordered until they are received. The GSU transformer will be designed to be used at Angus Anson 4, Black Dog 5, Blue Lake 7 and 8, High Bridge 7 and 8, Riverside 9 and 10. The project includes the purchase of the GSU transformer and accessories as well as the preparation of layup location where the spare transformer will be stored. Our previous CESP GSU transformer of this size was mobilized and installed at Angus Anson Unit 4 when that transformer failed in 2016, and therefore it is necessary that we acquire an additional CESP GSU transformer to service our fleet.

We have budgeted $1.1 ($0.8) million in 2022 capital additions to replace the Unit 7 exhaust silencer. This project involves replacing the Unit 7 Combustion Turbine (CT) exhaust silencer on the exhaust stack, which is made up of internal

baffles or panels. The existing stainless-steel panels are melting and breaking up consistent with normal wear and tear. The internal stack panels are used to reduce the exhaust decibels coming out the stack of the CT. Keeping noise levels down is a necessary condition of our operating permits, and consequently we must perform this project to remain in compliance with these permits.

Q. PLEASE DISCUSS THE SIGNIFICANT CAPITAL PROJECTS AT THE RED WING PLANT.

A. We have budgeted $1.3 ($0.9) million in 2022 capital additions to replace river intake traveling screens at the Red Wing plant. This is a mandated environmental project by the Minnesota Pollution Control Agency to ensure we are compliant with EPA regulation 316(b) of the Clean Water Act. Section 316(b) requires that National Pollutant Discharge Elimination System permits be obtained by any facility that contains a cooling water intake structure to ensure that the engineering design of the structure minimizes impacts on the environment.

The new screens will include a fish handling and return system with sufficient water flow to avoid harming the fish flowing back into the source water. The design may include dual flow screens with smooth mesh to continuously protect fish from descaling or rotary screens with a low-pressure vacuum return to remove fish prior to any high-pressure sprays that may otherwise harm the creatures.

Q PLEASE DISCUSS THE SIGNIFICANT CAPITAL PROJECTS AT THE WILMARTH PLANT.

A. We have budgeted $1.6 ($1.1) million in 2022 capital additions to replace the baghouse fabric filter bags on Unit 2. These bags are the filtration media that

remove particulates from the flue gas as part of our AQCS system. The project consists of six modules (1,260 total) of baghouse bags and cages. This replacement work is required to comply with our air permit.

G. 2023 Key Capital Additions

Q. WHAT CAPITAL PLANT ADDITIONS IS THE COMPANY PROPOSING TO PLACE IN SERVICE IN 2023?

A. For 2023, we are requesting to place in rates the costs associated with approximately $490.5 ($356.4) million of plant additions. Significant capital plant additions include:

- Sherco Solar project, first phase,
- Repowering of the Grand Meadow Wind Farm,
- Major CT overhaul on High Bridge Unit 8,
- Major CT overhaul on Angus Anson Unit 2,
- Combustion Hot Gas Path (HGP) overhaul on Blue Lake Unit 8,
- Combustion Turbine Exhaust Replacement on High Bridge Unit 8, and
- Turbine Control System replacement on Inver Hills Unit 5

Further, we are seeking to make approximately $41.8 ($30.4) million in 2023 capital additions related to smaller projects (under approximately $2.5 million) at our various other plants. Schedule 3 provides a list of all capital projects that we are seeking to include in rate base for 2023, their capital addition costs, and their estimated in-service dates. Schedule 4 provides a project description and information regarding why the project is needed. I address all of our major capital projects and most of our larger capital projects (above approximately $1 million) in further detail below in my discussion regarding each generating plant.

1. Renewable Facilities

Q. IS THE COMPANY PLACING ANY MAJOR RENEWABLE PROJECTS INTO SERVICE IN 2023?

A. Yes. We will be placing two major renewable projects in service in 2023: the repowering of the Grand Meadow wind farm and the first phase of the Sherco Solar project, that is currently pending before the Commission. As noted earlier, the costs for both of these facilities are expected to be recovered through the RES Rider.

Q. DESCRIBE THE GRAND MEADOW REPOWERING PROJECT.

A. The existing Grand Meadow Wind Farm is a 100 MW wind farm currently in operation in Mower County, Minnesota. The repowering project will replace certain components of the existing wind farm with upgraded components such as blades, hubs, and gearboxes to increase the average annual energy production from the facility. The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of low-cost renewable energy customers receive.[11] I summarize all of Energy Supply's Relief & Recovery projects in Section IV. We are forecasting $112.3 ($81.4) million in 2023 capital additions to repower the Grand Meadow wind farm.

Q. DESCRIBE THE SHERCO SOLAR PROJECT.

A. The first phase of the Sherco Solar project is a 230 MW solar facility located in Sherburne County, Minnesota west of our existing Sherco coal-fired generating

[11] *See* Docket No. E,G999/CI-20-492.

plant. The solar farm includes approximately 1,700 acres of bifacial photovoltaic (PV) modules mounted on single axis trackers, a collector system, access roads, and collector substation. We are forecasting $304.0 ($221.0) million in 2023 capital additions for this first phase of the Sherco Solar project.

Q. ARE THERE ANY OTHER CAPITAL PROJECTS PLANNED FOR THE COMPANY'S WIND FACILITIES IN 2023?

A. Yes. We are forecasting approximately $8.4 ($6.1) million in 2023 plant additions for our existing wind facilities that consist mainly of gearbox, generator, and transformer replacement projects. We are also forecasting about $3.4 ($2.5) million in capital additions in 2023 from the Nobles and Northern Wind projects which were placed in service late in 2022 but due to weather limitations final site restoration, vegetation planting, and project closeout will be completed in the summer of the following year. These costs are included in the above total for the question. Schedules 3 and 4 provide additional information.

Q. PLEASE DISCUSS THE OTHER SIGNIFICANT CAPITAL PROJECTS AT THE COMPANY'S WIND FARMS IN 2023.

A. We are planning one significant capital project addition at our wind farms for 2023 – gearbox replacements at Pleasant Valley. We have budgeted $1.0 ($0.7) million in 2023 capital additions to replace gearboxes at Pleasant Valley.

2. Coal Plants

Q. ARE ANY CAPITAL PROJECTS PLANNED FOR THE SHERCO PLANT IN 2023?

A. Yes. We are planning approximately $10.1 ($7.3) million in plant additions in 2023 for projects at Sherco Units 1, 2, and 3. These projects primarily relate to

maintaining environmental compliance, reliability, and efficiency of these units. In 2023, there is a scheduled overhaul for Sherco Unit 3 consistent with its regular three-year overhaul schedule. Included in Schedules 3 and 4 is a description of each individual project, its costs, in-service date, and the need for the project.

Q. PLEASE DISCUSS THE SIGNIFICANT 2023 CAPITAL PROJECTS AT SHERCO.

A. We are planning two significant capital project additions at our Sherco plant for 2023:

- Replacement of 36-1&2 high-pressure feedwater heaters for Unit 3, and
- Unit 3 DCS workstation upgrade.

We have budgeted $2.0 ($1.5) million in 2023 capital additions to replace 36-1&2 high-pressure feedwater heaters on Sherco Unit 3. The high-pressure feedwater heaters use extraction steam to pre-heat water prior to being transferred to the boiler. The heaters are original equipment from 1987 and tube failures have been increasing in frequency. When a tube leak occurs, the unit must be taken offline for a forced outage to complete repairs. Replacement of these aging feedwater heaters is needed to reduce the time and cost associated with those ongoing repairs.

We have budgeted $1.1 ($0.8) million in 2023 capital additions to upgrade the DCS workstations that are used to operate the plant equipment for Unit 3. The scope of this project includes the hardware and software that makeup the computer system. The current hardware is outdated and is preventing updates to OEM supported software.

Q. ARE ANY CAPITAL PROJECTS PLANNED FOR THE ALLEN S. KING PLANT IN 2023?

A. Yes. We are planning total capital plant additions of approximately $2.6 ($1.9) million in 2023. In 2023, there is no scheduled major overhaul for the Allen S. King plant, and there are no significant (*i.e.,* over $1 million) capital additions. Schedules 3 and 4 identify all of our capital plant additions at the Allen S. King plant.

3. Combined Cycle Plants

Q. ARE ANY CAPITAL PROJECTS PLANNED FOR THE COMPANY'S COMBINED CYCLE PLANTS IN 2023?

A. Yes. We are planning capital additions of approximately $25.4 ($18.5) million at our combined cycle plants. These projects are mainly related to maintaining reliability and environmental performance, and are scheduled during the overhaul on High Bridge Unit 8. Schedules 3 and 4 provide additional information on these capital additions.

Q. PLEASE DISCUSS THE SIGNIFICANT 2023 CAPITAL PROJECTS AT HIGH BRIDGE.

A. We have planned three significant projects at High Bridge in 2023.

First, we have budgeted $11.1 ($8.1) million in 2023 capital additions to complete a major Combustion Turbine (CT) overhaul including Hot Gas Path Replacement on High Bridge Unit 8. A major overhaul occurs when an Hot Gas Path (HGP) overhaul coincides with a compressor inspection and other infrequent major inspections. The High Bridge Unit 8 combustion turbine hot gas path (HGP) overhaul is being performed per the Original Equipment Manufacturer (OEM) recommended equivalent operating hours and starts. During a HGP overhaul, combustor parts are replaced, and complete rows of

turbine blades and vanes are replaced. Installation work is performed during a planned overhaul. Other components are replaced as required based on inspections, OEM recommendations and prudent utility practice. Significant inspections are also completed to assess the health of the turbine section and look for signs of long-term issues. This project also includes replacement of the combustion turbine Row 4 blades, vanes, and interstage seals. We have budgeted $11.1 ($8.1) million in 2023 capital additions to perform this capital work on High Bridge Unit 8.

Second, we have also budgeted $3.1 ($2.3) million in 2023 capital additions to replace the combustion turbine exhaust system on High Bridge Unit 8. This project will replace the Unit 8 Combustion Turbine Exhaust Duct and Aft Exhaust Manifold during the spring 2023 major overhaul at High Bridge. Materials and field service labor will be provided by Mitsubishi, the Combustion Turbine OEM.

Third, we have also budgeted $2.0 ($1.5) million in 2023 capital additions to replace the control system on High Bridge Unit 0. We are replacing Mitsubishi's control system, Diasys, with a more updated system that includes both hardware and software.

4. Simple Cycle and Refuse Derived Fuel Plants

Q. ARE ANY CAPITAL PROJECTS PLANNED FOR THE SIMPLE CYCLE AND REFUSE DERIVED FUEL PLANTS IN 2023?

A. Yes. We are planning $27.8 ($20.2) million in 2023 plant additions at our simple cycle and refuse derived fuel plants. These projects are mainly related to maintaining reliability and environmental performance. These project additions

are scheduled during the overhauls on Angus Anson, Blue Lake, and Inver Hills. Schedules 3 and 4 provide details on these projects.

Q. PLEASE DISCUSS THE SIGNIFICANT CAPITAL PROJECT AT THE ANGUS ANSON PLANT.

A. We have budgeted $10.6 ($7.7) million in 2023 capital additions to complete a major Combustion Turbine (CT) overhaul including a Hot Gas Path (HGP) Replacement on Angus Anson Unit 2. A major overhaul occurs when an Hot Gas Path (HGP) overhaul coincides with a compressor inspection and other infrequent major inspections. The Anson 2 combustion turbine hot gas path (HGP) overhaul is being performed per the Original Equipment Manufacturer (OEM) recommended equivalent operating hours and starts. During a HGP overhaul, combustor parts are replaced, and complete rows of turbine blades and vanes are replaced. Installation work is performed during a planned overhaul. Other components are replaced as required based on inspections, OEM recommendations and prudent utility practice. Significant inspections are also completed to assess the health of the turbine section and look for signs of long-term issues. This project also includes replacement of the combustion turbine Row 3 and Row 4 blades, vanes, and interstage seals.

Q. PLEASE DISCUSS THE SIGNIFICANT CAPITAL PROJECT AT THE BLUE LAKE PLANT.

A. We have budgeted $5.1 ($3.7) million in 2023 capital additions to overhaul the Blue Lake Unit 8 combustion turbine Hot Gas Path (HGP). This project scope is similar to the 2022 project for the HGP overhaul on Anson Unit 4.

Q. PLEASE DISCUSS THE SIGNIFICANT CAPITAL PROJECT AT THE INVER HILLS PLANT.

A. We have budgeted $2.5 ($1.8) million in 2023 capital additions to replace the Combustion Turbine (CT) control system on Unit 5. This project scope is similar to the 2022 project to replace the CT Controls for Inver Hills Unit 3.

H. 2024 Key Capital Additions

Q. WHAT CAPITAL PLANT ADDITIONS IS THE COMPANY PROPOSING TO PLACE IN SERVICE IN 2024?

A. For 2024, we are requesting to place in rates the costs associated with approximately $371.5 ($269.5) million of plant additions. Significant capital plant additions include:

- Sherco Solar project, second phase,
- Hot Gas Path (HGP) Overhaul at High Bridge Unit 7,
- Hot Gas Path (HGP) Overhaul at Riverside Unit 9,
- Hot Gas Path (HGP) Overhaul at Blue Lake Unit 7,
- Plant Flood Protection Berm at Black Dog Plant,
- Black Dog Road erosion protection Wall at Black Dog Plant,
- AQCS Baghouse Replacement at Allen S King Plant,
- Combustion Turbine Exhaust System replacement on High Bridge Unit 7, and
- Water Treatment System at Black Dog.

Further, we are seeking to make approximately $31.1 ($22.6) million in 2024 capital additions related to smaller projects (under approximately $2.5 million) at our various other plants. Schedule 3 provides a list of all capital projects that

we are seeking to include in rate base for 2024, their capital addition costs, and their estimated in-service dates. Schedule 4 provides a project description and information regarding why the project is needed. I discuss all of our major capital projects and most of our larger capital projects (above approximately $1 million) in further detail below in my discussion regarding each generating plant.

1. Renewable Facilities

Q. IS THE COMPANY PLACING ANY MAJOR RENEWABLE PROJECTS INTO SERVICE IN 2024?

A. Yes. We will be placing one major renewable project in service in 2024: the second and last phase of the Sherco Solar project. As noted earlier, the capital costs for this facility are expected to be recovered through the RES rider. We are also forecasting about $2.0 ($1.5) million in remaining capital additions from the Grand Meadow repowering wind project. Schedules 3 and 4 provide additional information.

Q. DESCRIBE THE SHERCO SOLAR PROJECT.

A. The second phase of the Sherco Solar project is a 230 MW solar facility located in Sherburne County, Minnesota east of our existing Sherco coal-fired generating plant. The solar farm includes approximately 1,700 acres of bifacial photovoltaic (PV) modules mounted on single axis trackers, a collector system, access roads, and collector substation. We are forecasting $305.8 ($221.9) million in 2024 capital additions for this phase of the Sherco Solar project. The Sherco Solar project is currently pending before the Commission and the Company plans to seek recovery for this project in the RES Rider.

Q. ARE ANY CAPITAL PROJECTS PLANNED FOR THE COMPANY'S WIND FACILITIES IN 2024?

A. Yes. We are forecasting approximately $5.6 ($4.1) million in 2024 plant additions for our existing wind facilities that consist mainly of gearbox, generator, and transformer replacement projects. Schedules 3 and 4 provide additional information. All of these projects are forecast at less than $1 million each.

2. Coal Plants

Q. ARE ANY CAPITAL PROJECTS PLANNED FOR THE SHERCO PLANT IN 2024?

A. Yes. We are planning approximately $5.1 ($3.7) million in plant additions in 2024 for projects at Sherco Units 1, 2, and 3. These projects primarily relate to maintaining environmental compliance, reliability and efficiency of these units. Included in Schedules 3 and 4 is a description of each individual project, its costs, in-service date, and the need for the project. All of the capital projects planned for Sherco in 2024 are less than $1 million.

Q. ARE ANY CAPITAL PROJECTS PLANNED FOR THE ALLEN S. KING PLANT IN 2024?

A. Yes. We are planning total capital plant additions of approximately $7.8 ($5.7) million in 2024. These capital additions include the Selective Catalytic Reduction (SCR) catalyst replacement project and a baghouse replacement project. Schedules 3 and 4 identify all of our capital plant additions at the Allen S. King plant.

Q DESCRIBE THE SELECTIVE CATALYTIC REDUCTION CATALYST REPLACEMENT PROJECT.

A. This project involves replacing one row of the Allen S. King Unit 1 SCR catalyst.

Specifically, we plan to replace the middle layer (143 modules) of the SCR with a new catalyst during the 2024 spring outage. Each catalyst module has dimensions of 64" x 75" x 38" and weighs 2,900 pounds each. The scope of the project includes the procurement and installation of new catalyst, removal and proper disposal of the existing catalyst, and ammonia injection tuning after installation. The expected life of the catalyst is six years for any particular layer, but will be impacted by run time and cycling. Our catalyst management plan requires replacement of one of the three layers every other year and has been completed several times at this plant. This particular layer was first installed in April 2014 and is due for replacement.

Three layers are required to be in operation to maintain emissions within permit limits. If a layer is allowed to fall under desired chemical activity levels, the unit must derate. By undertaking this project, we can continue to operate the Allen S. King plant at full capacity while maintaining compliance requirements. Failure to do so would require us to derate the unit so that emissions fall within required tolerances. We have budgeted $2.1 ($1.5) million in 2024 capital additions for this project.

Q DESCRIBE THE BAGHOUSE BAG REPLACEMENT PROJECT.

A. This project involves replacing the bags in the baghouse (fabric filter) of the Allen S. King Unit 1 Air Quality Control System (AQCS). The project will replace bags in all 16 compartments of baghouse filter bags due to end of life. Each of the 16 compartments holds 1,040 bags for a total of 17,000 bags including some spares. Purchase replacement wire cages (tub and lock style recommended) during this outage, because the existing cages have been

showing signs of corrosion during previous inspections. We have budgeted $3.5 ($2.5) million in 2024 capital additions for this project.

3. Combined Cycle Plants

Q. ARE ANY CAPITAL PROJECTS PLANNED FOR THE COMPANY'S COMBINED CYCLE PLANTS IN 2024?

A. Yes. We are planning capital additions of approximately $34.8 ($25.2) million at our combined cycle plants. These projects are mainly related to maintaining reliability and environmental performance. Significant project (over $1 million) additions are planned for High Bridge, Riverside, and Black Dog. Schedules 3 and 4 provide additional information on these capital additions.

Q. PLEASE DISCUSS THE SIGNIFICANT 2024 CAPITAL PROJECTS AT HIGH BRIDGE.

A. We have budgeted $7.6 ($5.5) million in 2024 capital additions to overhaul the High Bridge Unit 7 combustion turbine Hot Gas Path (HGP). This project scope is similar to the 2022 project for the HGP overhaul on Anson Unit 4.

We have also budgeted $3.4 ($2.5) million in 2024 capital additions to replace the combustion turbine exhaust system on High Bridge Unit 7. This project will replace the Unit 7 Combustion Turbine Exhaust Duct and Aft Exhaust Manifold during the spring 2024 major overhaul similar to the 2023 High Bridge Unit 8 project.

Q. PLEASE DISCUSS THE SIGNIFICANT 2024 CAPITAL PROJECT AT RIVERSIDE.

A. We have budgeted $5.3 ($3.8) million in 2024 capital additions to complete the Unit 9 combustion turbine HGP overhaul. This project scope is similar to the 2022 project for the HGP overhaul on Anson Unit 4.

Q. PLEASE DISCUSS THE SIGNIFICANT 2024 CAPITAL PROJECT AT BLACK DOG TO REPLACE THE WATER TREATMENT SYSTEM.

A. We have budgeted $2.8 ($2.0) million in 2024 capital additions to replace the water treatment system. This project scope is similar to the 2022 additions project for Riverside to replace that water treatment system.

Q. DESCRIBE THE BLACK DOG PLANT ENTRANCE ROAD EROSION WALL PROJECT.

A. This project involves installing an erosion wall to protect Black Dog Road from erosion issues caused by flooding of the Minnesota River. Black Dog Road is the main road used to access the Black Dog plant. This project includes installation of sheet pile wall or alternative means of correcting and preventing erosion on Black Dog Road and the Minnesota River between Lyndale Gates and the main plant entrance. It is estimated that approximately 600 linear feet of river wall will be required to be installed, subject to final engineering and design. We have budgeted $2.7 ($1.97) million in 2024 capital additions to install this erosion wall.

Q. DESCRIBE THE FLOOD BERM PROJECT AT THE BLACK DOG PLANT.

A. This project involves installing an addition on the flood berm to protect Black Dog power house from flooding of the Minnesota River. The flood berm addition will extend the flood protection from its current level of 715 feet mean sea level (MSL) to 720 feet MSL. Recent flood forecasts indicate that the Minnesota River could reach and exceed the current berm height of 715 feet MSL, which is the elevation of the plant's turbine floor. Extending the top of the flood berm to the 720 feet MSL level would avoid the significant O&M emergent spending experienced in 2019 when workers installed temporary sand bags to prevent flooding of the power house. This project significantly reduces

the risk of catastrophic flooding into the plant building. We have budgeted $4.0 ($2.9) million in 2024 capital additions to complete this project.

4. Simple Cycle and Refuse Derived Fuel Plants

Q. ARE ANY CAPITAL PROJECTS PLANNED FOR THE SIMPLE CYCLE AND REFUSE DERIVED FUEL PLANTS IN 2024?

A. Yes. We are planning $12.4 ($9.0) million in 2024 plant additions at our simple cycle and refuse derived fuel plants. These projects are mainly related to maintaining reliability and environmental performance. Schedules 3 and 4 provide details on these projects.

Q. PLEASE DISCUSS THE SIGNIFICANT CAPITAL PROJECT AT THE BLUE LAKE PLANT.

A. We have budgeted $5.2 ($3.8) million in 2024 capital additions to complete a combustion turbine hot gas path (HGP) overhaul on Blue Lake Unit 7. This project scope is similar to the 2022 project for the HGP overhaul on Anson Unit 4.

Q. IS THE OVERALL LEVEL OF ENERGY SUPPLY CAPITAL ADDITIONS REASONABLE AND NECESSARY IN EACH YEAR OF THIS MULTI-YEAR RATE PLAN?

A. Yes, the Energy Supply capital additions included in this rate case are reasonable and necessary to maintain the reliability and safety of our generation resources, to implement Commission Orders, and to ensure compliance with environmental and other mandates. Overall, our capital additions support investments that are necessary to provide electricity to meet our customers' energy needs.

IV. COMPLIANCE ITEMS

Q. WHAT DO YOU DISCUSS IN THIS SECTION OF YOUR DIRECT TESTIMONY?

A. Here, I discuss the compliance issues that have arisen since the Company's last rate case specific to Energy Supply and the Company's fulfillment of its compliance obligations in conjunction with these requirements. In particular, consistent with the Commission's March 12, 2021 Order in our COVID-19 Relief & Recovery docket,[12] I provide information on costs related to the Company's COVID-19 Relief & Recovery projects. I also provide additional information related to the Jeffers and Community Wind North wind projects that are currently recovered in the RES Rider but that will be moving to base rates with implementation of final rates in this proceeding. Specifically, I provide support for the prudency of the costs above the modeled and PSA costs. Finally, I provide additional information to support the prudence of the estimated removal costs for the Luverne Wind2Battery system as required by the Commission's September 2, 2021 Order.[13]

A. Relief & Recovery Projects

Q. WHAT COMPLIANCE ITEM ARE YOU ADDRESSING IN THIS SECTION OF YOUR TESTIMONY?

A. In this section of my Direct Testimony, I provide additional details regarding the Energy Supply capital projects the Company proposed as part of the

[12] *In the Matter of an Inquiry into Utility Investments that May Assist in Minnesota's Economic Recovery from the COVID-19 Pandemic*, ORDER DETERMINING THAT PROPOSALS HAVE THE POTENTIAL TO BE CONSISTENT WITH COVID-19 ECONOMIC RECOVERY, Docket No. E,999/CI-20-492 (March 12, 2021).
[13] *In the Matter of the Petition of Northern States Power Company for Approval of its 2020 Annual Review of Remaining Lives and Five-Year Depreciation Study*, Docket No. E,G002/M-19-723, ORDER APPROVING PETITION IN PART (September 2, 2021).

COVID-19 Relief & Recovery docket.[14] In response to the Commission's Notice, on June 17, 2020, we filed our initial Report that proposed $3 billion in investments that could help Minnesota recover from the economic impacts of the COVID-19 pandemic by spurring 5,000 jobs over the next five years. These proposed investments included a number of Energy Supply projects. Table 6 below outlines all of the Energy Supply projects that were proposed in the Relief & Recovery docket, including those that will not be placed in service during this MYRP. Consistent with the Commission's March 12, 2021 Order,[15] the Company has been tracking its spending related to all of these COVID-19 Relief & Recovery projects and the Company has been providing this information to the Commission as part of its quarterly compliance filings in that docket.[16]

[14] *In the Matter of an Inquiry into Utility Investments that May Assist in Minnesota's Economic Recovery from the COVID-19 Pandemic*, Docket No. E,G999/CI-20-492, REPORT COVID-19 RELIEF & RECOVERY (June 17, 2020).
[15] *In the Matter of an Inquiry into Utility Investments that May Assist in Minnesota's Economic Recovery from the COVID-19 Pandemic*, ORDER DETERMINING THAT PROPOSALS HAVE THE POTENTIAL TO BE CONSISTENT WITH COVID-19 ECONOMIC RECOVERY, Docket No. E,G999/CI-20-492 (March 12, 2021).
[16] *In the Matter of an Inquiry into Utility Investments that May Assist in Minnesota's Economic Recovery from the COVID-19 Pandemic*, 2021 SECOND QUARTER REPORT COVID-19 RELIEF & RECOVERY, Docket No. E,G999/CI-20-492 (July 30, 2021).

Table 6

Energy Supply COVID-19 Relief & Recovery

Capital Additions ($ millions)

Project Name	In-Service Date	2021 Forecast	2022 Budget	2023 Budget	2024 Budget	Proposed Cost Recovery Mechanism
Sherco Solar Project	2023/2024	$0	$0	$304.0	$305.8	RES Rider
Nobles Repowering	2022	$0.0	$230.4	$2.4	$0.2	RES Rider
Grand Meadow Repowering	2023	$0	$0	$112.3	$2.0	RES Rider
Pleasant Valley Repowering	2025	$0	$0	$0	$0	RES Rider
Borders Repowering	2025	$0	$0	$0	$0	RES Rider
Northern Wind	2022	$0	$223.6	$1.4	$0	RES Rider
Asset Removal at Blue Lake, Granite City, Key City, Riverside, Sherco Ash Pond, Minnesota Valley	2021/2022	RWIP	RWIP	RWIP	RWIP	Base Rates

Q. ARE THERE OTHER RELIEF & RECOVERY PROJECTS THAT YOU WANT TO DISCUSS HERE?

A. Yes. Following our initial Report, numerous parties recommended we establish a program to train a workforce for the jobs needed to complete the projects in our proposal. Additionally, parties recommended this program focus on outreach and program participation for women and members of the Black, Indigenous, People of Color (BIPOC) community.

Based on those recommendations, in comments we filed on October 16, 2020 in Docket No. E,G999/CI-20-492, we introduced the Workforce Training and Development Program and budgeted up to $4 million for a program designed to engage and provide women and BIPOC participants with apprenticeship-readiness training to enter registered apprentice programs in the utility industry and building trades. The goal of the program is to offer construction career readiness opportunities to under-served communities for energy-related careers. On November 20, 2020, we provided a status update, indicating we were meeting with multiple stakeholders to gather input on program development and structure.

On July 14, 2021, we requested Commission approval[17] of a three-year Workforce Training and Development Program Pilot focused on developing the necessary skills for those in traditionally under-represented communities to succeed in energy-related construction careers. The Pilot will offer approximately 150 individuals exposure to a career in the trades and the opportunity to receive hands-on skills training through an apprenticeship-readiness program. The Pilot is intended to coincide with the beginning of work on the Sherco Solar project. Pilot graduates will have the opportunity to further develop the skills received through the training program by working on the Sherco Solar project and may also have the opportunity to work on other available Company construction projects and generally enter the Minnesota building trades. Parties have provided comments on the Company's Petition, which is currently pending before the Commission.

[17] *See In the Matter of Xcel Energy's Petition for Approval of a Workforce Training and Development Program Pilot*, Docket No. E002/M-21-558, PETITION (July 14, 2021).

Q. ARE THE COSTS ASSOCIATED WITH THE WORKFORCE TRAINING AND DEVELOPMENT PROGRAM PILOT INCLUDED IN THIS RATE CASE?

A. Not at this time. The Company has proposed to recover the costs for this Pilot through the Low Income Surcharge Rider. While the Department supported this Pilot, the Department disagreed with the Company's proposed to recover the costs of the Pilot through the Low Income Surcharge Rider. As the Company's Petition is still pending before the Commission, the Company has not included these costs in its initial filing. If the Commission approves this Pilot but denies recovery through the Low Income Surcharge Rider, the Company plans to update our budgets to reflect these costs in rebuttal

B. RES Rider Projects

Q. WHAT COMPLIANCE ITEM ARE YOU ADDRESSING IN THIS SECTION OF YOUR TESTIMONY?

A. As discussed in the Direct Testimony of Mr. Halama, the Company is proposing to move the Courtenay, Foxtail, Blazing Star I and II, Lake Benton, Crowned Ridge, Jeffers, Community Wind North, Mower County, Freeborn and Dakota Range I and II wind projects from RES Rider recovery to base rate recovery coincident with implementation of final rates in this case, as each of these projects will be in service on or before December 31, 2021. The costs for these wind projects, up to their respective purchase and sale agreement (PSA) price, are currently being recovered in the RES Rider.[18] Although we both assumed and have incurred costs incremental to the PSA prices for these projects, the Commission has determined that the potential risk of double recovery of certain internal costs in both base rates and the RES Rider supports limiting rider

[18] *In the Matter of the Petition of Northern States Power Company for Approval of the Renewable Energy Standards (RES) Rider Revenue Requirements for 2019 and 2020 and RES Adjustment Factors*, Docket No. E002/M-19-732, ORDER AUTHORIZING RIDER RECOVERY AND REQUIRING COMPLIANCE FILING (May 6, 2021).

recovery to the PSA prices. When these wind projects are moved to base rate recovery, any risk of double recovery will be eliminated, and so the Company proposes to recover the PSA price for these projects as well as all incremental costs directly tied to these projects. As explained in the Company's reply comments filed on September 24, 2021 in support of the Company's 2021 RES Rider request, this is consistent with how the Company analyzed and proposed these projects to the Commission during the acquisition proceedings.[19] In those proceedings, the Company's detailed pro forma modeling as well as the Encompass modeling used to support the prudency of each acquisition, and the Commission's evaluation and approval of each project, included the total project costs (i.e., the PSA price, Xcel Energy's incremental costs above the PSA price, and eligible AFUDC). As a result, it is appropriate that the Company be allowed recovery of the total project costs for each of these wind projects.

Q. CAN YOU PROVIDE ADDITIONAL INFORMATION TO SUPPORT THE PRUDENCY OF THE ADDITIONAL COSTS FOR THESE WIND PROJECTS THAT WERE NOT INCLUDED IN THE PSA PRICE?

A. Yes. As explained in the Company's September 24, 2021 reply comments, there were additional necessary costs outside the scope of the PSA that were required to place these wind projects in service. These costs include the following:

- Title insurance and investigations as we transfer ownership of the plant to Xcel Energy;

[19] *In the Matter of the Petition of Northern States Power, doing business as Xcel Energy, for Approval of an Updated Renewable Energy Standard Rider Factor*, Docket No. E002/M-20-815, REPLY COMMENTS (September 24, 2021).

- Contract Engineering for specification review and quality assessments to make sure the facility has been constructed to meet all standards and expectations;
- IT equipment and installation services for data logging of the plant and so that the plant can be remotely dispatchable. This requires connecting the plant to high-speed networking systems. Because of wind facilities' geographical location, the closest high-speed telecommunication access point can be several miles away;
- Security, both physical and electronic, such as fencing, cameras, card readers, and firewalls, integrated into the Xcel Energy network;
- External legal firms used for the negotiation and execution of contract terms and conditions; and
- Post-construction noise studies to remediate potential landowner issues.

In addition, some of the facilities have had individual issues that needed to be addressed by the Company and are outside the scope of the PSA. For example:

- The Lake Benton developer failed to comply with the entirety of the project scope. The developer reduced the Company's required payments under the PSA, and the Company performed this aspect of the specifications;
- There was a necessary premium on materials shipping for Crowned Ridge, and therefore Xcel Energy paid a portion of this cost in order to have the project meet the in-service date required to be eligible for 100 percent PTCs; and
- Eagle nest monitoring was needed for Jeffers and Community Wind North to meet environmental standards.

The Company also includes in its base rate recovery internal labor costs associated with these wind projects that have not been recovered through the RES Rider, consistent with Commission direction.

Q. ARE THE TOTAL PROJECT COSTS FOR ANY OF THESE WIND PROJECTS ABOVE THE MODELED COSTS UTILIZED IN THEIR ACQUISITION PROCEEDING?

A. Yes. As shown in Table 7 below, the total capital additions for Community Wind North and Jeffers are slightly above their modeled costs. As explained below, however, these costs were prudently incurred and should be recoverable in base rates.

Table 7

Wind Project RES Rider Roll-in

($ millions)

Project	In-Service Date	Total Capital Additions (includes internal labor)	PSA Cost	Modeled Cost (includes internal labor)	Difference Between Total Capital Additions and PSA Cost	Difference Between Total Capital Additions and Modeled Cost
		[Protected Data Begins				
Community Wind North	December 2020					
Jeffers	December 2020					

Protected Data Ends]

Q. PLEASE PROVIDE ADDITIONAL INFORMATION TO SUPPORT THE PRUDENCY OF THE CAPITAL COSTS FOR THESE TWO WIND PROJECTS ABOVE THE MODELED COSTS.

A. The actual construction costs for these two projects are about $2.1 million higher than the total modeled costs. The cost increases are driven by a number of factors. The first, and most significant factor, is the impact of COVID-19 on the engineering, procurement, construction, and overall execution of the two projects. The delays due to engineering resulted in significant rework for Xcel Energy to comply with the changing cybersecurity and digital asset integration requirements. For example, once the project commenced, it was learned that the existing equipment at both facilities required upgrades to add cybersecurity measures. The coordination of this design was complicated since the turbine OEM was communicating with the Company through a third party (the PSA) who were both impacted by the COVID-19 pandemic. The construction work was impacted by supply chain issues like late delivery of various tower components, electrical vaults, and other hardware. Some delays were caused by temporary shutdowns, remote working requirements, and limitations on workers at the jobsite, like the use of temporary and shared resources due to travel restrictions and social distancing precautions. The construction delays prompted the Company to switch construction forces part way through the Community Wind North project, which also led to added costs. Other drivers include increased outside legal expenses to create, negotiate, execute, manage, and close out the PSA contract. Additional legal services were also required to assist with managing the COVID-19 impact on the PSA.

Q. WHAT DO YOU CONCLUDE ABOUT THE COSTS OF THE THESE TWO WIND PROJECTS?

A. These costs were prudent and directly related to the acquisition and construction of these two wind facilities and are consistent with other build-transfer projects that have since been completed and are prudent investments

to ensuring well-performing assets for the long-term generation of energy for our customers.

C. Luverne Wind2Battery System

Q. WHAT COMPLIANCE ITEM ARE YOU ADDRESSING IN THIS SECTION OF YOUR TESTIMONY?

A. In this section of my testimony, I am providing further support for the removal costs associated with the Luverne Wind2Battery projects that will be retired in 2021. This removal project was discussed in the Company's 2020 annual review of electric and gas production and gas storage asset lives and net salvage rates in Docket No. E,G002/M-19-723. The Commission's September 2, 2021 Order in that docket required the Company to address the prudence of the estimated removal costs for the Luverne Wind2Battery project and ensure that such costs are not included in interim rates. Mr. Halama discusses how these costs were removed from interim rates. Company witness Mark P. Moeller addresses whether the removal costs should be recoverable through rates either individually or by way of a depreciation reserve allocation. Mr. Moeller also addresses the dismantling studies that were performed by the Company to determine the disposal costs for this project.

Q. DESCRIBE THE LUVERNE WIND2BATTERY PROJECT.

A. The Luverne Wind2Battery System is a 1 MW wind energy battery-storage system using sodium-sulfur (NaS) battery technology that was installed in December 2009. The battery is made up of 20 50-kilowatt modules. It is roughly the size of two semi-trailers and weighs approximately 80 tons. The battery is able to store about 7.2 megawatt-hours of electricity, with a charge/discharge capacity of 1MW. This battery system was installed in

Luverne, Minnesota (about 30 miles east of Sioux Falls, South Dakota) and was connected to a nearby 11 MW wind farm formerly owned by Minwind Energy, LLC. When it was installed, this battery project was one of the first grid-scale battery projects in the U.S. The very first sodium-sulfur battery project was installed just two years prior. This pilot project was funded, in part, with a grant from the Renewable Development Fund, as authorized by the Commission in Docket No. E002/M-07-675.

Q. WHAT WAS THE PURPOSE OF THE LUVERNE WIND2BATTERY PILOT PROJECT?

A. Its purpose was to demonstrate the system's ability to store wind energy and move it to the electricity grid when needed and to validate energy storage in supporting greater wind penetration on the Xcel Energy system. NaS technology was selected for this project due to the following reasons: high storage capacity, ability to handle a large number of charge-recharge cycles as would be incurred with an intermittent renewable energy resource, scale and potential for even larger scalability, dynamic response to system changes, and demonstrated commercial performance and availability.

Q. WHAT INFORMATION DID THE COMPANY LEARN FROM THIS PILOT PROJECT?

A. This pilot project provided the Company and the entire industry with valuable information about the ability of battery technology to facilitate the integration of additional wind energy on the grid. Through this pilot, the Company was able to test the integration of a battery into the system and obtain hands-on experience with this technology. The Company shared a variety of research findings with the rest of the industry throughout the life of the project including

a comprehensive report completed in 2010.[20] In addition to the valuable research that was gathered through this pilot, the Company was also able to access firm wind power during off-peak generation times as a result of the installation of this battery.

Q. WHEN WAS THE BATTERY SYSTEM TAKEN OUT OF SERVICE?

A. In 2019 – years after the pilot study had been completed, and as the battery was approaching the end of its useful life – the battery's manufacturer informed the Company that the battery was entering legacy status, and they would not be manufacturing replacement parts. At that time, we began reassessing the value of the battery and determined that the ongoing O&M costs outweighed the value the battery was bringing to our customers. At the same time, the wind farm that the battery was connected to was sold to another party, and this party severed the connection from the wind farm to Xcel Energy's battery. After exploring several options for future use of this asset, Xcel Energy determined that removal of the battery was the best course of action.

Q. PLEASE DISCUSS THE ESTIMATED COSTS TO REMOVE THE LUVERNE WIND2BATTERY PROJECT.

A. The removal of the Luverne Wind2Battery project involves retiring the complete energy storage battery system, removing all equipment from site, safely transporting to a third party, responsibly recycling or disposing of removed equipment, and restoring the site to pre-construction conditions. The battery itself is constructed from a mixture of sodium and sulfur, which are hazardous materials as the compound can ignite when exposed to air and

[20] *In the Matter of the Petition of Northern States Power Company, a Minnesota corporation, Regarding the 2011 Renewable Energy Standard Rider and 2010 RES Tracker Report*, Docket No. E002/M-10-1066, INITIAL FILING at Attachment B (October 5, 2010).

moisture. As a result, the battery must be carefully removed from site and moved to a reprocessing facility for recycling and disposal of non-recyclable components. Currently, Xcel Energy is working with three different vendors to see which one will be able to perform this work, but we have not yet contracted with anyone. The removal costs are forecast at $4.6 million in 2023 and $1.6 million in 2024.

Q. HOW DID THE COMPANY ESTIMATE THESE REMOVAL COSTS?

A. Xcel Energy engaged NGK Insulators, Inc. (NGK), the battery manufacturer, and S&C Electric Company (NGK's representative in the United States) to develop the removal cost estimates. NGK and S&C contacted numerous battery recycling partners to find a company willing and able to dispose of this battery. NGK and S&C advised Xcel Energy that all companies contacted declined to accept these batteries, stating the industry did not have a solution for disposing these types of batteries in North America. The Company therefore based the current dismantling estimate on information provided by S&C, estimating the removal costs assuming they will be able to find a recycling partner willing to accept the battery.

The Company has undertaken its own outreach to potential battery recycling partners to determine whether recycling and disposal options have improved since the S&C estimate was prepared. While at least two recycling and disposal options now appear available in North America, there remains significant uncertainty regarding the means and methods required to safely discharge, disassemble, and transport the battery cells to one of these potential recycling facilities. The Company intends to participate in an upcoming Electric Power Research Institute (EPRI) working group on this topic in an effort to reduce

the current uncertainty and refine the Company's understanding of the scope and cost of the project before it begins in 2023.

Q. WHAT HAPPENS IF THE REMOVAL COSTS FOR THE BATTERY SYSTEM ARE LOWER THAN THE ESTIMATE PROVIDED HERE?

A. As discussed by Mr. Moeller, the Company is proposing a reserve reallocation such that if the actual costs are lower than our current estimate, then the Company will do an inverse reserve reallocation and the difference will be allocated back to other assets, lowering the depreciation expense of those other assets.

V. O&M BUDGET

A. O&M Overview and Trends

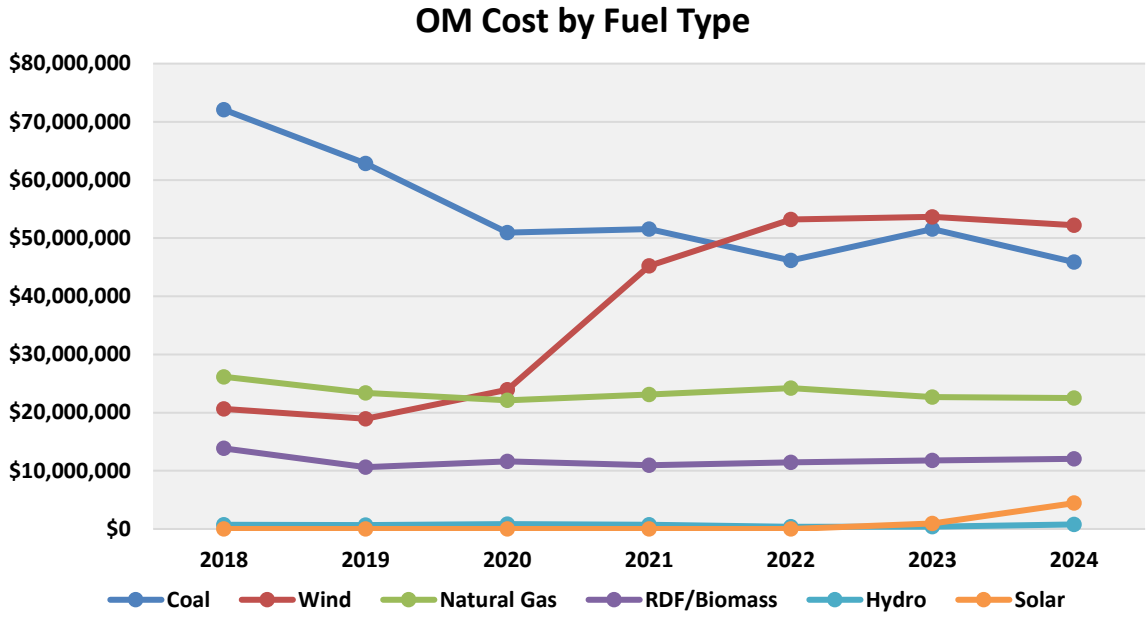
Q. WHAT IS INCLUDED IN THE ENERGY SUPPLY O&M BUDGET?

A. The Energy Supply O&M budget is necessary for the operation and maintenance of our generation fleet. O&M costs are categorized as Internal Labor, Contract Labor, Materials, Chemicals, and Other. For example, significant internal labor is required to operate and maintain our generating plants on a day-to-day basis, including operating power plant equipment from control rooms, performing checks on equipment operating parameters, cleaning and inspecting our equipment, and performing routine maintenance such as repairing pumps and valves. Contract Labor is comprised of external labor for work outside of the core skill set of our employees. Chemicals such as lime, activated carbon, and ammonia are used to reduce emissions at the plants. Other costs represent the land easement payments for our renewable wind resources.

Q. HOW ARE THE COMPANY'S LONG-TERM O&M COSTS TRENDING AS THE GENERATION FLEET TRANSITIONS TO MORE RENEWABLES?

A. Our baseline historical O&M spending from 2018 to 2020 averaged $138.6 million per year. As shown in Figure 5 below, our O&M costs are changing as we continue to transition our fleet towards a carbon-free future. The annual costs associated with operating and maintaining our coal units have been decreasing due to reduced overhaul and project investments as several units approach retirement. Chemical costs have also decreased due to seasonal operations and the efficiencies experienced from installed projects. Conversely, the annual costs associated with operating and maintaining our renewable fleet have been increasing, mostly from the addition of new wind generation to our portfolio. Wind land easement payments and the contracts required to maintain the wind farms are major components of the renewable assets. The impact of this shift to less carbon-intensive generation sources has shifted our overall O&M priorities so that the O&M spending on wind eclipsed the spending on coal generation in 2022. The costs associated with our combined cycle, simple cycle, RDF, and hydro units have been relatively flat, with variation between years due mostly to unit overhaul schedules.

Figure 5



There is some variation in our O&M expenses between years due to the timing of new assets going into service and other units moving towards retirement, but overall our average O&M budget for years 2022–2024 is 13.8 percent more than our average O&M spend for years 2018–2020. The new wind farm operations and maintenance contracts and land easement payments are the primary drivers of the future O&M increases.

I note that our O&M renewable asset costs, with the exception of internal labor, will be recovered through the RES Rider during the pendency of this case. I discuss these costs here, as they are integral to Energy Supply's O&M budget regardless of how they are recovered. Mr. Halama discusses the costs included in the Company's RES Rider and how it affects our O&M request for this rate case in further detail.

Q. WHAT IS THE COMPANY'S O&M BUDGET FOR 2022, 2023, AND 2024?

A. As shown in Table 8 below, we have budgeted $154.6 ($113.0) million for Energy Supply O&M in 2022, $160.8 ($117.4) million in 2023, and $157.7 ($115.0) million in 2024. Table 8 provides the actual individual year O&M costs for 2018, 2019, 2020 and the 2021 forecast (year-to-date actuals and year end forecast), and the 2022 through 2024 budgeted O&M. A detailed overview of our O&M budget by plant and year can be found in Schedule 2.

Table 8

Historical and Current NSPM Energy Supply O&M Budget

By Category ($s)

OM Category	2018 Actual	2019 Actual	2020 Actual	2021 Forecast	2022 Budget	2023 Budget	2024 Budget
Internal Labor	$74,479,153	$67,915,487	$65,250,024	$65,995,237	$59,985,657	$63,842,370	$61,250,785
Contract Labor	$37,070,615	$26,413,033	$31,204,272	$44,126,587	$49,303,942	$49,306,935	$46,296,830
Materials	$18,215,699	$19,431,453	$16,106,939	$15,805,557	$20,951,480	$22,831,820	$23,106,605
Chemicals	$6,865,136	$5,689,360	$4,674,675	$4,677,685	$3,090,002	$3,027,648	$3,214,496
Other	$19,042,625	$13,928,105	$9,409,313	$18,858,639	$21,244,403	$21,811,461	$23,802,983
Total	$155,673,228	$133,377,438	$126,645,222	$149,463,706	$154,575,483	$160,820,236	$157,671,699

Q. HOW DOES THE COMPANY'S CHANGING GENERATION FLEET AFFECT THE O&M BUDGET OVER THE TERM OF THE MYRP?

A. Asset additions and managing toward asset retirements materially impact our budgeting. As we install or purchase new assets, increased O&M funding is budgeted to effectively operate, maintain, and manage these resources.

Additionally, as a particular unit approaches retirement, less overhaul and project maintenance work is typically performed due to the diminishing returns on investment, and this decreases the O&M budget for that unit. The

retirement of existing assets also impacts the operating profiles of our other dispatchable assets. For example, after Sherco Unit 2 retires in 2023, the dispatch of Sherco Unit 1 will increase from a capacity factor of 49 percent to 65 percent after its major overhaul in 2024. Many of our existing assets have O&M costs that are variable based on their operating profiles, such as chemical costs, so any significant change to their operating profiles has a direct impact on their costs and is accounted for in our O&M budget.

Q. WHAT IS THE IMPACT OF NEW GENERATION ASSETS ON THE 2022, 2023, AND 2024 O&M BUDGETS?

A. The four new wind farms that were added to our generation portfolio in 2021, Blazing Star II, Mower County, Freeborn County, and Dakota Range I and II, contributed $19.0 million to the 2022 O&M budget. The acquisition of Northern Wind in 2022 also contributed $0.120 million to the 2022 O&M budget. These increases were offset by reductions in the fossil fuel plant O&M budgets, resulting in a net increase of $5.1 million in 2022 total O&M.

As the full-year wind farm maintenance contracts take effect, the Blazing Star II, Mower County, Freeborn County, Dakota Range I and II, Northern Wind farms and also Sherco Solar collectively contribute $22.4 million to the 2023 O&M budget.

Lastly, these new assets collectively comprise $24.3 million of the 2024 O&M budget; however, due to the Sherco Unit 2 early retirement in 2023, a net decrease of $3.1 million is the impact to the 2024 total budget.

Q. WHAT IS THE IMPACT OF GENERATION FLEET RETIREMENTS ON THE 2022, 2023, AND 2024 O&M BUDGETS?

A. As discussed above, when the units approach their retirement date, less overhaul and project maintenance work is typically performed, the dispatch profiles are reduced, and variable O&M such as chemicals can decrease impacting the O&M budgets. This pattern can be seen in Sherco Unit 2, which retires in 2023. The Sherco plant's O&M costs are $4.9 million lower in 2022 and $6.4 million lower in 2024 as compared to their 2021 forecasted costs. The overall Sherco O&M budget remains comparable to the 2021 forecast in 2023 due to the Sherco Unit 3 major overhaul. The reduction in O&M costs due to the retirement of plants in these future years is offset by the increased O&M costs required by the new renewable units coming online.

Q. HOW WILL THE SEASONAL DISPATCH OF ALLEN S. KING UNIT 1 AND SHERCO UNIT 2 IMPACT O&M EXPENSES OVER THE TERM OF THE MYRP?

A. All major overhauls for the Allen S. King plant have been removed from the O&M budget, including the $5.7 turbine overhaul and boiler maintenance outage that was scheduled for 2021. Only routine outages are scheduled at Allen S. King, primarily to conduct boiler inspections and other regulatory-driven work. The 2022 Sherco Unit 2 outage for $4.5 million has also been reduced to $0.95 million. This outage is needed to conduct required regulatory inspections and boiler cleaning. These are the primary cost-savings drivers in addition to variable O&M, such as chemical use. Our reductions in our Chemical budget are discussed in detail in in Section IV(C)(4).

Q. HOW DOES THE 2021 O&M FORECAST COMPARE WITH 2020 ACTUAL O&M COSTS?

A. As shown in Table 8 above, we are forecasting $149.5 million in O&M costs for 2021, which is an increase of $22.8 million above the 2020 actual O&M costs. The new wind site 2021 forecasts include the land easement payments and wind farm maintenance contracts for Blazing Star I and II, Freeborn, Mower County, Jeffers, Community Wind North, Crowned Ridge II, and Dakota Range I and II total $21.4 million.

In addition, the 2020 O&M actuals include a one-time decrease of $6.7 million in Energy Supply's O&M budget that is a result of modifying operations, reducing overtime and training, holding open positions, and shifting select projects due to the impacts of the COVID-19 public health emergency.

Q. HOW DOES THE 2022 O&M BUDGET COMPARE WITH 2020 ACTUAL COSTS?

A. The 2022 O&M budget is $154.6 million, which is an increase of 22.0 percent when compared to 2020 actuals of $126.6 million. The new wind farms that joined the fleet in 2020 and 2021 (outlined above) contributed $30.5 million to the 2022 Budget O&M budget as the maintenance contracts expanded to full-year coverage of the wind farms in-serviced in 2021. Offsetting these increases is a $4.0 million reduction in the Sherco Unit 2 overhaul and projects budget due to the planned retirement of this unit in 2023.

Q. HOW DOES THE 2022 BUDGET COMPARE WITH THE 2021 FORECAST?

A. Our 2022 Energy Supply O&M budget is $5.1 million or 3.4 percent higher than our 2021 forecasted expenses. The new wind farms that were placed in service at the close of 2020 and in 2021 increased the 2022 O&M budget, followed by

smaller increases from the Black Dog Unit 5 combustion turbine hot gas path inspection and the Red Wing Unit 2 turbine overhaul. These increases were offset by a reduction in the Sherco budget from the Unit 2 overhaul scope reduction.

Q. HOW DOES THE 2023 BUDGET COMPARE WITH THE 2022 BUDGET?

A. We budgeted $160.8 million in O&M costs for 2023, which is an increase of 4.0 percent compared to 2022. The increase in 2023 is due to the new wind farm, Northern Wind, Sherco Solar, the O&M portion of the High Bridge Unit 8 combustion turbine major overhaul, and the Sherco Unit 3 overhaul. This increase is offset by the contract structuring of the maintenance and operations contracts for the wind farms.

Q. HOW DOES THE 2024 BUDGET COMPARE WITH THE 2023 BUDGET?

A. We budgeted $157.7 million in O&M costs for 2024, which is a decrease of 2.0 percent or $3.1 million as compared to 2023. The significant decrease in 2024 is due to the retirement of Sherco Unit 2 in 2023 balanced by the first full year operation of the Sherco Solar project.

Q. HOW HAS THE COVID-19 PANDEMIC AFFECTED ENERGY SUPPLY'S O&M FORECASTS FOR 2022 AND BEYOND?

A. The COVID-19 pandemic has not materially changed Energy Supply's O&M forecasted costs for 2022 through 2024. Our 2020 O&M actuals reflected one-time reductions discussed above, but these reductions are not sustainable, as the core work of Energy Supply – operating and maintaining our fleet – must continue in spite of the pandemic.

B. O&M Budgeting Process

Q. HOW DOES ENERGY SUPPLY SET THE O&M BUDGET FOR THE ENERGY SUPPLY BUSINESS UNIT?

A. Our O&M budget process is similar to our capital budget process in that both are based on a partnership between corporate management of overall finances and the business needs Energy Supply identifies. Ms. Ostrom explains how the Company establishes business area O&M spending guidelines and budgets based on financing availability, specific needs of business areas, and overall needs of the Company.

Q. CAN YOU GENERALLY DESCRIBE ENERGY SUPPLY'S O&M BUDGET PROCESS?

A. Yes. Each year, Energy Supply's generation facilities and Energy Supply's service organizations set a budget for the five-year budgeting period. The budget covers several cost categories including headcount, overtime, chemicals, materials, outside services, rents, land easements, and employee expenses. Costs in these categories are aggregated at the plant level and then compared to the recent historical actuals for reasonableness, plant operating profile, plant improvements, overhaul schedules, and adjusted as necessary. If non-recurring overhauls and projects are budgeted at the plant level, they typically impact the overtime, materials and outside services cost categories. The budget for each plant is reviewed and approved by regional and executive leadership.

Q. DOES ENERGY SUPPLY EVER NEED TO CHANGE ITS O&M BUDGETS DURING THE YEAR?

A. Issues can arise during the year that require an adjustment of the O&M budget, including emergent work, cancelled projects, an increase/decrease to budgeted headcount, forced outages, and scope changes to projects. When these budget

change needs arise, the potential changes are discussed with Energy Supply leadership and Finance leadership to understand the impact the changes will have on operations and the overall financial picture of the Company. Any changes to the O&M budget must be approved by Energy Supply Leadership and Finance.

Q. HOW DOES ENERGY SUPPLY MONITOR ITS O&M EXPENDITURES THROUGHOUT THE YEAR?

A. Every month, actual O&M expenditures are compared both to the original budget and to the updated forecast of O&M costs. Variances are researched with plant and finance personnel and presented to Energy Supply leadership and Finance leadership monthly.

C. O&M Budget Detail

Q. WHAT IS INCLUDED IN THIS SECTION OF TESTIMONY?

A. In this section, I will describe Energy Supply's O&M budget for 2022 through 2024 by cost category and compare these costs to historical actual costs. A three-year historical average of actuals (2018-2020) is used to make these comparisons.

Q. WHAT ARE THE BASIC CATEGORIES OF THE ENERGY SUPPLY O&M BUDGET?

A. We prepare our budgets in accordance with the overall categories of Energy Supply spend. Our O&M budget can be analyzed by the following categories: 1) Internal Labor, 2) Contract Labor, 3) Materials, 4) Chemicals, and 5) Other.

Q. WHAT ARE THE MAIN DRIVERS OF THESE CATEGORIES?

A. There are several factors that influence the O&M budget categories shown in

Table 8 above, the most significant being overhauls and projects, which vary between years depending on the condition of our equipment.

Q. WHAT IS AN OVERHAUL?

A. The process of generating electricity involves a complex series of consecutive steps, each step carried out in a different part of the station. In order to ensure that this process runs efficiently, safely, and meets applicable regulation, regular maintenance of a generating station is necessary.

Each of our coal units requires regular overhauls every one to three years, depending on the design of each. Our natural gas unit overhauls are dependent upon the number of hours they have operated and the number of times they have been started. During an overhaul, we perform detailed equipment inspections and preventive and corrective maintenance work activities to prepare the unit to meet our reliability goals. We also perform similar work that we classify as projects if it does not require the unit to be offline.

Q. HOW DO OVERHAULS AFFECT THE O&M BUDGET CATEGORIES?

A. Our planned overhauls influence our O&M costs in two ways. First, our planned overhauls increase our Internal Labor, Contract Labor, and Material costs. Internal Labor costs increase due to additional labor and overtime costs associated with extended working hours to return the unit to service in a timely manner. Contract Labor costs increase due to additional contractors and vendors providing equipment inspections, repairs, and testing during the overhaul. Material costs also increase due to additional materials used during the overhaul for equipment repairs. Conversely, our Chemical costs decrease

during overhauls since our operating equipment is out of service and no chemicals are required.

Q. HOW DOES THE COMPANY PLAN AND SCHEDULE OVERHAULS?

A. In general, overhauls are planned and budgeted based on forecasted operating profiles and equipment condition to ensure long-term reliability and prevent operational issues and forced outages. Planned overhauls are managed so that costs are relatively constant each year. This overhaul management strategy minimizes variation in annual overhaul costs. As a result of our overhaul and project planning and prioritization process, we manage annual O&M spending on these items while also maintaining safe and reliable operations.

Q. WHAT ARE THE OVERHAUL SCHEDULES FOR THE COMPANY'S COAL AND COMBINED CYCLE GENERATION FACILITIES?

A. The Sherco units are on a three-year major overhaul schedule, with the exception of Sherco 2, which was overhauled in 2019 and is not scheduled for a major overhaul in 2022 due to its retirement in 2023. The overhaul schedule for Allen S. King Unit 1 has changed to routine cleanings throughout the budget period due to the seasonal operation strategy for this unit.

The combined cycle turbine overhauls at Black Dog, High Bridge, and Riverside are scheduled based on either equivalent starts or equivalent fired hours, depending on how they are dispatched. The combined cycle plants are currently scheduled for overhauls based on an equivalent fired-hours basis due to their recent operating profiles. These plants also perform steam turbine overhauls approximately every eight to 10 years depending on operation and equipment conditions. Steam turbine and gas turbine overhaul schedules are aligned when

possible to minimize total overhaul durations. Our gas turbine overhauls at Angus Anson, Blue Lake, and Inver Hills are scheduled on an equivalent-starts basis since they are typically used for peak demand and therefore have lower hours per start.

Red Wing and Wilmarth perform boiler overhaul work each year to ensure reliability over a 12-month cycle, and scheduled turbine overhaul work every six to eight years depending on equipment condition.

Q. HOW ARE OVERHAULS SCHEDULED WITHIN A GIVEN BUDGET YEAR?

A. Our overhauls are scheduled in a collaborative effort with Commercial Operations to be least impactful to regional operations in order to ensure Company and contractor resources are available to perform the work. Typically, our major overhauls are performed in the spring season when energy demand is lower and to ensure reliable generation in the summer peak demand period. To a lesser extent, some minor overhauls are performed in the fall season to prepare for the winter demand.

Q. IN ADDITION TO THE O&M CATEGORIES ABOVE, ARE THERE OTHER WAYS TO ANALYZE ENERGY SUPPLY'S O&M COSTS?

A. Yes. Our budgeting process begins at the plant level. Therefore, another way to analyze our O&M costs is by plant. Schedule 2 presents O&M costs by plant and by category from 2018 through 2024.

1. Internal Labor

Q. WHAT DOES THE INTERNAL LABOR COMPONENT OF THE ENERGY SUPPLY BUDGET CAPTURE?

A. Our Internal Labor budget component captures the costs of our Xcel Energy labor force that runs our plants and supports Energy Supply activities. Our Internal Labor budget also includes planned overtime and rotating shift premiums to ensure we have personnel available to operate our plants at all hours of the day. Our Internal Labor has historically been the largest component of our O&M budget, and this remains the case as we continue our transition to a carbon-free future.

Q. HOW DOES XCEL ENERGY DETERMINE WHICH OPERATIONS OF THE ENERGY SUPPLY FUNCTION WILL BE UNDERTAKEN BY INTERNAL LABOR?

A. We believe it best to maintain internal resources for the day-in, day-out work and support functions at our plants. Operating and maintaining our fleet is a core competency of the Company. Using internal labor to do so allows us to build up an internal knowledge base and expertise to meet these core needs. Key roles that we believe should be filled with internal labor resources include plant operators, maintenance personnel, electricians, environmental service analysts, engineers, instrument and control technicians, and chemists familiar with our fleet.

Further, we utilize a Special Construction workforce comprised of members of the Minnesota Building and Construction Trades who are dispatched to different plants to address projects and overhauls throughout our fleet. This ensures we have personnel ready to meet immediate needs. They essentially account for our "bench strength" to mitigate costs and maintain access to

critical resources, such as boilermakers. Our collective bargaining agreement with the Minnesota State Building and Construction Trades Council and Affiliates has governed this relationship for over 25 years.

Q. HOW HAVE YOUR INTERNAL LABOR COSTS BEEN TRENDING?

A. Our historical three-year Internal Labor costs have averaged $69.2 million annually with some variance between years due to overhauls and projects. We are forecasting a small but steady decrease in Internal Labor costs as several generation units approach retirement.

Q. WHAT IS THE COMPANY DOING TO CONTROL INTERNAL LABOR COSTS?

A. Our most significant means of controlling our Internal Labor costs is ensuring that we have the appropriate number of properly trained and qualified internal resources to perform the routine operation and maintenance of our operating units. As mentioned previously, we utilize our Special Construction workforce and Contractors to perform uncommon and specialty skill work during projects and overhauls, which helps us control our Internal Labor costs.

Q. WHAT IS THE IMPACT OF THE COMPANY'S CHANGING GENERATION PORTFOLIO ON YOUR INTERNAL LABOR?

A. Generally, as our fossil units are retired, there is a corresponding reduction in our number of full-time employees, as no labor is required to operate or maintain a retired asset. The Company typically manages these transitions through attrition from employee retirements or transfers leading up to unit retirement. To help with these transitions, we have also utilized employees from other plants and contractors to help maintain operations and maintenance as the unit nears retirement and we have reduced part of our regular workforce.

Q. HOW DO THESE UNIT RETIREMENTS IMPACT ENERGY SUPPLY'S TOTAL NUMBER OF FULL-TIME EMPLOYEES?

A. In preparation for Sherco Unit 2 retirement in 2023, we are forecasting a Sherco plant employee reduction of approximately 7.0 percent through attrition from 2021–2023.

Q. HOW DO THESE UNIT ADDITIONS IMPACT ENERGY SUPPLY'S TOTAL NUMBER OF FULL-TIME EMPLOYEES?

A. The impact from the new renewable units was an increase of five full-time employees from 2020 to 2021 and a forecast of four additional full-time employees from 2021 to 2022. These employees provide management support to Blazing Star I, II, Dakota Range I and II, Freeborn, Mower Country, Jeffers, Community Wind North, and Crowned Ridge II. The Internal Labor costs for Energy Supply's renewable generation units remains stable after 2022.

Q. HOW DOES ENERGY SUPPLY'S 2022 INTERNAL LABOR BUDGET COMPARE TO 2018-2020 ACTUALS?

A. Our 2022 Internal Labor budget is $60.0 million, which is 13.3 percent lower than our 2018-2020 average costs. This decrease is mostly due to employee attrition at our coal generating stations offset by annual wage increases and additional headcount to support our new renewable units.

Q. HOW DOES YOUR 2022 INTERNAL LABOR BUDGET COMPARE TO YOUR 2021 FORECAST?

A. Our 2022 Internal Labor budget is 9.1 percent lower than our 2021 forecast. This decrease is mostly due to employee attrition at our fossil generating stations

offset by annual wage increases and additional headcount to support our new renewable units.

Q. HOW DOES YOUR 2023 INTERNAL LABOR BUDGET COMPARE TO YOUR 2022 BUDGET?

A. Our 2023 Internal Labor budget is $63.8 million, which is a 6.4 percent increase over our 2022 budget. This increase is due to the Sherco Unit 3 overhaul during which our Special Construction labor pool performs much of the specialty work described earlier.

Q. HOW DOES YOUR 2024 INTERNAL LABOR BUDGET COMPARE TO YOUR 2023 BUDGET?

A. Our 2024 Internal Labor budget is $61.3 million, which is a 4.1 percent decrease from our 2023 budget. This, again, is due to employee attrition at our coal generating stations offset some by annual wage increases and maintaining the headcount to support our new renewable units.

2. Contract Labor

Q. WHAT TYPES OF COSTS ARE INCLUDED IN THE CONTRACT LABOR COMPONENT OF ENERGY SUPPLY'S O&M BUDGET?

A. The Contract Labor component of our budget captures the costs of outside contractors, experts, and other third-party assistance that augment our core operations and maintenance competencies. Examples include crews hired to help with overhaul work, as well as experts from our equipment manufacturers to provide expertise on engineering and construction.

Q. HOW DOES THE COMPANY DETERMINE WHICH OPERATIONS OF THE ENERGY SUPPLY FUNCTION WILL BE UNDERTAKEN BY CONTRACT LABOR?

A. We look to outside vendors to provide specialized expertise that is not cost-effective for us to maintain for our core operations. Such expertise may be necessary for specialized and non-regularly occurring work such as specialty repairs and overhauls. Examples of such functions include specialty engineers, turbine services, wind maintenance, construction contractors, and specialty trades. Further, we use contract labor to supplement our workforce as needed to accommodate major projects such as overhauls and O&M projects.

Q. HOW HAVE THE CONTRACT LABOR COSTS BEEN TRENDING?

A. As shown in Table 8 above, our historical Contract Labor costs have been fairly consistent at $31.5 million annually. With the addition of wind farms and solar, the contract labor significantly increases as the associated maintenance service agreements required to operate and maintain these generators are added to the O&M budget. The trends are explained in detail below.

Q. WHAT IS THE COMPANY DOING TO CONTROL CONTRACT LABOR COSTS?

A. We use the Master Service Agreement program, which I describe below, to help ensure we obtain qualified and cost-effective contract labor. We also carry out significant contract oversight protocols, which include validating hours charged to a project and compliance to contract terms and conditions.

Q. HOW DOES YOUR 2022 CONTRACT LABOR BUDGET COMPARE TO YOUR 2018-2020 ACTUALS?

A. Our 2022 Contract Labor budget is $49.3 million, which is an increase of $17.7 million or 56.2 percent compared to our 2018-2020 average costs. This increase

is attributed to the increase in contract labor required for our new wind farm facilities, as explained in the next question.

Q. HOW DOES YOUR 2022 CONTRACT LABOR BUDGET COMPARE TO YOUR 2021 FORECAST?

A. Our contract labor budget in 2022 is $49.3 million and represents an increase of $5.2 million or 11.7 percent as compared to our 2021 forecast. This increase is primarily due to the service agreements for our new wind farms that were placed into service late 2020 and during 2021 and are experiencing the first full year of contract labor costs. These first full-year service agreements impact the 2022 O&M budget: Dakota Ridge I and II, Blazing Star I and II, Freeborn, Mower County, Jeffers, Community Wind North, and Crowned Ridge.

Q. HOW DOES YOUR 2023 CONTRACT LABOR BUDGET COMPARE TO YOUR 2022 BUDGET?

A. Our 2023 Contract Labor budget is $49.3 million, which is stable with the 2022 Contract Labor budget. The stability of the contract labor costs is a reflection of no new wind farms coming into service in 2023.

Q. HOW DOES YOUR 2024 CONTRACT LABOR BUDGET COMPARE TO YOUR 2023 BUDGET?

A. Our 2024 Contract Labor budget is $46.3 million, which is a decrease of $3.0 million or 6.1 percent compared to our 2023 budget. The decrease in contract labor is attributable to the structuring of the wind operating and maintenance contracts.

3. Materials

Q. WHAT DOES THE MATERIALS COMPONENT OF THE ENERGY SUPPLY BUDGET CAPTURE?

A. The Materials budget component captures all non-chemical material costs we incur to operate and maintain our plants. This includes items such as piping, pumps, valves, filters, building materials, and other miscellaneous materials used to operate and maintain our units. The Materials budget also includes wind farm materials where the equipment manufacturer is General Electric.

Q. HOW HAVE MATERIAL COSTS BEEN TRENDING?

A. Our historical material costs have averaged $18 million annually with some variance between years due to overhauls and projects. Our material costs tend to fluctuate within a confined band depending on the scope of overhauls and projects. Certain projects and overhauls may include replacement of equipment components, which requires significant materials, whereas others may be focused on equipment cleaning or inspections and not require materials. Our material costs also tend to increase when major equipment comes out of warranty and any replacement parts need to be purchased by the Company instead of being provided by the manufacturer.

Q. WHAT HAS THE COMPANY BEEN DOING TO CONTROL MATERIAL COSTS?

A. As part of the MSA program, we have implemented supply agreements with several preferred vendors to obtain bulk discounts and better service. Significant measures to leverage our purchasing volumes have also been implemented to reduce spend in the MRO (maintenance, repair, and operations) supplies category. The MRO supplies category includes general industrial supplies; fasteners; hand and power tools; pipe, valves and fittings; power

transmission components; and safety materials. While these are generally less expensive items, we utilize a high volume of these materials.

Our basic sourcing strategy in this category is to lower the costs by leveraging volume purchasing at negotiated prices. Combining all of our sourcing with a few national suppliers has resulted in a cost reduction while also driving down operational costs. These savings are due to a combination of both negotiated pricing discounts and yearly cash rebate checks we receive from these suppliers.

Q. HOW DOES ENERGY SUPPLY'S 2022 MATERIALS BUDGET COMPARE TO YOUR 2018-2020 ACTUALS?

A. Our 2022 Materials budget is $20.9 million, which is an increase of 3.0 million or 16.9 percent compared to our 2018-2020 average costs. This is due mostly to the material costs associated with our new wind resources as well as variances in project and overhaul spending. The wind operations and maintenance contracts for sites where the equipment manufacturer is General Electric have separate budgets for materials which are included in our Materials O&M budgets. The wind sites where the equipment manufacturer is Vestas include materials in the operations and maintenance contracts. Therefore, the material costs for the Vestas sites are included in our Contract Labor Budget.

Q. HOW DOES ENERGY SUPPLY'S 2022 MATERIALS BUDGET COMPARE TO YOUR 2021 FORECAST?

A. Our 2022 Materials budget is $20.9 million, which is an increase of $5.1 million or 33.0 percent compared to our 2021 forecast. Mower County, Lake Benton II, and Crowned Ridge II GE wind assets impacted the materials budget, as well

as the renegotiated long-term contracts at Nobles. The Black Dog Unit 5 Hot Gas Path overhaul also impacted the Materials budget in 2022.

Q. HOW DOES YOUR 2023 MATERIALS BUDGET COMPARE TO YOUR 2022 BUDGET?

A. Our 2023 Materials budget is $22.8 million, which is an increase of $1.9 million or 8.9 percent compared to our 2022 budget. The 2023 Materials budget increase captures the anticipated write-off of the obsolete inventory due to the retirement of Sherco Unit 2, as well as increases from the Sherco Unit 3 major overhaul. The Materials budget for our wind facilities is stable in 2023.

Q. HOW DOES YOUR 2024 MATERIALS BUDGET COMPARE TO YOUR 2023 BUDGET?

A. Our 2024 Materials budget is $23.1 million, which is an increase of $0.275 million or 1.2 percent compared to our 2023 budget. The 2024 increase can be attributed to an additional obsolete inventory write-off from the Sherco Unit 2 retirement, offset by a base material decrease on the same unit.

4. Chemicals

Q. WHAT IS INCLUDED IN ENERGY SUPPLY'S CHEMICALS BUDGET?

A. This cost category consists primarily of chemicals used in the generation process and for the control of emissions. Chemicals for which we incur the most costs include lime, ammonia, mercury sorbent, and sulfuric acid. Chemical costs are continuing to trend downward as a benefit of both seasonal operations and previously installed plant projects that increase chemical application efficiency. Exhibit___(RAC-1), Schedule 5 provides our 2018–2020 actuals, 2021 forecast, and 2022–2024 budgets for our main chemicals. Exhibit___(RAC-1), Schedule 6 provides the quantity and prices for our main chemicals by plant (actual

percentage owned by the Company) for 2018–2020 actuals, 2021 forecast, and 2022–2024 budgets.

Q. CAN YOU PROVIDE ADDITIONAL INFORMATION REGARDING THE MAIN CHEMICALS THE COMPANY USES?

A. Yes. The main chemicals we utilize at our plants are discussed below.

Lime. Lime is used at the Allen S. King, Sherco Unit 3, Red Wing, and Wilmarth plants to remove sulfur dioxide from the flue gas. The use of lime at these plants is governed by the design of the flue gas desulfurization system and regulatory removal limits. The material is received and stored in a solid pebble form. In order to use lime in an air quality control system, it is usually slaked with water and stored a short time before being used as lime slurry. This lime slurry is then metered into the Air Quality Control System, where it reacts with sulfur dioxide to produce calcium sulfate. This calcium sulfate is then collected by this same Air Quality Control System and conveyed to a secure landfill for safe storage.

Ammonia. Historically, the majority of ammonia has been used at the Allen S. King plant in the SCR system. In addition to the Allen S. King plant, the Riverside, High Bridge, and Black Dog plants also use ammonia in SCR systems. An SCR system reduces the nitrogen oxides in boiler flue gas. The ammonia is received and handled in a liquid form, then vaporized and applied just ahead of a large catalyst inside the boiler flue gas ductwork. Here, nitrogen oxides reacts with the ammonia to form nitrogen and water. Allen S. King, Riverside, and High Bridge use 19 percent aqueous ammonia, whereas Black Dog uses 29 percent aqueous ammonia.

Significantly smaller amounts of ammonia are also used at these and other plants for boiler water treatments. In this application, it is used directly to raise the pH of the boiler water to specific limits to reduce corrosion of the boiler steel.

Mercury Absorbents. Activated carbon is the industry standard for mercury removal from flue gases and is used at Sherco and Allen S. King for that purpose. Activated carbon is received in semi-tanker trucks, where it is loaded into large silos in a powder form. From these storage silos, it is metered into the boiler flue gas where mercury is absorbed into the active carbon. This activated carbon that contains mercury is ultimately caught in the Air Quality Control System and then conveyed to a secure landfill for safe storage.

Sulfuric Acid. The bulk of the sulfuric acid is used for water treatment to control scale formation in cooling waters. The material is received and handled in liquid form. It is then metered into the cooling tower waters where it controls scale by maintaining the pH within certain limits. Minor amounts are also used in demineralizers and process water for pH control.

Other Chemicals. Other chemicals include chemicals with lower usage rates that may be specific to a generating site or are used in ancillary systems. Examples of these chemicals include: bromine, polisher resin, corrosion inhibitors, scale inhibitors, ethylene, hydrogen, CO2, nitrogen, phosphate, sodium chloride, and urea.

a. Base Chemical Trends

Q. HOW DOES ENERGY SUPPLY'S HISTORICAL ACTUAL CHEMICAL COSTS COMPARE TO THEIR BUDGETED AMOUNTS?

A. Our chemical costs have historically been under budget. This is due to a variety of reasons. The most significant impact on our historical costs has been operational improvements made at our coal plants that have considerably reduced our chemical consumption rates (*i.e.*, the amount of chemicals consumed per MWh generated). For example, at our Sherco plant, we have decreased our budgeted mercury sorbent consumption rate by approximately 30 percent for Unit 1 and Unit 2 from historical levels, as we have gained more experience in using mercury sorbent and installed additional equipment to monitor and optimize its use.

Q. HAS ENERGY SUPPLY ADJUSTED ITS CHEMICAL BUDGETING PROCESS IN LIGHT OF ITS OPERATIONAL EXPERIENCES?

A. Yes. As we have improved the efficiency of our chemical consumption, we have adjusted the 2022 test year budget and 2023 and 2024 plan year budgets to recognize more optimized chemical consumption rates going forward.

Q. DOES THE COMPANY EXPECT CHEMICAL CONSUMPTION RATES TO CONTINUE DECREASING SIGNIFICANTLY?

A. While we have made significant improvements over the past few years to optimize our chemical consumption, and we continue to analyze our consumption rates and ways to improve, we believe that we are approaching the limits of our current technology, and we are forecasting the consumption rates to stabilize accordingly.

Q. WHAT ARE THE SHORT-TERM TRENDS FOR BASE CHEMICALS?

A. Our chemical costs have generally been declining since 2018 due to the operational efficiency improvements mentioned earlier, most notably the improvements at Allen S. King 1 (reduced ammonia consumption), and improvements at Sherco 1 and 2 (reduced mercury sorbent consumption). There are some fluctuations between years due to overhaul schedules and the impact of market cost changes on our supply contracts. While our chemical contracts protect us from short-term commodity pricing volatility, they are tied to a market index. The indices tend to increase steadily over the life of the contract, but we have negotiated a cap limit to price as an additional protection measure. Our 2018-2020 actuals, 2021 forecast, and 2022-2024 budgets for Chemical for each type of chemical are provided in Table 9 below.

Table 9

Historical and Current NSPM Energy Supply O&M Costs

By Chemical

	2018 Actual	2019 Actual	2020 Actual	2021 Forecast	2022 Budget	2023 Budget	2024 Budget
Lime	$2,855,981	$2,077,916	$1,813,902	$1,831,916	$1,213,420	$1,197,846	$1,446,104
Mercury Sorbent	$1,023,097	$1,015,989	$1,243,068	$615,593	$610,507	$573,243	$487,907
Ammonia	$1,848,248	$1,334,444	$713,562	$1,059,306	$588,835	$570,252	$651,669
Sulfuric Acid	$763,803	$831,254	$523,380	$539,544	$275,962	$285,030	$279,381
Other Chemicals	$374,007	$429,757	$380,762	$631,326	$401,278	$401,278	$349,434
Total:	**$6,865,136**	**$5,689,360**	**$4,674,675**	**$4,677,685**	**$3,090,002**	**$3,027,648**	**$3,214,496**

Q. HOW DO THE 2022-2024 CHEMICAL BUDGETS COMPARE TO THE 2018-2020 THREE-YEAR AVERAGE?

A. We have budgeted $3.1 million in 2022 for Chemicals, which is 2.7 million less than our 2018–2020 average costs. This difference between the three-year

historical average and 2022 budget is due mostly to a $0.47 million reduction in the mercury sorbent budget at Sherco, a $0.53 million reduction in lime at Allen S. King, and a $0.62 million reduction in lime at Sherco Unit 3. These reductions consider the forecasted capacity factors at the plants as well as our recognition of the decreased consumption rates we have historically been experiencing.

Our 2023 and 2024 Chemical budgets are also lower than our 2018–2020 average costs and within 4 percent of our 2022 budget for similar reasons.

Q. CAN YOU ALSO DESCRIBE THE SHORT-TERM TRENDS FOR BASE CHEMICALS BY CHEMICAL TYPE?

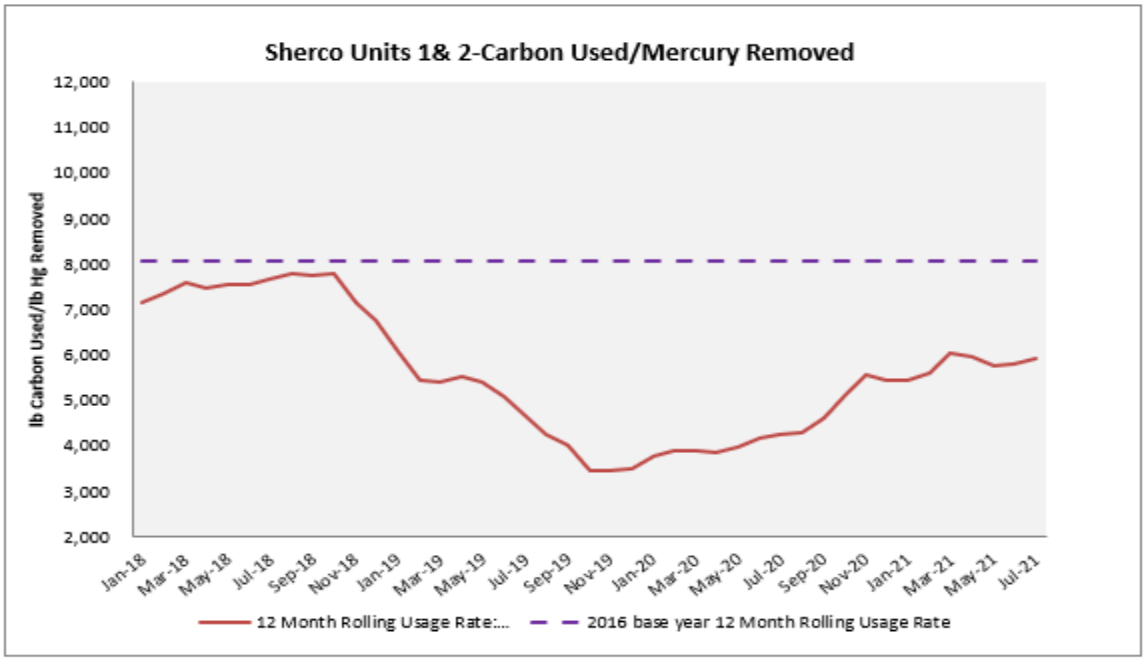
A. Yes. I will describe the short-term trends for each chemical in turn.

Lime. The majority of our lime consumption is due to Sherco Unit 3 sulfur dioxide emissions control equipment. In June 2017, the Sherco EPA Reasonably Attributable Visibility Impairment (RAVI) settlement went into effect, which resulted in more stringent sulfur dioxide emissions limits and therefore increased lime consumption. The Company then transitioned to a different blend of coal in 2019, which allowed for lime consumption rates to return back to their historical average. In addition to these changes, lime consumption also varies with unit capacity. For this reason, Sherco Unit 3 lime consumption actually decreased in 2020 and also has a decreased budget in 2023 due to the Sherco Unit 3 major overhaul cycle. The 2021 lime consumption for Allen S. King is forecasted to be 50 percent less than the 2018-2020 average due primarily to the seasonal generating profile. The Red Wing and Wilmarth lime consumption have been relatively stable.

Mercury Sorbent. The Sherco Unit 1 and Unit 2 mercury sorbent carbon injection system went into service in 2015 to respond to new mercury emissions limits. This added mercury sorbent to our chemical costs. In early 2018, the Company made significant improvements to the Continuous Emissions Monitoring System (CEMS), which allowed for real-time monitoring of mercury emissions compared to the previous methods that required sample analysis and provided delayed results. The new CEMS equipment allowed for tuning adjustments and operational changes in real time, which significantly reduced carbon injection rates and improved efficiency while maintaining mercury emissions compliance. This improvement can be seen in both the overall carbon usage and costs beginning with 2018 actuals, and going forward in the 2021 forecast and 2022–2024 budget. A trend of the mercury sorbent consumption rate for Sherco Units 1 and 2 can be seen in Figure 6 below.

Figure 6

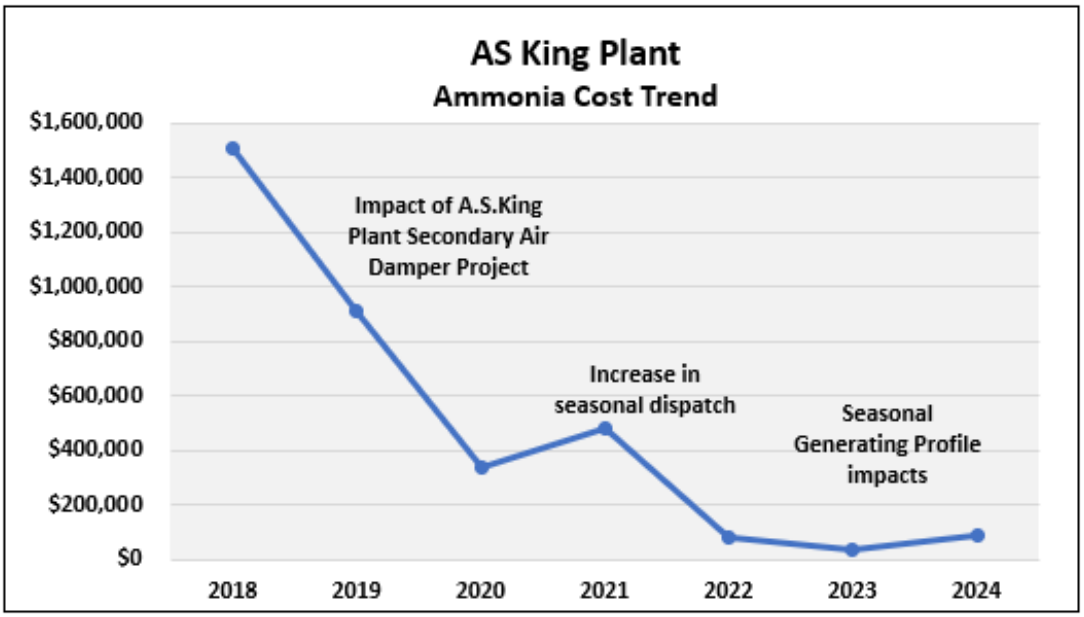
Mercury Sorbent Consumption Rate Sherco 1 and 2



Ammonia. Ammonia usage has been decreasing over the past few years for several reasons. The triasing secondary air dampers placed into service at the Allen S. King plant in spring 2016 and tuning adjustments have resulted in a lasting impact on our ammonia costs. In addition, the seasonal dispatch profile of the Allen S. King plant has contributed to the reduction trend in ammonia use. The combined cycle plants' (High Bridge, Black Dog and Riverside) ammonia use has held stable, varying incrementally with the dispatch profile. Figure 7 below shows the ammonia cost impact over time at the Allen S. King Plant.

Figure 7

Ammonia Cost Trend Allen S. King



Sulfuric Acid. Sulfuric Acid usage rates also remain steady overall. Fluctuations between years are due to overhaul schedules and the impact of market cost changes on our supply contracts.

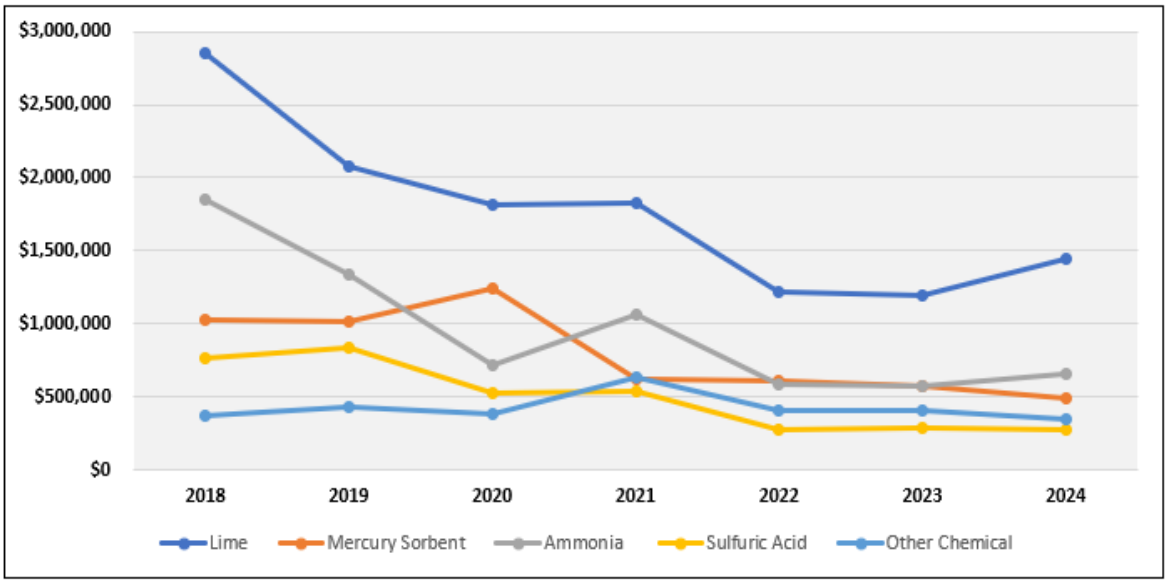
Other Chemical. We forecasted an increase to our Other chemical costs in 2021 for the addition of scale inhibitor chemicals to Sherco Unit 1 and 2 scrubber modules on a trial basis. The additional chemicals in this category have remained steady, with fluctuations due to overhaul schedules and the impact of market cost changes on our supply contracts.

Q. WHAT ARE THE LONG-TERM TRENDS FOR BASE CHEMICALS?

A. The long-term costs of our major chemicals are illustrated in Figure 8 below. Overall, most of our chemical costs have been flat or decreasing. Through a combination of new emissions monitoring technology, improved operating efficiencies, negotiated pricing, and seasonal operational dispatch, we have been able to significantly reduce the costs of our base chemicals. We are forecasting our chemical costs to stabilize in 2022-2024 between $3.0 and $3.3 million annually.

Figure 8

Historical and Current NSPM Energy Supply O&M Chemical Costs



Q. CAN YOU PROVIDE MORE DETAIL REGARDING THE TRENDS DEPICTED IN FIGURE 8?

A. Yes. As described in Section "a. Base Chemical Trends" above, historical data contains unique events that can make year-to-year trend analyses misleading. Chemical usage levels and costs are impacted by equipment planned overhauls, unplanned outages, and capacity factors. For example, during the Sherco Unit 3 overhaul years, the lime usage will be less than non-outage years. Exhibit___(RAC-1), Schedule 7 shows the 2021-2024 overhaul schedules.

Figure 8 above also identifies the material usage and cost reductions we have been able to achieve after gaining experience with newer emissions control chemicals at our plants. With greater experience, we are able to fine-tune the usage of these chemicals and optimize combustion equipment that effects emissions generation. As an example, our experience with SCR technology and the new triasing secondary air dampers at our Allen S. King plant have enabled us to fine-tune reductions in ammonia usage, which is evident in the trends. Lastly, keeping the chemical cost increases curtailed with effective contract negotiation has also contributed to stable chemical cost trends.

b. Base Chemical Budgeting

Q. GIVEN THESE TRENDS AND CONSIDERATIONS, HOW DOES THE COMPANY BUDGET FOR BASE CHEMICALS?

A. Our budgeting methodology considers the historical unit average chemical consumption while taking into consideration future capacity factors of the units and the current and forecasted chemical pricing. We then estimate forward pricing by factoring this data into our long-term chemical contract pricing formulas with adjustments for significant planned outages and improvements to chemical usage rates.

Q. WHAT ARE THE KEY VARIABLES THAT CAN AFFECT THE COMPANY'S BUDGETING PROCESS FOR CHEMICALS?

A. Our actual chemical costs are mainly affected by three variables: (1) plant dispatch, (2) chemical consumption efficiencies, and (3) commodity costs including the cost of transportation. While it is difficult to precisely predict these three variables, we have continued to refine our budgeting processes to reasonably predict chemical usage and costs.

Q. PLEASE DESCRIBE HOW PLANT OPERATING DISPATCH PROFILES AFFECT CHEMICAL CONSUMPTION AND WHAT THE COMPANY HAS DONE TO ACCOUNT FOR THIS FACTOR.

A. Our actual consumption of chemicals at a particular plant is directly correlated to the amount the plant is operating. If a particular plant operates more than forecasted, we will consume more chemicals. And if it runs less than projected it will consume less chemicals. Therefore, plant dispatch is a primary driver of our chemical costs. However, our budgeting methodology for chemicals factors in past actual usage to inform our budgeting, rather than relying only on predictions of future changes in plant dispatch profiles. Further, improvements in reliability lead to greater accuracy in predicting usage.

Q. PLEASE DESCRIBE HOW CHEMICAL CONSUMPTION EFFICIENCIES AFFECT CHEMICAL COSTS AND WHAT THE COMPANY HAS DONE TO ACCOUNT FOR THIS FACTOR.

A. As we obtain more experience using chemicals for environmental remediation, we are able to fine-tune our chemical operations to best suit the operating needs of the plant. This means that although we expected to use a certain amount of chemicals at a particular plant, through operating efficiencies we were able to

utilize a lesser amount of chemicals. These operating efficiencies inform subsequent years' budgeting. It is for this reason we have modified our straight consumption budgeting methodology to account for increased experience with certain emissions chemicals.

As an example, Sherco Unit 1 and 2 budget for mercury sorbent at a consumption rate of 206 lb/hour consistent with the manufacturer's guidelines. Through operating experience and equipment improvements, we have been able to reduce our consumption rates over time, and we are now budgeting Sherco 1 and 2 mercury sorbent at a consumption rate of 125 lbs/hour, which represents a 39 percent reduction. Similarly, at Allen S. King, we have been able to reduce our budgeted ammonia consumption rate from 2.3 tons/hour in 2016 down to 1.55 tons/hour in subsequent years, which represents a 33 percent reduction. There have been similar improvements at these and other sites for our other major chemicals.

Q. PLEASE DESCRIBE HOW COMMODITY COSTS AFFECT YOUR CHEMICAL COSTS AND WHAT THE COMPANY HAS DONE TO ACCOUNT FOR THIS FACTOR.

A. The base ingredients for the chemicals we use are commodities traded on world markets and subject to market volatility similar to metals or petroleum. The base pricing for all consumers of chemicals includes the base commodity costs plus an adder from the provider for manufacturing costs and a profit margin. Consequently, we, like every other large consumer of chemicals, are subject to market fluctuations.

An example is the current indexed pricing model for ammonia, which is subject to market volatility and changes monthly. As the market for ammonia is driven

by the world agriculture markets, any significant events affecting markets for fertilizer could have long-term impacts to our chemical pricing. As I explain below; however, we have negotiated long-term chemical contracts to help us ensure supply and achieve cost savings despite commodity cost fluctuations.

Q. HOW ACCURATE HAVE YOUR CHEMICAL PRICE FORECASTS BEEN?

A. Generally, our pricing forecasts have been reliable due to our negotiated rates in our chemical Master Service Agreements.

c. Base Chemical Cost Controls

Q. WHAT IS THE COMPANY DOING TO CONTAIN ITS CHEMICAL COSTS?

A. We are controlling our chemical costs by continuing to optimize our usage of chemicals at our plants; however, this fine-tuning can only provide limited cost reduction in any given year. Consequently, our efforts to mitigate our chemical costs are also focused on obtaining favorable pricing from our suppliers.

As part of overall fleet-wide cost mitigation measures, which I discuss further below, we have undertaken extensive chemical cost mitigation steps. By competitively bidding and negotiating long-term agreements with negotiated mark-ups above base commodity index pricing, we can leverage our volume purchases to ensure supply and remove pricing-risk premiums that are inherent in long-term fixed contracts. These contracts allow us to mitigate the impact of supply constraints pricing when markets tighten. However, due to the inherent nature of index pricing, volatility remains a risk.

Q. CAN YOU PROVIDE A MORE DETAILED DISCUSSION OF THE SPECIFIC EFFORTS THE COMPANY IS UNDERTAKING TO PROCURE CHEMICALS AT REASONABLE PRICES?

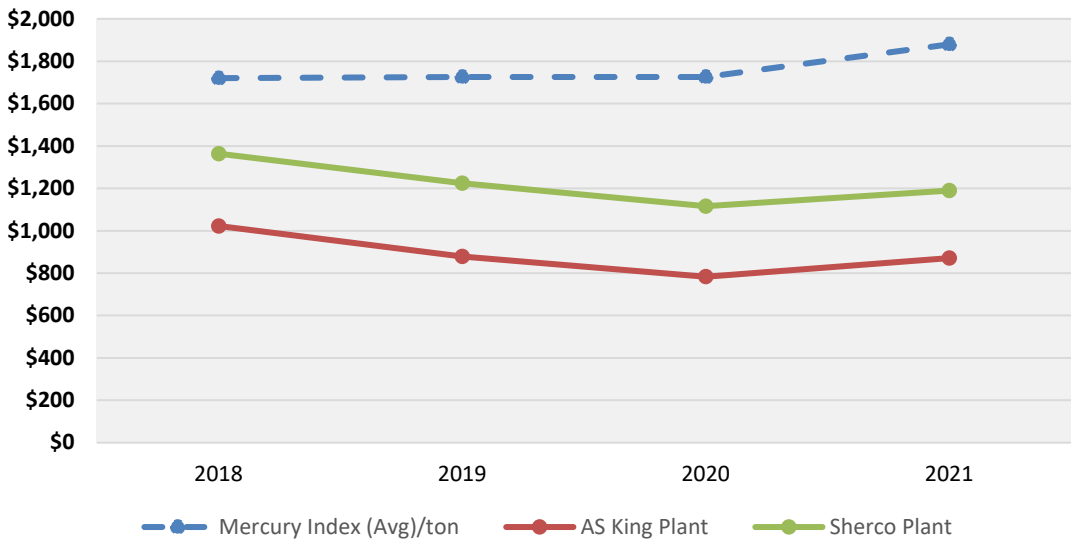
A. Yes. I will discuss our effort with respect to each major chemical:

Mercury Sorbent. Our contract for activated carbon was competitively bid and renewed in 2020. Our strategy for activated carbon in the near future is to build a strong relationship with our supplier to ensure sufficient supply and reasonable pricing. Pricing is based on the producer price index for industrial chemicals less fuel, but also has capped annual increases. Additional savings discounts and escalation caps were also negotiated for this contract. Our contract will allow for more consistent budget forecasts as well as anticipated below market, but indexed to market, pricing.

Figure 9 below features the mercury sorbent savings to the Allen S. King and Sherco plant as compared to the mercury Producer Price Index (PPI) on the spot market.

Figure 9

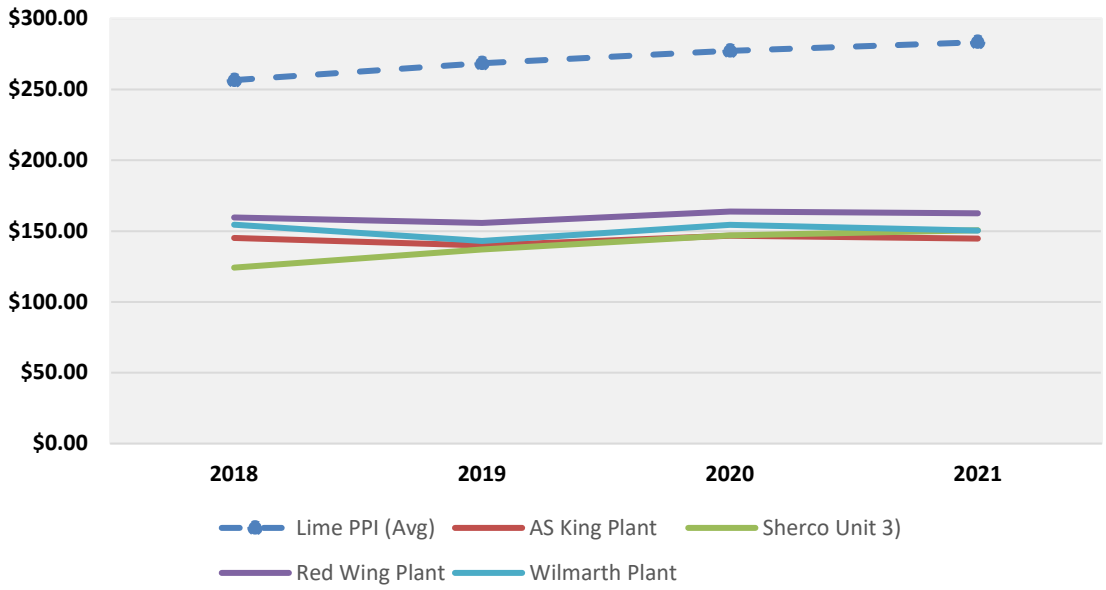
Mercury Sorbent Pricing Comparisons



Lime. Lime underwent another competitive bidding process in 2021, and as a result, Xcel Energy entered into an agreement that offered projected price protections through December 2023 based on available market intelligence. This contract has been renegotiated, and updated pricing forecasts can be found in Schedule 6. Figure 10 below features the lime savings to the Allen S King, Sherco, Red Wing, and Wilmarth plants as compared with industry's producer price index (PPI).

Figure 10

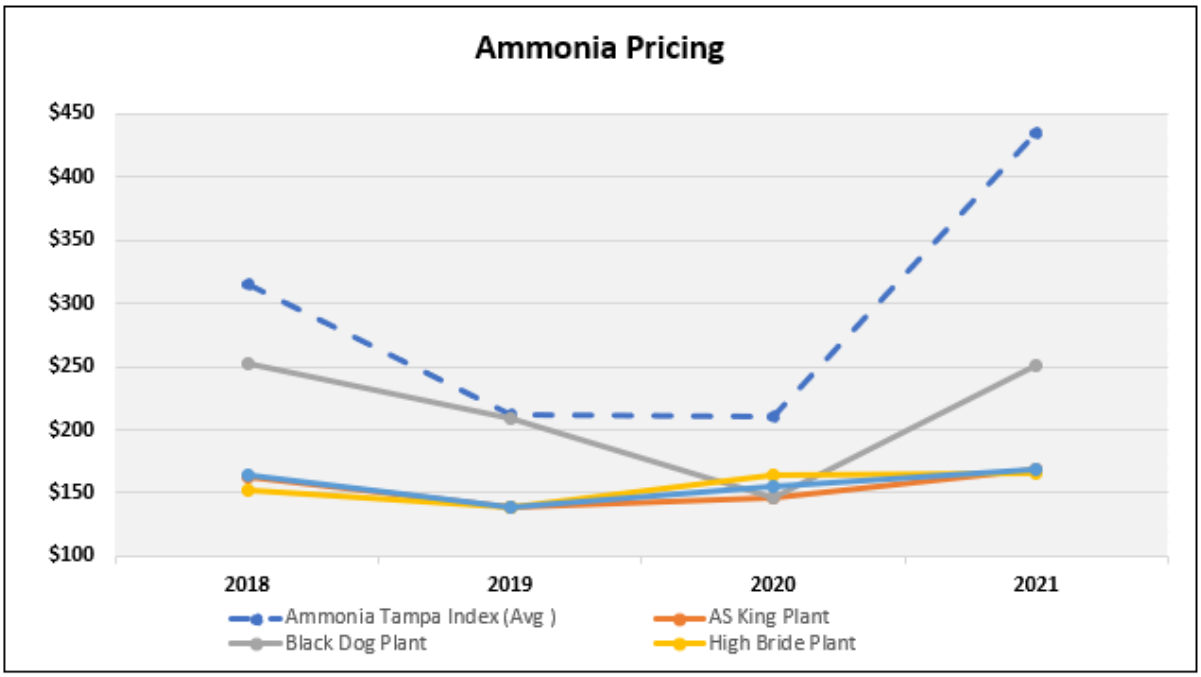
Lime Pricing Comparisons



Anhydrous and Aqueous Ammonia. The contracts for ammonia were competitively bid and renewed in 2020. As mentioned previously, ammonia prices are now subject to a volatile market. The ammonia supplier agreement is based on the Tampa Ammonia Index. The agreement utilizes a new formula based on this index and negotiated pricing to procure ammonia at significantly lower costs than the spot market. Figure 11 below features the ammonia savings to the Allen S. King, Black Dog, High Bridge, and Riverside plants as compared with industry's PPI.

Figure 11

Ammonia Pricing Comparison



Sulfuric Acid. The Company's current sulfuric acid supply agreement was extended to 2024 through a negotiation conducted in 2020. In an effort to apply downward cost pressure for this commodity, we are always looking for other supplier opportunities to leverage our current sulfuric acid costs.

Q. IN ADDITION TO COSTS, ARE THERE OTHER CONSIDERATIONS WHICH ARE EVALUATED WHEN SELECTING A CHEMICAL SUPPLIER?

A. Yes. In addition to cost control, it is also important to ensure that the supplier can meet the demands of each plant to ensure continuity of supply. This is important, since the demand varies throughout the year and most of our major chemicals are required to operate our units; therefore, a shortage of chemicals due to supplier issues would result in unit derates or outages. When selecting a

supplier, they are evaluated on their capability to ensure continuity of supply, including infrastructure of chemical production and storage, quantity of supply trucks available for dispatching, and other factors.

Q. IN ADDITION TO COST CONTROL, DOES THE COMPANY ENSURE THAT EMISSIONS CONTROL EQUIPMENT IS OPTIMIZED AND OPERATING EFFICIENTLY?

A. Yes. The Company has considerable control measures and checks in place to ensure our emissions control equipment is operating effectively. Plant operations and instrument technicians monitor performance and operating parameters in real time from the control room and CEMS equipment. There are alarms built into our control systems to alert operations to critical equipment issues to take timely action to resolve. Our emissions control equipment is also inspected routinely during operation and also during outages when the equipment is available for internal inspection. Our CEMS equipment is also calibrated and checked regularly to ensure it is operating correctly, and third-party testing contractors are utilized to verify accuracy of the CEMS equipment as required. Furthermore, the Operations staff at our coal plants, combined cycle plants, and RDF plants work together with our Environmental Services and Performance Optimization departments to review short-term and long-term emissions and chemical usage trends to identify issues, perform system adjustments and tuning, and share best practices and improvement ideas. The lessons learned from these meetings are shared across our fleet.

Q. HOW DOES YOUR 2022 CHEMICALS BUDGET COMPARE TO YOUR 2018-2020 ACTUALS AVERAGE?

A. Our 2022 Chemicals budget is $3.1 million, which is a decrease of $2.6 million or 46.2 percent of our 2018-2020 average costs. This is mostly due to a decrease

in mercury sorbent costs of $0.48 million, a decrease in ammonia costs of $0.71 million, and a decrease of $1.0 million in lime costs. Consistent with the discussion above, the decrease in mercury sorbent costs is due to improved performance of the Sherco 1 and 2 carbon injection system. The decrease in ammonia costs is due mostly to improvements at the Allen S. King plant related to the installation of secondary air dampers and the forecasted dispatch reduction. The lime reduction is due to Allen S. King operating profile and the coal blend change made at Sherco in 2019.

Q. HOW DOES YOUR 2023 CHEMICALS BUDGET COMPARE TO YOUR 2022 BUDGET?

A. Our 2023 Chemicals budget is $3.0 million, a nominal $.062 million decrease from the 2022 budget. Both the chemical consumption rate improvements and the forecasted dispatch profiles are holding firm.

Q. HOW DOES YOUR 2024 CHEMICALS BUDGET COMPARE TO YOUR 2023 BUDGET?

A. Our 2024 Chemicals budget is $3.2 million, which is an increase of $.186 million over our 2023 budget. The increase is due to the higher Sherco Unit 3 budgeted capacity factor in 2024 (17 percent) as compared to 2023 (8 percent), after the closure of Unit 2 in 2023.

5. Other

Q. WHAT DOES THE "OTHER" COMPONENT OF THE ENERGY SUPPLY O&M BUDGET CAPTURE?

A. The "Other" budget component, $21.2 million in the 2022 test year, captures all other costs we incur to operate and maintain our plants. This includes wind farm land easements, transportation fleet costs, utility costs for the plants such

as gas, electric and sewer bills, fees including environmental fees, and other miscellaneous costs.

Q. HOW HAVE THE COSTS OF THE "OTHER" CATEGORY BEEN TRENDING?

A. Our costs in this category averaged $14.1 million in historical years 2018 through 2020. As we added new wind resources to the generation fleet the "Other" category O&M costs have increased due to the wind turbine land easement payments. .

Q. HOW DOES YOUR 2022 "OTHER" BUDGET COMPARE TO YOUR 2018-2020 ACTUALS?

A. Our 2022 "Other" budget is $21.2 million, which is an increase of $7.1 million or 50.3 percent compared to our 2018-2020 average costs. This increase is attributable to the increase in land easement payments at the new wind resources placed in service between 2020 and 2022; Blazing Star I, II, Community Wind North, Jeffers, Crowned Ridge II, Mower County, Freeborn, and Dakota Range I and II. The year-over-year increases are discussed in the next paragraphs.

Q. HOW DOES YOUR 2022 "OTHER" BUDGET COMPARE TO YOUR 2021 FORECAST?

A. Our 2022 "Other" budget is $21.2 million, which is an increase of $2.4 million or 12.7 percent compared to our 2021 forecast. The driver of this change is the land easement costs at the 2021 newly in-serviced wind farms; Dakota Range I and II, Freeborn, Blazing Star II, Mower County.

Q. HOW DOES YOUR 2023 "OTHER" BUDGET COMPARE TO YOUR 2022 BUDGET?

A. Our 2023 "Other" budget is $21.8 million, which is marginally increased as

compared with the 2022 budget of $21.2 million. This budget stability is attributable to no additional new wind resources being placed in service, as well as small increase for Sherco Solar land easement payments.

Q. HOW DOES YOUR 2024 "OTHER" BUDGET COMPARE TO YOUR 2023 BUDGET?

A. Our 2024 "Other" budget is $23.8 million, which is an increase of $1.9 million or 9.1 percent compared to our 2023 budget. The increase is due to the addition of the 2024 Sherco Solar Farm and the Northern Wind land easement payments.

VI. OPERATING PERFORMANCE

Q. PLEASE DISCUSS THE PURPOSE OF THIS SECTION OF YOUR TESTIMONY.

A. This section provides information related to our fleet performance. While we believe that our fleet generally performs well, there is always room for improvement, and we continue to seek ways to do so. Our focus is on operational excellence and providing our customers with reliable and safe energy at a reasonable cost.

Q. WHY DO POWER PLANT OUTAGES OCCUR?

A. Power plants consist of multiple complex thermal, mechanical, electrical, and chemical systems working together to convert the energy content of fuel to thermal energy, to mechanical energy, and ultimately to electricity. These complex systems are under significant thermal and mechanical stresses. This causes the equipment to occasionally succumb to these stresses and fail, which can result in an unplanned outage.

Planned outages are necessary to maintain and replace equipment to mitigate failures which results in unplanned outages. Equipment used in generation is designed to be maintained, built up, or replaced at durations under specified operating conditions. When these intervals are exceeded, there is a present risk of equipment failure. For this reason, planned outages are scheduled for generating units.

Q. HAVE YOU QUANTIFIED THE RELATIONSHIP BETWEEN PLANNED OVERHAULS AND RELIABILITY?

A. Yes. Upon completion of an outage, there is a break-in period as the new equipment installed during the overhaul is operated and improved. After this break-in period, a duration of high reliability is achieved and maintained. After the equipment has served its useful life, maintenance needs to be performed again to keep the units reliable. The required maintenance is scheduled for the next overhaul.

Q. HAS THE COMPANY IMPLEMENTED ANY STRATEGIES TO INCREASE PLANT PERFORMANCE?

A. Yes. Since 2011, we have implemented our Operating Model to develop and execute on strategies to improve plant performance. As I discuss further below, our success with the Operating Model prompted us to implement Operating Model Version 2.0 beginning in 2019.

A. Past Performance and Outages

Q. HOW HAVE YOUR GENERATION UNITS PERFORMED FROM 2018 THROUGH 2020?

A. We are performing well compared to industry norms. Benchmarking indicates

that overhaul performance at our major plants is generally on par with our industry peers, although we consistently strive to improve performance.

For supplemental information related to plant performance, please refer to: Exhibit___(RAC-1), Schedule 8, which provides the following data by plant: 1) generation capacity (MWs), 2) type of fuel, 3) kWh produced by month for 2018, 2019, 2020, and 2021 through June and, 4) rate base amount for each plant. Exhibit___(RAC-1), Schedule 9, provides: 1) the number and duration of plant outages for 2018, 2019, 2020, and 2021 through July, 2) the reason the plant was in an outage, and 3) the plan to alleviate the reoccurrence of similar outages.

Q. DOES THE COMPANY UTILIZE ANY METRICS TO MEASURE PLANT PERFORMANCE?

A. Yes. The Company has standardized our performance metrics, utilizing Equivalent Availability Factor (EAF) as the primary metric of unit availability.

Equivalent Availability Factor measures a plant's availability at its maximum rating expressed as a percentage of all the available hours in a year. EAF is comprised of three sub-metrics to provide the availability profile of the unit. If a unit is unavailable for any reason, whether for planned outages or overhaul work (EPOF), for forced outages and derates (EUOF), or for ambient temperatures impacting the gas units (ESEDH), the EAF performance is impacted. Therefore, utilizing the EAF metric for all our generating units, the Company emphasizes the importance of both preventing forced outages and also optimizing planned outage schedules.

These metrics are tracked across the industry by the North American Electric Reliability Corporation (NERC), which allows us to benchmark our performance against our industry peers.

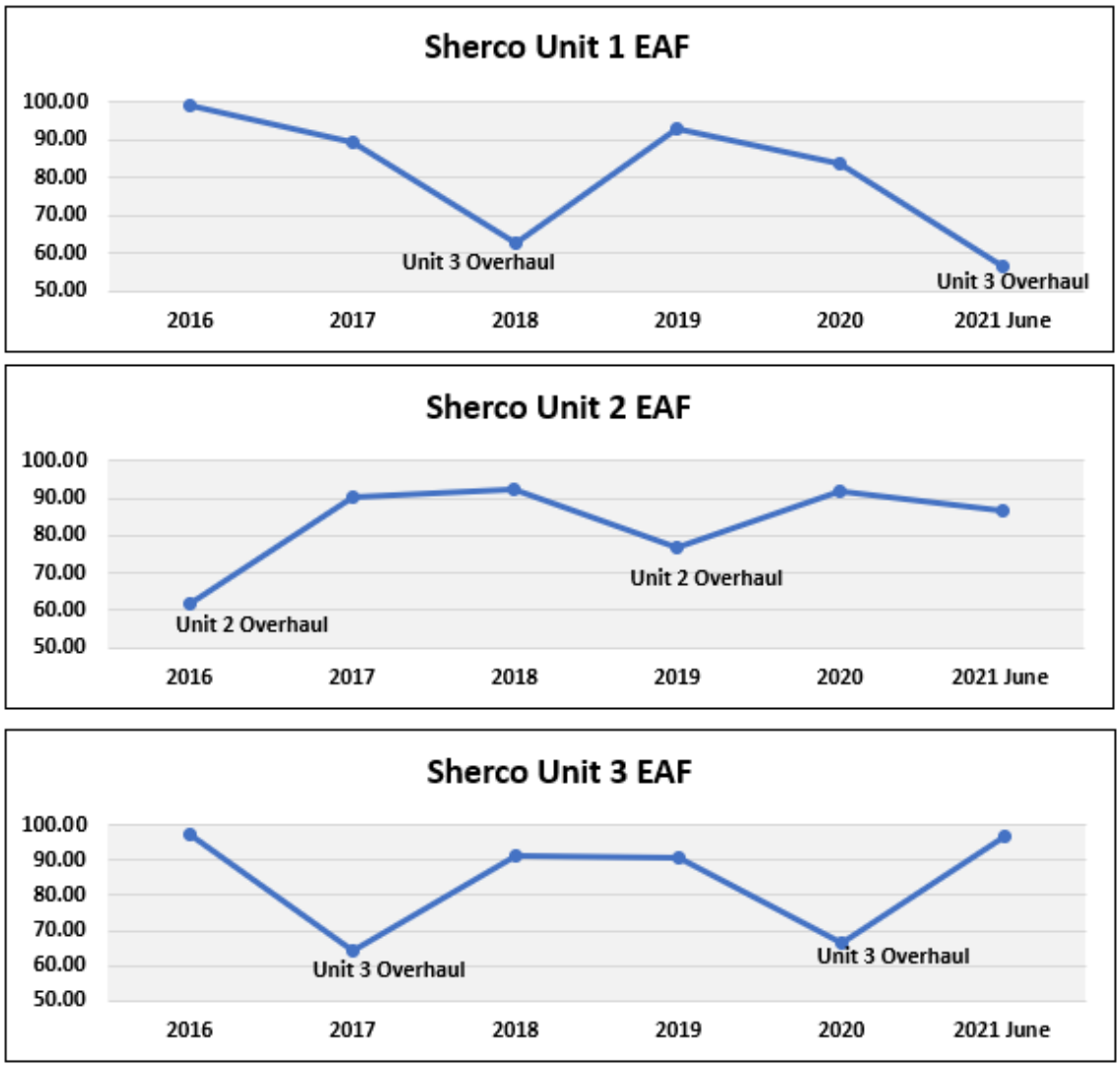
Q. HOW HAS THE SHERCO PLANT PERFORMED BASED ON THE EAF METRIC?

A. Our Sherco plant is comprised of three coal-fired generating units. The historical EAF for each unit can be seen in Figure 12 below. In general, the trend shows how significantly planned overhauls influence the EAF calculation. For example, Sherco Unit 1 EAF averages 59.6 percent during planned overhaul years 2018 and 2021, whereas Sherco Unit 1 EAF averages 91.4 percent for non-overhaul years. This relationship can also be seen with Sherco Unit 2 and Sherco Unit 3 as well, which had planned overhauls in 2016 and 2019 (Sherco Unit 2) and 2017 and 2020 (Sherco Unit 3).

Figure 12

Historical and Current Equivalent Availability Factor (EAF)

Sherco Plant Units



For 2018, Sherco Unit 1 EAF was 62.8 percent primarily due to an extended planned overhaul. This placed Unit 1 in fourth quartile when compared to industry peers. Sherco Unit 2 did not have any planned overhauls in 2018 and finished with an EAF of 92.3 percent, which is first quartile. Sherco Unit 3 also

did not have any planned overhauls in 2018 and finished with an EAF of 91.4 percent, which is also first quartile.

Similarly, in 2019, Sherco Unit 2 EAF was at 77.0 percent due to an extended spring overhaul, which is fourth quartile, whereas the Sherco Unit 1 and Sherco Unit 3 EAF was at 93.25 percent and 90.7 percent, respectively, both of which are first quartile.

Likewise, in 2020, the Sherco Unit 1 EAF was 83.67 percent and in second quartile, Sherco Unit 2 EAF is 92.07 percent and in first quartile, and Sherco Unit 3 was 66.6 percent due to a planned overhaul, which placed it in fourth quartile.

Q. WHAT DO YOU CONCLUDE BASED ON THESE METRICS?

A. I conclude that the Sherco station has been operating well and consistently in top industry performance, while recognizing that overhauls have an impact to the EAF metric.

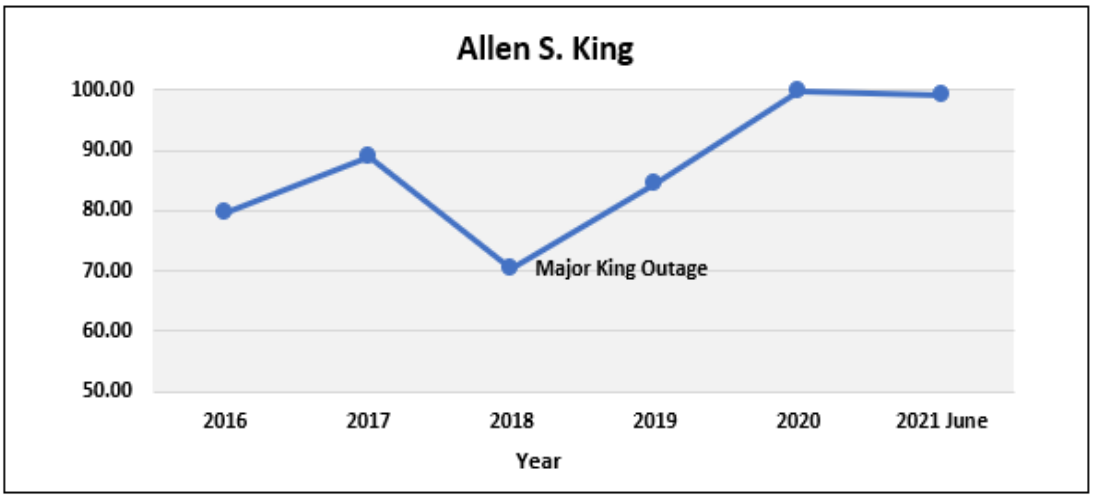
Q. HOW HAS THE ALLEN S. KING PLANT PERFORMED BASED ON THE EAF METRIC?

A. Our Allen S. King plant is a single coal-fired generating unit. The historical EAF can be seen in Figure 13 below. For 2018, Allen S. King Unit 1 EAF was 70.4 percent, which was fourth quartile when compared to industry peers. Similarly for 2019, Allen S. King Unit 1 EAF was at 84.5 percent due to a forced outage in the spring from steam turbine generator vibrations, landing in the upper end of second quartile. In 2020, the plant achieved first quartile with an EAF of 99.73 percent. Allen S. King plant is forecasting to be in first quartile performance with a 2021 year to date 2021 EAF of 99.14 percent.

Figure 13

Historical and Current Equivalent Availability Factor (EAF)

Allen S. King Plant



Q. WHAT DO YOU CONCLUDE WITH RESPECT TO THESE METRICS?

A. I conclude that the Allen S. King plant is performing well and has been performing in first and second quartile, except for 2018 when it had a major overhaul.

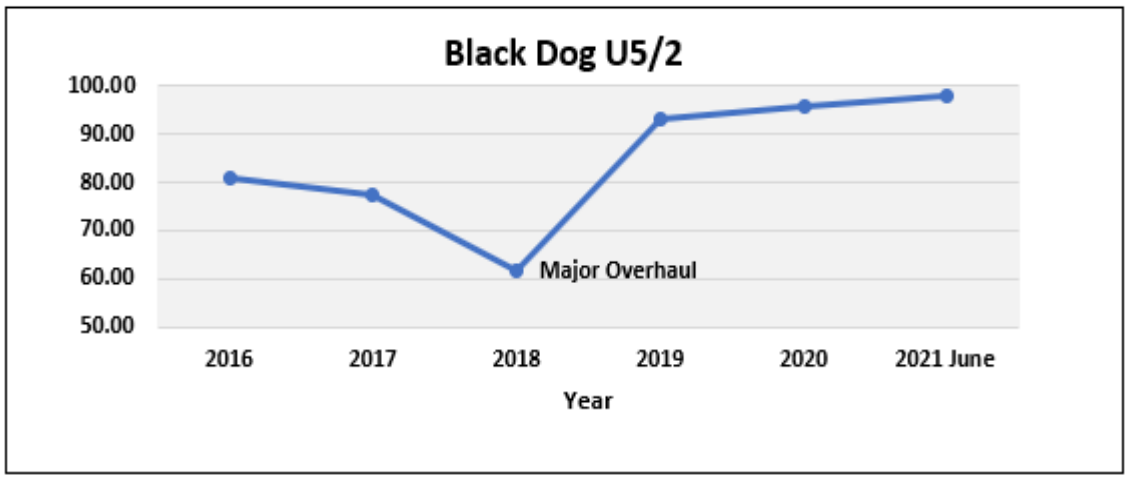
Q. HOW HAS THE BLACK DOG PLANT PERFORMED BASED ON THE EAF METRIC?

A. Black Dog is comprised of a repowered Unit 2 steam turbine in combined cycle with Unit 5 gas turbine. The historical EAF for these units can be seen in Figure 14 below.

Figure 14

Historical and Current Equivalent Availability Factor (EAF)

Black Dog Plant



For 2018, Black Dog Units 5 and 2 EAF was 61.6 percent due to an outage extension resulting from gas turbine damage identified during an inspection, which is fourth quartile.

In 2019, Black Dog Units 5 and 2 EAF was 93.12 percent, which is first quartile. Black Dog Units 5 and 2 ended 2020 with 95.6 percent EAF and is operating at 97.85 percent EAF through June 2021, both years in first quartile.

Q. WHAT DO YOU CONCLUDE BASED ON THESE METRICS?

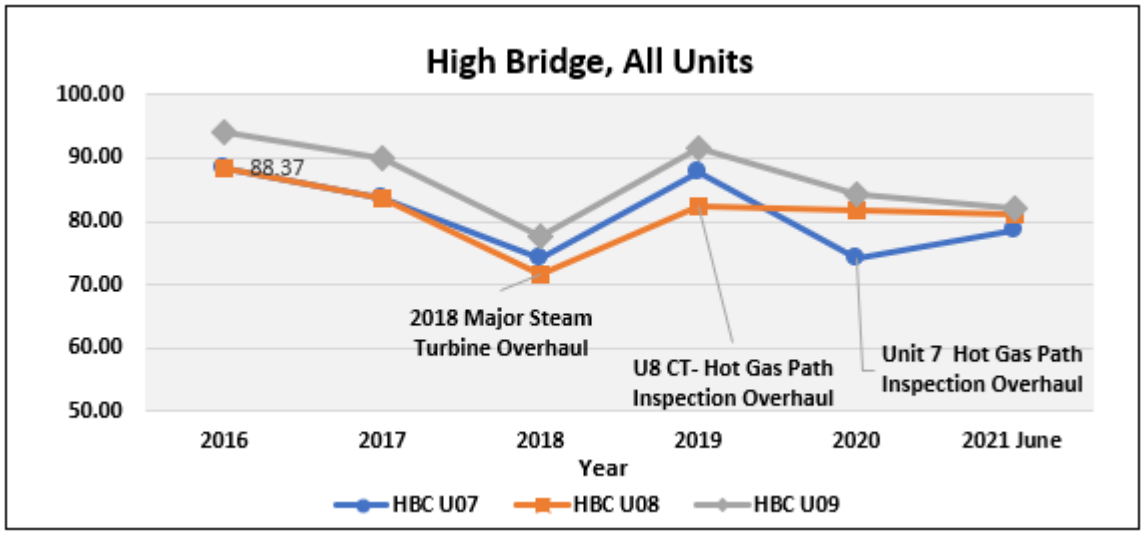
A. I conclude that the Black Dog plant is operating exceptionally since the overhaul of Unit 5 combustion turbine in 2018.

Q. HOW HAS THE HIGH BRIDGE PLANT PERFORMED BASED ON THE EAF METRIC?

A. The High Bridge plant is comprised of Unit 7 and Unit 8 gas turbines and Unit

9 steam turbine in combined cycle configuration. The historical EAF for these units can be seen in Figure 15 below.

Figure 15
Historical and Current Equivalent Availability Factor (EAF)
High Bridge Plant



For 2018, High Bridge 7 EAF was 74.0 percent, High Bridge 8 EAF was 71.6 percent, and High Bridge 9 EAF was 77.7 percent due to a planned steam turbine overhaul, all fourth quartile. For our combined cycle plants, any steam turbine overhaul work also requires the gas turbines to be out of service, since the units are not designed to be operated in simple cycle. Therefore, a steam turbine overhaul has an adverse impact on the EAF of the combustion turbine units.

For 2019, High Bridge Unit 7 EAF was 87.7 percent and High Bridge Unit 8 EAF was 82.4 percent, second and third quartile respectively. High Bridge Unit 8 performance was due to a combustion turbine hot gas path inspection

overhaul. High Bridge Unit 9 EAF was 91.4, which is first quartile reliability performance.

In 2020, a combustion turbine major inspection overhaul was performed on High Bridge Unit 7. This resulted in a third quartile EAF of 74.3 percent for Unit 7 while Units 8 and 9 performed above 80 percent EAF.

Q. WHAT DO YOU CONCLUDE FROM THESE METRICS?

A. I conclude that the High Bridge plant is operating well in years when the Company was not performing a combustion turbine or steam turbine overhaul.

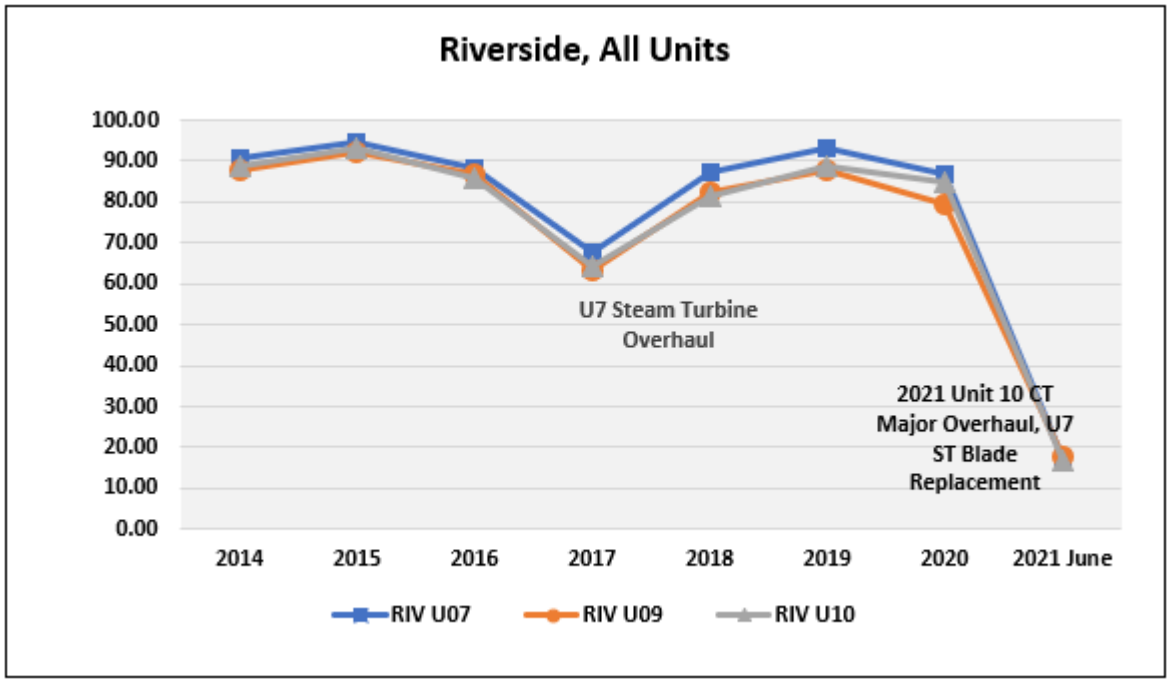
Q. HOW HAS THE RIVERSIDE PLANT PERFORMED BASED ON THE EAF METRIC?

A. The Riverside plant is comprised of a repowered Unit 7 steam turbine in combined cycle with Unit 9 and Unit 10 gas turbines. The historical EAF for these units can be seen in Figure 16 below.

Figure 16

Historical and Current Equivalent Availability Factor (EAF)

Riverside Plant



In 2017, Riverside steam turbine Unit 7 incurred a planned major overhaul to replace the low-pressure section of turbine blading. As stated for High Bridge, the outage for the steam turbine, Unit 7, also requires that the two combustion turbines, Unit 9 and Unit 10 be offline. This resulted in an average EAF of 65.0, fourth quartile performance.

In 2018 and 2019 all three units at Riverside improved their EAF with no scheduled overhauls and achieved an average EAF in 2018 of 89.9 percent and 83.6 percent in 2020.

In 2021, all three Riverside units were offline for significant work; a major combustion turbine overhaul on Unit 10, a low pressure blade replacement and turbine valve work on the Unit 7 steam turbine, and a Unit 9/Unit 10 generator robotic inspection. Because all three units were offline, this resulted in low EAF performance.

Q. WHAT DO YOU CONCLUDE FROM THESE METRICS?

A. I conclude that the Riverside plant has been operating well in years when the Company was not performing a combustion turbine or steam turbine overhaul.

Q. HOW HAVE THE WIND ASSETS PERFORMED BASED ON THE EAF METRIC?

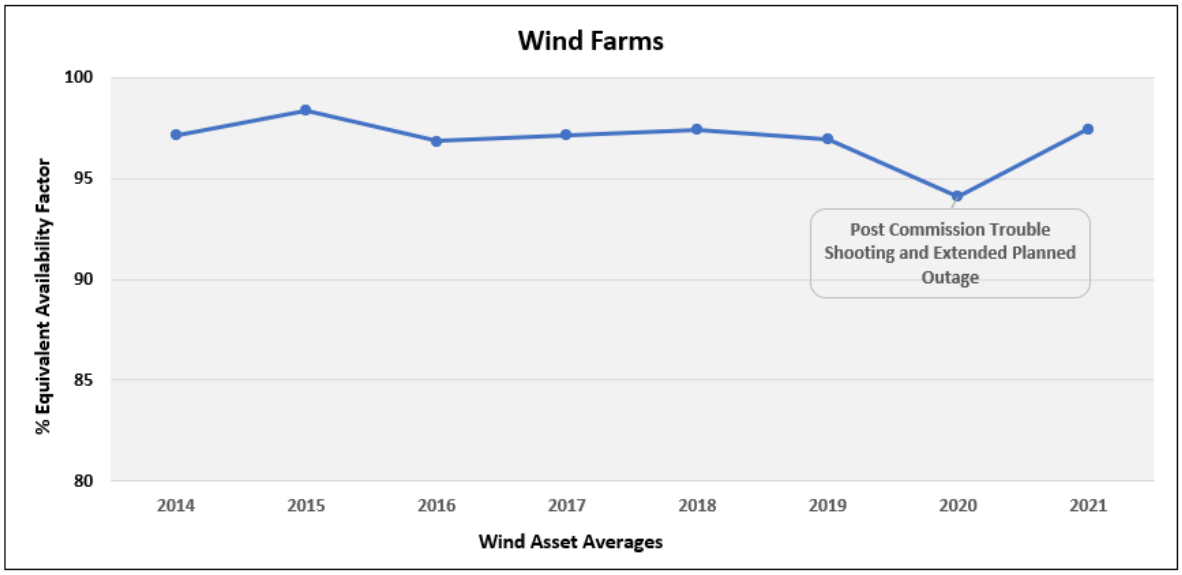
A. The wind farms have been performing well as shown in the historical years EAF in Figure 17 below. Xcel Energy commissioned our first wind farm in 2008, and since that time has added to the fleet with 15 NSP wind sites in operation today. The Wind assets are comprised of multiple turbines per farm, typically between 40 and 100 turbines.

When calculating wind reliability, the farms are viewed as a whole; therefore, an unavailability issue occurring to one or more turbines results in an impact to the wind farm equivalent availability. As with all new generating assets, at times there are post commissioning issues that occur after the site has been commissioned. These impacts to EAF can be seen in Figure 17 below following the 2020 commissioning of Foxtail and Blazing Star I wind turbines

Figure 17

Historical and Current Equivalent Availability Factor

Wind Assets



Q. WHAT DO YOU CONCLUDE FROM THESE METRICS?

A. Excluding minimal start-up issues, I conclude that the Wind assets have been performing well. Xcel Energy continues to actively manage our Wind farms by reviewing reliability events and pursuing technology improvements in an effort to continue improving EAF performance.

Q. WHAT IS THE IMPACT OF SEASONAL DERATES ON THE COMPANY'S COMBINED CYCLE PLANTS?

A. The intermediate combined cycle plants see a negative effect from seasonal derating during the summer months. The seasonal rating of a unit can impact its stated availability without actually affecting its performance. In this situation, a unit will see a calculated performance drop in its Net Dependable Capacity (NDC) due to warmer ambient conditions. When air is warmer, its density

decreases. This affects the ability of the compressor section of the combustion turbine to supply adequate air for full load combustion. Performance on a given unit is not being impacted by any events, but rather its capacity changes due to ambient temperature conditions. This affects combined cycle units in the NSPM region to a greater extent than units in other regions because of the wide range of ambient weather conditions we experience.

Xcel Energy uses a two-season capacity rating (summer/winter) for the NDC of all generating units. This methodology has a seasonal impact on our combined cycle units during the summer months. For the NSPM region, summer is defined as May through October. This is consistent with industry practice. Other major utilities against which Xcel Energy performs benchmarking also reduce their Net Maximum Capacity (NMC) during the summer months to eliminate the effect of seasonal derating and create a higher EAF performance.

Q. HOW DO YOU EVALUATE FORCED OUTAGES?

A. The unplanned loss of generating capacity (e.g., through a forced outage or derate) is systematically evaluated through the event assessment process. These processes determine the cause of the event and identify corrective actions that are undertaken as governed by Company policy. We take plant outages very seriously and have a comprehensive corporate policy and procedure for assessing and analyzing the causes of an outage. Exhibit___(RAC-1), Schedule 10 provides this policy. Events impacting the generating capacity of a unit (e.g., unplanned outages or unit derates) require completion of an Event Assessment Report. This report documents all pertinent information associated with the event and includes interviews with personnel involved.

In the event of an unplanned outage, we:

- Conduct an analysis that determines the root cause of the unplanned loss of capacity and document the incident in writing;
- Document all corrective actions taken to place the plant back online;
- Meet regularly as plants to discuss corrective actions and repair progress, tracking the tasks until resolved; and
- Share significant events monthly with all power plants to prevent recurrence at other sites.

By collecting this information, we hope to improve our internal processes and prevent similar occurrences in the future. Schedule 9 generally identifies the cause of the unplanned outages from 2018 through July 2021.

B. Best Practices and Productivity Improvements

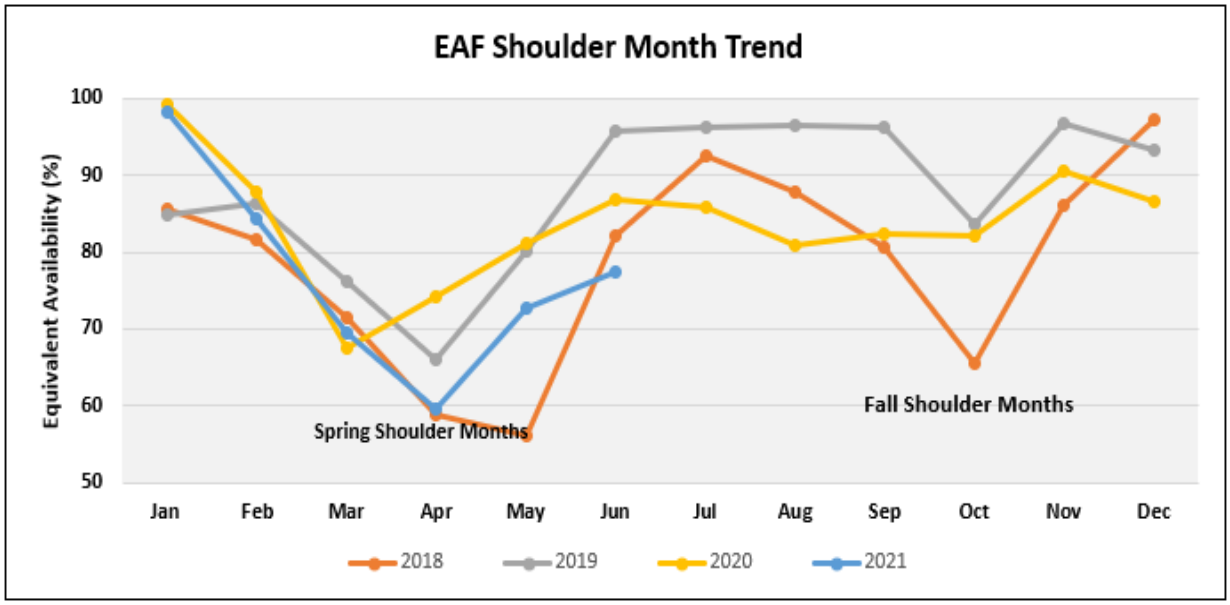
Q. HOW WOULD YOU SUMMARIZE THE PERFORMANCE OF THE NSPM GENERATING FLEET?

A. Our units have generally been operating well and meeting our goals for reliable generation. The most significant impact to our plant EAF performance has been due to planned overhauls in the spring and fall, which are necessary to prevent more costly forced outages during the summer peak demand. Figure 18 below shows this relationship and demonstrates how we have balanced the overhauls and EAF performance in the shoulder months to ensure our units are available and reliable during the summer.

Figure 18

Historical and Current Equivalent Availability Factor (EAF)

NSP-MN



As shown in Figure 18 above, our units have typically performed within or near the first quartile for EAF during the summer months when they are needed the most. This is particularly significant considering that our combined cycle plants are somewhat arbitrarily impacted by seasonal derates in the summer.

Q. DURING THE 2015 RATE CASE YOU DISCUSSED THE COMPANY'S NEW OPERATING MODEL. HOW HAS THE OPERATING MODEL BEEN PERFORMING?

A. We believe that the Generation Operating Model launched in late 2011 has been successful in its purpose of standardizing processes, creating efficiencies, and identifying and sharing best practices across the fleet to ultimately improve plant performance and reduce costs. Due to this success, the Company leveraged these lessons learned and transitioned to the next phase of the Operating Model in 2019. The most significant component of this transition is the development

of the Performance Optimization department which further centralizes our technical support services and develops new departments to transition our organizational structure to match our evolving generation portfolio.

Q. WHAT ARE THE KEY COMPONENTS OF THE PERFORMANCE OPTIMIZATION DEPARTMENT WITHIN THE NEW 2019 OPERATING MODEL?

A. The Performance Optimization department was designed to provide a broad fleet focus with centralized functions and common processes to implement a fleet-wide asset management strategy and effectively drive systematic improvement in fleet asset and equipment health. Performance Optimization will increase the use of data, advanced analytics, and financial analysis to improve business decision making. The Performance Optimization department can be broken down into Reliability Engineering, Fleet Engineering, and Analytics and Practices.

Q. WHICH FUNCTIONS ARE INCLUDED IN THE RELIABILITY ENGINEERING DEPARTMENT?

A. The Reliability Engineering department is responsible for the daily engineering activities at our plants. This department is organized by plant technologies to optimize the sharing of best practices for each technology, combined cycle and simple cycle units, and coal and Refuse Derived Fuel units. The Reliability Engineers provide onsite support for our operations and maintenance departments, ensure our plant design basis is maintained, and ensure we implement a consistent asset strategy across the fleet. We have similar engineering support and strategies for our combined cycle and simple cycle units and our renewable generation to account for our increasing renewable portfolio.

Q. WHAT ARE THE FUNCTIONS OF THE FLEET ENGINEERING DEPARTMENT?

A. The Fleet Engineering department is responsible for developing and implementing asset and equipment strategies consistently across the fleet. This department is broken into fleet engineering teams for common systems and components including Electrical and Controls, Boilers and Balance of Plant, Steam Turbines and Gas Turbines, Materials Engineering, and Non-Destructive Examination and Testing. The department is organized by common systems and components to more efficiently and effectively share and implement system best practices and lessons learned. This department also includes an Asset Strategy and Budget Integration team to ensure that fleet asset strategies are effectively integrated and prioritized within our budgets.

Q. WHICH FUNCTIONS ARE INCLUDED IN THE ANALYTICS AND PRACTICES DEPARTMENT?

A. The Analytics and Practices department includes both a Monitoring and Diagnostics team and a System and Equipment Analytics team. The Monitoring and Diagnostics team utilizes the Company's remote monitoring capability and predictive analytics to identify abnormal operational issues and alert plant personnel for corrective actions prior to failure to minimize costs. The System and Equipment Analytics team integrates equipment monitoring, asset performance management analytical tools, and financial analysis to improve existing equipment maintenance practices and transition equipment maintenance towards performance-based and condition-based maintenance practices.

Q. HOW IS THE NEW OPERATING MODEL IMPACTING PLANT RELIABILITY?

A. While each of our generating units is different, there are sufficient

commonalities where we can further implement best practices and consistent program initiatives throughout our fleet. Additionally, by centralizing the management of our fleet, we can capture economies of scale to more efficiently procure service and materials.

Q. PLEASE PROVIDE EXAMPLES OF APPLICATION OF BEST PRACTICES AND EFFICIENCY OR PRODUCTIVITY INITIATIVES.

A. The key focus of the 2019 Operations Model II is Continuous Improvement. Continuous Improvement will be accomplished by utilizing Lean Management, Operating Model Governance, and Event Assessment (EA) and Root Cause Analysis (RCA). A short description of each is below.

- Lean Management – Provides a set of tools to eliminate waste and inefficiency. The people-based system produces improved processes, inventory management, teamwork, and customer relationships.
- Operating Model Governance – Monitoring, documenting, and resolving issues that arise while continuously improving performance is Operating Model Governance. Core functional leadership is committed to ensuring all aspects of the continuous improvement are successful.
- Event Assessment and RCA – The objective of performing EAs and RCAs is to identify the causes of events, not only to correct, but to prevent recurrence in the fleet. EAs and RCAs are performed for forced outages, major process breakdowns, equipment failures, and environmental permit exceedances.

Lastly, as we mature in our use of Operating Model II, we have also developed a Continuous Improvement Team that is responsible for identifying and implementing best practices across the fleet.

Q. ARE THERE OTHER ASPECTS OF THE COMPANY'S WORK YOU WISH TO NOTE?

A. Yes. The GE Asset Performance Management (GE-APM) is software implemented in 2021 that leverages technology to effectively enable Asset Performance Management methodology. It consolidates and analyzes data from a variety of sources to optimize the cost, risk, and reliability of selected generation equipment.

A primary focus for Energy Supply over the next three years will be the development and rollout of the Intelligent Asset Health and Operational Risk analytical models and dashboards. Equipment data will be integrated into GE-APM and health models will be built to give a clear picture of equipment and system health. This will then be combined with the criticality of selected assets to quantify and communicate operational risk.

Another major use of the GE-APM software in Energy Supply will be developing and optimizing targeted maintenance strategies. GE-APM provides the functionality to develop and document maintenance strategies based on failure modes and design risk. The software also provides the analytical tools to optimize maintenance strategies based on the best cost versus risk scenarios. Our goal is to leverage data and analytics in order to perform maintenance on the right assets at the right time. This will reduce costs and minimize risk while maintaining reliability

Q. WHAT ARE YOUR CONCLUSIONS WITH RESPECT TO THE GENERATION OPERATING MODEL?

A. I believe that moving Energy Supply to a fleet-based model has improved performance. Operational improvements could be lost without a centralized

governance model. Moving to a fleet-based approach allows the individual plants to leverage the power of the lessons learned. Our model facilitates knowledge transfer of leading practices through formalized, structured interactions and by centralizing critical functions, such as engineering and overhaul management. Expanding these core concepts into the next phase of the Operating Model will continue to improve our plant performance.

Q. IN ADDITION TO THE IMPROVEMENTS YOU JUST DESCRIBED, IS THE COMPANY DOING ANYTHING TO MITIGATE PROCUREMENT COSTS?

A. Yes. The Company utilizes Master Material Agreements (MMAs) and Master Service Agreements (MSAs) to mitigate procurement costs. MMAs and MSAs are agreements that include pricing for multiple purchases of goods and/or services by one or more Xcel Operating Companies and/or the Service Company. The Company strategically identifies which materials and services are required for our business needs and enters into agreements to obtain these at favorable pricing. Our most significant agreements include the following:

- *Wind Turbine Maintenance OEM and MSA Contracts* – We have extended the Service, Maintenance, and Warranty agreements for existing wind farms with the OEMs and established new agreements for our expanding wind fleet. These agreements include scheduled maintenance, inspections, repairs, and routine operations support of our wind turbines, balance of plant equipment, and site grounds.
- *Combustion Turbine Parts Exchange Program MSA* – This agreement allows the Company to purchase major gas turbine components which are placed directly into service. Instead of investing in complete sets of emergency spare parts for each plant, we utilize long-term contracts with a qualified parts supplier to provide the parts on a just-in-time basis. This

has resulted in better pricing, reduced ownership costs, and fewer overhauls of our gas turbines.

- *Combustion Turbine Overhaul MSA* – This agreement provides combustion turbine overhaul and maintenance services, including Combustion Inspections, Hot Gas Path Inspections, and Major Overhauls.
- *Steam Turbine Overhaul MSA* – This agreement provides steam turbine and generator maintenance services including equipment disassembly, cleaning, inspections, and reassembly. There are also negotiated time and material rates for additional repair work scope if requested by the Company. This MSA leveraged a long-term agreement with a single contractor to establish competitive pricing, transparent work scope and clear pricing structures, and improved predictability of steam turbine maintenance costs and schedules.
- *Chemicals Supply MSAs* – Our chemical supply MSAs are competitively bid for each major chemical and have resulted in favorable pricing from our suppliers as detailed in the Chemical Cost section above. This includes agreements for activated carbon, aqueous ammonia, lime, sulfuric acid, and other miscellaneous chemicals. By competitively bidding and negotiating long-term agreements with negotiated markups above base commodity index pricing, we leverage our volume purchases to ensure supply and remove pricing risk premiums that are inherent in long-term fixed contracts.

The Company continues to take steps to further reduce costs both with existing and new agreements. For example, we have been successful re-negotiating pricing in various existing agreements where market conditions have shifted to take advantage of decreasing vendor cost structures.

Q. PLEASE DESCRIBE THE MASTER SERVICES AGREEMENT INITIATIVE.

A. Keeping Xcel Energy's generation facilities running smoothly and efficiently requires the careful coordination of a wide range of maintenance processes and activities, including specialized efforts during outages. Much of this maintenance work is completed by contractors, including contractors with specific skills that are not cultivated in-house, such as work on railroad lines and cooling tower inspections.

The contracts required for each subcontractor are often complex and time-consuming to prepare and execute. We therefore launched the Master Service Agreements (MSA) with three main objectives:

- Reduction of costs due to "volume purchasing" at competitively-bid rates and the reduction of the associated transactional inefficiencies of negotiating services agreements on an individual or plant-by-plant basis;
- Consistent contract terms and conditions across business units and projects, which reduces the time spent in negotiation and allows the Company greater control of contractual risk; and
- QA and QC control, through standard contractual terms, allowing stricter adherence to the Company's operating and safety standards.

Q. WHAT BENEFITS HAVE RESULTED FROM THE MSA INITIATIVE?

A. The MSA initiative has reduced the number of service agreements for plant maintenance that we were executing with the same companies on a plant-by-plant basis. This allows our staff to focus on higher-value requests-for-proposals and negotiations, as opposed to one-time purchase orders. It has also resulted in a list of key providers for each work category, which allows plant employees to issue maintenance orders more quickly by having competitively-

bid pricing, safety appendices, and terms and conditions already in place. By aggregating the work performed by contractors across Xcel Energy and using longer-term contracts, we can negotiate better terms and pricing.

VII. CONCLUSION

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. Energy Supply's primary responsibility is to operate and maintain the Company's non-nuclear generation portfolio in a safe, reliable, cost-effective, and environmentally-sound manner. I recommend that the Commission approve the Energy Supply capital investments and O&M budget presented in this rate case. Our 2022 through 2024 capital additions align with the Company's and State's policy goals and are part of a sound plan to address aging infrastructure and ensure system reliability as we transition to a carbon-free future. We plan to in-service $537.9 ($392.2) million of capital additions in 2022, $490.5 ($357.9) million in 2023, and $371.5 ($270.7) million in 2024 in furtherance of these goals. To support these capital investments and our existing assets, we have budgeted $154.6 ($113.0) million for Energy Supply O&M in 2022, $160.8 ($117.4) million in 2023, and $157.7 ($114.9) million in 2024. We manage our O&M activities to keep costs low and operate as efficiently as possible.

Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?

A. Yes.

Statement of Qualifications

Randy Anthony Capra

General Manager Power Generation, Energy Supply
Xcel Energy Inc.

Randy A. Capra is the General Manager of NSP Power Generation, Energy Supply Operations for Xcel Energy Services Inc., responsible for all fossil and renewable operations throughout the NSP generation fleet.

Mr. Capra has more than 30 years of regulated utility experience. He joined Xcel Energy is 1985. His career includes assignments in Instrument and Control Specialist, Plant Supervisor, Engineering Manager, Operations Manager, Plant Director and General Manager.

Throughout his career with Xcel Energy, he has held a number of positions of increasing responsibility in the areas of operations, maintenance, engineering, project management and support service functions.

Mr. Capra earned a Bachelor of Science degree in Electronic Engineering from the University of Minnesota – Duluth (UMD).

O&M Costs by Plant and Category: 2018-2024
($s)

NSPM Total Company

	2018 Actual	2019 Actual	2020 Actual	2018-20 Act Avg	2021 Forecast	2022 Budget	2023 Budget	2024 Budget
Angus Plant	2,198,997	2,246,265	1,946,929	2,130,730	1,814,706	2,493,885	2,184,673	2,029,610
AS King Plant	25,355,172	16,937,421	11,653,318	17,981,970	11,245,531	10,849,317	11,251,714	11,981,897
Black Dog Station	5,452,103	7,016,036	5,595,423	6,021,187	5,634,046	8,599,963	5,492,652	5,631,321
Blazing Star I	-	857	3,223,088	1,074,649	5,121,106	4,980,033	4,293,831	4,267,565
Blazing Star II	-	-	1,462	487	4,900,270	5,349,252	5,078,337	4,228,094
Blue Lake Plant	1,113,645	1,174,350	1,283,690	1,190,562	1,438,253	1,209,139	1,262,196	1,519,630
Borders Wind	3,390,421	3,095,763	2,557,329	3,014,504	2,607,713	2,616,836	2,637,669	2,663,580
Community Wind North	-	-	-	-	765,560	1,027,838	775,271	622,351
Courtenay Wind	4,980,270	4,037,675	3,194,417	4,070,787	4,104,494	3,954,372	4,006,750	4,066,383
Crowned Ridge Wind	-	-	199,451	66,484	3,526,826	4,164,401	3,893,941	3,900,316
Dakota Range Wind	-	-	5,703	1,901	475,638	5,666,545	5,909,928	5,462,455
Fibrominn	2,875,783	(329,458)	5,115	850,480	-	-	-	-
Foxtail Wind	-	50,070	3,227,758	1,092,609	3,665,509	3,322,592	2,691,196	2,784,206
Freeborn Wind	-	-	172	57	3,438,243	5,659,839	5,670,201	4,932,750
Grand Meadows Wind	3,205,058	2,405,127	2,164,878	2,591,688	2,555,162	2,335,354	2,371,381	2,410,499
High Bridge Plant	10,173,696	5,654,485	6,454,532	7,427,571	5,491,817	5,399,316	6,945,498	6,167,437
Inver Hills Plant	1,309,782	1,253,149	1,089,860	1,217,597	1,103,867	1,219,674	1,300,584	1,346,744
Jeffers Wind	-	-	-	-	1,194,912	1,350,594	1,102,295	853,154
Lake Benton Wind	-	163,574	1,395,363	519,646	2,092,223	1,944,045	1,938,488	2,205,979
Mower Wind	-	-	-	-	2,025,331	2,324,152	2,253,905	2,521,584
Nobles Wind	4,114,841	3,685,197	3,902,778	3,900,939	4,357,602	4,150,028	4,199,131	4,279,964
Northern Wind	-	-	-	-	-	120,000	2,563,649	2,687,409
Pleasant Valley Wind	4,934,055	5,512,626	4,074,752	4,840,478	4,401,585	4,249,105	4,276,194	4,310,035
Red Wing Plant	5,046,205	5,201,022	5,771,277	5,339,501	5,513,322	6,026,461	5,241,390	5,277,436
Riverside Plant	5,917,660	6,022,861	5,748,018	5,896,180	7,629,028	5,312,913	5,475,663	5,831,297
Sherco Plant	46,716,244	45,917,728	39,290,467	43,974,813	40,314,607	35,330,737	40,301,518	33,890,586
Sherco Solar	-	-	-	-	-	-	925,915	4,444,392
St. Anthony Falls	740,693	646,316	841,408	742,806	742,212	378,555	413,760	779,764
Wilmarth Plant	5,928,121	5,758,135	5,845,017	5,843,757	5,438,037	5,425,995	6,531,588	6,755,285
Other Energy Supply O&M1	22,220,482	16,928,240	17,173,017	18,773,913	17,866,107	19,114,544	19,830,917	19,819,977
Total	$ 155,673,228	$ 133,377,438	$ 126,645,222	$ 138,565,296	$ 149,463,706	$ 154,575,483	$ 160,820,236	$ 157,671,699

Minnesota Jurisdiction
Net of Interchange Allocation

	2018 Actual	2019 Actual	2020 Actual	2018-20 Act Avg	2021 Forecast	2022 Budget	2023 Budget	2024 Budget
Angus Plant	1,610,227	1,644,839	1,425,649	1,560,238	1,325,281	1,823,151	1,590,985	1,475,028
AS King Plant	18,566,456	12,402,514	8,533,202	13,167,391	8,212,620	7,931,377	8,194,043	8,707,897
Black Dog Station	3,992,331	5,137,528	4,097,278	4,409,045	4,114,548	6,286,990	4,000,015	4,092,588
Blazing Star I	-	628	2,360,123	786,917	3,739,948	3,640,646	3,126,976	3,101,472
Blazing Star II	-	-	1,071	357	3,578,671	3,910,563	3,698,291	3,072,786
Blue Lake Plant	815,472	859,924	939,988	871,795	1,050,357	883,939	919,192	1,104,398
Borders Wind	2,482,653	2,266,888	1,872,617	2,207,386	1,904,415	1,913,034	1,920,879	1,935,769
Community Wind North	-	-	-	-	559,089	751,400	564,590	452,297
Courtenay Wind	3,646,828	2,956,608	2,339,128	2,980,855	2,997,515	2,890,838	2,917,909	2,955,262
Crowned Ridge Wind	-	-	146,049	48,683	2,575,644	3,044,379	2,835,757	2,834,572
Dakota Range Wind	-	-	4,176	1,392	347,359	4,142,519	4,303,896	3,969,864
Fibrominn	2,105,807	(241,248)	3,746	622,768	-	-	-	-
Foxtail Wind	-	36,664	2,363,543	800,069	2,676,924	2,428,976	1,959,860	2,023,434
Freeborn Wind	-	-	126	42	2,510,952	4,137,617	4,129,315	3,584,898
Grand Meadows Wind	2,346,920	1,761,167	1,585,243	1,897,777	1,866,037	1,707,257	1,726,955	1,751,841
High Bridge Plant	7,449,741	4,140,526	4,726,364	5,438,877	4,010,678	3,947,162	5,058,048	4,482,213
Inver Hills Plant	959,095	917,625	798,055	891,592	806,155	891,641	947,149	978,752
Jeffers Wind	-	-	-	-	872,645	987,350	802,745	620,034
Lake Benton Wind	-	119,778	1,021,762	380,513	1,527,952	1,421,191	1,411,701	1,603,205
Mower County Wind	-	-	-	-	1,479,101	1,699,068	1,641,403	1,832,573
Nobles Wind	3,013,114	2,698,504	2,857,830	2,856,483	3,182,361	3,033,872	3,058,011	3,110,483
Northern Wind	-	-	-	-	-	87,726	1,866,973	1,953,087
Pleasant Valley Wind	3,612,987	4,036,649	2,983,758	3,544,465	3,214,481	3,106,302	3,114,132	3,132,338
Red Wing Plant	3,695,110	3,808,475	4,226,047	3,909,877	4,026,383	4,405,635	3,817,034	3,835,401
Riverside Plant	4,333,237	4,410,271	4,209,016	4,317,508	5,571,485	3,883,997	3,987,643	4,237,921
Sherco Plant	34,208,211	33,623,493	28,770,647	32,200,784	29,441,789	25,828,482	29,349,518	24,630,136
Sherco Solar	-	-	-	-	-	-	674,296	3,229,982
St. Anthony Falls	542,376	473,268	616,126	543,923	542,038	276,742	301,320	566,697
Wilmarth Plant	4,340,897	4,216,424	4,280,044	4,279,122	3,971,403	3,966,665	4,756,619	4,909,434
Other Energy Supply O&M[1]	16,271,063	12,395,791	12,575,030	13,747,295	13,047,632	13,973,659	14,441,834	14,404,258
Total	$ 113,992,524	$ 97,666,317	$ 92,736,617	$ 101,465,153	$ 109,153,463	$ 113,002,174	$ 117,117,086	$ 114,588,620

[1] "Other ES OM" includes the GM Bucket and the ES Service Orgs

O&M Costs by Plant and Category: 2018-2024
($s)

NSPM Total Company

O&M Category	2018 Actual	2019 Actual	2020 Actual	2018-20 Act Avg	2021 Forecast	2022 Budget	2023 Budget	2024 Budget
Internal Labor	$74,479,153	$67,915,487	$65,250,024	$69,214,888	$65,995,237	$59,985,657	$63,842,370	$61,250,785
Contract Labor	$37,070,615	$26,413,033	$31,204,272	$31,562,640	$44,126,587	$49,303,942	$49,306,935	$46,296,830
Materials	$18,215,699	$19,431,453	$16,106,939	$17,918,031	$15,805,557	$20,951,480	$22,831,820	$23,106,605
Chemicals	$6,865,136	$5,689,360	$4,674,675	$5,743,057	$4,677,685	$3,090,002	$3,027,648	$3,214,496
Other	$19,042,625	$13,928,105	$9,409,313	$14,126,681	$18,858,639	$21,244,403	$21,811,461	$23,802,983
Total	$155,673,228	$133,377,438	$126,645,222	$138,565,296	$149,463,706	$154,575,483	$160,820,236	$157,671,699

Minnesota Jurisdiction Net of Interchange Allocation

	2018 Actual	2019 Actual	2020 Actual	2018-20 Act Avg	2021 Forecast	2022 Budget	2023 Budget	2024 Budget
Internal Labor	54,537,744	49,731,465	47,779,667	50,682,959	48,196,374	43,852,424	46,493,107	44,514,285
Contract Labor	27,145,149	19,341,080	22,849,489	23,111,906	32,225,682	36,043,572	35,907,699	33,646,430
Materials	13,338,540	14,228,782	11,794,389	13,120,570	11,542,811	15,316,548	16,627,237	16,792,830
Chemicals	5,027,031	4,166,063	3,423,055	4,205,383	3,416,117	2,258,941	2,204,880	2,336,149
Other Chemicals	13,944,060	10,198,926	6,890,018	10,344,335	13,772,479	15,530,689	15,884,163	17,298,926
Total	$ 100,048,464	$ 87,467,390	$ 85,846,600	$ 91,120,818	$ 95,380,984	$ 97,471,486	$ 101,232,923	$ 97,289,694

Capital Additions: 2022-2024
($s)

Company	Project ID	New Grandparent	Project Name	YE Amt	Activity Year
NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022
NSP-Minnesota	A.0001742.001	Renewable and New Generation	NRW North Wind Farms - Viking	162,087,915	2022
NSP-Minnesota	A.0001742.003	Renewable and New Generation	NRW North Wind Farms - Rock Aetna	37,336,113	2022
NSP-Minnesota	A.0001742.002	Renewable and New Generation	NRW North Wind Farms - Chanarambie	24,145,510	2022
NSP-Minnesota	A.0001573.224	Reliability/Performance Enhancement	BDS5 - Ovhl U5 Hot Gas Path - 22403	11,217,821	2022
NSP-Minnesota	A.0001571.090	Reliability/Performance Enhancement	ANS4 - U4 Hot Gas Path - 10341	4,828,319	2022
NSP-Minnesota	A.0001579.072	Reliability/Performance Enhancement	RIV0C -- Replace Water Treamen	2,707,890	2022
NSP-Minnesota	A.0001573.212	Reliability/Performance Enhancement	BDS2C-Replace U2 Turbine L-0 Blades	2,426,503	2022
NSP-Minnesota	A.0001705.001	Renewable and New Generation	CRW G100-Crowned Ridge BOT Wind Far	2,400,000	2022
NSP-Minnesota	A.0001579.500	Reliability/Performance Enhancement	RIV Emergent Fund -Other prod	2,192,277	2022
NSP-Minnesota	A.0001561.030	Reliability/Performance Enhancement	IVH3C Turbine Controls	2,162,144	2022
NSP-Minnesota	A.0001573.500	Reliability/Performance Enhancement	BDS Emergent Fund -Other prod	2,057,485	2022
NSP-Minnesota	A.0001574.087	Environmental Enhancement	SHC3C U3 Landfill Cell 4 2019	1,947,740	2022
NSP-Minnesota	A.0001559.048	Reliability/Performance Enhancement	BLL8C-CESP GSU 171-227 MVA 18-115kV	1,864,903	2022
NSP-Minnesota	A.0001565.124	Environmental Enhancement	WLM2C Replace U2 Baghouse Bag	1,562,338	2022
NSP-Minnesota	A.0001575.500	Reliability/Performance Enhancement	HBR Emergent Fund -Other prod	1,463,129	2022
NSP-Minnesota	A.0001591.007	Reliability/Performance Enhancement	-12186 ANS4C U4 Repl Mark V Cn	1,396,081	2022
NSP-Minnesota	A.0001574.848	Reliability/Performance Enhancement	SHC99-New RPF on 53 conv-24287	1,354,283	2022
NSP-Minnesota	A.0001710.001	Reliability/Performance Enhancement	NSPM APM Digital Asset Modeling	1,339,492	2022
NSP-Minnesota	A.0001562.038	Environmental Enhancement	REW0 - EPA 316b-Traveling Screens -	1,297,511	2022
NSP-Minnesota	A.0001573.070	Reliability/Performance Enhancement	BDS5C U5 Ovation System Evergr	1,210,450	2022
NSP-Minnesota	A.0001573.281	Reliability/Performance Enhancement	BDS0-480V Load Centers Repl -17548	1,149,107	2022
NSP-Minnesota	A.0001573.184	Reliability/Performance Enhancement	BDS2C Automated Trap Bypass Valves	1,148,819	2022
NSP-Minnesota	A.0001559.006	Reliability/Performance Enhancement	BLLC7 U7 Exhaust Silencer Repl	1,059,805	2022
NSP-Minnesota	A.0001573.205	Reliability/Performance Enhancement	BDS0C-Replace Fire Protection Panel	969,740	2022
NSP-Minnesota	A.0001573.056	Reliability/Performance Enhancement	BDS2C U2 LP Steam to Crossover	961,302	2022
NSP-Minnesota	A.0001559.124	Environmental Enhancement	BLL7C CEMS CDM AutoTune-25046	956,005	2022
NSP-Minnesota	A.0001559.125	Environmental Enhancement	BLL8C CEMS CDM AutoTune-25047	956,005	2022
NSP-Minnesota	A.0001591.003	Reliability/Performance Enhancement	-17052 ANS2C Repl U2 gen break	948,845	2022
NSP-Minnesota	A.0001571.011	Reliability/Performance Enhancement	ANSC0 Replace U4 Silencer	923,608	2022
NSP-Minnesota	A.0001610.010	Renewable and New Generation	BWF0-Border WD Tower Climb System-2	917,250	2022
NSP-Minnesota	A.0001611.015	Renewable and New Generation	PVW0C Wind Tower Climb System-24774	884,419	2022
NSP-Minnesota	A.0001591.004	Reliability/Performance Enhancement	-17478 ANS0C BOP Evrgren Ctrl	864,624	2022
NSP-Minnesota	A.0001571.500	Reliability/Performance Enhancement	ANS Emergent Fund -Other prod	743,861	2022
NSP-Minnesota	A.0001575.037	Reliability/Performance Enhancement	HBC0C Warming Line to Intake	737,171	2022
NSP-Minnesota	A.0001611.009	Renewable and New Generation	PVW0-Pleasant Valley Gearbox Replac	724,274	2022
NSP-Minnesota	A.0001579.083	Reliability/Performance Enhancement	RIV0C --Aux boiler Controls Up	646,092	2022
NSP-Minnesota	A.0001574.268	Reliability/Performance Enhancement	SHC1C Emergent Projects	635,491	2022
NSP-Minnesota	A.0001579.069	Reliability/Performance Enhancement	RIV0C -- Instument Air Sys Rep	632,407	2022
NSP-Minnesota	A.0001574.198	Reliability/Performance Enhancement	SHCCC 2017 Emergent Work	592,085	2022
NSP-Minnesota	A.0001565.111	Reliability/Performance Enhancement	WLM0C Replace U0 Scalping Conveyor	577,236	2022
NSP-Minnesota	A.0001562.140	Reliability/Performance Enhancement	REW2C Repl U2 Turb Blade Rows 1-2	556,624	2022
NSP-Minnesota	A.0003000.214	Reliability/Performance Enhancement	C100C PMO Tool Blanket-New	550,000	2022
NSP-Minnesota	A.0001566.168	Renewable and New Generation	NBL0 - Gearbox Replacements	543,388	2022
NSP-Minnesota	A.0001571.082	Reliability/Performance Enhancement	ANS4C U4-Ex 2100 E -Excitation Sys	520,718	2022
NSP-Minnesota	A.0001574.173	Reliability/Performance Enhancement	SHC3C Emergent work	483,288	2022
NSP-Minnesota	A.0001572.214	Reliability/Performance Enhancement	ASK1C AQCS Battery Replacement	481,371	2022
NSP-Minnesota	A.0001572.232	Reliability/Performance Enhancement	ASK1C-TurboToc PLC Upgrade	475,567	2022
NSP-Minnesota	A.0001562.500	Reliability/Performance Enhancement	REW Emergent Fund -Steam prod	472,922	2022
NSP-Minnesota	A.0001571.081	Reliability/Performance Enhancement	ANS4C U4-LCI Controls Replacement	469,910	2022
NSP-Minnesota	A.0001565.114	Environmental Enhancement	WLM0C Landfill Cell 7 and 6 Cap	459,610	2022
NSP-Minnesota	A.0001580.007	Renewable and New Generation	CWF0-Courtenay Gearbox Replacement	458,560	2022
NSP-Minnesota	A.0001562.155	Reliability/Performance Enhancement	REW2-Replace Bus 21 Switchgear	455,288	2022
NSP-Minnesota	A.0001562.156	Reliability/Performance Enhancement	REW1-Replace Bus 11 Switchgear	454,740	2022
NSP-Minnesota	A.0001572.233	Reliability/Performance Enhancement	ASK99C-Transfer House 1 Control Sys	451,300	2022
NSP-Minnesota	A.0001572.234	Reliability/Performance Enhancement	ASK99C-Transfer House 2 Control Sys	451,300	2022
NSP-Minnesota	A.0001572.500	Reliability/Performance Enhancement	ASK Emergent Fund -Steam prod	436,864	2022
NSP-Minnesota	A.0001565.117	Reliability/Performance Enhancement	WLM1C Replace U1 Gratebed 2018	428,783	2022
NSP-Minnesota	A.0001565.125	Reliability/Performance Enhancement	WLM2-Replace U2 Boiler Grates 2022	424,614	2022
NSP-Minnesota	A.0001576.005	Renewable and New Generation	GDM0 - Gearbox replacements	424,200	2022
NSP-Minnesota	A.0001573.182	Reliability/Performance Enhancement	BDS2C U2 Turning Gear Replace	408,310	2022
NSP-Minnesota	A.0001562.138	Reliability/Performance Enhancement	REW0C Replace Scalping Conveyor	404,563	2022
NSP-Minnesota	A.0001562.154	Environmental Enhancement	REW0-Replace Duct Scrubber Controls	403,313	2022
NSP-Minnesota	A.0001573.223	Reliability/Performance Enhancement	BDS2 -Rplc Turbine Valve Internal -	387,651	2022
NSP-Minnesota	A.0001561.015	Reliability/Performance Enhancement	IVH5C U5-6 UG Cable Replacemen	382,097	2022
NSP-Minnesota	A.0001575.169	Reliability/Performance Enhancement	HBC0 - Boiler Feed Pump CESP - 2373	378,022	2022
NSP-Minnesota	A.0001561.029	Reliability/Performance Enhancement	IVH3C Gas Valve Ctrl Repl	370,375	2022
NSP-Minnesota	A.0001573.171	Reliability/Performance Enhancement	BDS0C Admin Bldg Fire Protection	363,359	2022
NSP-Minnesota	A.0001574.269	Reliability/Performance Enhancement	SHC2C Emergent Projects	360,757	2022
NSP-Minnesota	A.0001574.493	Reliability/Performance Enhancement	SHC1C Mill OH 2022 Fall	357,047	2022
NSP-Minnesota	A.0001574.526	Reliability/Performance Enhancement	SHC3C Mill OH 2022 Spring	355,652	2022
NSP-Minnesota	A.0001565.132	Reliability/Performance Enhancement	WLM0-Replace Overhead Bridge Crane-	353,444	2022
NSP-Minnesota	A.0001574.525	Reliability/Performance Enhancement	SHC3C Mill OH 2022 Fall	347,830	2022
NSP-Minnesota	A.0001562.162	Environmental Enhancement	REW1-Replace U1 Baghouse Bags 2023-	347,270	2022
NSP-Minnesota	A.0001575.198	Reliability/Performance Enhancement	HBC8C CESP Torque Convrtr-24727	329,635	2022
NSP-Minnesota	A.0001574.304	Reliability/Performance Enhancement	SHC2 -Turb Ctrl Vlv Internals 2022-	325,329	2022
NSP-Minnesota	A.0001565.500	Reliability/Performance Enhancement	WLM Emergent Fund -Steam prod	315,512	2022
NSP-Minnesota	A.0001574.491	Reliability/Performance Enhancement	SHC1C Mill 2022 Spring	309,369	2022
NSP-Minnesota	A.0001574.802	Reliability/Performance Enhancement	SHC2-Level 2 Mill OH 2022 Spring 15	309,369	2022
NSP-Minnesota	A.0001562.153	Reliability/Performance Enhancement	REW2 Rep U2 Superheater-Secondary-1	302,864	2022
NSP-Minnesota	A.0001562.135	Environmental Enhancement	REW0C Repl Baghouse Controls	302,725	2022

Capital Additions: 2022-2024
($s)

Company	Project ID	New Grandparent	Project Name	YE Amt	Activity Year
NSP-Minnesota	A.0001562.183	Reliability/Performance Enhancement	REW2-U2 Roof Tubes-24588	302,343	2022
NSP-Minnesota	A.0001562.007	Reliability/Performance Enhancement	REW0613-Condenser Retube	301,775	2022
NSP-Minnesota	A.0001565.070	Reliability/Performance Enhancement	WLM0C Fire Protection System R	301,642	2022
NSP-Minnesota	A.0001574.252	Reliability/Performance Enhancement	SHC99 Emergent work	298,836	2022
NSP-Minnesota	A.0003000.682	Reliability/Performance Enhancement	SHCJC Tools and Equip pur	296,000	2022
NSP-Minnesota	A.0001579.166	Reliability/Performance Enhancement	RIV0-Aux Cooling Tunnel Redesign-25	288,343	2022
NSP-Minnesota	A.0003000.698	Reliability/Performance Enhancement	SER-CHM-Misc Tools-MN	274,960	2022
NSP-Minnesota	A.0001576.006	Renewable and New Generation	GDM0C Generator Replacements 2	255,359	2022
NSP-Minnesota	A.0001702.018	Environmental Enhancement	BS2 Blazing Star 2 PCMM-New-23573	250,000	2022
NSP-Minnesota	A.0001572.236	Reliability/Performance Enhancement	ASK1C-Econ Outlet Exp Joint	247,216	2022
NSP-Minnesota	A.0001565.167	Environmental Enhancement	WLM0-Replace North Travelling Scree	227,915	2022
NSP-Minnesota	A.0001579.016	Reliability/Performance Enhancement	RIV7C-U7 Turbine Roof Replace	215,591	2022
NSP-Minnesota	A.0001573.186	Reliability/Performance Enhancement	BDS2C Redundant LO Vapor Extractor	212,111	2022
NSP-Minnesota	A.0001580.008	Renewable and New Generation	CWF1-Generator Rplacments	209,321	2022
NSP-Minnesota	A.0001574.861	Reliability/Performance Enhancement	SHC99-Coal Barn CO Detection Proj-2	204,832	2022
NSP-Minnesota	A.0001574.295	Reliability/Performance Enhancement	SHC0 -#54 Pit Floor Slope ReCover -	202,034	2022
NSP-Minnesota	A.0001574.682	Reliability/Performance Enhancement	SHCJC 3, 4 Xshr Fdr Floor Resto	198,832	2022
NSP-Minnesota	A.0001573.292	Reliability/Performance Enhancement	BDS6C G.E. Cyber Sec Upgrd-25039	196,728	2022
NSP-Minnesota	A.0001573.304	Reliability/Performance Enhancement	BDS5 Evap Cooler Media Repl-15643	188,090	2022
NSP-Minnesota	A.0001579.127	Reliability/Performance Enhancement	RIV7C-Install Circ Water Pumps CESP	186,423	2022
NSP-Minnesota	A.0001574.860	Reliability/Performance Enhancement	SHC99-Replace Festoon Cable on #2 P	184,349	2022
NSP-Minnesota	A.0001566.169	Renewable and New Generation	NBL0 - Replace Generators	182,431	2022
NSP-Minnesota	A.0001574.801	Reliability/Performance Enhancement	SHC3-Landfl Mtnc Grg Lim Rcv HVAC P	181,328	2022
NSP-Minnesota	A.0001610.011	Renewable and New Generation	BWF0 - Oil Particle Count System-24	181,010	2022
NSP-Minnesota	A.0001573.271	Reliability/Performance Enhancement	BDS5-Replace CT Inlet Filters-19102	180,553	2022
NSP-Minnesota	A.0001562.139	Reliability/Performance Enhancement	REW2C Repl U2 Trvlg Gate Bed	176,300	2022
NSP-Minnesota	A.0001562.051	Reliability/Performance Enhancement	REW1C REPLACE U1 TRAVELING GRA	175,893	2022
NSP-Minnesota	A.0001574.862	Reliability/Performance Enhancement	SHC99-Replace Plow Feeder Gearbox-2	170,694	2022
NSP-Minnesota	A.0001562.136	Reliability/Performance Enhancement	REW0C C9 Internal Repl	168,969	2022
NSP-Minnesota	A.0001573.225	Reliability/Performance Enhancement	BDS5 - Rplc U5 Duct Burner PLC - 23	165,262	2022
NSP-Minnesota	A.0001565.115	Reliability/Performance Enhancement	WLM0C DCS Software Hardware Upgrade	162,327	2022
NSP-Minnesota	A.0001573.128	Reliability/Performance Enhancement	BDS5C CT Expansion Joint	161,796	2022
NSP-Minnesota	A.0001574.687	Reliability/Performance Enhancement	SHCJC 3A Gate to 4A-B Upgrade	157,112	2022
NSP-Minnesota	A.0003000.758	Reliability/Performance Enhancement	JWF0 - Jeffers Tools-Equip	155,000	2022
NSP-Minnesota	A.0001573.107	Reliability/Performance Enhancement	BDS0C Vehicle Fueling Station	154,854	2022
NSP-Minnesota	A.0003000.658	Reliability/Performance Enhancement	ASK0C- Tool Blanket	150,000	2022
NSP-Minnesota	A.0001579.165	Reliability/Performance Enhancement	RIV7C Inst Circ Water Pumps-10860	150,000	2022
NSP-Minnesota	A.0001707.012	Environmental Enhancement	DKR Dakota Range PCMM New-23576	142,000	2022
NSP-Minnesota	A.0001611.013	Environmental Enhancement	PVW0-PVW Eagle Take Permit New-2148	141,500	2022
NSP-Minnesota	A.0001565.141	Reliability/Performance Enhancement	WLM2-New Unit 2 Hotwell Pump-24708	141,418	2022
NSP-Minnesota	A.0001565.128	Reliability/Performance Enhancement	WLM1-Replace U1 B12 Screw Auger 123	132,214	2022
NSP-Minnesota	A.0001562.184	Reliability/Performance Enhancement	REW1-C6 Ash Conveyor-24590	125,765	2022
NSP-Minnesota	A.0001562.169	Reliability/Performance Enhancement	REW2-Electronic Overspeed-24219	121,084	2022
NSP-Minnesota	A.0001611.011	Renewable and New Generation	PVW1-Transformer Replacements	118,379	2022
NSP-Minnesota	A.0001580.009	Renewable and New Generation	CWF1-Transformer Replacements	115,884	2022
NSP-Minnesota	A.0001579.170	Reliability/Performance Enhancement	RIV0-NE Fence Replacement-24744	110,838	2022
NSP-Minnesota	A.0001574.302	Reliability/Performance Enhancement	SHC99-CESP-2021 #2 CC Rotor Asmbl-2	107,592	2022
NSP-Minnesota	A.0001611.010	Renewable and New Generation	PVW1-Generator Replacements	106,227	2022
NSP-Minnesota	A.0001562.137	Reliability/Performance Enhancement	REW2C Repl U2 Turb EH Govern	106,010	2022
NSP-Minnesota	A.0001574.306	Reliability/Performance Enhancement	SHC99-CESP 2022 #1 CC Rotor Asmbl-2	105,882	2022
NSP-Minnesota	A.0001562.178	Reliability/Performance Enhancement	REW2-U2 Lower Air Heater Basket-245	105,673	2022
NSP-Minnesota	A.0001573.298	Reliability/Performance Enhancement	BDS5C Repl Gas Ctrl Vlvs-25045	104,365	2022
NSP-Minnesota	A.0001574.463	Reliability/Performance Enhancement	SHC3-U3 Stock Fdr Speed repl	103,369	2022
NSP-Minnesota	A.0003000.699	Reliability/Performance Enhancement	SER-SMC-Misc Tools & Equipment	100,000	2022
NSP-Minnesota	A.0001573.300	Reliability/Performance Enhancement	BDS5C Repl Battery Charger-24633	99,694	2022
NSP-Minnesota	A.0001574.840	Reliability/Performance Enhancement	SHC99-Chemistry Lab Fire Protectn-2	97,117	2022
NSP-Minnesota	A.0001573.296	Reliability/Performance Enhancement	BDS0C Repl Diesel Fire Pump-25043	97,087	2022
NSP-Minnesota	A.0001573.120	Reliability/Performance Enhancement	BDS2 -Rplc Circ Pump Disch Valves -	96,669	2022
NSP-Minnesota	A.0001579.167	Reliability/Performance Enhancement	RIV10-U10 Econ FW Cond XOver ISO-24	95,043	2022
NSP-Minnesota	A.0001579.168	Reliability/Performance Enhancement	RIV9-U9 Econ FW Cond X-Over ISO-247	95,043	2022
NSP-Minnesota	A.0001562.133	Reliability/Performance Enhancement	REW1C Repl U1 Turb EG Governor	90,600	2022
NSP-Minnesota	A.0001573.207	Reliability/Performance Enhancement	BDS2C-Install Lube Oil Trip Manifol	89,644	2022
NSP-Minnesota	A.0001575.201	Reliability/Performance Enhancement	HBC0C No. 2 IA Comp Repl-24690	88,481	2022
NSP-Minnesota	A.0003000.697	Reliability/Performance Enhancement	SER-MMR- Misc Tools & Equip	86,630	2022
NSP-Minnesota	A.0001576.023	Renewable and New Generation	GDM Climb Lift System -24572	86,625	2022
NSP-Minnesota	A.0001562.189	Reliability/Performance Enhancement	REW1-12 LP FWH-24875	85,965	2022
NSP-Minnesota	A.0001574.292	Reliability/Performance Enhancement	SHC0 -Rplc DS Pmphouse Pipe vlv'20-	85,876	2022
NSP-Minnesota	A.0001573.274	Reliability/Performance Enhancement	BDS5-Repl 5 CT Compartment Dampers-	85,691	2022
NSP-Minnesota	A.0005014.142	Renewable and New Generation	BS10-Blazing Star 1 Build Furn & Eq	85,000	2022
NSP-Minnesota	A.0005014.144	Renewable and New Generation	FTW0-Foxtail Building Furn & Equip	85,000	2022
NSP-Minnesota	A.0001579.150	Reliability/Performance Enhancement	RIV10-Repl Unit 10 FW Reg Valve-241	83,520	2022
NSP-Minnesota	A.0001579.153	Reliability/Performance Enhancement	RIV9-Replace HP FW valve Unit 9-241	83,107	2022
NSP-Minnesota	A.0001579.115	Environmental Enhancement	RIV0-U0 Install CEMS power red	79,348	2022
NSP-Minnesota	A.0001579.135	Reliability/Performance Enhancement	RIV0C 62 Battery Replace	77,544	2022
NSP-Minnesota	A.0001574.358	Reliability/Performance Enhancement	SHC1C North Blr Bldg Roof Repl	75,497	2022
NSP-Minnesota	A.0001579.073	Reliability/Performance Enhancement	RIV0C -- Replace 61 Battery	73,899	2022
NSP-Minnesota	A.0001574.769	Reliability/Performance Enhancement	SHC3C CR HVAC PLC 2nd Flr Replace	70,003	2022
NSP-Minnesota	A.0001575.200	Environmental Enhancement	HBC8C SCR Hot Gas Recirc Imp-25051	68,607	2022
NSP-Minnesota	A.0001575.199	Environmental Enhancement	HBC7C SCR Hot Gas Recirc Imp-25050	68,557	2022
NSP-Minnesota	A.0001565.065	Reliability/Performance Enhancement	WLM1C C7 & C8 VFD	65,298	2022
NSP-Minnesota	A.0003000.748	Renewable and New Generation	BS10-Blazing Star 1 Tools and Equip	65,000	2022

Capital Additions: 2022-2024
($s)

Company	Project ID	New Grandparent	Project Name	YE Amt	Activity Year
NSP-Minnesota	A.0001576.500	Reliability/Performance Enhancement	GDM Emergent Fund -Wind prod	64,633	2022
NSP-Minnesota	A.0001574.805	Reliability/Performance Enhancement	SHC0-Coal conveyor F.P. 20631	64,010	2022
NSP-Minnesota	A.0001562.188	Reliability/Performance Enhancement	REW0-Sample Panel & Analyzers-24612	60,569	2022
NSP-Minnesota	A.0003000.679	Reliability/Performance Enhancement	RIV0C-Tool Blanket	60,000	2022
NSP-Minnesota	A.0001574.666	Reliability/Performance Enhancement	SHC3C CT Vibration System	58,604	2022
NSP-Minnesota	A.0001573.203	Reliability/Performance Enhancement	BDS5C-Repl U5 Fuel Gas Heater CV	58,148	2022
NSP-Minnesota	A.0001565.122	Reliability/Performance Enhancement	WLM2C U2 Static Exciter	57,520	2022
NSP-Minnesota	A.0001573.272	Reliability/Performance Enhancement	BDS5-Repl U5 LP Drum Feedwater CV-2	56,107	2022
NSP-Minnesota	A.0003000.578	Reliability/Performance Enhancement	SER0C MMR Video Probe 2022	55,000	2022
NSP-Minnesota	A.0003000.669	Reliability/Performance Enhancement	HBC0C HB CC Tool Blanket	50,000	2022
NSP-Minnesota	A.0001574.731	Reliability/Performance Enhancement	SHC0C Fuel Oil Pump F.P.	50,000	2022
NSP-Minnesota	A.0001561.500	Reliability/Performance Enhancement	IVH Emergent Fund -Other prod	46,916	2022
NSP-Minnesota	A.0001579.169	Reliability/Performance Enhancement	RIV7-Riv 7 Automate Cond. Xover Vlv	45,988	2022
NSP-Minnesota	A.0003000.661	Reliability/Performance Enhancement	BDS0C Tool Blanket	42,850	2022
NSP-Minnesota	A.0001573.102	Reliability/Performance Enhancement	BDS0C Office Area Heaters	42,010	2022
NSP-Minnesota	A.0001559.500	Reliability/Performance Enhancement	BLL Emergent Fund -Other prod	41,803	2022
NSP-Minnesota	A.0001575.171	Reliability/Performance Enhancement	HBC0 - Rmv & Rplc BFP Spare YR1 -23	40,958	2022
NSP-Minnesota	A.0001565.162	Reliability/Performance Enhancement	WLM1-Replace U1 Slurry Density Mete	40,334	2022
NSP-Minnesota	A.0001565.161	Reliability/Performance Enhancement	WLM2-Replace U2 Slurry Density Mete	40,182	2022
NSP-Minnesota	A.0003000.567	Reliability/Performance Enhancement	SER0C MMR Alloy Analyzer 2022	38,000	2022
NSP-Minnesota	A.0001704.014	Environmental Enhancement	FBW Freeborn PCMM NEW-23575	37,500	2022
NSP-Minnesota	A.0001573.273	Reliability/Performance Enhancement	BDS5-U5 Overspeed Probe 24030	35,705	2022
NSP-Minnesota	A.0001571.098	Reliability/Performance Enhancement	ANS0C PDC Bard Unit Repl-24736	32,788	2022
NSP-Minnesota	A.0003000.707	Reliability/Performance Enhancement	C100C CSC Aerosol Can Crusher	32,180	2022
NSP-Minnesota	A.0003000.750	Renewable and New Generation	FTW0-Foxtail Tools and Equipment	30,000	2022
NSP-Minnesota	A.0003000.662	Renewable and New Generation	BRDR Small Tools Equip	30,000	2022
NSP-Minnesota	A.0003000.128	Renewable and New Generation	CWF Tools & Misc Equipment	30,000	2022
NSP-Minnesota	A.0003000.667	Renewable and New Generation	GDM0C Grand Mead Cap Tool	30,000	2022
NSP-Minnesota	A.0003000.678	Renewable and New Generation	PLV Tools Equip	30,000	2022
NSP-Minnesota	A.0003000.749	Renewable and New Generation	CRW0-Crowned Ridge Tools-Equip	29,688	2022
NSP-Minnesota	A.0001562.190	Reliability/Performance Enhancement	REW1-U1 Generator Field Breaker-249	27,765	2022
NSP-Minnesota	A.0001562.191	Reliability/Performance Enhancement	REW2-U2 Generator Field Breaker-250	27,765	2022
NSP-Minnesota	A.0003000.752	Renewable and New Generation	FBWO Freeborn Tools and Equipment	27,273	2022
NSP-Minnesota	A.0003000.751	Renewable and New Generation	LBW0-Lake Benton Tools-Equip	27,273	2022
NSP-Minnesota	A.0003000.757	Renewable and New Generation	MWF0 - Mowers Tools-Equip	27,273	2022
NSP-Minnesota	A.0001564.030	Reliability/Performance Enhancement	HNI0 Repl 130VDC Battery-25022	25,138	2022
NSP-Minnesota	A.0001576.021	Environmental Enhancement	GDM Eagle Take New - 22846	25,000	2022
NSP-Minnesota	A.0001571.102	Reliability/Performance Enhancement	ANS0C Clear Well Pump Repl-24742	23,470	2022
NSP-Minnesota	A.0001571.101	Reliability/Performance Enhancement	ANS4C PDC Bard Unit Repl-24739	22,952	2022
NSP-Minnesota	A.0003000.563	Reliability/Performance Enhancement	SER0C CSC Drum Packer Crusher	21,000	2022
NSP-Minnesota	A.0001573.294	Reliability/Performance Enhancement	BDS2C Inst Hydrogen Vlvs-25041	20,439	2022
NSP-Minnesota	A.0003000.657	Reliability/Performance Enhancement	ANS0C Tools and Equip Ca	20,000	2022
NSP-Minnesota	A.0003000.659	Reliability/Performance Enhancement	BLL0C Tools Blanket	20,000	2022
NSP-Minnesota	A.0003000.672	Reliability/Performance Enhancement	IVH0C Misc tools and Equip	20,000	2022
NSP-Minnesota	A.0003000.676	Reliability/Performance Enhancement	NBLCo Misc Tools and Equi	20,000	2022
NSP-Minnesota	A.0001573.297	Reliability/Performance Enhancement	BDS5C Repl Ammonia Dtctrs-25044	19,417	2022
NSP-Minnesota	A.0001575.192	Reliability/Performance Enhancement	HBC8-Evap Cooler Ctrls Integration-	18,226	2022
NSP-Minnesota	A.0001575.188	Reliability/Performance Enhancement	HBC7-Evap Cooler Ctrls Integration-	18,182	2022
NSP-Minnesota	A.0003000.313	Reliability/Performance Enhancement	SER CSC Tool Blanket	18,000	2022
NSP-Minnesota	A.0001574.673	Reliability/Performance Enhancement	SHC3C 1st Floor HVAC PLC Replace	15,635	2022
NSP-Minnesota	A.0001573.293	Reliability/Performance Enhancement	BDS5C Inst Ammonia Htr Cooling-2504	15,330	2022
NSP-Minnesota	A.0001565.147	Environmental Enhancement	WLM0-CEMS Room HVAC Replacement-245	15,059	2022
NSP-Minnesota	A.0003000.671	Reliability/Performance Enhancement	HNIC0 Misc Tools and Equ	15,000	2022
NSP-Minnesota	A.0003000.680	Reliability/Performance Enhancement	REW0C Tool Blanket	15,000	2022
NSP-Minnesota	A.0001562.168	Reliability/Performance Enhancement	REW2-SKF Monitoring System-24218	13,590	2022
NSP-Minnesota	A.0001573.299	Reliability/Performance Enhancement	BDS5C Repl Seismic Probes-25048	9,076	2022
NSP-Minnesota	A.0003000.564	Reliability/Performance Enhancement	SER0C CSC Rolloff Container 1	8,000	2022
NSP-Minnesota	A.0003000.565	Reliability/Performance Enhancement	SER0C CSC Rolloff Container 2	8,000	2022
NSP-Minnesota	A.0001571.100	Environmental Enhancement	ANS3C CEMS Bard Unit Repl-24738	7,963	2022
NSP-Minnesota	A.0001571.099	Environmental Enhancement	ANS2C CEMS Bard Unit Repl-24737	7,588	2022
NSP-Minnesota	A.0001574.190	Reliability/Performance Enhancement	SHC3C 2018 Small Project Routi	6,793	2022
NSP-Minnesota	A.0003000.753	Renewable and New Generation	MWF0 Mower WF Tools and Equipment	5,000	2022
NSP-Minnesota	A.0001573.295	Reliability/Performance Enhancement	BDS0C Repl 52 CCW Check Vlv-25042	4,088	2022
NSP-Minnesota	A.0001559.104	Reliability/Performance Enhancement	BLL0C LCI Controls Replacement	4,000	2022
NSP-Minnesota	A.0001559.112	Reliability/Performance Enhancement	BLL7C U7-Excitation System Replacem	4,000	2022
NSP-Minnesota	A.0001559.015	Reliability/Performance Enhancement	BLL7-U7 CT Control System Repl	4,000	2022
NSP-Minnesota	A.0001559.114	Reliability/Performance Enhancement	BLL8C U8 Excitation System Replacem	4,000	2022
NSP-Minnesota	A.0001559.014	Reliability/Performance Enhancement	BLL8-U8 CT Control System Repl	4,000	2022
NSP-Minnesota	A.0001574.733	Reliability/Performance Enhancement	SHC0C Electric & Electronic Room FP	1,667	2022
NSP-Minnesota	A.0001572.048	Reliability/Performance Enhancement	ASK1C-Inst Emerson DCS Evergre	1,000	2022
NSP-Minnesota	A.0001565.118	Environmental Enhancement	WLM1C Replace U1 Baghouse Bags	1,000	2022
NSP-Minnesota	A.0001564.500	Reliability/Performance Enhancement	St Anthony Falls Emergent -Other Pr	681	2022
NSP-Minnesota	A.0001574.174	Reliability/Performance Enhancement	SHCJC 2018 Small Project routi	44	2022
NSP-Minnesota	A.0001574.464	Environmental Enhancement	SHC3-U3 landfill capping 2020	(7)	2022
NSP-Minnesota	A.0001574.808	Environmental Enhancement	SHC99 Stormwater Management 22619	(19,227)	2022
NSP-Minnesota	A.0001707.001	Renewable and New Generation	DKR0 Dakota Range Wind Turbines	(6,862,779)	2022
NSP-Minnesota	A.0001574.890	Renewable and New Generation	SHC Solar Generating Plant - Phase I	303,994,870	2023
NSP-Minnesota	A.0001576.022	Renewable and New Generation	GDM Grand Meadow Repower	112,314,104	2023
NSP-Minnesota	A.0001575.170	Reliability/Performance Enhancement	HBC8 - U8 CT Ovhl Major Outage	11,060,701	2023
NSP-Minnesota	A.0001571.023	Reliability/Performance Enhancement	ANS2-C-U2 replace vanes and bl	10,642,869	2023
NSP-Minnesota	A.0001559.118	Reliability/Performance Enhancement	BLL U8 Hot Gas Path-21336	5,095,983	2023

Capital Additions: 2022-2024
($s)

Company	Project ID	New Grandparent	Project Name	YE Amt	Activity Year
NSP-Minnesota	A.0001575.197	Reliability/Performance Enhancement	HBC8C GT EXHAUST REPL-24699	3,087,177	2023
NSP-Minnesota	A.0001561.032	Reliability/Performance Enhancement	IVH5C Turbine Controls	2,540,628	2023
NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	2,388,315	2023
NSP-Minnesota	A.0001575.190	Reliability/Performance Enhancement	HBC0-Diasys Controls Replacement-22	2,037,805	2023
NSP-Minnesota	A.0001574.672	Reliability/Performance Enhancement	SHC3C 36_1 & 36_2 FWHs Replace	2,014,385	2023
NSP-Minnesota	A.0001573.500	Reliability/Performance Enhancement	BDS Emergent Fund -Other prod	2,011,050	2023
NSP-Minnesota	A.0001579.500	Reliability/Performance Enhancement	RIV Emergent Fund -Other prod	1,326,394	2023
NSP-Minnesota	A.0001574.804	Reliability/Performance Enhancement	SHC3-U3 DCS Workstation Upgrade 202	1,056,278	2023
NSP-Minnesota	A.0001611.009	Renewable and New Generation	PVW0-Pleasant Valley Gearbox Replac	1,046,925	2023
NSP-Minnesota	A.0001742.001	Renewable and New Generation	NRW North Wind Farms - Viking	1,033,834	2023
NSP-Minnesota	A.0001575.500	Reliability/Performance Enhancement	HBR Emergent Fund -Other prod	970,807	2023
NSP-Minnesota	A.0001566.173	Renewable and New Generation	NBL0C Wind Tower Climb System-24814	968,431	2023
NSP-Minnesota	A.0001575.167	Reliability/Performance Enhancement	HBC0-Evergreen Upgrade #2-16185	962,475	2023
NSP-Minnesota	A.0001565.083	Environmental Enhancement	WLM0-Cap WLM Landfill Cells 8, 9, 1	881,472	2023
NSP-Minnesota	A.0001580.007	Renewable and New Generation	CWF0-Courtenay Gearbox Replacement	876,367	2023
NSP-Minnesota	A.0001574.307	Reliability/Performance Enhancement	SHC3 - Replace U3 Inverter - 23426	820,028	2023
NSP-Minnesota	A.0001574.173	Reliability/Performance Enhancement	SHC3C Emergent work	750,446	2023
NSP-Minnesota	A.0001565.077	Reliability/Performance Enhancement	WLM0C Slaker PLC Replacement	689,489	2023
NSP-Minnesota	A.0001574.198	Reliability/Performance Enhancement	SHCCC 2017 Emergent Work	678,271	2023
NSP-Minnesota	A.0001565.151	Reliability/Performance Enhancement	WLM2-Replace Unit 2 Turbine Blades-	600,874	2023
NSP-Minnesota	A.0001576.005	Renewable and New Generation	GDM0 - Gearbox replacements	590,243	2023
NSP-Minnesota	A.0001575.174	Reliability/Performance Enhancement	HBC8- Rplc LP Lower Prehtr Header-1	583,948	2023
NSP-Minnesota	A.0001559.126	Reliability/Performance Enhancement	BLL0C Quarry Park Rd Driveway-24784	545,947	2023
NSP-Minnesota	A.0001571.105	Environmental Enhancement	ANS4C CDM Auto Tune-25062	535,595	2023
NSP-Minnesota	A.0001572.161	Reliability/Performance Enhancement	ASK1-Nuva Feeder PLC Replaceme	509,403	2023
NSP-Minnesota	A.0001574.268	Reliability/Performance Enhancement	SHC1C Emergent Projects	480,979	2023
NSP-Minnesota	A.0001571.500	Reliability/Performance Enhancement	ANS Emergent Fund -Other prod	472,725	2023
NSP-Minnesota	A.0001572.500	Reliability/Performance Enhancement	ASK Emergent Fund -Steam prod	461,518	2023
NSP-Minnesota	A.0001572.177	Reliability/Performance Enhancement	ASK1C Repl ID Fan Suction Exp	461,368	2023
NSP-Minnesota	A.0001579.156	Reliability/Performance Enhancement	RIV0-Replace Obsolete EDG Controls-	408,651	2023
NSP-Minnesota	A.0001561.039	Reliability/Performance Enhancement	IVHC Gas Vlv Ctrl Rplc	407,846	2023
NSP-Minnesota	A.0001565.159	Reliability/Performance Enhancement	WLM2-New Unit 2 ID Fan Motor and VF	356,301	2023
NSP-Minnesota	A.0001574.816	Reliability/Performance Enhancement	SHC3-U3 Level 2 Mill OH 2023 Sprg-1	354,958	2023
NSP-Minnesota	A.0001574.815	Reliability/Performance Enhancement	SHC3-U3 Level 2 Mill OH 2023 Fall-1	347,655	2023
NSP-Minnesota	A.0001575.183	Reliability/Performance Enhancement	HBC9- ST Vlv Overhaul-24034	328,422	2023
NSP-Minnesota	A.0001572.246	Reliability/Performance Enhancement	ASK1-Protective Relay Upgrades-2423	326,470	2023
NSP-Minnesota	A.0001580.008	Renewable and New Generation	CWF1-Generator Rplacments	324,758	2023
NSP-Minnesota	A.0001562.500	Reliability/Performance Enhancement	REW Emergent Fund -Steam prod	320,172	2023
NSP-Minnesota	A.0001573.217	Reliability/Performance Enhancement	BDS0-Repl Discharge Gate Comm Ctrl	318,996	2023
NSP-Minnesota	A.0001574.820	Reliability/Performance Enhancement	SHC1-U1 Level 2 Mill OH 2023 Sprg-1	308,750	2023
NSP-Minnesota	A.0001575.189	Reliability/Performance Enhancement	HBC9-Vibration Monitoring System-19	305,642	2023
NSP-Minnesota	A.0001562.176	Environmental Enhancement	REW0-Metal Recovery System-24580	305,563	2023
NSP-Minnesota	A.0001562.149	Reliability/Performance Enhancement	REW1 Rep U1 Superheater-Secondary-2	302,956	2023
NSP-Minnesota	A.0001574.821	Reliability/Performance Enhancement	SHC1-U1 Level 2 Mill OH 2023 Fall-1	302,259	2023
NSP-Minnesota	A.0001565.500	Reliability/Performance Enhancement	WLM Emergent Fund -Steam prod	294,004	2023
NSP-Minnesota	A.0001574.814	Environmental Enhancement	SHC3-U3 landfill capping 2022-11340	287,665	2023
NSP-Minnesota	A.0001572.176	Reliability/Performance Enhancement	ASK1C Repl Hydrojet PC HF Sens	284,009	2023
NSP-Minnesota	A.0001572.252	Environmental Enhancement	ASK1-13&14 Travel Water Screen - 23	281,635	2023
NSP-Minnesota	A.0003000.698	Reliability/Performance Enhancement	SER-CHM-Misc Tools-MN	266,620	2023
NSP-Minnesota	A.0001565.144	Reliability/Performance Enhancement	WLM99-Replace Walking Floor 2022-17	259,553	2023
NSP-Minnesota	A.0001565.134	Reliability/Performance Enhancement	WLM2 Turbine Electronic Overspeed-2	252,066	2023
NSP-Minnesota	A.0001562.039	Environmental Enhancement	REW0 - EPA 316b-Svc Water Pumps - 2	249,919	2023
NSP-Minnesota	A.0001574.844	Environmental Enhancement	SHC0-Pond 3S Ring Dike Phase II-242	242,275	2023
NSP-Minnesota	A.0001742.003	Renewable and New Generation	NRW North Wind Farms - Rock Aetna	238,138	2023
NSP-Minnesota	A.0001574.421	Reliability/Performance Enhancement	SHC3C Fan Control Room Roof Re	235,017	2023
NSP-Minnesota	A.0001573.206	Reliability/Performance Enhancement	BDS0C-Replace CV Positioners	234,838	2023
NSP-Minnesota	A.0001565.163	Reliability/Performance Enhancement	WLM0-Greensand Filter for RO Water-	232,407	2023
NSP-Minnesota	A.0001574.309	Reliability/Performance Enhancement	SHC3 - Turb Cntrl Vlv Intnl 2023 -	230,048	2023
NSP-Minnesota	A.0001565.166	Reliability/Performance Enhancement	WLM99-New Magnetic Separator-24724	200,626	2023
NSP-Minnesota	A.0001565.165	Reliability/Performance Enhancement	WLM99-Eddy Current Separator-24723	200,543	2023
NSP-Minnesota	A.0003000.682	Reliability/Performance Enhancement	SHCJC Tools and Equip pur	200,000	2023
NSP-Minnesota	A.0001574.252	Reliability/Performance Enhancement	SHC99 Emergent work	197,227	2023
NSP-Minnesota	A.0001565.116	Reliability/Performance Enhancement	WLM1C U1 Static Exciter	191,050	2023
NSP-Minnesota	A.0001559.127	Reliability/Performance Enhancement	BLL7C Inlt Filter Evap Media Repl-2	185,859	2023
NSP-Minnesota	A.0001559.128	Reliability/Performance Enhancement	BLL8C Inlt Filter Evap Media Repl-2	185,859	2023
NSP-Minnesota	A.0001573.179	Reliability/Performance Enhancement	BDS0C GSU Containment Const Spare	177,184	2023
NSP-Minnesota	A.0001574.791	Reliability/Performance Enhancement	SHC3-SHC3-Haul Road 2019 19889	171,387	2023
NSP-Minnesota	A.0001742.002	Renewable and New Generation	NRW North Wind Farms - Chanarambie	154,006	2023
NSP-Minnesota	A.0001574.863	Reliability/Performance Enhancement	SHC0-Replace Well #4-24876	153,077	2023
NSP-Minnesota	A.0001573.059	Reliability/Performance Enhancement	BDS5C CT Remote Monitoring	150,550	2023
NSP-Minnesota	A.0003000.658	Reliability/Performance Enhancement	ASK0C- Tool Blanket	150,000	2023
NSP-Minnesota	A.0001565.164	Reliability/Performance Enhancement	WLM0-Replace BFP #3-24707	146,369	2023
NSP-Minnesota	A.0001562.179	Reliability/Performance Enhancement	REW0-100% Circ Water Pump-24583	146,152	2023
NSP-Minnesota	A.0001565.052	Reliability/Performance Enhancement	WLM0-Replace Lime Mixer Grit S	140,495	2023
NSP-Minnesota	A.0001579.171	Reliability/Performance Enhancement	RIV9-Rpl Evap Cooler Media 2023-223	137,539	2023
NSP-Minnesota	A.0001576.006	Renewable and New Generation	GDM0C Generator Replacements 2	134,936	2023
NSP-Minnesota	A.0001565.152	Reliability/Performance Enhancement	WLM2-New VFD for Unit 2 OFA Fan Mot	131,114	2023
NSP-Minnesota	A.0001572.107	Reliability/Performance Enhancement	ASK1C Inst GRF Damper Drives	129,244	2023
NSP-Minnesota	A.0001611.011	Renewable and New Generation	PVW1-Transformer Replacements	122,672	2023
NSP-Minnesota	A.0001580.009	Renewable and New Generation	CWF1-Transformer Replacements	122,402	2023
NSP-Minnesota	A.0001565.157	Reliability/Performance Enhancement	WLM2-New Unit 2 FD Fan motor and VF	121,086	2023

Capital Additions: 2022-2024
($s)

Company	Project ID	New Grandparent	Project Name	YE Amt	Activity Year
NSP-Minnesota	A.0001565.155	Reliability/Performance Enhancement	WLM0-New motor and VFD for #2 BFP-2	121,082	2023
NSP-Minnesota	A.0001562.165	Environmental Enhancement	REW1-Repl U1 CEMS Analyzers-22051	120,827	2023
NSP-Minnesota	A.0001562.170	Environmental Enhancement	REW2-Replace U2 CEMS Analyzers-2428	120,827	2023
NSP-Minnesota	A.0001574.737	Reliability/Performance Enhancement	SHC0 Air Comp Controls U0	118,568	2023
NSP-Minnesota	A.0001575.204	Reliability/Performance Enhancement	HBC8C Air Inlet Filter Repl-24728	114,441	2023
NSP-Minnesota	A.0001575.205	Reliability/Performance Enhancement	HBC7C Air Inlet Filter Repl-24729	114,437	2023
NSP-Minnesota	A.0001611.010	Renewable and New Generation	PVW1-Generator Replacements	112,202	2023
NSP-Minnesota	A.0001574.311	Reliability/Performance Enhancement	SHC99 -CESP 2023 #3 CC Rotor Asmbl-	105,706	2023
NSP-Minnesota	A.0001574.572	Reliability/Performance Enhancement	SHC99 -CESP-2024 #4 CC Rotor Asmbl-	104,460	2023
NSP-Minnesota	A.0001571.107	Reliability/Performance Enhancement	ANS0C Com Gas Line Pig Barrel-25061	101,881	2023
NSP-Minnesota	A.0001562.185	Reliability/Performance Enhancement	REW1-U1 Lower Air Heater Baskets-24	100,703	2023
NSP-Minnesota	A.0003000.699	Reliability/Performance Enhancement	SER-SMC-Misc Tools & Equipment	100,000	2023
NSP-Minnesota	A.0001573.178	Reliability/Performance Enhancement	BDS0C Heating System Sample Panel	96,715	2023
NSP-Minnesota	A.0001574.677	Reliability/Performance Enhancement	SHC3C Air Comp Controls Replace	96,588	2023
NSP-Minnesota	A.0001574.535	Reliability/Performance Enhancement	SHC3C BFP Overhaul 33	95,318	2023
NSP-Minnesota	A.0001573.275	Reliability/Performance Enhancement	BDS0-Plant Admin Area Roof Repl-240	86,598	2023
NSP-Minnesota	A.0001562.164	Reliability/Performance Enhancement	REW2-Rep 21 Screw Feeder Augers-121	85,747	2023
NSP-Minnesota	A.0001562.163	Reliability/Performance Enhancement	REW2-Rep 22 Screw Feeder Augers-121	85,747	2023
NSP-Minnesota	A.0001566.168	Renewable and New Generation	NBL0 - Gearbox Replacements	84,984	2023
NSP-Minnesota	A.0001574.778	Reliability/Performance Enhancement	SHC0-Lime slaking building roof 221	83,901	2023
NSP-Minnesota	A.0001574.824	Reliability/Performance Enhancement	SHC99-Tunnel Dust Collectors F.P.-2	81,504	2023
NSP-Minnesota	A.0001574.308	Reliability/Performance Enhancement	SHC3 - Replace U3 TCS HMI - 22765	78,872	2023
NSP-Minnesota	A.0001562.160	Reliability/Performance Enhancement	REW1-Replace Bin 12 Augers 2024-138	75,937	2023
NSP-Minnesota	A.0001574.269	Reliability/Performance Enhancement	SHC2C Emergent Projects	71,004	2023
NSP-Minnesota	A.0001574.847	Reliability/Performance Enhancement	SHC3-LFLeachate Truck FIll Station-	68,991	2023
NSP-Minnesota	A.0001579.017	Reliability/Performance Enhancement	RIV7C-71 UPS Battery Replaceme	68,647	2023
NSP-Minnesota	A.0001574.310	Reliability/Performance Enhancement	SHC99 - Rplc RCD DS Pipe 2023 - 234	66,316	2023
NSP-Minnesota	A.0001575.101	Reliability/Performance Enhancement	HBC7C CT Servo Replacement	60,400	2023
NSP-Minnesota	A.0003000.679	Reliability/Performance Enhancement	RIV0C-Tool Blanket	60,000	2023
NSP-Minnesota	A.0001575.203	Reliability/Performance Enhancement	HBC8C Turning Gear Repl-24726	58,787	2023
NSP-Minnesota	A.0001565.148	Reliability/Performance Enhancement	WLM2-Cooling Water Pump #2 VFD-2457	55,713	2023
NSP-Minnesota	A.0001575.051	Reliability/Performance Enhancement	HBC7C U7 CT Servo Replace 2	54,712	2023
NSP-Minnesota	A.0001574.417	Reliability/Performance Enhancement	SHC3C Bearing Fire Protect Pip	54,145	2023
NSP-Minnesota	A.0003000.669	Reliability/Performance Enhancement	HBC0C HB CC Tool Blanket	50,000	2023
NSP-Minnesota	A.0001574.313	Reliability/Performance Enhancement	SHC99-RR Return Track Crossing '23-	48,010	2023
NSP-Minnesota	A.0001575.172	Reliability/Performance Enhancement	HBC0 - Rmv & Rplc BFP Spare YR2 - 2	43,208	2023
NSP-Minnesota	A.0003000.661	Reliability/Performance Enhancement	BDS0C Tool Blanket	42,850	2023
NSP-Minnesota	A.0001574.826	Reliability/Performance Enhancement	SHC99-3 Plow Fdr Obsolete upgrade-2	41,818	2023
NSP-Minnesota	A.0001574.861	Reliability/Performance Enhancement	SHC99-Coal Barn CO Detection Proj-2	40,000	2023
NSP-Minnesota	A.0001574.860	Reliability/Performance Enhancement	SHC99-Replace Festoon Cable on #2 P	36,000	2023
NSP-Minnesota	A.0003000.372	Reliability/Performance Enhancement	SER-CSC-Purchase Forklift #2	35,985	2023
NSP-Minnesota	A.0001574.862	Reliability/Performance Enhancement	SHC99-Replace Plow Feeder Gearbox-2	33,333	2023
NSP-Minnesota	A.0003000.748	Renewable and New Generation	BS10-Blazing Star 1 Tools and Equip	30,000	2023
NSP-Minnesota	A.0003000.750	Renewable and New Generation	FTW0-Foxtail Tools and Equipment	30,000	2023
NSP-Minnesota	A.0001571.106	Reliability/Performance Enhancement	ANS0C Com Shop HVAC Repl-24743	29,825	2023
NSP-Minnesota	A.0001561.500	Reliability/Performance Enhancement	IVH Emergent Fund -Other prod	27,874	2023
NSP-Minnesota	A.0001562.193	Reliability/Performance Enhancement	REW0-#1 BFWP VFD-24605	27,716	2023
NSP-Minnesota	A.0001562.192	Reliability/Performance Enhancement	REW1-U1 OFA Fan VFD-24603	27,716	2023
NSP-Minnesota	A.0001559.500	Reliability/Performance Enhancement	BLL Emergent Fund -Other prod	27,320	2023
NSP-Minnesota	A.0003000.657	Reliability/Performance Enhancement	ANS0C Tools and Equip Ca	20,000	2023
NSP-Minnesota	A.0003000.659	Reliability/Performance Enhancement	BLL0C Tools Blanket	20,000	2023
NSP-Minnesota	A.0003000.672	Reliability/Performance Enhancement	IVH0C Misc tools and Equip	20,000	2023
NSP-Minnesota	A.0003000.676	Reliability/Performance Enhancement	NBLCo Misc Tools and Equi	20,000	2023
NSP-Minnesota	A.0001571.103	Reliability/Performance Enhancement	ANS4C LCI Bard Unit Repl-24740	18,241	2023
NSP-Minnesota	A.0001572.002	Reliability/Performance Enhancement	GMM0C-Investment Recovery Cap	17,672	2023
NSP-Minnesota	A.0001562.194	Reliability/Performance Enhancement	REW1-U1 FD Fan VFD-24610	17,633	2023
NSP-Minnesota	A.0003000.671	Reliability/Performance Enhancement	HNIC0 Misc Tools and Equ	15,000	2023
NSP-Minnesota	A.0003000.680	Reliability/Performance Enhancement	REW0C Tool Blanket	15,000	2023
NSP-Minnesota	A.0003000.697	Reliability/Performance Enhancement	SER-MMR- Misc Tools & Equip	15,000	2023
NSP-Minnesota	A.0001574.805	Reliability/Performance Enhancement	SHC0-Coal conveyor F.P. 20631	12,500	2023
NSP-Minnesota	A.0001565.147	Environmental Enhancement	WLM0-CEMS Room HVAC Replacement-245	10,000	2023
NSP-Minnesota	A.0003000.662	Renewable and New Generation	BRDR Small Tools Equip	10,000	2023
NSP-Minnesota	A.0003000.128	Renewable and New Generation	CWF Tools & Misc Equipment	10,000	2023
NSP-Minnesota	A.0003000.667	Renewable and New Generation	GDM0C Grand Mead Cap Tool	10,000	2023
NSP-Minnesota	A.0003000.678	Renewable and New Generation	PLV Tools Equip	10,000	2023
NSP-Minnesota	A.0001571.104	Reliability/Performance Enhancement	ANS4C PEECC Bard Unit Repl-24741	8,662	2023
NSP-Minnesota	A.0001707.012	Environmental Enhancement	DKR Dakota Range PCMM New-23576	8,000	2023
NSP-Minnesota	A.0001576.500	Reliability/Performance Enhancement	GDM Emergent Fund -Wind prod	7,002	2023
NSP-Minnesota	A.0001573.070	Reliability/Performance Enhancement	BDS5C U5 Ovation System Evergr	5,000	2023
NSP-Minnesota	A.0001579.072	Reliability/Performance Enhancement	RIV0C -- Replace Water Treamen	5,000	2023
NSP-Minnesota	A.0001571.102	Reliability/Performance Enhancement	ANS0C Clear Well Pump Repl-24742	4,583	2023
NSP-Minnesota	A.0001571.098	Reliability/Performance Enhancement	ANS0C PDC Bard Unit Repl-24736	2,917	2023
NSP-Minnesota	A.0003000.752	Renewable and New Generation	FBWO Freeborn Tools and Equipment	2,727	2023
NSP-Minnesota	A.0003000.751	Renewable and New Generation	LBW0-Lake Benton Tools-Equip	2,727	2023
NSP-Minnesota	A.0003000.757	Renewable and New Generation	MWF0 - Mowers Tools-Equip	2,727	2023
NSP-Minnesota	A.0001571.101	Reliability/Performance Enhancement	ANS4C PDC Bard Unit Repl-24739	2,042	2023
NSP-Minnesota	A.0001565.124	Environmental Enhancement	WLM2C Replace U2 Baghouse Bag	2,000	2023
NSP-Minnesota	A.0001574.190	Reliability/Performance Enhancement	SHC3C 2018 Small Project Routi	736	2023
NSP-Minnesota	A.0001571.100	Environmental Enhancement	ANS3C CEMS Bard Unit Repl-24738	708	2023
NSP-Minnesota	A.0001571.099	Environmental Enhancement	ANS2C CEMS Bard Unit Repl-24737	675	2023
NSP-Minnesota	A.0003000.749	Renewable and New Generation	CRW0-Crowned Ridge Tools-Equip	312	2023

Capital Additions: 2022-2024
($s)

Company	Project ID	New Grandparent	Project Name	YE Amt	Activity Year
NSP-Minnesota	A.0001564.500	Reliability/Performance Enhancement	St Anthony Falls Emergent -Other Pr	74	2023
NSP-Minnesota	A.0001574.174	Reliability/Performance Enhancement	SHCJC 2018 Small Project routi	5	2023
NSP-Minnesota	A.0001574.893	Renewable and New Generation	SHC Solar Generating Plant Phase 2	305,794,548	2024
NSP-Minnesota	A.0001575.194	Reliability/Performance Enhancement	HBC7 Hot Gas Path-24006	7,591,889	2024
NSP-Minnesota	A.0001579.147	Reliability/Performance Enhancement	RIV9 - Hot Gas Path - 23487	5,283,834	2024
NSP-Minnesota	A.0001559.121	Reliability/Performance Enhancement	BLL U7 Hot Gas Path-21337	5,245,647	2024
NSP-Minnesota	A.0001573.276	Reliability/Performance Enhancement	BDS0-Plant Flood Berm Hght to 720'-	4,014,834	2024
NSP-Minnesota	A.0001572.242	Environmental Enhancement	ASK1-Repl AQCS Baghouse Bags 2023-1	3,541,711	2024
NSP-Minnesota	A.0001575.202	Reliability/Performance Enhancement	HBC7C GT EXHAUST REPL-24689	3,409,792	2024
NSP-Minnesota	A.0001573.169	Reliability/Performance Enhancement	BDS0C Reverse Osmosis 2nd Ps (WTS)-	2,777,926	2024
NSP-Minnesota	A.0001573.226	Environmental Enhancement	BDS0 -BlackDog Rd Erosion Wall -232	2,717,905	2024
NSP-Minnesota	A.0001572.122	Environmental Enhancement	ASK1C- Replace SCR Catalyst 20	2,082,914	2024
NSP-Minnesota	A.0001573.500	Reliability/Performance Enhancement	BDS Emergent Fund -Other prod	2,001,401	2024
NSP-Minnesota	A.0001576.022	Renewable and New Generation	GDM Grand Meadow Repower	1,951,568	2024
NSP-Minnesota	A.0001579.500	Reliability/Performance Enhancement	RIV Emergent Fund -Other prod	1,815,745	2024
NSP-Minnesota	A.0001575.500	Reliability/Performance Enhancement	HBR Emergent Fund -Other prod	1,757,564	2024
NSP-Minnesota	A.0001574.268	Reliability/Performance Enhancement	SHC1C Emergent Projects	1,223,786	2024
NSP-Minnesota	A.0001574.198	Reliability/Performance Enhancement	SHCCC 2017 Emergent Work	842,467	2024
NSP-Minnesota	A.0001611.009	Renewable and New Generation	PVW0-Pleasant Valley Gearbox Replac	800,084	2024
NSP-Minnesota	A.0001580.007	Renewable and New Generation	CWF0-Courtenay Gearbox Replacement	748,673	2024
NSP-Minnesota	A.0001573.218	Environmental Enhancement	BDS5-Replace SCR catalyst-15648	708,282	2024
NSP-Minnesota	A.0001571.500	Reliability/Performance Enhancement	ANS Emergent Fund -Other prod	693,880	2024
NSP-Minnesota	A.0001565.150	Reliability/Performance Enhancement	WLM1-Replace U1 Turbine Blades-2461	600,886	2024
NSP-Minnesota	A.0001572.500	Reliability/Performance Enhancement	ASK Emergent Fund -Steam prod	534,677	2024
NSP-Minnesota	A.0001573.282	Reliability/Performance Enhancement	BDS0-Install liq cw chem treatment-	521,851	2024
NSP-Minnesota	A.0001572.239	Reliability/Performance Enhancement	ASK1-Main Station Battery Repl-2053	504,510	2024
NSP-Minnesota	A.0001580.008	Renewable and New Generation	CWF1-Generator Rplacments	490,889	2024
NSP-Minnesota	A.0001574.173	Reliability/Performance Enhancement	SHC3C Emergent work	479,238	2024
NSP-Minnesota	A.0001565.129	Reliability/Performance Enhancement	WLM1-Replace U1 Superhtr Bundle -12	469,458	2024
NSP-Minnesota	A.0001574.314	Reliability/Performance Enhancement	SHC1 -Turb Ctrl Vlv Internals 2024-	436,847	2024
NSP-Minnesota	A.0001565.119	Reliability/Performance Enhancement	WLM1C Replace U1 Boiler Tubes 2022	429,685	2024
NSP-Minnesota	A.0001562.500	Reliability/Performance Enhancement	REW Emergent Fund -Steam prod	405,698	2024
NSP-Minnesota	A.0001565.081	Reliability/Performance Enhancement	WLM2C Repl U2 Boiler Tubes 201	405,684	2024
NSP-Minnesota	A.0001565.500	Reliability/Performance Enhancement	WLM Emergent Fund -Steam prod	397,748	2024
NSP-Minnesota	A.0001565.037	Reliability/Performance Enhancement	WLM1C Replace U1 Rear Wall	378,958	2024
NSP-Minnesota	A.0001611.010	Renewable and New Generation	PVW1-Generator Replacements	365,626	2024
NSP-Minnesota	A.0001574.315	Reliability/Performance Enhancement	SHC1 -Level 2 Mill OH 2024 Spring -	356,675	2024
NSP-Minnesota	A.0001565.160	Reliability/Performance Enhancement	WLM1New Unit 1 ID Fan Motor and VFD	354,464	2024
NSP-Minnesota	A.0001574.574	Reliability/Performance Enhancement	SHC1 -U1 Level 2 Mill OH 2024 Fall-	353,600	2024
NSP-Minnesota	A.0001572.152	Reliability/Performance Enhancement	ASK1-480V Plant Swgr Bus 3-4 R	334,133	2024
NSP-Minnesota	A.0001574.316	Reliability/Performance Enhancement	SHC3 -Level 2 Mill OH 2024 Spring -	330,689	2024
NSP-Minnesota	A.0001572.243	Reliability/Performance Enhancement	ASK1-480V Plant Swgr Bus 5-6 Repl-1	303,515	2024
NSP-Minnesota	A.0001572.222	Reliability/Performance Enhancement	ASK99C 480V Coal Yrd Swgr Bus3-4 Rp	289,636	2024
NSP-Minnesota	A.0001574.418	Reliability/Performance Enhancement	SHC3C ID Fan Building Roof Rep	289,384	2024
NSP-Minnesota	A.0001574.252	Reliability/Performance Enhancement	SHC99 Emergent work	277,941	2024
NSP-Minnesota	A.0001561.500	Reliability/Performance Enhancement	IVH Emergent Fund -Other prod	265,909	2024
NSP-Minnesota	A.0001565.133	Reliability/Performance Enhancement	WLM1 Turbine Electronic Overspeed-2	251,968	2024
NSP-Minnesota	A.0001579.076	Reliability/Performance Enhancement	RIV0C -- Upgrade Emerg Warning	249,388	2024
NSP-Minnesota	A.0003000.698	Reliability/Performance Enhancement	SER-CHM-Misc Tools-MN	235,900	2024
NSP-Minnesota	A.0001573.283	Reliability/Performance Enhancement	BDS0-Install Security Badge Readers	225,440	2024
NSP-Minnesota	A.0001566.168	Renewable and New Generation	NBL0 - Gearbox Replacements	219,866	2024
NSP-Minnesota	A.0001575.094	Reliability/Performance Enhancement	HBC0C Plant Instrum M&D	209,824	2024
NSP-Minnesota	A.0001573.050	Reliability/Performance Enhancement	BDS5C U5 HRSG Steam Drain Sys	207,189	2024
NSP-Minnesota	A.0003000.682	Reliability/Performance Enhancement	SHCJC Tools and Equip pur	200,000	2024
NSP-Minnesota	A.0001571.108	Environmental Enhancement	ANS0C CEMS Upgrade Project-24693	198,719	2024
NSP-Minnesota	A.0001559.500	Reliability/Performance Enhancement	BLL Emergent Fund -Other prod	185,817	2024
NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	180,000	2024
NSP-Minnesota	A.0001579.159	Reliability/Performance Enhancement	RIV10-Replace U10 CT Inlet Filters-	178,556	2024
NSP-Minnesota	A.0001611.011	Renewable and New Generation	PVW1-Transformer Replacements	169,838	2024
NSP-Minnesota	A.0001580.009	Renewable and New Generation	CWF1-Transformer Replacements	169,809	2024
NSP-Minnesota	A.0001574.837	Reliability/Performance Enhancement	SHC1-12 Boiler Feed Pump-24003	163,767	2024
NSP-Minnesota	A.0001559.116	Reliability/Performance Enhancement	BLL8-U8 Turning Gear Repl-24221	163,151	2024
NSP-Minnesota	A.0001571.021	Reliability/Performance Enhancement	ANS0-C-Upgrade U2 3 Protect. R	160,304	2024
NSP-Minnesota	A.0001559.117	Reliability/Performance Enhancement	BLL7-U7 Turning Gear Repl-24220	153,470	2024
NSP-Minnesota	A.0001573.231	Reliability/Performance Enhancement	BDS2 -Ovhl #21 Circ Water Pump -236	152,861	2024
NSP-Minnesota	A.0001579.172	Reliability/Performance Enhancement	RIV10-Rpl Evap Cooler Media 2024-22	152,861	2024
NSP-Minnesota	A.0003000.658	Reliability/Performance Enhancement	ASK0C- Tool Blanket	150,000	2024
NSP-Minnesota	A.0003000.697	Reliability/Performance Enhancement	SER-MMR- Misc Tools & Equip	148,000	2024
NSP-Minnesota	A.0001562.034	Reliability/Performance Enhancement	REW0C BOILER BLDG ROOF REPL	135,776	2024
NSP-Minnesota	A.0001565.130	Reliability/Performance Enhancement	WLM2-Replace U2 Lower Air Htr-12354	133,009	2024
NSP-Minnesota	A.0001565.127	Reliability/Performance Enhancement	WLM1-Replace U1 Lower Air Htr-12315	131,913	2024
NSP-Minnesota	A.0001565.123	Reliability/Performance Enhancement	WLM2C Replace U2 B22 Screw Auger 20	131,170	2024
NSP-Minnesota	A.0001565.153	Reliability/Performance Enhancement	WLM1-New VFD for Unit 1 OFA Fan Mot	131,138	2024
NSP-Minnesota	A.0001565.158	Reliability/Performance Enhancement	WLM1-New Unit 1 FD Fan motor and VF	121,673	2024
NSP-Minnesota	A.0001565.156	Reliability/Performance Enhancement	WLM0-New Motor and VFD for #1 BFP-2	121,668	2024
NSP-Minnesota	A.0001565.154	Reliability/Performance Enhancement	WLM0-New Motor and VFD for #3 BFP-2	121,668	2024
NSP-Minnesota	A.0001565.168	Reliability/Performance Enhancement	WLM99-Replace Distribution Conveyor	121,476	2024
NSP-Minnesota	A.0001701.021	Environmental Enhancement	BS1-Blazing Star 1 ETP 23578-New	111,166	2024
NSP-Minnesota	A.0001574.571	Reliability/Performance Enhancement	SHC99 -CESP-2024 #1 CC Rotor Asmbl-	106,263	2024
NSP-Minnesota	A.0001571.093	Reliability/Performance Enhancement	ANS0 - Replace UPS Battery - 16602	100,370	2024
NSP-Minnesota	A.0003000.699	Reliability/Performance Enhancement	SER-SMC-Misc Tools & Equipment	100,000	2024

Capital Additions: 2022-2024
($s)

Company	Project ID	New Grandparent	Project Name	YE Amt	Activity Year
NSP-Minnesota	A.0001576.006	Renewable and New Generation	GDM0C Generator Replacements 2	98,268	2024
NSP-Minnesota	A.0001576.005	Renewable and New Generation	GDM0 - Gearbox replacements	98,088	2024
NSP-Minnesota	A.0001702.017	Environmental Enhancement	BS2 Eagle Take Permit New-23579	92,800	2024
NSP-Minnesota	A.0001573.229	Reliability/Performance Enhancement	BDS0 - Rplc #41 Screen Wash Pump -	91,717	2024
NSP-Minnesota	A.0001571.092	Reliability/Performance Enhancement	ANS0 - Replace Well Piping - 10342	85,150	2024
NSP-Minnesota	A.0003000.679	Reliability/Performance Enhancement	RIV0C-Tool Blanket	60,000	2024
NSP-Minnesota	A.0001572.165	Reliability/Performance Enhancement	ASK1 - Replace Sootblower 2024	55,955	2024
NSP-Minnesota	A.0001562.196	Reliability/Performance Enhancement	REW0-Security Cameras-24657	52,851	2024
NSP-Minnesota	A.0003000.669	Reliability/Performance Enhancement	HBC0C HB CC Tool Blanket	50,000	2024
NSP-Minnesota	A.0001575.173	Reliability/Performance Enhancement	HBC0 - Rmv & Rplc BFP Spare YR3 - 2	46,026	2024
NSP-Minnesota	A.0003000.661	Reliability/Performance Enhancement	BDS0C Tool Blanket	42,850	2024
NSP-Minnesota	A.0001562.159	Reliability/Performance Enhancement	REW0 Repl 40% CW internals-22045	40,472	2024
NSP-Minnesota	A.0001572.246	Reliability/Performance Enhancement	ASK1-Protective Relay Upgrades-2423	31,927	2024
NSP-Minnesota	A.0003000.748	Renewable and New Generation	BS10-Blazing Star 1 Tools and Equip	30,000	2024
NSP-Minnesota	A.0003000.750	Renewable and New Generation	FTW0-Foxtail Tools and Equipment	30,000	2024
NSP-Minnesota	A.0003000.685	Reliability/Performance Enhancement	WLM0C Tools & Equipment B	30,000	2024
NSP-Minnesota	A.0001573.217	Reliability/Performance Enhancement	BDS0-Repl Discharge Gate Comm Ctrl	28,417	2024
NSP-Minnesota	A.0001562.186	Reliability/Performance Enhancement	REW2-U2 OFA Fan VFD-24602	27,719	2024
NSP-Minnesota	A.0001565.146	Reliability/Performance Enhancement	WLM1-Unit 1 Drip Tank Motor VFD-245	21,231	2024
NSP-Minnesota	A.0001565.149	Reliability/Performance Enhancement	WLM2-Unit 2 Drip Tank Motor VFD-245	21,231	2024
NSP-Minnesota	A.0003000.657	Reliability/Performance Enhancement	ANS0C Tools and Equip Ca	20,000	2024
NSP-Minnesota	A.0003000.659	Reliability/Performance Enhancement	BLL0C Tools Blanket	20,000	2024
NSP-Minnesota	A.0003000.672	Reliability/Performance Enhancement	IVH0C Misc tools and Equip	20,000	2024
NSP-Minnesota	A.0003000.676	Reliability/Performance Enhancement	NBLCo Misc Tools and Equi	20,000	2024
NSP-Minnesota	A.0001562.195	Reliability/Performance Enhancement	REW2-U2 FD Fan VFD-24611	17,635	2024
NSP-Minnesota	A.0003000.671	Reliability/Performance Enhancement	HNIC0 Misc Tools and Equ	15,000	2024
NSP-Minnesota	A.0003000.680	Reliability/Performance Enhancement	REW0C Tool Blanket	15,000	2024
NSP-Minnesota	A.0003000.662	Renewable and New Generation	BRDR Small Tools Equip	10,000	2024
NSP-Minnesota	A.0003000.128	Renewable and New Generation	CWF Tools & Misc Equipment	10,000	2024
NSP-Minnesota	A.0003000.667	Renewable and New Generation	GDM0C Grand Mead Cap Tool	10,000	2024
NSP-Minnesota	A.0003000.678	Renewable and New Generation	PLV Tools Equip	10,000	2024
NSP-Minnesota	A.0001574.677	Reliability/Performance Enhancement	SHC3C Air Comp Controls Replace	8,604	2024
NSP-Minnesota	A.0001574.269	Reliability/Performance Enhancement	SHC2C Emergent Projects	7,687	2024
NSP-Minnesota	A.0001574.847	Reliability/Performance Enhancement	SHC3-LFLeachate Truck FIll Station-	6,146	2024
NSP-Minnesota	A.0001571.106	Reliability/Performance Enhancement	ANS0C Com Shop HVAC Repl-24743	5,833	2024
NSP-Minnesota	A.0001579.156	Reliability/Performance Enhancement	RIV0-Replace Obsolete EDG Controls-	5,077	2024
NSP-Minnesota	A.0001565.083	Environmental Enhancement	WLM0-Cap WLM Landfill Cells 8, 9, 1	3,000	2024
NSP-Minnesota	A.0001576.500	Reliability/Performance Enhancement	GDM Emergent Fund -Wind prod	758	2024
NSP-Minnesota	A.0001574.190	Reliability/Performance Enhancement	SHC3C 2018 Small Project Routi	80	2024
NSP-Minnesota	A.0003000.372	Reliability/Performance Enhancement	SER-CSC-Purchase Forklift #2	15	2024
NSP-Minnesota	A.0001564.500	Reliability/Performance Enhancement	St Anthony Falls Emergent -Other Pr	8	2024
NSP-Minnesota	A.0001574.174	Reliability/Performance Enhancement	SHCJC 2018 Small Project routi	1	2024

Company	Project ID	New Grandparent	Project Name	YE Amt ($s)	Activity Year	Project Description	Project Justification
NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001742.001	Renewable and New Generation	NRW North Wind Farms - Viking	162,087,915	2022	The Northern Wind Project is a Build, Own, Transfer (BOT) project between Xcel Energy and ALLETE Clean Energy (ACE) also known as ACE Mid-west Holdings LLC. ACE currently owns the projects and will manage the reconstruction of a new 80% Production Tax Credit (PTC) eligible wind farm. Xcel Energy will purchase and operate the site following construction. The Norther Wind Project consists of repowering two (2) existing wind sites comprised of the Chanarambie (85.5 Mega-Watt (MW)) and Viking (12MW) projects, along with the adjacent Rock Aetna (20MW) green-field wind project, all located in southwest Minnesota along the Buffalo Ridge. Chanarambie and Viking II wind farms are currently under a Power Purchase Agreement (PPA) with Northern States Power (NSP) and Rock Aetna is known as the expansion project pursuant to the Purchase and Sales Agreement (PSA) executed by the companies on February 4, 2021. The Northern Wind Project will update the existing generation with new technology providing up to 120 megawatts of power	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001742.003	Renewable and New Generation	NRW North Wind Farms - Rock Aetna	37,336,113	2022	The Northern Wind Project is a Build, Own, Transfer (BOT) project between Xcel Energy and ALLETE Clean Energy (ACE) also known as ACE Mid-west Holdings LLC. ACE currently owns the projects and will manage the reconstruction of a new 80% Production Tax Credit (PTC) eligible wind farm. Xcel Energy will purchase and operate the site following construction.□ □ The Norther Wind Project consists of repowering two (2) existing wind sites comprised of the Chanarambie (85.5 Mega-Watt (MW)) and Viking (12MW) projects, along with the adjacent Rock Aetna (20MW) green-field wind project, all located in southwest Minnesota along the Buffalo Ridge. Chanarambie and Viking II wind farms are currently under a Power Purchase Agreement (PPA) with Northern States Power (NSP) and Rock Aetna is known as the expansion project pursuant to the Purchase and Sales Agreement (PSA) executed by the companies on February 4, 2021. The Northern Wind Project will update the existing generation with new technology providing up to 120 megawatts of power	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001742.002	Renewable and New Generation	NRW North Wind Farms - Chanarambie	24,145,510	2022	The Northern Wind Project is a Build, Own, Transfer (BOT) project between Xcel Energy and ALLETE Clean Energy (ACE) also known as ACE Mid-west Holdings LLC. ACE currently owns the projects and will manage the reconstruction of a new 80% Production Tax Credit (PTC) eligible wind farm. Xcel Energy will purchase and operate the site following construction.□ □ The Norther Wind Project consists of repowering two (2) existing wind sites comprised of the Chanarambie (85.5 Mega-Watt (MW)) and Viking (12MW) projects, along with the adjacent Rock Aetna (20MW) green-field wind project, all located in southwest Minnesota along the Buffalo Ridge. Chanarambie and Viking II wind farms are currently under a Power Purchase Agreement (PPA) with Northern States Power (NSP) and Rock Aetna is known as the expansion project pursuant to the Purchase and Sales Agreement (PSA) executed by the companies on February 4, 2021. The Northern Wind Project will update the existing generation with new technology providing up to 120 megawatts of power	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001573.224	Reliability/Performance Enhancement	BDS5 - Ovhl U5 Hot Gas Path - 22403	11,217,821	2022	Parts and labor to perform a Hot Gas Path overhaul. Parts purchased include one full set of CI parts (support housings, pilot nozzles, combustor baskets, transitions, and transition seals) and one full set (ring segments, vanes, and blades for turbine rows 1 - 3). The row 4 components shall also be included since they will be at the OEM limit for fired hours.	Per OEM requirements, scheduled outages must occur within 25,000 operating hours. Parts replacement is required to maintain unit reliability and avoid catastrophic equipment damage and extensive outage time and repair costs.
NSP-Minnesota	A.0001571.090	Reliability/Performance Enhancement	ANS4 - U4 Hot Gas Path - 10341	4,828,319	2022	Hot gas path inspection for U4 at Angus Anson. The project includes replacement of the following standard□ hot gas path parts per the PSM parts contract; transitions, liners, liner end caps, fuel nozzle assemblies,□ stage 1 buckets/nozzles/shroud blocks, stage 2 buckets/shroud blocks. The project also includes□ replacing the R0 (1st stage) compressor blades to mitigate a design issue with the OEM blades. The exhaust frame flex seals will be replaced with a set of Inconnel seals.	The HGP inspection is required at 24,000 operating hours or 900 starts per the OEM and the PSM parts□ contract.

Company	Project ID	New Grandparent	Project Name	YE Amt ($s)	Activity Year	Project Description	Project Justification
NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001579.072	Reliability/Performance Enhancement	RIV0C -- Replace Water Treamen	2,707,890	2022	Design, permit, fabricate, and install one new Reverse Osmosis (RO) Water Treatment System located In the approximate area of the existing equipment so that a new building and related infrastructure is not required. This is a scope reduction to the original project which included relocation of the new equipment to a new building which would require additional infrastructure such as electrical switchgear and additional piping, control wiring, HVAC fire protection, etc. That project was estimated at 3.7 million dollars, and would be too expensive to justify in Sharps. □ □ The revised scope it to replace the two existing RO's installed in 2000 and 2011 with two new RO's for a 2 pass system, or one two pass RO. The location of the new equipment is to be in the same or general area of the existing equipment to make use of the existing electrical and piping infrastructure - including location in an existing building. The new location can also utilize the Ovation system control cabinet - intertie that was originally installed to support the retired demineralizer system, but never used. The new system is sized for 1 x 90GPM nominal. 1st pass RO, 2nd pass RO, Electrodeionization (EDI) Skid, Clean-In-Place (CIP), Mixed Bed Polisher, and Chemical Feed systems. The new system will remove CO2 with either a membrane separator system, or a caustic feed system. The new system will be operated from a PLC to allow for future vendor interface. The only function from the maint control room is start/stop capability.□ □ There is now removal activities associated with this project. The new install cost is estimated at 2.35 million and removal at $175,000 for a total new installation estimated cost of 2.55 million, or a reduction of approximately 1.2 million from the original scope and estimate.	The present plant water treatment systems are a significant Operations and Maintenance burden. As plant staff is adjusted (reduced) to planned permanent levels there will not be resources available to devote to high maintenance ancillary (non-core) plant equipment.□ □ By the year 2021, the existing 1st pass RO, controls, pressure vessels, ancillary equipment, etc. will be 20 years old, and the existing 2nd pass RO will be 10 years old. The membranes will be in need of replacing - and the system will be operating at a significantly higher cost than necessary due to the lack of a CDI - deionizer system for the necessary condensate polishing. It would not be advised to update the old and antiquated system with a new CDI system addition since the controls, valves, transmitters, and operator interface equipment the existing equipment relies on is all past end of life and likely of multiple failures each year that risk availability of the generating plant due to loss of water production capability. A new 90 gpm system is recommended to be installed prior to 2022. □ □ □ The new estimate of 2.525 million dollars is what should be used as an estimate based on the 2019 revised scope recommendation.
NSP-Minnesota	A.0001573.212	Reliability/Performance Enhancement	BDS2C-Replace U2 Turbine L-0 Blades	2,426,503	2022	This project would entail the full replacement of the last row of LP turbine blading (L-0) in Unit 2. This activity should be performed during a major turbine overhaul when the unit is disassembled for inspection. This work will require rotor removal, and it should be sent to a qualified facility for machining and NDE, as well as high-speed balancing.	The current L-0 blades were installed in 1987 and will have 30+ years of operation during the next steam turbine major overhaul. These blades typically have a life expectancy of between 20-40 years, or 160,000 - 320,000 EOH, depending on operating conditions. This unit is more susceptible to water droplet erosion because of the lower main steam temperature than design, especially during winter months. Cycling duty will also decrease life expectancy by increasing fatigue and thermal stresses on the turbine, possibly necessitating replacement earlier in the life expectancy range. Recent inspections on these blades have shown evidence of more rapid moisture erosion than would be expected with this operating history, which may warrant replacement during the next major overhaul, but these blades should be re-inspected before the overhaul do determine if this project can be deferred to a future overhaul. Failure of these blades would result in a significant unplanned outage to repair or replace.
NSP-Minnesota	A.0001705.001	Renewable and New Generation	CRW G100-Crowned Ridge BOT Wind Far	2,400,000	2022	Purchase a 200MW Wind Farm from NextEra near Watertown, SD. The wind farm will consist of 73 GE 2.3-116 90HH and 15 GE 2.1 -116 80HH wind turbine generators, a collection system, Operations and Maintenance building, access roads, collector substation, and a transmission interconnection line.	Qualifies for a Federal Production Tax Credit (PTC).
NSP-Minnesota	A.0001579.500	Reliability/Performance Enhancement	RIV Emergent Fund -Other prod	2,192,277	2022	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001561.030	Reliability/Performance Enhancement	IVH3C Turbine Controls	2,162,144	2022	Replace the existing obsolete GE Fanuc turbine controls and integrated balance of plant controls with a modern control system including new microprocessors, HMI's, monitors, historian, EMS-SCADA interface, network switches, dual redundant network, data links, etc. The new turbine control system is planned to be similar to sister Wheaton Units 1-4. The new controls will include overspeed integration including 4 active speed probes similar to Wheaton. The project also includes modifying the fuel oil controls with position feedback. This project includes upgrading the vibration monitoring with Bently Nevada equipment rather than the equipment provided by Emerson as was done for the Wheaton plant.□ □ For transmission system requirements, new controls will be installed 2 units at a time, thereby maintaining 4 units available for operation. This is a 3 year project starting in 2019 and ending in 2021.	The existing control system is obsolete and not supported by the manufacturer. Spare parts are difficult to find and costly to procure when located. The NSP fleet control systems are being standardized on Emerson Ovation to improve operations, maintainability, reliability, and availability.
NSP-Minnesota	A.0001573.500	Reliability/Performance Enhancement	BDS Emergent Fund -Other prod	2,057,485	2022	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001574.087	Environmental Enhancement	SHC3C U3 Landfill Cell 4 2019	1,947,740	2022	SHC0612 - Construct 24 acre, GCL/HDPE composite lined, cell located West of Cell 3. Project includes an additional sump pump station, extension of fence and permitting (renewal for cell 4 and inclusion of cell 5). Engineering for permit renewal begins spring 2015 with application submittal by Oct 2015 and approval by Oct 2016.□ UPDATE 130220: The renewal of the existing permit will be submitted October 2013 and will include Cell 4 and Cell 5. Due to the Unit 3 shutdown, the schedule for construction of Cell 4 may be adjusted when more information becomes available regarding the start-up of the unit.□ UPDATE170102: In process of evaluating the construction to be South of Cell 3, instead of West of Cell 3. The project schedule and costs are not expected to change because of the location.□ UPDATE 200220:	The new cell is necessary for the continued disposal of AQCS ash from Sherco U3 and as backup disposal for King Fly Ash. Cell 4 design was approved by MPCA in current permit. Ash generation and utilization is assumed to continue at present rates.□ UPDATE170118: Due to budget constraints in 2020, moved project up one year to 2019 construction.□ UPDATE 171114: Ash generation rates still suggest capacity will not be needed until mid-2021, but 2020 budget constraints resulted in moving construction up to 2019.
NSP-Minnesota	A.0001559.048	Reliability/Performance Enhancement	BLL8C-CESP GSU 171-227 MVA 18-115kV	1,864,903	2022	Obtain a Capital Emergency Spare Generator Step Up (GSU) Transformer suitable for use at Angus Anson 4, Black Dog 5, Blue Lake 7 & 8, High Bridge 7 & 8, Riverside 9 & 10. Scope to include GSU, accessories, and preparation of layup location. □ □ Pending final estimate, following are the approximate costs:□ $1,650,000 for Xfmr Delivered□ $ 150,000 transformer containment (Design/Build)□ $ 75,000 E&C support□ $ 25,000 Plant Support□ $ 50,000 Acceptance testing and lay-up Maple Grove□ $ 10,000 Crane Rental□ Numbers based off of Black Dog 6 Project input.	Lead time on these transformers can range from 12-18 months. We consumed our SPARE from the retirement of Black Dog Unit 4 when a fault occurred in the Angus Anson 4 transformer. Having the transformer on hand greatly reduces the potential down time of a generating asset. The transformers for these units are equivalent to one another from an MVA, Voltage and Bushing arrangement to support this.
NSP-Minnesota	A.0001565.124	Environmental Enhancement	WLM2C Replace U2 Baghouse Bag	1,562,338	2022	Replace six modules (1260 total) of baghouse bags and cages. This project would also include a series of mechanical work to the baghouse modules including replacement of the bottom hoppers, patching of the walls at the tops of the modules above and below the tubesheet, replacement of electrical wiring, sand-blasting the inside of the module and coating it with an anti-corrosive coating, re-tinning and re-insulating the modules, etc.	Permit required to meet opacity standards. Bags are on a five year frequency to be changed out. The bags were on a six plus year changeout in the past but it was determined that changing out the bags more frequently saves on material loss on boiler tubes. It has been determined that after five years the bags begin to blind/plug and no longer allow enough air flow to operate the units at their full potential. Because of the plugged bags the air flow through the unit is decreased causing a high differential pressure reducing load capability and allowing the flue gas to consume more of the tube material throughout the boiler. Whenever change outs of bags and cages occur, there are always areas found that are in need of repair. The plant has observed severe thinning in some areas of the conical hoppers at the bottom of the baghouse modules. Some areas have gotten so bad that weldments have fallen off. Because of the age of the baghouse modules and the amount of welded repairs that have been performed in the past, the plant is running out of the necessary amount of true base material to continue performing these sorts of weld repairs for much longer. By taking the opportunity to replace conical hoppers and then coating them with a suitable anti-corrosion coating this will lessen the amount of mechanical work necessary in future years and help reduce or eliminate the amount of tramp air seeping into the modules.
NSP-Minnesota	A.0001575.500	Reliability/Performance Enhancement	HBR Emergent Fund -Other prod	1,463,129	2022	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001591.007	Reliability/Performance Enhancement	-12186 ANS4C U4 Repl Mark V Cn	1,396,081	2022	Replace Mark V Control System. This includes microprocessors, HMI's, I/O Boards, and Power Supplies.	System is no longer supported by GE. Parts are obsolete. Running on Windows 2000. Installed at plant in 2004. (These were 2001 CT's.)
NSP-Minnesota	A.0001574.848	Reliability/Performance Enhancement	SHC99-New RPF on 53 conv-24287	1,354,283	2022	Install a new Drop In Rotary Plow Feeder (RPF) on 53 conv in the bottom of the coal barn. New unit to be complete with hydraulic power unit, electrical components with more operator feedback like feedrate, and position along the rails. New unit will have a remote PLC to allow much of the current festoon cable to be eliminated, allowing the re-use of the festoon cables.	Safety - We have Feeders that are 35 years old, and have obsolescence problems. Due to the age of the equipment, it is not as reliable as it once used to be. We need a reliable way to be able to remove the coal from the barn so it does not start any fires.

Company	Project ID	New Grandparent	Project Name	YE Amt ($s)	Activity Year	Project Description	Project Justification
NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001710.001	Reliability/Performance Enhancement	NSPM APM Digital Asset Modeling	1,339,492	2022	The project includes the labor and contractor expense to design, develop, and implement a software model development program of new digital assets in the form of software models for Energy Supply physical assets. The project creates new digital asset models that are utilized to simulate equipment condition, monitor equipment, quantify operational risk and prioritize maintenance. This would include the creation of an asset criticality database as the foundation for model development in Asset Performance Management Software (new capital software installation) and digital twin models for wind turbines and thermal generation equipment (digital model replication of physical asset). Development of the asset criticality database for utilization in the digital models requires a specific value and classification be assigned to each asset within the project scope to rank the impact a failure of the asset would have on business priorities (safety, regulatory, reliability, flexibility, efficiency and financial). This will include internal plant labor and contractor facilitation support to ensure accuracy and consistency and also to accelerate the timeline. The wind model creation includes the internal labor to build, tune and configure predictive analytics models in the GE Smart Signal application that has been purchased for new wind farms.	These models are long term assets for the company that are tools utilized to transform maintenance practices and manage risk, cost and performance of equipment. The development of the asset criticality database is foundational for Asset Performance Management methodologies and is essential in order to shift to risk based decision making. Information gathered throughout this process will be used in software models to optimize maintenance strategies/decisions as well as provide significant value related to work management (daily/weekly work prioritization, inventory/spares, backlog prioritization). In addition, this data will assist with strategically prioritizing future instrumentation and technology expansion. Finally, data from Asset Criticality will be used for project/overhaul justification and prioritization as well as provide risk communication in the event of budget/scope reductions. Building, configuring and tuning models for the new wind site GE Smart Signal applications are required to gain the predictive analytics functionality of the software and remote monitoring capability from the M&D Center. The software model build and development for each turbine is required to utilize the functionality of the software. The initial model creation and configuration for the new software is part of the capital expansion, and M&D O&M labor expense will be reduced by the same amount.
NSP-Minnesota	A.0001562.038	Environmental Enhancement	REW0 - EPA 316b-Traveling Screens -	1,297,511	2022	Screen house intake traveling screen modification. The new screens will include a fish handling and return system with sufficient water flow to avoid harming the fish flowing back into the source water. The design may include dual flow screens with smooth mesh to continuously protect fish from descaling or rotary screens with a low pressure vacuum return to remove fish prior to any high pressure sprays that may otherwise harm the creatures.	This is a mandated environmental project by the MPCA to ensure we are compliant with EPA regulation 316(b) of the Clean Water Act. Section 316(b) requires that National Pollutant Discharge Elimination System permits be obtained by any facility that contains a cooling water intake structure to ensure that the engineering design of the structure minimizes harmful impacts on the environment.
NSP-Minnesota	A.0001573.070	Reliability/Performance Enhancement	BDS5C U5 Ovation System Evergr	1,210,450	2022	This project is to replace the Black Dog Unit 5/2 Ovation System Hardware and Software.	Project is required to maintain the plant ahead of the digital asset obsolescence curve. This also enhances compliance with regulatory/security requirements. The project is based on replacing critical plant control system hardware/software components on a five-year cycle. There is Fleet goal/expectation that all units utilizing similar control systems vendors be at similar and current hardware/software revision. This keeps the plant in compliance with Cyber Infrastructure Protection (CIP) anti-virus requirements. There is difficulty with older systems in procuring replacement parts, finding good field service support, and meeting current cyber asset security requirements. Replacement of plant control system hardware is necessary to ensure that the equipment will continue to operate reliably, safely, and in compliance with environmental requirements. This Control System is responsible for controlling and monitoring most of the plant equipment, and failure could lead to significant equipment damage, environmental compliance issues and extended outages.
NSP-Minnesota	A.0001573.281	Reliability/Performance Enhancement	BDS0-480V Load Centers Repl -17548	1,149,107	2022	Low voltage load centers 101, 102 and 103 are in need of replacement due to age and parts availability. They are 1950s and 1960s vintage equipment and have energized bus exposed when racking equipment and from below.□ □ This project has four main goals to complete. □ The primary goal is to disassemble and remove the existing SUS 101, 102 and the attached 11/12LT Load Center, then purchase and replace with a new 480VAC (101, 102) load center with a TIE breaker and a new 11/12 208V lighting load center. NOTE: Depending on the size of the new switch gear, a new location within the plant would need to determined with the plant.□ □ The second goal is to replace all incoming and if required any outgoing cables from the existing 101, 102, 11LTG, and 12LTG transformers. Install as required new cable trays, conduits and junction boxes for short out going load cables. Also install any new area lighting as required.□ □ The third goal is to purchase a new remote drop Emerson DCS equipment, including modules, and commissioning and programming services for communication and control of the load centers. And then install and commission the new load centers which will allow remote auto control from the main operators control room.□ □ the fourth goal is to purchase and install a high resistance ground system (HRG) for the new 480VAC load center gear. Alarm communication through the DCS.□ □ This project is to be coordinated with the timing of the Spring of 2019	Failure of load center 102 would result in loss of power to the screen house for an extended period, requiring shutdown of all units.It would also result in loss of power to battery charger #11. Loss of load center 101 would result in loss of power to battery charger #12 and air compressor #5. Loss of load center 103 would result in loss of power to auxiliary transformer 31 and 41 cooling fans and the alternate power supply to GSU 4 transformer cooling fans.□ □ There is also a safety concern related to the exposed bus on the switchgear.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001573.184	Reliability/Performance Enhancement	BDS2C Automated Trap Bypass Valves	1,148,819	2022	Installation of automated bypass valves of existing steam traps off the HP steam, LP steam, gland steam, extraction steam, and turbine drain systems to ensure condensate is removed from these systems during startup, operation, and shutdown. This includes new valves, piping, thermocouples, instrumentation, wiring, and controls to perform the project. Valves will be tied into Ovation BOP controls and function in automatic and manual per operator input. Valves will have position feedback to the DCS to ensure they are functional.	These bypass valves are currently manually operated globe valves which are in need of replacement due to age and recent failures. These valves currently require operations to manually open and close these valves during each startup and shutdown. Black Dog cycles 50 - 100 times per year and is forecasted to increase operation in the future. These bypasses are critical for ensuring that condensate is drained from steam lines to prevent turbine water induction and other operational issues which could cause significant equipment damage and extended forced outages. Frequent manual operation of these valves is prone to operator error which could have significant consequences. These drain lines have also had a history of pluggage due to iron oxide which would be identified by the instrumentation of this project so corrective actions could be performed, and will also indicate when steam trap maintenance is required.
NSP-Minnesota	A.0001559.006	Reliability/Performance Enhancement	BLLC7 U7 Exhaust Silencer Repl	1,059,805	2022	Replace silencer on Unit 7 CT exhaust stack.	The panels are used to reduce the noise levels coming out the stack of the CT. The panels are melting and breaking up. They are made with a stainless steal the can not standup to the higher temperature of a GE 7FA CT.
NSP-Minnesota	A.0001573.205	Reliability/Performance Enhancement	BDS0C-Replace Fire Protection Panel	969,740	2022	Replace obsolete Fire Protection Panels and instruments in the Plant Dog Power Plant.	A number of the fire protection system panels in service at the Black Dog are obsolete, no longer supported by the manufacturer or our approved Fire Protection Services vendors. There have been several component failures in recent years, it is possible that future component failures could result in significant parts availability issues. The panels would be replaced with supported equipment.□ □ In addition to the obsolescence issue, newer panels would have self-monitoring capabilities that the existing panels lack, resulting in a better protecting system.
NSP-Minnesota	A.0001573.056	Reliability/Performance Enhancement	BDS2C U2 LP Steam to Crossover	961,302	2022	Installation of new piping to route the existing LP Steam supply to the crossover pipe. This includes materials and labor for new 10" piping, insulation, valves, drip legs, instrumentation, electrical, and controls to complete the project.	The existing configuration of the LP Steam system supplies steam to Unit 2 DA for deaeration purposes and supplies steam to row 32 of the HP turbine for injection into the steam turbine for power generation. The row 32 admission line connects to a re-purposed extraction nozzle but there have been historical issues and concerns with admitting LP Steam to the HP turbine in that location. During the 2010 turbine overhaul, it was discovered that the row 32 blades had experienced plastic deformation and other damage which required the entire row of blades to be replaced at that time. At that time, Siemens performed an internal study and recommended that injection into the extraction line be discontinued. Since then, the plant has operated mostly with the LP Steam admission system out of service because it is believed that this system was the primary cause of the damage. This project would re-route the LP Steam supply to the LP Crossover pipe to restore approximately 3 - 4 MWs to the unit which are currently being lost because the admission system is out of service. This project would not increase the NDC capacity of the unit, rather the additional load could be achieved without requiring duct burner operation at a significant heat rate penalty.
NSP-Minnesota	A.0001559.124	Environmental Enhancement	BLL7C CEMS CDM AutoTune-25046	956,005	2022	Installation of CEMS Contnuous Emmissions Monitoring, Gas Turbine Combustion Dynamics Monitoring System, and AutoTune for the combustion system.	In support of Energy Supply Strategic Objectives to boost Unit Availability, Reliability. This will provide a better operational range without seasonal tuning, protect the gas turbine due to variation in gas composition-ambient conditions and improve reliability.
NSP-Minnesota	A.0001559.125	Environmental Enhancement	BLL8C CEMS CDM AutoTune-25047	956,005	2022	Installation of CEMS Continuous Emissions Monitoring, Gas Turbine Combustion Dynamics Monitoring System, and Auto-Tune for the combustion system.	In support of Energy Supply Strategic Objectives to boost Unit Availability, Reliability. This will provide a better operational range without seasonal tuning, protect the gas turbine due to variation in gas composition-ambient conditions and improve reliability.
NSP-Minnesota	A.0001591.003	Reliability/Performance Enhancement	-17052 ANS2C Repl U2 gen break	948,845	2022	Replacement of unit 2 generator breaker and MOD.	Fugi will no longer provide parts or service after 2015.
NSP-Minnesota	A.0001571.011	Reliability/Performance Enhancement	ANSC0 Replace U4 Silencer	923,608	2022	ANS0613 - Replace Unit 4 CT Silencer. The panels are used to reduce the Db's coming out the stack of the CT	The panels are melting and breaking up. The are made with a stainless steal the can not standup to the higher temperature of a GE 7FA Ct. They were designed for a GE 7FE class CT that runs at lower temps.
NSP-Minnesota	A.0001610.010	Renewable and New Generation	BWF0-Border WD Tower Climb System-2	917,250	2022	Installation of a new climbing system that will replace the existing climb assist system. The new system will be a Climb Auto or equivalent system that can support the full weight of a technician and lift them from the bottom of the turbine tower to the nacelle without the need to climb the ladder.	The system will provide long term reliability and safety benefits for the farm. It is estimated that each of the 75 turbines will be off line 2 fewer hours for each of the 2 planned maintenance events per year. The additional benefits include reduced risk of climbing related injuries and fatigue related issues. Retention of qualified technicians will increase which results in lower training costs and reduced risk of errors. The towers on this site are 15 meters taller than several of our sites and will be a proving ground to determine if this system should be installed across the fleet.
NSP-Minnesota	A.0001611.015	Renewable and New Generation	PVW0C Wind Tower Climb System-24774	884,419	2022	Installation of a new climbing system that will replace the existing climb assist□ system. The new system will be a Climb Auto or equivalent system that can□ support the full weight of a technician and lift them from the bottom of the turbine□ tower to the nacelle without the need to climb the ladder.	The system will provide long term reliability and safety benefits for the farm. It is□ estimated that each of the turbines will be off line 2 fewer hours for each of□ the 2 planned maintenance events per year. The additional benefits include□ reduced risk of climbing related injuries and fatigue related issues. Retention of□ qualified technicians will increase which results in lower training costs and□ reduced risk of errors.
NSP-Minnesota	A.0001591.004	Reliability/Performance Enhancement	-17478 ANS0C BOP Evrgren Ctrl	864,624	2022	This project is to upgrade for Units 2, 3, and Balance of Plant for Unit 4 Evergreen System Upgrade.	Project is required to maintain the plant ahead of the digital asset obsolescence curve. This also enhances compliance with regulatory/security requirements. The project is based on replacing critical plant control system hardware/software components on a five-year cycle. There is Fleet goal/expectation that all units utilizing similar control systems vendors be at similar and current hardware/software revision. This keeps the plant in compliance with Cyber Infrastructure Protection (CIP) anti-virus requirements. There is difficulty with older systems in procuring replacement parts, finding good field service support, and meeting current cyber asset security requirements. Replacement of plant control system hardware is necessary to ensure that the equipment will continue to operate reliably, safely, and in compliance with environmental requirements. This Control System is responsible for controlling and monitoring most of the plant equipment, and failure could lead to significant equipment damage, environmental compliance issues and extended outages.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001571.500	Reliability/Performance Enhancement	ANS Emergent Fund -Other prod	743,861	2022	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001575.037	Reliability/Performance Enhancement	HBC0C Warming Line to Intake	737,171	2022	Install warming line to take a portion of the condenser/CW discharge from the plant to combat frazil ice conditions at the circulating water intake structure.	When frazil ice conditions exist, the plant has no way to address them other than shutting the units down. We are investigating revisions to our T-screen air blast system, but do not have confidence that this system will be able to combat frazil ice. □ □ Frazil ice forms in water that is super cooled (i.e. is below 32F, e.g. 31.8F). The frazil ice is small shards of ice suspended in the water. The frazil ice attaches to anything solid that it touches. Frazil ice causes the inlet screens (a.k.a. T-screens) to become plugged with ice. The clogging starts out slow and as the opening begins to become blocked, the process speeds up very quickly to the point of pluggage. Once the screens are plugged, the suction to the circulating water pumps empties and the low water level causes the pumps to trip. Without the circulating water pumps, the plant cannot be started up and the plant cannot continue to operate, if already running. There is no real good way of preventing frazil ice from accumulating on stationary solid objects other than to either warm the object above 32F or warm the water to 32F, or above.
NSP-Minnesota	A.0001611.009	Renewable and New Generation	PVW0-Pleasant Valley Gearbox Replac	724,274	2022	Replace failed gearboxes. Cost includes the crane and labor for overhaul of the rotor, gearbox and main shaft	Gearboxes fail with planetary section damage and need to be replaced
NSP-Minnesota	A.0001579.083	Reliability/Performance Enhancement	RIV0C --Aux boiler Controls Up	646,092	2022	Upgrade the Riverside Auxiliary Boiler Controls.	The Auxiliary Boiler Control System has configuration/programming issues with the original controls logic that makes the burner controls very unstable at low load operation. This instability results in excess CO emissions and is one of the reasons the boiler has to be operated at a higher load to maintain emissions compliance. Due to the nature of the controls logic configuration, only the OEM would be able to make the necessary changes to the software. Due to legal issues with Terms and Conditions, Xcel Energy cannot do business with the OEM, Coen. □ □ Upgrading the controls would allow a VFD for the FD fan to be incorporated into the Aux Boiler Control System. This will result in heat rate improvements during the operation of the Aux Boiler, as it will improve emissions at lower loads, resulting in improved turndown capability. The current practice at Riverside is to run the Aux Boiler at a higher load than is necessary for the building heating system and frazil ice system to maintain emissions compliance. This is accomplished by venting steam out of the roof, which results in a waste of natural gas and water. Upgrading the controls will also ensure that the system does not fall behind the obsolescence curve. There is difficulty with older systems in procuring replacement parts, finding good field service technicians, and meeting up to date cyber asset security requirements. It may make sense to move the controls to the existing plant Ovation platform. The existing system was installed in 2009.□ □ The new system will be specified to include detailed description of each rung of logic in the controls, which will also help in troubleshooting when problems occur.
NSP-Minnesota	A.0001574.268	Reliability/Performance Enhancement	SHC1C Emergent Projects	635,491	2022	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001579.069	Reliability/Performance Enhancement	RIV0C -- Instument Air Sys Rep	632,407	2022	Replace the existing plant instrument air compressors with a system that either requires limited plant Operations/Maintenance resources or is intended to be maintained by external service providers.	The present plant air compressors are aging and are an increasingly large Operations and Maintenance burden. The poor reliability of these units may result in simultaneous unavailabilty of multiple units, possibily resulting in failure of plant air system. As plant staffing is reduced to planned permanent levels there will not be in-house resources available to devote to high maintenance ancillary (non-core) plant equipment. The existing system capacity is also limited on the CT side of the plant.
NSP-Minnesota	A.0001574.198	Reliability/Performance Enhancement	SHCCC 2017 Emergent Work	592,085	2022	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001565.111	Reliability/Performance Enhancement	WLM0C Replace U0 Scalping Conveyor	577,236	2022	Replace Scalping Conveyor. This includes pans, chain, gears, etc.	Complete conveyor was last replaced in 2005 and the chain was last replaced in 2009 on O M. The conveyor use to be on a 5 year replacement schedule but has been lengthened due to the chain replacements happening between complete replacement. By 2012 the chain will be three years old and links will be breaking due to the chain streching out.
NSP-Minnesota	A.0001562.140	Reliability/Performance Enhancement	REW2C Repl U2 Turb Blade Rows 1-2	556,624	2022	This project will replace the Unit 2 Turbine Blading on stages 5, 6 and 7.	The intermediate stationary segment blades are heavily pitted. Moderate to heavy erosion on the blade admission edges exists. The exhaust edges are heavily pitted and eroded with missing pieces of blading. Some of the blade tenons had been previously welded to prevent cover loss but can no longer be repaired.
NSP-Minnesota	A.0003000.214	Reliability/Performance Enhancement	C100C PMO Tool Blanket-New	550,000	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001566.168	Renewable and New Generation	NBL0 - Gearbox Replacements	543,388	2022	Replace failed gearboxes. Cost includes the crane and labor to remove the rotor, gearbox, and main shaft, and then reinstall the components.	Gearboxes fail with planetary section damage and need to be replaced.
NSP-Minnesota	A.0001571.082	Reliability/Performance Enhancement	ANS4C U4-Ex 2100 E -Excitation Sys	520,718	2022	Replace U4 Excitation System Controls with reliable, non-obsolete equipment.	The ANS U4 Excitation Systems Controls are nearing end of useful life. It is necessary to upgrade in order to ensure reliable operation and parts availability.
NSP-Minnesota	A.0001574.173	Reliability/Performance Enhancement	SHC3C Emergent work	483,288	2022	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001572.214	Reliability/Performance Enhancement	ASK1C AQCS Battery Replacement	481,371	2022	Replace 125V AQCS station batteries. There are 60 total cells in this array.	These batteries are associated with NERC requirements, and are showing signs of deteriation.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001572.232	Reliability/Performance Enhancement	ASK1C-TurboToc PLC Upgrade	475,567	2022	Replace Allen Bradley Control System. Upgrade the following PLC hardware on both (two) panels:□ 1. MicroLogix compact PLC to ControLogix compact PLC□ 2. Implement the following PLC program changes:□ 3. Port PLC program to new platform□ □ Add/Renew the following hardware:□ 1. Add communication hardware and wiring for tie in to PLC controls network to allow unattended program backups.	Projected year of replacement due to obselecence.
NSP-Minnesota	A.0001562.500	Reliability/Performance Enhancement	REW Emergent Fund -Steam prod	472,922	2022	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001571.081	Reliability/Performance Enhancement	ANS4C U4-LCI Controls Replacement	469,910	2022	Replace U4 LCI System Controls with reliable, non-obsolete equipment.	The ANS U4 LCI Systems Controls are nearing end of useful life. It is necessary to upgrade in order to ensure reliable operation and parts availability.
NSP-Minnesota	A.0001565.114	Environmental Enhancement	WLM0C Landfill Cell 7 and 6 Cap	459,610	2022	Landfill Cell 7/6 Cap	Required by permit
NSP-Minnesota	A.0001580.007	Renewable and New Generation	CWF0-Courtenay Gearbox Replacement	458,560	2022	Replace failed gearboxes. Cost includes the crane and labor for overhaul of the rotor, gearbox and main shaft	Gearboxes fail with planetary section damage and need to be replaced
NSP-Minnesota	A.0001562.155	Reliability/Performance Enhancement	REW2-Replace Bus 21 Switchgear	455,288	2022	1949 vintage Bus 21 live-front style switchgear needs to be replaced. Also, because of the age and type of the equipment, all new breaker panels will need to be redesigned to fit the pre-existing space. In addition the 13.8 kV to 480 V transformer and bus 11 to bus 21 tiebreaker would be replaced to have a larger capacity to allow ID fan operation.	Bus 21 Switchgear is a live front design, where if the front door is open the electrician or operator is exposed to parts that are energized. When racking breakers the operator is not shielded from an arc flash if one occurs, this makes it an extremely hazardous process. Due to safety hazards involved with these, manufacturers no longer construct these types of switchgear. This was a recommendation from the life extension study conducted by E&C, TR&C, and Excel Engineering.
NSP-Minnesota	A.0001562.156	Reliability/Performance Enhancement	REW1-Replace Bus 11 Switchgear	454,740	2022	1949 vintage Bus 11 live-front style switchgear needs to be replaced. Also, because of the age and type of the equipment, all new breaker panels will need to be redesigned to fit the pre-existing space. In addition the 13.8 kV to 480 V transformer and bus 11 to bus 21 tiebreaker would be replaced to have a larger capacity to allow ID fan operation.	Bus 11 Switchgear is a live front design, where if the front door is open the electrician or operator is exposed to parts that are energized. When racking breakers the operator is not shielded from an arc flash if one occurs, this makes it an extremely hazardous process. Due to safety hazards involved with these, manufacturers no longer construct these types of switchgear. This was a recommendation from the life extension study conducted by E&C, TR&C, and Excel Engineering.
NSP-Minnesota	A.0001572.233	Reliability/Performance Enhancement	ASK99C-Transfer House 1 Control Sys	451,300	2022	Replace current Allen Bradley control system with Ovation DCS, and add the following hardware:□ 1. Ovation Controls to replace all Allen Bradley hardware currently in place□ □ Implement the following program changes:□ 1. Port PLC program to Ovation platform	Existing control system is problematic and a source of issues for yard operations. It is also expected that by this year the existing control system would need to be replaced due to obsolescence.
NSP-Minnesota	A.0001572.234	Reliability/Performance Enhancement	ASK99C-Transfer House 2 Control Sys	451,300	2022	Replace current Allen Bradley control system with Ovation DCS, and add the following hardware:□ 1. Ovation Controls to replace all Allen Bradley hardware currently in place□ □ Implement the following program changes:□ 1. Port PLC program to Ovation platform	Existing control system is problematic and a source of issues for yard operations. It is also expected that by this year the existing control system would need to be replaced due to obsolescence.
NSP-Minnesota	A.0001572.500	Reliability/Performance Enhancement	ASK Emergent Fund -Steam prod	436,864	2022	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001565.117	Reliability/Performance Enhancement	WLM1C Replace U1 Gratebed 2018	428,783	2022	Capital project to replace all grates beds (called 11 grates and 12 grates) in Unit 1 boiler. This would include replacing all grate bars, chains, grate weights, sprockets, pins, seals, etc.	Bars and chain were replaced in 2008 to prolong life with having to replace entire conveyor. Previous frequency of complete change out was every 5 years. Since bars and chain were replaced in 2008 we were able to buy another 5 years until a complete replacement.
NSP-Minnesota	A.0001565.125	Reliability/Performance Enhancement	WLM2-Replace U2 Boiler Grates 2022	424,614	2022	Capital project to replace all grates beds (called 21 grates and 22 grates) in Unit 2 boiler. This would include replacing all grate bars, chains, grate weights, sprockets, pins, seals, etc.	Bars and chain were replaced in 2008 to prolong life with having to replace entire conveyor. Previous frequency of complete change out was every 5 years. Since bars and chain were replaced in 2008 we were able to buy another 5 years until a complete replacement.
NSP-Minnesota	A.0001576.005	Renewable and New Generation	GDM0 - Gearbox replacements	424,200	2022	Replace failed gearboxes in GE 1.5 SLE wind turbines. Cost includes the crane and labor to remove the rotor, gearbox, and main shaft, and then reinstall the components.	Gearboxes fail with planetary section damage and need to be replaced.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001573.182	Reliability/Performance Enhancement	BDS2C U2 Turning Gear Replace	408,310	2022	This project includes replacement of the 1950's vintage turning gear internals for Unit 2 Steam Turbine / Generator. This includes removal of the existing turning gear internal assembly and motor and replacement in kind. Project includes all necessary labor (company and contractor), materials, and additional costs to perform the work.	The turning gear for Unit 2 Steam Turbine is 60+ years old and is nearing end of life. The turning gear was not designed for cycling operation and excessive turning gear hours (4000 - 6000 hours per year) and has been increasingly difficult to maintain since the conversion to combined cycle operation in 2002. Turning gear is a critical component as it is required to operate continuously when the unit is offline to keep the unit available to commercial operations by preventing the rotor from bowing or sagging while idle. Furthermore, even a short duration off turning gear while the unit is hot could result in excessive bowing which would require several days forced outage to cool the unit down before it can be put back on gear.□ □ In December 2012, the turning gear failed to engage which attributed to a high vibration event during unit startup which resulted in a forced outage totaling 77 days, 500,000 lost MW-hrs, and approximately $2,000,000 repair costs. Since then, the turning gear assembly has had other significant issues including failures to disengage during startup, high amps causing turning gear motor trips, locked components preventing rotation, excessive noise and vibration, and oil leaks. The turning gear assembly has been overhauled on an accelerated frequency every 2 - 3 years to maintain equipment reliability at an estimated average cost of $85,000 with no significant improvement to unit operation. If the turning gear is not replaced, it is likely that additional forced outage events will continue to occur as the equipment condition continues to degrade, regardless of accelerated overhaul schedule.
NSP-Minnesota	A.0001562.138	Reliability/Performance Enhancement	REW0C Replace Scalping Conveyor	404,563	2022	This project will replace the scalping conveyor and all it's components (i.e. chain, flights, pans, etc.).	The scalper is an essential part of the fuel system that affects both units. If the scalper breaks down the plant will run for about 30 minutes before there isn't enough fuel left in the bins. After the 5 year mark, the scalper breaks down more and more causing more downtime for the plant. In 2020 the scalper several wear components entirely fail, these have been patched in a fashion that may make it last until the replacement.
NSP-Minnesota	A.0001562.154	Environmental Enhancement	REW0-Replace Duct Scrubber Controls	403,313	2022	Replace Duct Scrubber Allen Bradley Controls to combine the baghouse and scrubber controls to a single processor for each unit for simplification and improved physical layout. This project should be completed in conjunction with the REW0-Replace Baghouse Controls project as they go hand-in-hand.	These Allen Bradley controls are obsolete and parts availability is becoming more and more rare. It is unknown exactly when in the next several years these controls will fail beyond the point of repair, when that does occur it will require an immediate estimated 16 week replacement.
NSP-Minnesota	A.0001573.223	Reliability/Performance Enhancement	BDS2 -Rplc Turbine Valve Internal -	387,651	2022	Replacement of the Unit 2 steam turbine valve internals (two stop valves, six control valves) during the Fall 2022 major steam turbine overhaul. This includes replacement of the stems, plugs, bushings, and other internal parts which are considered capital and other associated costs to perform the work. The valve actuators will be sent off-site for rebuild under O&M funds.	The unit 2 steam turbine valves are overhauled every 4 - 6 years per OEM, company, and insurance requirements to maintain unit safety and reliability. These valves are critical for unit operation since they control the steam flow admitted to the turbine and perform unit overspeed protection. These valves were last overhauled in Fall 2016 and are scheduled for the Fall 2022 overhaul under contract with GE. It is recommended that the valve internals are replaced under a planned project due to past experience with repairs and extensive lead time for the parts if found to be damaged. Any parts which are inspected and found to be in reusable condition will be repaired under O&M funds and placed into inventory as spares.
NSP-Minnesota	A.0001561.015	Reliability/Performance Enhancement	IVH5C U5-6 UG Cable Replacemen	382,097	2022	IVH0417 - Replace dated direct buried cable on units 5-6. This will include control cables between the control room and the units, the cables from the aux transformers and support equipment, this includes both 480 and 4-kV.□ □ This project would install new cabling in conduits or raceways to segregate voltages and facilitate ease of future replacement.□ □ The insulation of the cables is failing due to age.	Due to the insulation type and advanced age of the original construction cables failures are likely. In fact there have been events in the last 12-18 months that unit unavailability was incured due to grounds on the 480-V systems. Additionally the sister units to Inver Hills at the Wheaton WI facility suffered a insulation failure on buried cable that resulted in a energizing low voltage control cables that initiated a fire in a control cabinet in the plant control room.
NSP-Minnesota	A.0001575.169	Reliability/Performance Enhancement	HBC0 - Boiler Feed Pump CESP - 2373	378,022	2022	Purchase of a rotating spare boiler feed pump for use during the overhauls of in service pumps	Currently, one boiler feed pump is needed to operate the unit to 100% load. The second pump is on standby mode to protect the HRSG water components if the first pump would trip at any time. □ The OEM has indicated that an overhaul of one pump would take six to eight weeks. Our normal outage lengths are 10 days. To send out a pump during an outage, we would either have to risk the units operability in a trip event or to extend the outage to the six to eight weeks.□ This spare pump would allow one operating pump to be removed during the shorter time outage period and replaced with the new (or spare) pump.

Company	Project ID	New Grandparent	Project Name	YE Amt ($s)	Activity Year	Project Description	Project Justification
NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001561.029	Reliability/Performance Enhancement	IVH3C Gas Valve Ctrl Repl	370,375	2022	Replace the existing obsolete gas control logic, gas control valves, wiring, and pressure switches on Units 3 & 4. This project is planned to be run in parallel with the turbine control replacement project because the software and microprocessor hardware for turbine control, gas valve control and fuel oil valve control is one integrated whole.□ □ Due to transmission system requirements the new gas control valves will be installed 2 units at a time; thereby maintaining 4 units available for concurrent operation.□ □ The new control valves are slightly narrower and a bit longer than the existing valve per initial vendor drawings. Per field measurements we expect that the new valves will fit in the same location with minor piping modifications. We do not expect to require gas valve cabinets and other major modifications.□ □ This is a 2 year project starting in 2019 and ending in 2020.	The servomotors that operate the gas control valves (GCV) are obsolete. They are controlled by obsolete Pacific-Scientific controllers. This control scheme has not proven to be very reliable over the years with numerous unit outages due to component failure and electrical/control/mechanical issues with gas operation. In addition these components are very difficult to troubleshoot and maintain in calibration.□ □ The existing control system is obsolete and not supported by the manufacturer. Spare parts are difficult to find and costly to procure when located. The NSP fleet control systems are being standardized on Emerson Ovation to improve operations, maintainability, reliability, and availability.
NSP-Minnesota	A.0001573.171	Reliability/Performance Enhancement	BDS0C Admin Bldg Fire Protection	363,359	2022	Install automatic sprinkler protection in the administrative and office areas connected to the main plant as follows: In the administrative areas, sprinkler protection designed for 0.15 gpm/sq. ft. over a design area of 2,000 sq. ft. using ordinary temperature quick response sprinklers with a 250 gpm hose stream allowance.	Recommended by Xcel Energy Risk Management department per All Risk Loss Prevention Report File# 101101. See recommendation# BDP P 06-12 . The areas described above are not sprinkler protected and are connected to the main plant. If a fire were to occur in these areas, there are sufficient combustibles present to result in a total loss of the area in question, and then to allow the fire to spread to the main plant creating an exposure to the electrical generating equipment, particularly the Unit 5 combustion turbine. Therefore, sprinkler protection should be installed in these areas. The Loss Expectancy associated with this condition is estimated at $25,000,000.
NSP-Minnesota	A.0001574.269	Reliability/Performance Enhancement	SHC2C Emergent Projects	360,757	2022	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001574.493	Reliability/Performance Enhancement	SHC1C Mill OH 2022 Fall	357,047	2022	Includes replacement of one or more of the following components: worn ceramic surfaces, wear liners, classifier vane blade replacements, air inlet vane replacement, RTV, roll to ring adjustment, hardwire weld overlay on floor, replace mill rolls, replace hardox wall liners, replace outlet valve discs, replace door springs, classifier replacement, inverted cone replacement, and replacement of pyrite supply valve and jet pump/piping.	Unit 1 has 7 mills whose performance is tracked through operating data (mill motor amps, coal fineess, etc.) to determine the frequency of Level 1, Level 2, and Level 3 overhauls. Typically there are 2-3 Level 2 overhauls per year.
NSP-Minnesota	A.0001574.526	Reliability/Performance Enhancement	SHC3C Mill OH 2022 Spring	355,652	2022	Includes replacement of one or more of the following components: worn ceramic surfaces, wear liners, classifier vane blade replacements, air inlet vane replacement, RTV, roll to ring adjustment, hardwire weld overlay on floor, replace mill rolls, replace hardox wall liners, replace outlet valve discs, replace door springs, classifier replacement, inverted cone replacement, and replacement of pyrite supply valve and jet pump/piping.	Unit 3 has 10 coal mills whose performance is tracked though operating data (mill motor amps, coal fineness, etc.) to determine the frequency of Level 1, Level 2, and Level 3 overhauls. Typically there are 2-3 Level 2 overhauls per year.
NSP-Minnesota	A.0001565.132	Reliability/Performance Enhancement	WLM0-Replace Overhead Bridge Crane-	353,444	2022	Project to replace and install new 65-ton rated overhead bridge crane. The supplier will reuse the existing remote-control system, replace the trolley frame and replace the hook block, refurbish the bridge crane motor for VFD duty, and perform a rated load test upon completion of installation.	The large overhead bridge crane hook at the Wilmarth plant has been out of commission since Fall 2018 when it was damaged after the block became lodged in one of the main sheaves after a kill sensor failed. The block kept travelling up past the sensor that was supposed to cut the power to it. After this incident took place, the fuses in power supply junction box for the bridge crane were removed and the block red-taped off so that it could not be operated at all. The overhead bridge is needed to safely lift the heavier pieces of equipment during major overhauls: examples include turbine casings, turbine rotors, generator rotors, etc. The plant has two turbine major overhauls scheduled for 2023 (Unit 2) and 2024 (Unit 1). Without a working overhead bridge crane, it will be extremely difficult, if not impossible, to perform these overhauls. The existing auxiliary hook is only rated for 10 tons and will not be able to lift the turbine upper casings or rotor.
NSP-Minnesota	A.0001574.525	Reliability/Performance Enhancement	SHC3C Mill OH 2022 Fall	347,830	2022	Includes replacement of one or more of the following components: worn ceramic surfaces, wear liners, classifier vane blade replacements, air inlet vane replacement, RTV, roll to ring adjustment, hardwire weld overlay on floor, replace mill rolls, replace hardox wall liners, replace outlet valve discs, replace door springs, classifier replacement, inverted cone replacement, and replacement of pyrite supply valve and jet pump/piping.	Unit 3 has 10 coal mills whose performance is tracked though operating data (mill motor amps, coal fineness, etc.) to determine the frequency of Level 1, Level 2, and Level 3 overhauls. Typically there are 2-3 Level 2 overhauls per year.
NSP-Minnesota	A.0001562.162	Environmental Enhancement	REW1-Replace U1 Baghouse Bags 2023-	347,270	2022	This project will replace all Unit 2 fabric filter bags in all four compartments of the baghouse, replace bag tubesheets (thimbles), and internally coat the hoppers with Magnalux #304 Acid Resistant Coating.	The pulse jet bags are at the end of their life expectancy and overtime have become hardened with "bag cake" from moisture in the ash. Once hardened, the cake cannot be removed with standard cleaning practices. The bag tubesheets corrode from acid in the flue gas and are at a point that repairs can be expected. The Magnalux #304 Acid Resistant Coating has significantly reduced repair costs in the Unit 2 Baghouse by greatly extending the life expenctancy of the compartments and ducting.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001575.198	Reliability/Performance Enhancement	HBC8C CESP Torque Convrtr-24727	329,635	2022	Purchase a CESP torque converter assembly for the combustion turbine starting package. This torque converter will be a CESP that can be used on either HBC Unit 7 or Unit 8, but will first be installed on Unit 8 during the 2023 Major Overhaul. The replacement Torque Converter was quoted at $306k with a lead time of 67 weeks. Payment terms are NET 30 upon delivery.	The torque converter is a critical component of the combustion turbine starting package. If the torque converter fails, the combustion turbine will not be able to be started. The torque converter and starting package are Japanese designed and manufactured, and repair parts are long lead time items that are difficult to obtain. Plant Engineering and Fleet Engineering staff attempted to get the Unit 7 torque converter overhauled during the 2020 major overhaul, but even with 6 months notice the OEM could not source any repair parts in time to inspect and overhaul the torque converter. Torque converter maintenance therefore had to be deferred due to lack of available parts. If a torque converter fails unexpectedly and a spare unit is not available, it is expected that the unit will enter a lengthy forced outage of 6 months or longer. The lead time on a new torque converter is 67 weeks.
NSP-Minnesota	A.0001574.304	Reliability/Performance Enhancement	SHC2 -Turb Ctrl Vlv Internals 2022-	325,329	2022	Replace main turbine control valve internals including, but not limited to stems, balance chambers, plugs, and seats.	The valve internals have been subject to damage due to excessive wear and tear due to frequent unit cycling and more frequent economic outages. There are four control valves, all four of which experience significant degradation. The above work description is intended for all four control valves. The control valves are critical safety devices used to prevent turbine overspeed after a unit trip and are also responsible for regulating steam admission to the turbine. Their mechanical integrity is essential to safe and reliable operation of the turbine.
NSP-Minnesota	A.0001565.500	Reliability/Performance Enhancement	WLM Emergent Fund -Steam prod	315,512	2022	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001574.491	Reliability/Performance Enhancement	SHC1C Mill 2022 Spring	309,369	2022	Includes replacement of one or more of the following components: worn ceramic surfaces, wear liners, classifier vane blade replacements, air inlet vane replacement, RTV, roll to ring adjustment, hardwire weld overlay on floor, replace mill rolls, replace hardox wall liners, replace outlet valve discs, replace door springs, classifier replacement, inverted cone replacement, and replacement of pyrite supply valve and jet pump/piping.	Unit 1 has 7 mills whose performance is tracked through operating data (mill motor amps, coal fineess, etc.) to determine the frequency of Level 1, Level 2, and Level 3 overhauls. Typically there are 2-3 Level 2 overhauls per year.
NSP-Minnesota	A.0001574.802	Reliability/Performance Enhancement	SHC2-Level 2 Mill OH 2022 Spring 15	309,369	2022	Includes replacement of one or more of the following components: worn ceramic surfaces, wear liners, classifier vane blade replacements, air inlet vane replacement, RTV, roll to ring adjustment, hardwire weld overlay on floor, replace mill rolls, replace hardox wall liners, replace outlet valve discs, replace door springs, classifier replacement, inverted cone replacement, and replacement of pyrite supply valve and jet pump/piping.	Unit 2 has 7 mills whose performance is tracked through operating data (mill motor amps, coal fineness, etc.) to determine the frequency of Level 1, Level 2, and Level 3 overhauls. Typically there are 2-3 Level 2 overhauls per year.
NSP-Minnesota	A.0001562.153	Reliability/Performance Enhancement	REW2 Rep U2 Superheater-Secondary-1	302,864	2022	This project will replace the entire U2 boiler secondary superheater. This portion of the superheater contains 19 pendants that each have 16 tubes (7 sets of u-bends and 2 hanger tubes). The tubes are made of 2.5" OD, 0.220" Wall SA210-A1 Carbon Steel. We will also replace all the 1/2" thick carbon steel tube shields on the leading and lagging edge tubes in the sootblower lane.	Past NDE data has shown that by year number 3, the secondary superheater is about 40% worn out. This means a lot of time is spent during the outage by replacing individual tubes on O&M. Tube leaks occur frequently which increases lost burn revenue and increases safety risk.
NSP-Minnesota	A.0001562.135	Environmental Enhancement	REW0C Repl Baghouse Controls	302,725	2022	Replace Baghouse Allen Bradley Controls to combine the baghouse and scrubber controls to a single processor for each unit for simplification and improved physical layout. This project should be completed in conjunction with the REW0-Replace Duct Scrubber Controls project as they go hand-in-hand.	These Allen Bradley controls are obsolete and parts availability is becoming more and more rare. It is unknown exactly when in the next several years these controls will fail beyond the point of repair, when that does occur it will require an immediate estimated 16 week replacement.
NSP-Minnesota	A.0001562.183	Reliability/Performance Enhancement	REW2-U2 Roof Tubes-24588	302,343	2022	Replace all the roof tubes in the U2 boiler. New tubes will be spiral wound Inconel.	The current tubes require pad welding every year in order to maintain wall thickness, and they are almost at the point where they cannot be padded any longer. Once this happens, we won't be able to repair the roof tubes and they must be replaced. These tubes are believed to be original to the site from 1949. If a roof tube leak occurs this will likely blow through the boiler casing and release water and asbestos throughout the boiler building, causing a significant safety risk for anybody in the area.
NSP-Minnesota	A.0001562.007	Reliability/Performance Enhancement	REW0613-Condenser Retube	301,775	2022	This project will return the condenser to original design by replacing the Unit 1 Condenser tubes with Cupro Nickel tubes.	Retubing U1 condenser to the original Cupro Nickel tubes will increase heat transfer rate and standardize the units. Stainless steel tubes are currently installed in Unit 1 Condenser. When stainless steel tubes were placed in the condenser the design heat transfer rate of the condenser was affected resulting in a 1.5MW loss.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001565.070	Reliability/Performance Enhancement	WLM0C Fire Protection System R	301,642	2022	Capital project to install a new AFFF foam-based fire suppression system to be used at the tail end of the Scalping Conveyor, with additional piping installed to provide foam suppression to our Walking Floor and Scalping Conveyor hydraulic pump skid room and oil storage room (both these rooms are located outside the Receiving Building proper). This project will also provide a new Fire protection addressable control panel and new heat detection cable to be routed to it. The new heat detector cable will be installed along the entire run of the #2 Transfer Tunnel, #1 Transfer Tunnel, Transfer tunnel transition areas, Scalper Conveyor body and above the Walking Floor. This project will also involve moving the existing deluge valve and associated piping and instrumentation out of its current location in the Scalper Conveyor basement up to a newly constructed shack placed outside the Receiving building at ground level. In order to do this, we will have to remove the existing concrete and soil that the main fire protection header piping is buried under, set adequate wall bracing for trench work and tap into the existing fire protection main header on the outside. The reason for this is that rerouting the fire protection header piping in the basement and installing heat tracing will likely not be sufficient as it has been observed that critters consistently chew through insulation and lagging in this area. If this were to occur and the heat tracing cable chewed through, it could cause a short and risk freezing the water in the pipe. Finally, this project would also involve replacing the ~7 manual pull stations located in Transfer Tunnel #2, Transfer Tunnel #1, the Transfer Towers and the Receiving building.	The existing system has rotten EMT conduit, brittle wires for heat, and goes off from time to time due to electrical shorts. The system is not reliable and in the event of a fire cannot be depended upon. The areas that the Foam Suppression fire protection system will be installed for are areas that very oil-saturated. They hydraulic pump skid room and oil storage room currently have no fire protection of any kind and the Scalper Basement has a traditional water suppression system. However, if a fire were to occur in the Scalper basement, the water system would not do us any good because of the amount of oil saturation in the area. Red Wing experienced a fire in their Scalper basement area and the water system made the oil fire worse by spreading it more. After this event they installed the foam system which will do much better in these areas because it would smother the fire. Moving the deluge valve out of the Scalper basement has been requested for years because of how much easier it will be to perform regular maintenance on. The shack it currently resides in down in the basement is very decrepit and tight to move around in. Relocating the deluge valve up to the ground level and removing the basement shack will better for maintenance of the system and create much more room in the Scalper Basement. The fire detection wiring amongst the heat detectors in the transfer tunnels, transition areas and Scalper/Walking Floor areas of the receiving building is original to install almost 30 years ago and is in dire shape. It has become very maintenance intensive to repair and the conduit it is contained is very corroded. The Fire Control panel itself is also orginal to the installation of the system nearly 30 years ago and has become obsolete.
NSP-Minnesota	A.0001574.252	Reliability/Performance Enhancement	SHC99 Emergent work	298,836	2022	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0003000.682	Reliability/Performance Enhancement	SHCJC Tools and Equip pur	296,000	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001579.166	Reliability/Performance Enhancement	RIV0-Aux Cooling Tunnel Redesign-25	288,343	2022	Install approximately 100 ft of 30 inch diameter thin wall under water piping in #6 aux cooling water tunnel to increase water velocity by approximately 10X, so that river silt is unable to settle out in tunnel and cause system plugging and other operating problems.	The low water velocity in this tunnel causes large amounts of silt to settle out in tunnel, which causes system blockage and aux cooling system trips. Every several years this silt must be removed at significant cost, over $125,000 and requires a 5 person dive team for removal. By installing approximately 80 ft of 30 inch thin wall pipe, and 30 ft of 24 inch thin wall pipe, the water velocity through the pipe feeding the pumps will be high enough to eliminate silt build up, and the future need for dredging will be eliminated. Also, slugs of silt that ocurr every time the system flow changes will no longer be sucked up by the pumps and system and plant trips will be avoided.
NSP-Minnesota	A.0003000.698	Reliability/Performance Enhancement	SER-CHM-Misc Tools-MN	274,960	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001576.006	Renewable and New Generation	GDM0C Generator Replacements 2	255,359	2022	Replace failed generator in GE 1.5 SLE wind turbines. Cost includes the crane and labor to remove the generator and then reinstall it.	High operating temperatures in the compact design have caused a small amount of failures in the industry after 5 years of operation.
NSP-Minnesota	A.0001702.018	Environmental Enhancement	BS2 Blazing Star 2 PCMM-New-23573	250,000	2022	To better understand the potential impacts to birds and bats, Xcel Energy executes a post-construction□ mortality monitoring (PCMM) study using methods developed in conjunction with U.S. Fish and Wildlife□ Service and Minnesota Department of Natural Resources as part of a Bird and Bat Conservation□ Strategy (BBCS).	The BBCS called for conducting a post-construction mortality monitoring study with the primary□ objectives of providing a summary of documented fatalities, presenting estimates of searcher efficiency□ and carcass persistence, and calculating fatality rates adjusted for bias during the study. The secondary□ objective was to monitor all turbines specifically for eagle and other large bird fatalities.
NSP-Minnesota	A.0001572.236	Reliability/Performance Enhancement	ASK1C-Econ Outlet Exp Joint	247,216	2022	Replace economizer oulet flue gas expansion joint with fabric expansion joint on the north side. The existing joint is 27-1/2' x 21-1/2' in area. The joint was last replaced during the MERP project in 2007 and has torn during normal operation.□ □ The south expansion will be replaced during Spring 2014 outage.	Replace Economizer Outlet fabric expansion joint. There are holes starting to form in this existing joint. As the boiler fouls between spring overhaul cleanings, this joint temperature can be limiting on load. Leakage thru this expansion joint affects O2 sensors and emission controls (primarily the NOx analyzer).□ Reference existing Maximo WO #5201473.
NSP-Minnesota	A.0001565.167	Environmental Enhancement	WLM0-Replace North Travelling Scree	227,915	2022	Complete replacement of the #2 Traveling Screen assembly. This includes the belts, sprockets, rods, seals, wear bars, etc.	Screenbelt has reached >90% of expected life. The south travelling screen failed in August 2020 when the belt tore in half and fell into the bottom of the screenhouse bay. When the OEM Field Engineer inspected the North screen for comparison to the South screen that had failed, he noted that the belt pitch and tension was nearly identical which makes sense given that they were installed at the same time and had been running continuously for the same amount of time since original commissioning.
NSP-Minnesota	A.0001579.016	Reliability/Performance Enhancement	RIV7C-U7 Turbine Roof Replace	215,591	2022	Replace roof over Unit 7 Steam Turbine.	Roof is showing increasing signs of leakage as evident by accumulating puddles on the turbine floor. Puddles present tripping hazards, and leakage is getting bad.
NSP-Minnesota	A.0001573.186	Reliability/Performance Enhancement	BDS2C Redundant LO Vapor Extractor	212,111	2022	Replace the existing 60 year old U2 lube oil vapor extractor with a dual 100% redundant vapor extractor system. This will consist of dual motors and blowers with an in-tank separator and connections with isolation capabilities to existing oil tank, exhaust and water drain lines. The extractor system will be tied into the turbine controls and be controlled in automatic / standby operation in the event of failure of the other extractor.	The existing vapor extractor is 60 years old and wearing out, a single point of failure with the current lube oil configuration; if this extractor were to fail the unit would not be available until the repairs were performed. Failure of the vapor extractor could cause our lube oil to leak at the bearings which would saturate the insulation and could cause a fire and significant turbine damage and pose a personnel safety hazard. Replacement parts are no longer available, OEM & and outage contractors in 2010 and 2016 have suggested replacement.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001580.008	Renewable and New Generation	CWF1-Generator Rplacments	209,321	2022	Replace failed generator in Vestas V100 wind turbines. Cost includes the crane and labor for generator overhaul	Upon failure, the wind turbine can not be run
NSP-Minnesota	A.0001574.861	Reliability/Performance Enhancement	SHC99-Coal Barn CO Detection Proj-2	204,832	2022	This project will consist of installing a new Carbon Dioxide (CO) detection system to monitor the coal barn storage area. The new system will need to be incorporated into the existing DCS system in the coal yard. This will replace the obsolete Methane Detection Equipment that was originally installed in the coal barn.	Safety - A waring system is needed in our coal barn to indicate the beginning of a fire, so we can have a better early indicator of a fire.□ □ Management Request - Sherco Yard Management has requested that we install a new CO monitoring system similar to what we have in other critical areas in the coal yard.□ □ Potential Coal Switch - There have been talks about needing to use the coal barn to store Wyoming coal in the future. Wyoming coal tends to spontaneously combust more often, so this system will help monitor any self heating of the coal.
NSP-Minnesota	A.0001574.295	Reliability/Performance Enhancement	SHC0 -#54 Pit Floor Slope ReCover -	202,034	2022	Remove/Rough up top layer of concrete floor and add floor covering of Concrete/Grout to create drainage in the bottom floor of the coal barn by the tail end of 54 conveyor. Drainage is to lead water to the sump pump.	Safety - Xcel is talking on switching coal type to a cheaper, dustier Belle Ayr coal, which will create more dust than our current coal type. This area is already a dusty area that is hard to keep up with cleaning due to declining personal. You will have less people down in this pit to clean it, and it will go faster.
NSP-Minnesota	A.0001574.682	Reliability/Performance Enhancement	SHCJC 3, 4 Xshr Fdr Floor Resto	198,832	2022	Redesign and replace the floor and structural support system	Safety - After years of washing the floor has significant corosion. The structural integrity of this floor is weakened and this needs to be addressed. The floor is not designed for constant washdowns. The floor used to be grating that was open. Then the grating was capped with metal sheeting and the bottom was sprayed with insulation. The insulation, grating and sheeting has become packed with moisture and coal over the years, and is never completely cleaned or dried out. The floor needs to be redesigned for water washdown, and the structural members need to be replaced.
NSP-Minnesota	A.0001573.292	Reliability/Performance Enhancement	BDS6C G.E. Cyber Sec Upgrd-25039	196,728	2022	Upgrade Black Dog U6 HMI network to install additional firewalls and redundant routers and to integrate servers into the existing PWCS system.	This project will allow us to be compliant with corporate policy EPR 4.200 Plant Process Network Security Policy. It will allow us to deploy windows OS, and Anti virus patches; whitelist applications, and take and store system backups.
NSP-Minnesota	A.0001573.304	Reliability/Performance Enhancement	BDS5 Evap Cooler Media Repl-15643	188,090	2022	Replace evaporation cooler media. Project includes material and labor.	Evap cooler media is planned to be replaced on a 10 year cycle. Media was last replaced in 2011.
NSP-Minnesota	A.0001579.127	Reliability/Performance Enhancement	RIV7C-Install Circ Water Pumps CESP	186,423	2022	Provide one spare circulating water pump and motor for Riverside. The spare pump and motor will be identical to the existing installed pumps.	Minimize plant downtime in the event of another circulating water pump failure. The plant is de-rated if one circulating water pump is out of service. A spare circulating water pump and motor will allow the failed pump to be replaced in a few days.
NSP-Minnesota	A.0001574.860	Reliability/Performance Enhancement	SHC99-Replace Festoon Cable on #2 P	184,349	2022	This project consists of replacing the festoon cable on #2 plow in the coal barn.	This cable needs to be replaced due to a recent repair that shortened the cable. This replacement will allow for #2 Plow to regain its full range of motion. If the plow can not operate in its full range of motion, the potential for a fire in the barn significantly increases.
NSP-Minnesota	A.0001566.169	Renewable and New Generation	NBL0 - Replace Generators	182,431	2022	Replace failed generator in GE 1.5 SLE wind turbines. Cost includes the crane and labor to remove the generator and then reinstall it.	High operating temperatures in the compact design have caused a small amount of failures in the industry after 5 years of operation.
NSP-Minnesota	A.0001574.801	Reliability/Performance Enhancement	SHC3-Landfl Mtnc Grg Lim Rcv HVAC P	181,328	2022	Replace the Lime Receiving HVAC, and the Landfill Maintenance Garage HVAC PLC systems.	These PLC's are unsupported SquareD systems. Troubleshooting these devices are very difficult, and can take a lot of time due to cryptic, outdated error codes. The hardware is also unsupported, so buying new components is impossible. We are forced to keep used inventory on-site in case failures occur.
NSP-Minnesota	A.0001610.011	Renewable and New Generation	BWF0 - Oil Particle Count System-24	181,010	2022	Install oil particle count sensors on all 75 turbines. The sensors will report data continuously to the SCADA system	Long term detailed monitoring of the oil condition will allow early detection of unusual gearbox wear to allow potential to reduce repair costs or to allow for a planned shutdown and replacement.
NSP-Minnesota	A.0001573.271	Reliability/Performance Enhancement	BDS5-Replace CT Inlet Filters-19102	180,553	2022	Full replacement of the combustion turbine inlet filters. This includes labor and materials to replace the pre-filters and pulse jet filters of the combustion inlet section with new HEPA style filters.	As the inlet filters age, they become plugged to the point that air pulsing is no longer effective and combustion turbine performance degrades. Aging filters can also become brittle and there is a risk of filter damage if not replaced which could have severe consequences. These filters were last replaced in Fall 2014, and past experience and testing has indicated that new filters will be required every 6 years. Before the Fall 2014 replacement, filter testing showed that the previous filters were too brittle to be air pulsed so that function was de-activated leading up to the replacement.□ □ This project aligns with the Unit 5 HGP overhaul scheduled in 2022 and the Evap Cooler Media replacement and coating project being performed under O&M during that same outage. Aligning the projects will minimize costs since the filters need to be removed to perform the coating project.
NSP-Minnesota	A.0001562.139	Reliability/Performance Enhancement	REW2C Repl U2 Trvlg Gate Bed	176,300	2022	Replace the complete grate bed (inludes grate bars, rails, and sprockets) during the February major overhaul. This is on a 5 year replacement schedule.	Current grates have holes, andthe rails and sprockets are showing severe wear. As the grates wear-out they jam more frequently. This immediately stops the throughput of RDF and 50% of the time causes a shut-down of the boiler to repair for 1-2 days. From and environmental standpoint, the excess holes in the grating effect the boiler airflow□ and combustion, which results in higher CO emissions.
NSP-Minnesota	A.0001562.051	Reliability/Performance Enhancement	REW1C REPLACE U1 TRAVELING GRA	175,893	2022	Replace the complete grate bed (inludes grate bars, rails, and sprockets) during the February 2020 overhaul. This is on a 5 year replacement schedule. Material would be ordered in 2019 for installation in early 2020.	Current grates have holes, andthe rails and sprockets are showing severe wear. As the grates wear-out they jam more frequently. This immediately stops the throughput of RDF and 50% of the time causes a shut-down of the boiler to repair for 1-2 days. From and environmental standpoint, the excess holes in the grating effect the boiler airflow□ and combustion, which results in higher CO emissions.
NSP-Minnesota	A.0001574.862	Reliability/Performance Enhancement	SHC99-Replace Plow Feeder Gearbox-2	170,694	2022	This project consists of purchasing and installing a new rotary plow feeder gearbox.	This project is needed due to the fact that the existing gearbox is near the end of its life.
NSP-Minnesota	A.0001562.136	Reliability/Performance Enhancement	REW0C C9 Internal Repl	168,969	2022	C9 Internals - Replace flights, chain, sprockets, idlers, and hardware.	More economical to replace internals rather than repair.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001573.225	Reliability/Performance Enhancement	BDS5 - Rplc U5 Duct Burner PLC - 23	165,262	2022	Replacement of existing U5 duct burner PLC controls with new Emerson Ovation controls. Project includes necessary equipment, instrumentation, wiring, conduit, labor, and engineering to perform the work.	The existing U5 duct burner PLC controls are 2002 vintage and nearing end of life. There have been times where the duct burners have tripped and a fault code is not displayed on the PLC, indicating a PLC hardware issue was the cause. This most recently occurred in July 2018 and nearly caused Unit 5/2 to trip on high drum level from the load swing after the duct burners tripped. The existing duct burner PLC does not have a historian so troubleshooting efforts are limited. If not replaced, the duct burner PLC will become an increasing reliability risk. Replacing with Emerson Ovation DCS controls will result in more reliable operation with easier troubleshooting and maintenance, and the ability to more seamlessly integrate duct burner controls into AGC operation per marketing request.
NSP-Minnesota	A.0001565.115	Reliability/Performance Enhancement	WLM0C DCS Software Hardware Upgrade	162,327	2022	DCS Software update (latest revision) and hardware replacement of 10 work stations; 2 server, 3 work, 3 maintanence, 2 pro.	Updating to the latest software revision keeps the DCS up to date for servicing and trouble shooting. After time the older revisions are essentially unsupported by the vender. Hardware replacements every five years will help to ensure limited failures.
NSP-Minnesota	A.0001573.128	Reliability/Performance Enhancement	BDS5C CT Expansion Joint	161,796	2022	Perform complete replacement of Unit 5 Combustion Turbine Exhaust Expansion Joint. This includes labor and materials to perform a full replacement of the expansion joint.	The combustion turbine exhaust expansion joint is a critical component subject to severe duty. If the joint should fail, 1100F exhaust gases would escape the combustion turbine exhaust into the plant. The original expansion joint furnished with the combustion turbine in 2002 required replacement in December 2003. The first replacement expansion joint was of better quality than the original, and was replaced in 2012 when the Siemens single piece exhaust was installed. This current expansion joint may need to be replaced during the Hot Gas Path Inspection, currently scheduled for 2018.
NSP-Minnesota	A.0001574.687	Reliability/Performance Enhancement	SHCJC 3A Gate to 4A-B Upgrade	157,112	2022	Retrofit 3A to 4A/B diverter gate to a splitter gate. Design needs to eliminate coal build up around the gate inside the chute work. This will involve retrofitting the housing/chute work section, gate, and actuator.	Safety-Will eliminate the need for employees to have to blow, pry, chip, and clean out the gate to get them unplugged with coal.□ Redundancy-with a splitter gate you will not need to run your redundant path to help with blending.□ Blending-with a splitter gate you will be able to run more coal to the 4 belts because you will have 2 paths to supply coal to.
NSP-Minnesota	A.0003000.758	Reliability/Performance Enhancement	JWF0 - Jeffers Tools-Equip	155,000	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001573.107	Reliability/Performance Enhancement	BDS0C Vehicle Fueling Station	154,854	2022	Construction of a fill station for gasoline and diesel fuel to supply plant vehicles at Black Dog. This includes labor and materials to install the necessary tanks, piping, valves, containment, structures, and other equipment as necessary to perform this function.	As part of the plant decommissioning and remediation beginning in 2015, the large underground fuel tanks in the yard will be removed from service as part of the cleanup. This will leave Black Dog with no method of filing the on-site vehicles with gasoline or diesel fuel. These vehicles are not licensed for road traffic, so it is not legal (or practical) to drive to the gas station when they are low on fuel.
NSP-Minnesota	A.0003000.658	Reliability/Performance Enhancement	ASK0C- Tool Blanket	150,000	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001579.165	Reliability/Performance Enhancement	RIV7C Inst Circ Water Pumps-10860	150,000	2022	Provide one spare circulating water pump and motor for Riverside. The spare pump and motor will be identical to the existing installed pumps.	Minimize plant downtime in the event of another circulating water pump failure. The plant is de-rated if one circulating water pump is out of service. A spare circulating water pump and motor will allow the failed pump to be replaced in a few days.
NSP-Minnesota	A.0001707.012	Environmental Enhancement	DKR Dakota Range PCMM New-23576	142,000	2022	To better understand the potential impacts to birds and bats, Xcel Energy executes a post-construction□ mortality monitoring (PCMM) study using methods developed in conjunction with U.S. Fish and Wildlife□ Service and Minnesota Department of Natural Resources as part of a Bird and Bat Conservation□ Strategy (BBCS).	The BBCS called for conducting a post-construction mortality monitoring study with the primary□ objectives of providing a summary of documented fatalities, presenting estimates of searcher efficiency□ and carcass persistence, and calculating fatality rates adjusted for bias during the study. The secondary□ objective was to monitor all turbines specifically for eagle and other large bird fatalities.
NSP-Minnesota	A.0001611.013	Environmental Enhancement	PVW0-PVW Eagle Take Permit New-2148	141,500	2022	This project supports the activities required to coordinate and manage an Eagle Take Permit at Pleasant Valley Wind Farm. The tasks associated with this include: Point Count Surveys, Aerial Nest Survey, Weekly Nest Monitoring, Application Fee, and Consulting Services.	Nesting eagles were observed in March 2016 on the Pleasant Valley Wind Farm. Xcel notified State and Federal agencies and an Eagle Take Permit is required. The agencies involved are MDNR (Minnesota Department of Natural Resources), USFWS (US Fish and Wildlife Services), and EERA (Energy Environmental Review and Analysis).
NSP-Minnesota	A.0001565.141	Reliability/Performance Enhancement	WLM2-New Unit 2 Hotwell Pump-24708	141,418	2022	Project to procure and install a new 250GPM hotwell pump with new pump rotating assembly, upper and lower casings, impellers, seals and bearings. This would be a like-for-like replacement of the existing Allis-Chalmers 51082 model. Project costs would include mounting, electrical work and repiping.	Our existing Unit 2 hotwell pump has seen large amount of pitting in the lower casing when it was recently opened up to repair the rotating assembly which was seeing erosion damage as a result of rubbing from the pump packing. While the pump rotating assembly has been replaced before, the casings are still original to the late 1940's. We have performed sand-blast and welding repairs on them but soon they will be so worn that these types of repairs will not be an option. This is the only Hotwell pump for Unit 2, there are no redundant pumps.
NSP-Minnesota	A.0001565.128	Reliability/Performance Enhancement	WLM1-Replace U1 B12 Screw Auger 123	132,214	2022	Replace six fuel metering screw augers in Bin 12. This project will include making the flat floor modifications that were previously performed in Bin 22 to great success in the September 2019 outage.	These Bin 12 augers were last replaced in early 2017. The plant has observed a typical life span on these augers lasting between 5-6 years. During recent Capital budget cycles this project got pushed out to 2025 so an attempt to bring it back closer to the normal replacement year in the cycle was made. The augers would have failed by 2025 and would have required replacement either by Emergent Capital funding or O&M funding.
NSP-Minnesota	A.0001562.184	Reliability/Performance Enhancement	REW1-C6 Ash Conveyor-24590	125,765	2022	This project will replace all aspects of the C6 fly ash conveyor; including tub, rotating assembly, motor, drive, gearbox, etc.	The C6 conveyor is located in an extremely corrosive area and is getting worn out past the point of repair. The last time C6 was replaced was in 2015, so it is nearing it's end of life. Once C6 has a catastrophic failure, the unit will be offline until it is replaced. When C6 is broken down, the ash will have to be manually moved by shovel and wheelbarrow, this greatly increases the chance of injury for the Operations staff.
NSP-Minnesota	A.0001562.169	Reliability/Performance Enhancement	REW2-Electronic Overspeed-24219	121,084	2022	This project will replace the current mechanical overspeed with an electronic overspeed system. The current overspeed system involves a mechanical trip mechanism and a single channel electronic system.	The lack of redundancy with the electronic overspeed means that the mechanical system must be the primary trip method, and since it's the primary method it must be tested annually. There is a large risk involved with over speeding a turbine to test the mechanical overspeed trip, the installation of an electronic overspeed will negate the need to do many of these tests.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001611.011	Renewable and New Generation	PVW1-Transformer Replacements	118,379	2022	Replace failed transformer in Vestas V100 wind turbines. Cost includes the crane and labor for overhaul of the transformer	Upon failure, the wind turbine can not be run
NSP-Minnesota	A.0001580.009	Renewable and New Generation	CWF1-Transformer Replacements	115,884	2022	Replace failed transformer in Vestas V100 wind turbines. Cost includes the crane and labor for transformer overhaul	Upon failure, the wind turbine can not be run
NSP-Minnesota	A.0001579.170	Reliability/Performance Enhancement	RIV0-NE Fence Replacement-24744	110,838	2022	Replace perimeter fence line on the North and East sides of the Riverside Plant property.	Fence line is in poor condition. Many posts are rotting at ground level, barbed wire topping is in poor condition, and some fence fabric has been compromised. Perimeter fence is required by building code in the City of Minneapolis for commercial property. Existing fence will not pass an inspection in the near future.□ □ Management decision for site security infrastructure given recent civil unrest and present condition of fence. If the existing fence were to be breached, we may need to shut down the site for a few days to resolve/clean up whatever mess/damage occurs.
NSP-Minnesota	A.0001574.302	Reliability/Performance Enhancement	SHC99-CESP-2021 #2 CC Rotor Asmbl-2	107,592	2022	Change out the rotating hammer assembly with CESP rotor Assembly on Sherco #1 Coal Crusher. Also change out worn / thin cage pieces, and wear plating inside the crusher.	Crusher is worn out and cannot provide a consistent coal fineness to the plant. This in turn effects the efficiency , of the burning, of the coal in the plant.
NSP-Minnesota	A.0001611.010	Renewable and New Generation	PVW1-Generator Replacements	106,227	2022	Replace failed generators. Cost includes the crane and labor for generator overhaul	Upon failure, the wind turbine can not be run
NSP-Minnesota	A.0001562.137	Reliability/Performance Enhancement	REW2C Repl U2 Turb EH Govern	106,010	2022	This project will replace the Unit 2 turbine mechanical-hydraulic governor with an electro-hydraulic system. The mechanical speed governor, speed changer and both operating cylinders (primary and secondary) will be removed. A new hydraulic cylinder and Woodward PLC will be added.	The current mechanical-hydraulic control system on the turbines occasionally can bind up on a moment's notice and require Operations to adjust with a pipe wrench.
NSP-Minnesota	A.0001574.306	Reliability/Performance Enhancement	SHC99-CESP 2022 #1 CC Rotor Asmbl-2	105,882	2022	Change out the rotating hammer assembly with CESP rotor Assembly on Sherco #1 Coal Crusher. Also change out worn / thin cage pieces, and wear plating inside the crusher.	Crusher is worn out and cannot provide a consistent coal fineness to the plant. This in turn effects the efficiency , of the burning, of the coal in the plant.
NSP-Minnesota	A.0001562.178	Reliability/Performance Enhancement	REW2-U2 Lower Air Heater Basket-245	105,673	2022	This project will replace the lower air heater baskets on Unit 2. The lower baskets are on a 5 year replacement cycle due to the high amount of dew point corrosion they see.	Once the air heater baskets reach the point where there is too much corrosion, sections of the baskets must be blanked off to prevent mixing between flue gas and supply air from the FD. If mixing occurs, emissions, boiler burn characteristics, and the ID fans ability to control furnace pressure are impacted. Once too many sections of the air heaters are blinded, the unit will need to be pulled offline.
NSP-Minnesota	A.0001573.298	Reliability/Performance Enhancement	BDS5C Repl Gas Ctrl Vlvs-25045	104,365	2022	Replacement of the Unit 5 CT gas control valves, including the A, B, C and Pilot stage. Project is to exchange the existing valves with new or refurbished valves and send the old valves offsite for refurbishment under O&M or sale. This project includes the valves, actuators, and servos. Includes labor to removal and reinstall valves, costs for the new equipment, and calibration.	This work is scheduled every 4 - 5 years to maintain unit reliability. Last performed during 2017/2018 HGP outage under a combination of O&M and Capital. If not performed, valves could leak by and/or stick which would cause failed starts and/or unit trips and derates. This project was flagged during the 2022 O&M budget create cycle as being a good candidate for the capital replacement program which has been used at other locations.
NSP-Minnesota	A.0001574.463	Reliability/Performance Enhancement	SHC3-U3 Stock Fdr Speed repl	103,369	2022	Replace the original feeder speed controls for 9of the 10 Stock coal feeders on Unit 3. One already had their speed controls replaced several years ago. They were our pilot tests for the Stock Feeder control conversion. The remaining 8 feeder controls have been in-service since 1987.	Legacy equipment that is not supported anymore by Stock Feeder Corp. We are currently using the parts from the Unit 1 feeders after they were upgraded in 2012.
NSP-Minnesota	A.0003000.699	Reliability/Performance Enhancement	SER-SMC-Misc Tools & Equipment	100,000	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001573.300	Reliability/Performance Enhancement	BDS5C Repl Battery Charger-24633	99,694	2022	Replace U5 Battery charger with two fully redundant battery chargers.	U5 battery charger has had two SCR firing board fail since the initial install of this unit. the second failure in 4/2020 revealed that the OEM of the charger is closed and was not acquired by another company. Other battery charger companies will not work on the CPI charger currently in service. □ □ Full redundant chargers are recommended because the DC turning gear on U5. In the event of a failed battery charger the unit has a short window to stay on turning gear without issue. This could extend unit outages on top of charger replacement time to remove a bow from the rotor.
NSP-Minnesota	A.0001574.840	Reliability/Performance Enhancement	SHC99-Chemistry Lab Fire Protectn-2	97,117	2022	Replace the existing Halon Fire Protection system in the Chemistry Lab. From 2019 Sherco All Risk Loss Prevention Report	The system was removed from service some time ago but Fire Protection is still required for this area.□ Halon is an old system and is very difficult to procure parts and materials for. Restoring the existing□ system is not feasible when there are modern gaseous systems that can replace it.
NSP-Minnesota	A.0001573.296	Reliability/Performance Enhancement	BDS0C Repl Diesel Fire Pump-25043	97,087	2022	This project includes the replacement of the diesel engine driven fire pump rotating internals as well as removal and reinstallation costs (labor and services). The shaft has experienced extensive mechanical damage that will require shaft replacement. Removal and install of the pump requires mobilization of a crane to the screenhouse area as well as opening of the screenhouse roof. Pump is likely in poor condition due to length of time in operation and condition of other pumps using the MN River water.	The pump is required for fire protection of the power plant in case of a blackout, for and proper fire code compliance. Without the diesel fire pump in service, the only fire protection available to the plant is with the cooling water pumps which are electric motor driven. These pumps would not be able to provide protection during the blackout. Furthermore, the diesel fire pump may fail during the emergent operation and therefore place the integrity of the power plant in jeopardy. Replacing the pump (versus repairing) will also expedite the project schedule and minimize the amount of time the plant is without the diesel fire pump for fire protection purposes. There have been continuous O&M costs associated with patch repairs that have increased in frequency and scope.
NSP-Minnesota	A.0001573.120	Reliability/Performance Enhancement	BDS2 -Rplc Circ Pump Disch Valves -	96,669	2022	Replace Unit 2 circulating water pump discharge valves (42") and actuators.	The existing valves were installed in 2002 and no longer seal effectively, which presents hazards to the pumps (could spin backwards and damage/disassemble pump) and personnel during maintenance. The valves have non-serviceable seals molded into the disc and seat that are worn out. The actuators were reused from the previous installation and require frequent adjustment and overhaul due to worn components.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001579.167	Reliability/Performance Enhancement	RIV10-U10 Econ FW Cond XOver ISO-24	95,043	2022	Add automatic double block and bleed capability to the feedwater system on Unit 10 that cross connects to the condensate system. This would require automation of two existing high pressure valves with actuators, and addition of a small high pressure bleed valve as well. This is to provide automatic double isolation and bleed of the feedwater which leaks into the condensate system after shutdown and damages piping and supports due to severe water hammer.	The severe water hammer from this design problem has damaged pipe and pipe supports on numerous occasions in the past and has resulted in significant repair costs. It is absolutely necessary that the plant install a long term fix to this issue to prevent further damage to the piping, supports, and insulation. Even if the leaky valve is repaired, it does not stay leak tight for very long, and then the problem repeats. Additional automation of valves can provide the redundancy needed to make sure the hot feedwater cannot leak into the condensate after the unit is shut down.
NSP-Minnesota	A.0001579.168	Reliability/Performance Enhancement	RIV9-U9 Econ FW Cond X-Over ISO-247	95,043	2022	Automate two valves and install a 3rd automated valve on the Feedwater Condensate cross connection to assure complete isolation on unit shutdown. This project provides for automated double block and bleed protection.	See above. It is critical that the cross over circuit between high pressure feedwater and low pressure condensate not leak by after shutdown. However, by relying on only one valve - this is not possible because the valve will eventually leak, even after repair. A double block and bleed set up is necessary to assure the damage to piping and supports does not continue to occur due to this design flaw and insufficient isolation between the two systems. Currently the one automated valve on the system allows leakage when closed which results in severe condensate system water hammer which has damaged pipe, hangers, and insulation on numerous occasions requiring costly repairs.
NSP-Minnesota	A.0001562.133	Reliability/Performance Enhancement	REW1C Repl U1 Turb EG Governor	90,600	2022	This project will replace the Unit 1 turbine mechanical-hydraulic governor with an electro-hydraulic system. The mechanical speed governor, speed changer and both operating cylinders (primary and secondary) will be removed. A new hydraulic cylinder and Woodward PLC will be added.	The current mechanical-hydraulic control system on the turbines occasionally can bind up on a moment's notice and require Operations to adjust with a pipe wrench.
NSP-Minnesota	A.0001573.207	Reliability/Performance Enhancement	BDS2C-Install Lube Oil Trip Manifol	89,644	2022	Install a Pressure Status Manifold and redundant pressure transmitters to implement the lube oil pressure Turbine trip at Black Dog Unit 2.□ □ This project includes all Emerson DCS hardware and software and logic and HMI screen updates for the new equipment, instruments, and any digital and analog Inputs and Outputs accordingly. And this project includes all wiring and power protection for the new equipment.	The lube oil pressure trip is a critical trip for plant equipment protection. The installation of a Pressure Status Manifold (PMS) including a three transmitter and 2/3 transmitter logic configuration would ensure this critical trip is implemented in a reliable and fault-tolerant manner. The current lube oil pressure trips are 1 of out 1 logic, meaning a single component failure could result in a spurious trip or the loss of the automatic trip function.
NSP-Minnesota	A.0001575.201	Reliability/Performance Enhancement	HBC0C No. 2 IA Comp Repl-24690	88,481	2022	Replace the existing #2 Instrument Air Compressor, which is a Ingersoll Rand H100A Oil Free Rotary Screw Air Compressor, with a new Ingersoll Rand H75A Oil Free Rotary Screw Air Compressor. The new air compressor will have the same external dimensions and electrical/piping connections as the existing compressor, and can be installed on the existing mounting pad. The existing air compressor is slightly oversized based on the historical instrument air consumption of the plant. The new compressor will be smaller and better matched to the instrument air demand of the plant, which will reduce the amount of load/unload cycles. The cost of the 75 HP compressor is 18% lower than a 100 HP model. The scope of this project is identical to the 2020 Emergent Project request to replace the failed #1 Instrument Air Compressor.	The High Bridge Plant has two 100% capacity air compressors that supply both House and Instrument Air. The existing #2 Instrument Air Compressor was installed in 2007 and is reaching the end of life for an oil-free rotary screw machine, which has a 15 year design life according to the OEM. The original #1 Instrument Air Compressor, which was identical, suffered a gearbox and air end failure in 2020 and was not economical to repair. Failures of air ends and/or gearboxes on these machines are very expensive to repair(approx. 60 to 90% the cost of a new machine). It is very likely that the #2 Instrument Air Compressor will require maintenance on the gearbox or air ends within the next 5 years. It is likely that the unloader valve and motor will also require maintenance within the next 5 years. Taking these factors into consideration, it is anticipated that the most economical option will be to replace the entire air compressor with 75 HP unit instead making repairs to the existing 100 HP unit.
NSP-Minnesota	A.0003000.697	Reliability/Performance Enhancement	SER-MMR- Misc Tools & Equip	86,630	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001576.023	Renewable and New Generation	GDM Climb Lift System -24572	86,625	2022	Purchase and installation of 3S Climb Lift System for each wind turbine.	Climb assist that is currently installed is unusable due to concerns that it may interfere with fall protection device. The 3S Climb Lift System is configured different than the current climb assist system and does not have the same concern. Further, the 3S Climb Lift System reduces the possibility of injury due to climbing, as it is a ride along system.
NSP-Minnesota	A.0001562.189	Reliability/Performance Enhancement	REW1-12 LP FWH-24875	85,965	2022	The project will replace 12 low pressure feedwater heater in it's entirety. 12 heater is a late 1940's vintage Foster Wheeler 4-pass feedwater heater.	12 LP FWH currently has a tube leak and will need to be retubed. Currently 28% of the tubes in the 1st pass are plugged - additional required tube plugging will cause accelerated tube wear in in-service tubes. Due to the age of the equipment it is likely that the remainder of the internals (baffles, tube sheet, etc.) are also in poor condition. It is roughly the same price to replace the heater as it would be to retube and replace internals, so we are going to plan to replace. The FWH can be OOS for a short while but eventually the increase in boiler temp and extra strain on the turbine could cause long-term issues.
NSP-Minnesota	A.0001574.292	Reliability/Performance Enhancement	SHC0 -Rplc DS Pmphouse Pipe vlv'20-	85,876	2022	Replace piping and valving in the Dust Suppression pump house by the recycle basin. Inspect piping for holes and thinning, and talk with Ops on problem valves.	Environmental - DS water is used for majority of dust control in the coal yard. Piping is corroded and valving is reported to not be working properly.
NSP-Minnesota	A.0001573.274	Reliability/Performance Enhancement	BDS5-Repl 5 CT Compartment Dampers-	85,691	2022	Replace the Unit 5 combustion turbine enclosure ventilation dampers to make them more reliable, less prone to actuator failure. This project will replace the existing pneumatic-actuated dampers with gravity-actuated passive dampers. This project is intended to be completed during the Fall 2022 major overhaul as this ductwork will already be removed as part of that project.	The Unit 5 combustion turbine enclosure ventilation dampers are actuated by pneumatic actuators which are prone to failure. The failure of a damper actuator can only be visually observed, so may continue for longer periods of time before being discovered. When a ventilation damper fails closed, the enclosure is not properly ventilated, and higher enclosure temperatures result. Often, when the pneumatic actuators fail, they are accompanied by instrument air leakage, which can reduce the CT instrument air pressure to dangerously low levels. There have been unit trips and other reliability issues as a result of low instrument air pressure when these dampers have failed in the past.
NSP-Minnesota	A.0005014.142	Renewable and New Generation	BS10-Blazing Star 1 Build Furn & Eq	85,000	2022	Building equipment and office furniture blanket for O&M building initial setup and sustainment.	Furniture and equipment for new site

Company	Project ID	New Grandparent	Project Name	YE Amt ($s)	Activity Year	Project Description	Project Justification
NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0005014.144	Renewable and New Generation	FTW0-Foxtail Building Furn & Equip	85,000	2022	Building equipment and office furniture blanket for O&M building initial setup and sustainment.	Furniture and equipment for new site
NSP-Minnesota	A.0001579.150	Reliability/Performance Enhancement	RIV10-Repl Unit 10 FW Reg Valve-241	83,520	2022	Replace Unit 10 Feed Water Regulating Valve. The original valve has performed poorly. Plugs frequently with magnetite which can cause a forced outage to address issues. The new valves will require a minimum of annual maintenance with replacement of parts and exchange of the cage to keep the valve functional.	The new valves will be a more robust design for severe duty and designed not to plug with magnetite (rust.) They will be designed to perform in service for 3 - 4 years between maintenance cycles.
NSP-Minnesota	A.0001579.153	Reliability/Performance Enhancement	RIV9-Replace HP FW valve Unit 9-241	83,107	2022	Replace the existing HP Feed Water Regulating Valve on Unit 9. The current valve has trim that plugs with magnetite on a regular basis. The new FW valve will be designed not to plug up and to only need maintenance every 3 - 4 years.	The current FW valve plugs up every 12 months and forces repair and internal component change out. The existing valves have been high maintenance and have performed poorly. They have caused generating unit down time to address problems. The new valve will be a more robust and severe service valve good for 3 - 4 year maintenance cycle.
NSP-Minnesota	A.0001579.115	Environmental Enhancement	RIV0-U0 Install CEMS power red	79,348	2022	This project will install a redundant power feed to the Continous Emissions Monitoring System (CEMS) and install a local UPS source to the main computer.	The Continous Emissions Monitoring System (CEMS) is required to operate reliably for environmental monitoring and reporting and to reduce unit emissions. It was discovered during an environmental vulnerability assessment that one major vulnerability is that the CEMS system has only one power source with very short and limited backup power.
NSP-Minnesota	A.0001579.135	Reliability/Performance Enhancement	RIV0C 62 Battery Replace	77,544	2022	Replace Riverside 62 Battery	Station batteries have a limited operational life, this battery is expected to reach it's end of life around 2023. The load test results have shown this battery has already degraded to 85% capacity meaning it is only capable of 6.8 hours vs the 8 hr design.
NSP-Minnesota	A.0001574.358	Reliability/Performance Enhancement	SHC1C North Blr Bldg Roof Repl	75,497	2022	Replace the north section of the boiler building roof	The roof is in poor condition and leaks will damage sensitive equipment inside the building.
NSP-Minnesota	A.0001579.073	Reliability/Performance Enhancement	RIV0C -- Replace 61 Battery	73,899	2022	Replace Riverside 61 Battery	Station batteries have a limited operational life, this battery is expected to reach it's end of life around 2016. This battery is a non-NERC PRC-004 battery but provides back-up power to emergency lighting on the Unit 7 side of the Riverside Power Plant.
NSP-Minnesota	A.0001574.769	Reliability/Performance Enhancement	SHC3C CR HVAC PLC 2nd Flr Replace	70,003	2022	Replace the PLC, remote panels, damper actuators and other instruments as needed. Work could be done during an outage or in spring or fall moderate temperatures.	The existing equipment is obsolete and repairs are becoming difficult or not possible. Higher temperatures could have an adverse effect on control room equipment.
NSP-Minnesota	A.0001575.200	Environmental Enhancement	HBC8C SCR Hot Gas Recirc Imp-25051	68,607	2022	The SCR ammonia vaporization skid uses hot gas recirculation from the HRSG gas side to vaporize the aqueous ammonia. The existing source of hot gas comes upstream of the HP Economizer 2. Under typical conditions the temperature of the gas at this location is 620 to 670 F. The SCR fan is rated at 800 F. This project will install a new 8" piping run approximately 30 ft long that extracts hotter gas from upstream of the HP Evaporator. An 8" metal seated butterfly valve with a pneumatic modulating actuator will be used to admit the hotter gas into the existing 12" piping on the inlet of the SCR fan. The pneumatic valve will be controlled with an Ovation PID to raise the temperature of the gas entering the SCR fan and control it to 775 F for optimal performance and longevity of the SCR. There will be one manual 8" metal seated butterfly valve installed for isolation purposes.	The temperature of the exhaust gas at the current location is marginal for the amount of aqueous ammonia we need to vaporize, and our vaporizer outlet temperatures are lower than design. Low vaporizer outlet temperatures contribute to increased fouling of the ammonia injection grid. This project will put more heat into the vaporizer, which will help keep the vaporizer outlet temperatures closer to the design values.
NSP-Minnesota	A.0001575.199	Environmental Enhancement	HBC7C SCR Hot Gas Recirc Imp-25050	68,557	2022	The SCR ammonia vaporization skid uses hot gas recirculation from the HRSG gas side to vaporize the aqueous ammonia. The existing source of hot gas comes upstream of the HP Economizer 2. Under typical conditions the temperature of the gas at this location is 620 to 670 F. The SCR fan is rated at 800 F. This project will install a new 8" piping run approximately 30 ft long that extracts hotter gas from upstream of the HP Evaporator. An 8" metal seated butterfly valve with a pneumatic modulating actuator will be used to admit the hotter gas into the existing 12" piping on the inlet of the SCR fan. The pneumatic valve will be controlled with an Ovation PID to raise the temperature of the gas entering the SCR fan and control it to 775 F for optimal performance and longevity of the SCR. There will be one manual 8" metal seated butterfly valve installed for isolation purposes.	The temperature of the exhaust gas extracted at the current location is marginal for the amount of aqueous ammonia we need to vaporize, and our vaporizer outlet temperatures are lower than design. Low vaporizer outlet temperatures contribute to increased fouling of the ammonia injection grid. This project will put more heat into the vaporizer, which will help keep the vaporizer outlet temperatures closer to the design values.
NSP-Minnesota	A.0001565.065	Reliability/Performance Enhancement	WLM1C C7 & C8 VFD	65,298	2022	Install Variable Frequency Drive's on the new C7 & C8 conveyors. Per a discussion with plant personnel on 1-29-15, this project will also cover the installation of new VFD's on the plant C3 and C4 conveyors. Our station electricians have received material quotes at $7000 per VFD and about 200 man-hours in labor to install VFD's on all four conveyors. An additional project, WLM-17290, that was created to facilitate installtion of new VFD's on C3 and C4 has been cancelled as a result	Install drives to slow the new conveyors down saving wear and future O&M costs
NSP-Minnesota	A.0003000.748	Renewable and New Generation	BS10-Blazing Star 1 Tools and Equip	65,000	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001576.500	Reliability/Performance Enhancement	GDM Emergent Fund -Wind prod	64,633	2022	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001574.805	Reliability/Performance Enhancement	SHC0-Coal conveyor F.P. 20631	64,010	2022	From 2014 All Risk Loss Prevention Report for Sherco, Recommendation SHC P 06-11.□ Extend the existing sprinkler protection for the following coal conveyors to include inside the metal enclosures over selected portions of the conveyors:□ ¿ Conveyor 52 located on the upper level of the east side of the Coal Storage Barn□ ¿ The head end of Conveyors 4A and 4B□ ¿ The tail end of Conveyors 4A and 4B□ ¿ The head end of the No. 1 Emergency Reclaim conveyor□ ¿ The tail and head end of Conveyor 2A□ ¿ The east end of Conveyor 1A□ ¿ The east end of Conveyor 55□ ¿ The head end of Conveyor 51□ ¿ The Crusher end of Conveyor 6A and 6B	Currently, these conveyors are sprinkler protected except for the enclosed portions indicated above. If a fire occurs on these conveyors inside the enclosures, there would be no sprinkler protection to control it until the fire exited the enclosure, which would result in greater damage than would otherwise occur. Therefore, this protection should be installed. Reference NFPA 850, Section 7.4. The Loss Expectancy associated with this condition is estimated at $5,000,000. The estimated cost to complete is $75,000.
NSP-Minnesota	A.0001562.188	Reliability/Performance Enhancement	REW0-Sample Panel & Analyzers-24612	60,569	2022	This project will replace the boiler water sample panel, silica analyzer and phosphate analyzer.	This sample station is necessary to insure proper water chemistry in both boilers.
NSP-Minnesota	A.0003000.679	Reliability/Performance Enhancement	RIV0C-Tool Blanket	60,000	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001574.666	Reliability/Performance Enhancement	SHC3C CT Vibration System	58,604	2022	Connect the two Bentley vibration systems to the plant computer to allow for trending and real time display of equipment condition.	The original project did not connect the equipment to the plant computer. Thus current readings and trending functions are not available and the units provide minimal value.
NSP-Minnesota	A.0001573.203	Reliability/Performance Enhancement	BDS5C-Repl U5 Fuel Gas Heater CV	58,148	2022	Replace the Unit 5 Fuel Gas Heater Feedwater Control Valve (1", 1500#) and actuator with a severe duty control valve. Project includes engineering, craft labor, materials, and other costs to support the project.	HP Feedwater pressure drop across this control valve reduces from approximately 2,000 psig boiler feed pump discharge pressure to approximately 100 psig. This is severe duty, and the existing control valve is not up to the duty. The existing control valve must be disassembled, inspected, and cleaned annually, to avoid control valve sticking and other problems experienced. The new control valve would be a true severe duty control valve and provide more reliable service without requiring ongoing maintenance and valve issues associated with the current design. This valve is critical for maintaining Unit 5 fuel gas temperature, which causes unit runbacks and trips if not within control.
NSP-Minnesota	A.0001565.122	Reliability/Performance Enhancement	WLM2C U2 Static Exciter	57,520	2022	Replace obsolete Basler 200 Exciter - installed in 2002 - with the NSP fleet standard Basler DECS 400 series Static Exciter.	This exciter has a history of loss of field trips, and has had to have contactors and other parts replaced. The exciter is an obsolete model, and OEM parts are no longer available, leading to work-around equivilencies to keep the unit running.
NSP-Minnesota	A.0001573.272	Reliability/Performance Enhancement	BDS5-Repl U5 LP Drum Feedwater CV-2	56,107	2022	Replace the Unit 5 LP Drum Feedwater Control Valve (1", 1500#) and actuator with a severe duty control valve. Project includes engineering, craft labor, materials, and other costs to support the project.	HP Feedwater pressure drop across this control valve reduces from approximately 2,000 psig boiler feed pump discharge pressure to approximately 100 psig. This is severe duty, and the existing control valve is not up to the duty. The existing control valve must be disassembled, inspected, and cleaned annually, to avoid control valve sticking and other problems experienced. The new control valve would be a true severe duty control valve and provide more reliable service without requiring ongoing maintenance and valve issues associated with the current design. This valve is critical for maintaining Unit 5 LP Drum Level, which will trip the unit on low and high levels if not within control. Proper drum level control is the most important boiler operating parameter from a safety perspective as well. There have been historical conditions where the leakage by this valve was so significant that drum level was being controlled with the valve at 0% (due to leakage through the plug / seat).
NSP-Minnesota	A.0003000.578	Reliability/Performance Enhancement	SER0C MMR Video Probe 2022	55,000	2022	MMR-Replace Video Probe iPLEX	MMR-Replace Video Probe iPLEX
NSP-Minnesota	A.0003000.669	Reliability/Performance Enhancement	HBC0C HB CC Tool Blanket	50,000	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001574.731	Reliability/Performance Enhancement	SHC0C Fuel Oil Pump F.P.	50,000	2022	From 2014 All Risk Loss Prevention Report for Sherco, Recommendation 06-15: □ Install automatic sprinkler protection over the fuel oil pumps in the Auxiliary Boiler Building designed for 0.25 GPM/ft2 over a design area of 3,000 ft2 with a 250 GPM hose stream allowance.	There are four fuel oil pumps in this room. Two of them supply the Auxiliary Boiler and are seldom used. The other two supply fuel oil to the Unit 1 and 2 boilers for ignition and are used in the coal mill starting process. If a leak should occur around these pumps, there is the potential for the leak to become ignited starting a fire. Since there is no sprinkler protection in this area, such a fire could spread throughout the Administration areas destroying this portion of the Main Building. It could also spread outside the room to the turbine under deck mezzanine area and lower boiler areas, doing damage to the Unit 1 turbine generator and boiler. There is sprinkler protection in the turbine under deck area and, although there are no sprinklers in the boiler area and combustibles are limited, so a fire could burn out or be manually controlled at this point. However, there could still be enough damage done to affect Unit 1. Therefore, sprinkler protection is recommended. Reference NFPA 850, Section 7.3.9. The Loss Expectancy associated with this condition is estimated at $40,000,000. The estimated cost to complete is $300,000.
NSP-Minnesota	A.0001561.500	Reliability/Performance Enhancement	IVH Emergent Fund -Other prod	46,916	2022	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001579.169	Reliability/Performance Enhancement	RIV7-Riv 7 Automate Cond. Xover Vlv	45,988	2022	Automate the 30" condenser water box cross over valve so that the valve can be operated remotely. Currently the valve has to be opened and closed with a large chain hand wheel by an operator who has to leave the control room for up to 10 minutes, during a unit transition period, to perform this task.	This is a critical valve that needs to operate when the circulating water system transfers from one pump to two, or back to a single pump. Having to operate this valve manually risks a system and unit trip due to the extra time it takes and the lack of adequate personnel to monitor the system while in transition. Automating this valve will reduce the chance of unit trips due to a malfunction or delay in operating this critical valve.
NSP-Minnesota	A.0003000.661	Reliability/Performance Enhancement	BDS0C Tool Blanket	42,850	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001573.102	Reliability/Performance Enhancement	BDS0C Office Area Heaters	42,010	2022	Install (2) 360,000 BtuH electric boilers for heating hot water loops while plant steam is not in operation, there are (2) separate hot water loops for the area. One loop serves the baseboard radiation, the other serves the hot water coil in the air handler rooftop unit	The current HVAC in the Engr/Supt office is dependent on the chiller system in the warmer months and depends on the Plant steam heat in the colder months. Due to Units 3&4 retiring, the heating units to be installed will be electric boilers that will operate when the plant steam is not operating during shoulder months of the year.
NSP-Minnesota	A.0001559.500	Reliability/Performance Enhancement	BLL Emergent Fund -Other prod	41,803	2022	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001575.171	Reliability/Performance Enhancement	HBC0 - Rmv & Rplc BFP Spare YR1 -23	40,958	2022	Supervision, labor, and consumables to remove boiler feed pump and install the rotating CESP pump in it's place.	Boiler feed pumps are severe duty critical plant equipment. Periodical overhauls are required. Two pumps are currently showing indications of thrust bearing degradation.
NSP-Minnesota	A.0001565.162	Reliability/Performance Enhancement	WLM1-Replace U1 Slurry Density Mete	40,334	2022	Project to replace existing slurry density meter with newer model that measures both density and material flow. This project would also incorporate the necessary piping modifications and electrical conduit modifications to install the new meter.	This newer meter is more robust and will last much longer than the existing models which we have had to replace twice in the past two years. This newer model also has the added benefit of measuring multiple parameters including density and flow.
NSP-Minnesota	A.0001565.161	Reliability/Performance Enhancement	WLM2-Replace U2 Slurry Density Mete	40,182	2022	Project to replace existing slurry density meter with newer model that measures both density and material flow. This project would also incorporate the necessary piping modifications and electrical conduit modifications to install the new meter.	This newer meter is more robust and will last much longer than the existing models which we have had to replace twice in the past two years. This newer model also has the added benefit of measuring multiple parameters including density and flow.
NSP-Minnesota	A.0003000.567	Reliability/Performance Enhancement	SER0C MMR Alloy Analyzer 2022	38,000	2022	MMR-Replace Alloy Analyzer 2022	MMR-Replace Alloy Analyzer 2022
NSP-Minnesota	A.0001704.014	Environmental Enhancement	FBW Freeborn PCMM NEW-23575	37,500	2022	To better understand the potential impacts to birds and bats, Xcel Energy executes a post-construction□ mortality monitoring (PCMM) study using methods developed in conjunction with U.S. Fish and Wildlife□ Service and Minnesota Department of Natural Resources as part of a Bird and Bat Conservation□ Strategy (BBCS).	The BBCS called for conducting a post-construction mortality monitoring study with the primary□ objectives of providing a summary of documented fatalities, presenting estimates of searcher efficiency□ and carcass persistence, and calculating fatality rates adjusted for bias during the study. The secondary□ objective was to monitor all turbines specifically for eagle and other large bird fatalities.
NSP-Minnesota	A.0001573.273	Reliability/Performance Enhancement	BDS5-U5 Overspeed Probe 24030	35,705	2022	Currently U5 overspeed protection is only equipped with two speed probes, and there is no redundancy available if either probe or associated wiring and controls are unavailable. This project would be to install a third speed probe that can be wired up to enable two out of three voting.	Overspeed protection needs to have a high level of redundancy and accuracy to prevent catastrophic damage to the unit. The additional probe will also allow for 2 out of 3 voting which will be more fault tolerant and allow for 2 out of 3 voting if there are any issues with a particular speed probe, card, wiring, etc.
NSP-Minnesota	A.0001571.098	Reliability/Performance Enhancement	ANS0C PDC Bard Unit Repl-24736	32,788	2022	HVAC System Replacement	Bard units no longer supported by Manufacture and parts no longer available
NSP-Minnesota	A.0003000.707	Reliability/Performance Enhancement	C100C CSC Aerosol Can Crusher	32,180	2022	Replace existing aerosol can crusher.	Aerosol can crusher - our operating experience with three previous aerosol can crushers indicate that□ they last three years. The existing crusher was installed in 2003. The manufacture of the current crusher□ believes the service life under our operating conditions should be at least 5 years; that is two years longer□ than our experience with other designs. Crushers have complex linkages and controls and closed□ tolerances which become more problematic as the equipment ages, resulting in improper cycling of the□ equipment, jams, and miss cycles of the hydraulic ram causing equipment damage. Environmental□ conditions for this equipment are relatively harsh with paint spray, wedged can parts, and high hydraulic□ forces. Once the machine becomes excessively worn, repairs become frequent and out of service times□ longer. Because of the relatively high payback from operating the aerosol can crusher and the storage□ limis for flammable liquids at the HWSF when the equipment becomes inoperative it is very important to□ repair or replace quickly. Because of recent changes in the facility's processes the life of this equipment□ has been extended. As of early 2011, the current can crusher is working better than previous models and□ is expected to last into 2016. Consequently, I believe replacement for the existing can crusher can be□ extended until 2016.
NSP-Minnesota	A.0003000.750	Renewable and New Generation	FTW0-Foxtail Tools and Equipment	30,000	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.662	Renewable and New Generation	BRDR Small Tools Equip	30,000	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.128	Renewable and New Generation	CWF Tools & Misc Equipment	30,000	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.667	Renewable and New Generation	GDM0C Grand Mead Cap Tool	30,000	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.678	Renewable and New Generation	PLV Tools Equip	30,000	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.749	Renewable and New Generation	CRW0-Crowned Ridge Tools-Equip	29,688	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.

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NSP-Minnesota	A.0001562.190	Reliability/Performance Enhancement	REW1-U1 Generator Field Breaker-249	27,765	2022	This project will replace the original obsolete 1949 vintage generator field breaker.	The 1949 vintage breakers are obsolete and in very rough shape. The Unit 1 breaker failed in the fall of 2020 and was temporarily repaired, but finding the correct parts was very difficult. This breaker is expected to fail again soon due to excessive damage/wear in the mica insulation bars which are not repairable. Should the breaker fail, the unit will be offline.
NSP-Minnesota	A.0001562.191	Reliability/Performance Enhancement	REW2-U2 Generator Field Breaker-250	27,765	2022	This project will replace the original obsolete 1949 vintage generator field breaker.	The 1949 vintage breakers are obsolete and in very rough shape. The Unit 2 breaker failed in the fall of 2020 and was temporarily repaired, but finding the correct parts was very difficult. This breaker is expected to fail again soon due to excessive damage/wear in the mica insulation bars which is not repairable. When the breaker fails, the unit will be forced offline.
NSP-Minnesota	A.0003000.752	Renewable and New Generation	FBWO Freeborn Tools and Equipment	27,273	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.751	Renewable and New Generation	LBW0-Lake Benton Tools-Equip	27,273	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.757	Renewable and New Generation	MWF0 - Mowers Tools-Equip	27,273	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001564.030	Reliability/Performance Enhancement	HNI0 Repl 130VDC Battery-25022	25,138	2022	130VDC battery installed in 2009 has multiple cells testing bad. 2021 trying to remove 2 cells from the string. 60cell 250amphour battery.	Battery is required for plant operation.
NSP-Minnesota	A.0001576.021	Environmental Enhancement	GDM Eagle Take New - 22846	25,000	2022	This project supports the activities required to coordinate and manage an Eagle Take Permit at□ the Grand Meadow Wind Farm. The tasks associated with this include: Point Count Surveys, Aerial□ Nest Survey, Weekly Nest Monitoring, Application Fee, and Consulting Services.	Nesting Eagles were observed in March 2016 on the adjacent Pleasant Valley Wind Farm. Xcel notified□ State and Federal agencies and an Eagle Take Permit is required. The agencies involved are□ MDNR (Minnesota Department of Natural Resources), USFWS (US Fish and Wildlife Services),□ and EERA (Energy Environmental Review and Analysis).
NSP-Minnesota	A.0001571.102	Reliability/Performance Enhancement	ANS0C Clear Well Pump Repl-24742	23,470	2022	Replace Clear Well Pump	Pump is 15 years old and sister pump failed in 2020
NSP-Minnesota	A.0001571.101	Reliability/Performance Enhancement	ANS4C PDC Bard Unit Repl-24739	22,952	2022	HVAC System Replacement	Bard units no longer supported by manufacturer and parts no longer available
NSP-Minnesota	A.0003000.563	Reliability/Performance Enhancement	SER0C CSC Drum Packer Crusher	21,000	2022	Replace existing drum packer/crusher.	The existing drum packer/crusher was purchased in 1987 and has been in service since the inception of the Hazardous Waste Storage Facility. It is used primarly for crushing metal 55-gallon drums (and occassionally other sizes) and for compacting empty containers inside of 55-gallon drums, which significantly reduce (waste volume) (e.g., PCB contaminated drums can be crushed and palletized to reduce storage space & transport space, in return reducing transportion costs). Minor repairs have been made to the lever that controls the up and down motion. Eventually, it is anticpated that this unit will fail due to the longevity of the equipment. The exact service life of this piece of equipment is unknown, but has been estimated to be 15 years. The existing crusher does not have the ability to crush overpack drums. It also has removable plates to go from packing of materials to crushing of drums. The plates are held in place by 3 bolts. Handling and positioning of the plates presents both lifting and other ergonomic concens. The existing model can also operate with the front door open, which presents additional safety concerns. □ New models have the capability of crushing overpacks (85-gal capacity drums). An emergency stop button shuts off all power at a touch. A safety interlock automatically shuts off the hydraulic power when the door is not completely closed. A universal head can be used for either compacting or crushing eliminating the removal of one of the plates. A piercer on this plate vents closed drums through the squeeze head.
NSP-Minnesota	A.0001573.294	Reliability/Performance Enhancement	BDS2C Inst Hydrogen Vlvs-25041	20,439	2022	Installation of a hydrogen block valve, regulator, flowmeter, and manual bypass valve for Unit 2 hydrogen feed. This project includes the labor and materials to install the equipment and wire into Ovation for monitoring.	Currently the hydrogen feed for Unit 2 generator is a manual process which requires operations to monitor and add hydrogen daily. Installation of a regulator will reduce operator labor for this and optimize hydrogen at the design pressure throughout operation. This will also provide a means of monitoring the hydrogen feed continuously to identify and alarm upon any potential hydrogen leaks. The automated stop valve could be used in case of an emergency.
NSP-Minnesota	A.0003000.657	Reliability/Performance Enhancement	ANS0C Tools and Equip Ca	20,000	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.659	Reliability/Performance Enhancement	BLL0C Tools Blanket	20,000	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.672	Reliability/Performance Enhancement	IVH0C Misc tools and Equip	20,000	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.676	Reliability/Performance Enhancement	NBLCo Misc Tools and Equi	20,000	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001573.297	Reliability/Performance Enhancement	BDS5C Repl Ammonia Dtctrs-25044	19,417	2022	Replacement of the seven existing ammonia detectors which are used for monitoring the 29% aqueous ammonia system at Black Dog. These are located in the ammonia storage room (4), pump room (1), and vaporization room (2). The existing detectors are at end of life, are obsolete, and drifting from calibration. This project includes replacing the detectors and wiring them in Ovation for better awareness by plant operations. Also includes installation of another 1 ammonia detectors near the Unit 2 vacuum pumps and chemical feed skids. Total cost of detectors is about $12k plus labor for installation.	Ammonia detectors are critical for plant safety and health to alert personnel on any potential ammonia leaks and spills. The existing detectors require replacement for continued operation. Currently operations only received a common trouble alarm, by wiring these individually into Ovation they will now receive a location specific alarm to respond appropriately.

Company	Project ID	New Grandparent	Project Name	YE Amt ($s)	Activity Year	Project Description	Project Justification
NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001575.192	Reliability/Performance Enhancement	HBC8-Evap Cooler Ctrls Integration-	18,226	2022	Replace the evaporative cooler PLC and bring control of the system into the plant DCS. This will bring the evaporative cooler controls into Ovation rather than a seperate stand alone PLC platform.	Evaporative cooler controls will be easier and less expensive to maintain if it is a part of Ovation. PLC life expectancy of 10 years, the PLC will be obsolete in 2018. The PLC has experienced issues in the past, some negatively impacting the availability of the Evaporative coolers to supply supplemental load and help cool turbine components during hot ambient conditions. Sump level control and monitoring has also been and issue and has led to excessive amounts of water usage.
NSP-Minnesota	A.0001575.188	Reliability/Performance Enhancement	HBC7-Evap Cooler Ctrls Integration-	18,182	2022	Replace the evaporative cooler PLC and bring control of the system into the plant DCS. This will bring the evaporative cooler controls into Ovation rather than a seperate stand alone PLC platform.	Evaporative cooler controls will be easier to troubleshoot and less expensive to maintain if it is a part of Ovation. PLC life expectancy of 10 years, the PLC will be obsolete in 2018. The PLC has experienced issues in the past, some negatively impacting the availability of the Evaporative coolers to supply supplemental load and help cool turbine components during hot ambient conditions.
NSP-Minnesota	A.0003000.313	Reliability/Performance Enhancement	SER CSC Tool Blanket	18,000	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001574.673	Reliability/Performance Enhancement	SHC3C 1st Floor HVAC PLC Replace	15,635	2022	Replace the PLC, remote panels, damper actuators and other instruments as needed. This HVAC system supplies all of the transition building from the 1st floor maintenance offices all the way up to the I&C shop. A significant portion of the cost is associated with upgrading ancillary equipment such as damper drives and duct heater controllers which are obsolete and need upgrades to work with the new PLC. Temporary heating and or cooling may be required depending on when the major work is performed.	The existing equipment is obsolete and repairs are becoming difficult or not possible. This equipment controls the HVAC in the Unit 3 office areas. Should a larger failure occur this project will have to be performed as an emergent project at a greater cost.
NSP-Minnesota	A.0001573.293	Reliability/Performance Enhancement	BDS5C Inst Ammonia Htr Cooling-2504	15,330	2022	Install cooling for the Unit 5 Dilution Air Heater cabinet which houses the electronics that cycle the heaters..	The electronics that drive the heating coils for the dilution air heaters are overheating. Installation of a cooling system will decrease the number of troubleshooting time, and will decrease the amount of electronics that we will need to replace.
NSP-Minnesota	A.0001565.147	Environmental Enhancement	WLM0-CEMS Room HVAC Replacement-245	15,059	2022	Project to replace the HVAC system for the plant CEMS room on the 3rd floor.	The existing HVAC equipment has not been replaced in roughly a decade and is requiring considerably more maintenance.
NSP-Minnesota	A.0003000.671	Reliability/Performance Enhancement	HNIC0 Misc Tools and Equ	15,000	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.680	Reliability/Performance Enhancement	REW0C Tool Blanket	15,000	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001562.168	Reliability/Performance Enhancement	REW2-SKF Monitoring System-24218	13,590	2022	This project will replace the SKF monitoring system (monitors turbine vibration). It will also combine both Unit's systems into a single control rack to save space and cut costs. This project goes hand-in-hand with the U1 SKF Monitoring System project.	The current system is obsolete and it is becoming increasingly harder to find replacement parts.
NSP-Minnesota	A.0001573.299	Reliability/Performance Enhancement	BDS5C Repl Seismic Probes-25048	9,076	2022	This project includes the procurement, installation, and configuration in the system (both the 3500 rack and S1) of 4 new seismic vibration transducers for the U5 combustion turbine. This project would be best executed during the Hot Gas Path on U5 scheduled for 2022 due to the need for opening and entering the exhaust bearing tunnel.	The currently installed transducers are of the old moving magnet and coil design that is subject to wear and mechanical damage from operation. These transducers have begun introducing signal issues that have been flagged by the M&D center. They have also operated on the combustion turbine to a point where they are due for replacement. The upgrade should be with piezoelectric seismic transducers that do not have moving parts and therefore would not be subject to wear and tear. The upgrade would also remove the phase lag in the vibration signal that is associated with the moving magnet and coil design.
NSP-Minnesota	A.0003000.564	Reliability/Performance Enhancement	SER0C CSC Rolloff Container 1	8,000	2022	CSC-Replace Rolloff Container 1-replace the first existing roll-off container.	CSC-Replace Rolloff Container 1 The Hazardous Waste Storage Facility (HWSF) has two roll-off containers. One container is always on site for loading of industrial wastes and the other is storage at the transportation company's location. When the on-site roll-off is full, the empty roll-off is delivered and the full one is picked up. This method allows for the continuous ability to dispose of industrial wastes. □ The new roll-off would be cable and hook hoist compatible (currently the roll-off is only cable hoist compatible). This would allow for greater flexibility in transporting the roll-off as Xcel Energy trucking or other vendors could also transport it. □ Without replacing the first roll-off container, we would be limited to cable hoist trucks to swap out the roll-off containers as one roll-off would be hook compatible and the second one would not.
NSP-Minnesota	A.0003000.565	Reliability/Performance Enhancement	SER0C CSC Rolloff Container 2	8,000	2022	CSC-Replace Rolloff Container 2-eplace the second existing roll-off container.	CSC-Replace Rolloff Container 2 The Hazardous Waste Storage Facility (HWSF) has two roll-off containers. One container is always on site for loading of industrial wastes and the other is storage at the transportation company's location. When the on-site roll-off is full, the empty roll-off is delivered and the full one is picked up. This method allows for the continuous ability to dispose of industrial wastes. □ The new roll-off would be cable and hook hoist compatible (currently the roll-off is only cable hoist compatible). This would allow for greater flexibility in transporting the roll-off as Xcel Energy trucking or other vendors could also transport it. □ Without replacing the second roll-off container, we would be limited to cable hoist trucks to swap out the roll-off containers as one roll-off would be hook compatible and the second one would not.
NSP-Minnesota	A.0001571.100	Environmental Enhancement	ANS3C CEMS Bard Unit Repl-24738	7,963	2022	HVAC System Replacement	Bard units no longer supported by manufacturer and parts no longer available
NSP-Minnesota	A.0001571.099	Environmental Enhancement	ANS2C CEMS Bard Unit Repl-24737	7,588	2022	HVAC System Replacement	Bard units no longer supported by manufacturer and parts no longer available
NSP-Minnesota	A.0001574.190	Reliability/Performance Enhancement	SHC3C 2018 Small Project Routi	6,793	2022	Labor and materials that are categorized as capital expenditures. Must meet capitalization criteria categories and include material costs greater than $2,500, but total cost less than $50,000.	These are small projects such as valve replacement, motors, etc that have failed during plant operation.
NSP-Minnesota	A.0003000.753	Renewable and New Generation	MWF0 Mower WF Tools and Equipment	5,000	2022	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001573.295	Reliability/Performance Enhancement	BDS0C Repl 52 CCW Check Vlv-25042	4,088	2022	Replace 52 Closed Cooling Water Pump discharge check valve. Project includes labor and parts to perform the work.	Check valve has worn and requires replacement in the next year or so to prevent coming apart during operation. This occurred years ago with the other pump and caused issues with the check valve components ending up in the closed cooling water heat exchanger. The replacement check valve will be an upgraded design to prevent future failures.
NSP-Minnesota	A.0001559.104	Reliability/Performance Enhancement	BLL0C LCI Controls Replacement	4,000	2022	Replace the U7/U8 Shared LCI controls with non-obsolete equipment.□ Upgrade the existing EX2000 J-Frame HBU exciters (qty2) to an EX2100 e Redundant digital front end (DFE) excitation system	The LCI controls are nearing the end of their useful life. There have been several failures and parts availability is becoming an increasing problem It will be necessary to upgrade in order to ensure reliable operation and spare parts are available.□ □ GE drives and controls, Inc will cease normal production of the EX2000 Excitation Control system effective March 30, 2004. As with many products, and particularly with electronics, the EX2000 will eventually exceed its supportable life as components become unavailable and technology resources become scarce. This makes it increasingly difficult to guarantee timely reparability of parts for an extended period of time. □ □ 2014->2019□ Support Options□ -Repair Only□ -Referral□ -Obsolete/ No Longer offered□ -Documentation
NSP-Minnesota	A.0001559.112	Reliability/Performance Enhancement	BLL7C U7-Excitation System Replacem	4,000	2022	Replace U7 Excitation System Controls with reliable, non-obsolete equipment.	The BLL U7 Excitation Systems Controls are nearing end of useful life. It is necessary to upgrade in order to ensure reliable operation and parts availability.□ □ GE Drives and Controls Inc. will cease normal production of the EX2000 Excitation control system effective March 30, 2004. As with many products, and particularly with electronics, the EX2000 will eventually exceed its supportable life as components become unavailable and technology resources become scarce. This makes it increasingly difficult to guarantee timely reparability of parts for an extended period of time.
NSP-Minnesota	A.0001559.015	Reliability/Performance Enhancement	BLL7-U7 CT Control System Repl	4,000	2022	Replace the Combustion Turbine Control System (AKA Speedtronic Mark V Turbine Controls) Hardware and Software on Blue Lake Unit 7	The Combustion Turbine Control System Hardware/Software needs to be refreshed periodically in order to ensure the system does not fall behind the obsolescence curve. There is difficulty with older systems in procuring replacement parts, finding good field service technicians, and meeting up to date cyber asset security requirements. The current system has been operating since 2005.□ □ GE drives and controls, Inc. will cease normal production of the SpeedTronic Mark V turbine Control system on March 31, 2004. As with many products, and particularly with electronics, the Mark V will eventually exceed its supportable life as parts and components become unavailable and technology resources become scarce. This makes it increasingly difficult to guarantee timely availability/ reparability of parts for an extended period of time. □ □ Support Option□ 2014->2019□ -Repair Only□ -Referral□ -Obsolete/ No Longer Offered□ -Documentation
NSP-Minnesota	A.0001559.114	Reliability/Performance Enhancement	BLL8C U8 Excitation System Replacem	4,000	2022	Replace U8 Excitation System with reliable, non-obsolete equipment.	The BLL U8 Excitation System Controls are nearing end of useful life. It is necessary to upgrade in order to ensure reliable operation and parts availability.
NSP-Minnesota	A.0001559.014	Reliability/Performance Enhancement	BLL8-U8 CT Control System Repl	4,000	2022	Replacement of the Combustion Turbine Control System Hardware and Software.	The Combustion Turbine Control System hardware/Software needs to be refreshed periodically in order to ensure the system does not fall behind the obsolescence curve. There is difficulty with older systems in procuring replacement parts, finding good field service support, and meeting up to date cyber asset security requirements. The current system has been operating since 2005.
NSP-Minnesota	A.0001574.733	Reliability/Performance Enhancement	SHC0C Electric & Electronic Room FP	1,667	2022	From 2014 All Risk Loss Prevention Report for Sherco, Recommendation 06-23: □ Install smoke detection monitored by the Main Control Room or other 24/7 occupied area in the following areas:□ ¿ Main secondary unit substation room (ground floor)□ ¿ Main 4,160 volt switchgear room (mezzanine level) for Unit 1 and 2□ ¿ Unit 1 and 2, 480-volt SUS room□ ¿ Unit 1 and 2 Relay Rooms□ ¿ All of the Inverter Rooms□ ¿ Unit 1 and 2 Electrostatic Precipitator switchgear rooms□ ¿ All of the battery rooms	The most likely problem in an electrical equipment area like the above is an electrical fault, which will often result in smoke being generated. Smoke detection in these areas can provide an early warning of a problem and allow action to be taken prior to significant damage occurring. Reference NFPA 850, Section 7.8.4 and 7.8.5. The Loss Expectancy associated with this condition is estimated at $2,000,000. The estimated cost to complete is $10,000.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001572.048	Reliability/Performance Enhancement	ASK1C-Inst Emerson DCS Evergre	1,000	2022	Emerson to provide new hardware and software to support plant digital control system. To keep pace with advancements is the goal of the Ovation Evergreen program. This SureService customer support module provides a way to keep your Ovation system continuously up-to-date. The Evergreen program allows you to avoid a costly total system retrofit required when the components are too old to be salvaged. The Ovation Evergreen program plans for replacing the affected items, including networks, workstations, controllers and system software with the latest releases, and incorporating new I/O and security features.	Project is required to maintain the plant ahead of the digital asset obsolescence curve. This also enhances compliance with regulatory/security requirements. The project is based on replacing critical plant control system hardware/software components on a five-year cycle. There is Fleet goal/expectation that all units utilizing similar control systems vendors be at similar and current hardware/software revision. This keeps the plant in compliance with Cyber Infrastructure Protection (CIP) anti-virus requirements. There is difficulty with older systems in procuring replacement parts, finding good field service support, and meeting current cyber asset security requirements. Replacement of plant control system hardware is necessary to ensure that the equipment will continue to operate reliably, safely, and in compliance with environmental requirements. This Control System is responsible for controlling and monitoring most of the plant equipment, and failure could lead to significant equipment damage, environmental compliance issues and extended outages.
NSP-Minnesota	A.0001565.118	Environmental Enhancement	WLM1C Replace U1 Baghouse Bags	1,000	2022	Replace six modules (1260 total) of baghouse bags and cages. This project would also include a series of mechanical work to the baghouse modules including replacement of the bottom hoppers, patching of the walls at the tops of the modules above and below the tubesheet, replacement of electrical wiring, sand-blasting the inside of the module and coating it with an anti-corrosive coating, re-tinning and re-insulating the modules, etc.	Permit required to meet opacity standards. Bags are on a five year frequency to be changed out. The bags were on a six plus year changeout in the past but it was determined that changing out the bags more frequently saves on material loss on boiler tubes. It has been determined that after five years the bags begin to blind/plug and no longer allow enough air flow to operate the units at their full potential. Because of the plugged bags the air flow through the unit is decreased causing a high differential pressure reducing load capability and allowing the flue gas to consume more of the tube material throughout the boiler. Whenever change outs of bags and cages occur, there are always areas found that are in need of repair. The plant has observed severe thinning in some areas of the conical hoppers at the bottom of the baghouse modules. Some areas have gotten so bad that weldments have fallen off. Because of the age of the baghouse modules and the amount of welded repairs that have been performed in the past, the plant is running out of the necessary amount of true base material to continue performing these sorts of weld repairs for much longer. By taking the opportunity to replace conical hoppers and then coating them with a suitable anti-corrosion coating this will lessen the amount of mechanical work necessary in future years and help reduce or eliminate the amount of tramp air seeping into the modules. The baghouse modules have not had a lot of attention since they began operation in the late 1980's and these repairs must be completed to ensure optimal reliability and functionality through the end of the current fuel contract (which currently goes through 2027). The electrical wiring replacement work was created as a separate project but were brought in to be done under this one as it would be advantageous to do this work at the same time.
NSP-Minnesota	A.0001564.500	Reliability/Performance Enhancement	St Anthony Falls Emergent -Other Pr	681	2022	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001574.174	Reliability/Performance Enhancement	SHCJC 2018 Small Project routi	44	2022	Labor and materials that are categorized as capital expenditures. Must meet capitalization criteria categories and include material costs greater than $2,500, but total cost less than $50,000.	These are small projects such as valve replacement, motors, etc that have failed during plant operation.
NSP-Minnesota	A.0001574.464	Environmental Enhancement	SHC3-U3 landfill capping 2020	(7)	2022	SHC0219 - Cap the next approximately 6 acres of Cell 3 of the Unit 3 Landfill.	Meet permit requirements by reducing water infiltration into the landfill, reducing the amount of leachate generated and providing protective cover. The solid waste permit requires capping within 180 days of reaching final elevation.
NSP-Minnesota	A.0001574.808	Environmental Enhancement	SHC99 Stormwater Management 22619	(19,227)	2022	Install systems to collect and divert storm water away from the Recycle Basin and Scrubber Pond.	Reducing water flow into the Recycle Basin will reduce the volume of water transferred to the Scrubber Solids Pond. Which will reduce the amount and cost of water treatment that will be needed at end of life of Sherco 1-3.
NSP-Minnesota	A.0001707.001	Renewable and New Generation	DKR0 Dakota Range Wind Turbines	(6,862,779)	2022	Construct a 300 MW New Wind Farm in Grant and Codington Counties, South Dakota. The wind farm includes 72- V136 Vestas Turbines rated at 4.2 MWs each, a collector system, O&M building, access roads, and collector substation.	This project qualifies for the Production Tax Credit (PTC) at an 80% level.
NSP-Minnesota	A.0001574.890	Renewable and New Generation	SHC Solar Generating Plant Phase I	303,994,870	2023	New 230MWac solar generating plant	Need to meet IRP Alternate Plan modeling asset capacity and energy additions
NSP-Minnesota	A.0001576.022	Renewable and New Generation	GDM Grand Meadow Repower	112,314,104	2023		
NSP-Minnesota	A.0001575.170	Reliability/Performance Enhancement	HBC8 - U8 CT Ovhl Major Outage	11,060,701	2023	HBC0220 - Labor cost to perform major ooverhaul on U8 CT. During a major overhaul, all combustion parts are replaced, all turbine blades and vanes are replaced. The rotor is pulled out of the CT disassembled and restacked.	Per OEM specification a major overhaul is required at 48,000 hours.
NSP-Minnesota	A.0001571.023	Reliability/Performance Enhancement	ANS2-C-U2 replace vanes and bl	10,642,869	2023	ANS2-U2 major overhaul with rotor removal and Class 3 inspection. Replacement of row 4 turbine rotor disk, row 2, 3 and 4 blades, and . The refurbishment of combustion components is also included to extend the unit life.	U2 has been in operation since 1994. The OEM recommendation for a major overhaul is 3200 starts. U2□ is expected to be at or above the recommended starts by 2022. In addition, the row 4 turbine□ rotor disk has significant wear due to the number of hours on turning gear. This causes high vibration□ during startup and has resulted in unit trips.
NSP-Minnesota	A.0001559.118	Reliability/Performance Enhancement	BLL U8 Hot Gas Path-21336	5,095,983	2023	Hot gas path inspection for U8 at Blue Lake. The project includes replacement of the following standard hot gas path parts per the PSM parts contract; transitions, liners, liner end caps, fuel nozzle assemblies, stage 1 buckets/nozzles/shroud blocks, stage 2 buckets/shroud blocks. The project also includes replacing the R0 (1st stage) compressor blades to mitigate a design issue with the OEM blades.	The HGP inspection is required at 24,000 operating hours or 900 starts per the OEM and the PSM parts contract.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001575.197	Reliability/Performance Enhancement	HBC8C GT EXHAUST REPL-24699	3,087,177	2023	Replace the Unit 8 Combustion Turbine Exhaust Duct and Aft Exhaust Manifold during the Spring 2023 Major Overhaul. Materials and Field Service Labor will be provided by Mitsubishi, the Combustion Turbine OEM. The replacement exhaust has a 16 month lead time and will need to be ordered in the Fall of 2021.	Continued degradation of the Unit 8 exhaust duct and aft exhaust manifold was observed during the spring 2020 outage. There is significant distortion of the exhaust duct and through wall cracking around the stiffening ribs. The expansion joint flange is cracked and displaced over a significant portion of the circumference. Temporary repairs have been made previously, but it is only feasible to keep patching the exhaust for a finite amount of time. The cracks in the exhaust are allowing the combustion turbine exhaust to leak into the building.
NSP-Minnesota	A.0001561.032	Reliability/Performance Enhancement	IVH5C Turbine Controls	2,540,628	2023	Replace the existing obsolete GE Fanuc turbine controls and integrated balance of plant controls with a modern control system including new microprocessors, HMI's, monitors, historian, EMS-SCADA interface, network switches, dual redundant network, data links, etc. The new turbine control system is planned to be similar to sister Wheaton Units 1-4. The new controls will include overspeed integration including 4 active speed probes similar to Wheaton. The project also includes modifying the fuel oil controls with position feedback. This project includes upgrading the vibration monitoring with Bently Nevada equipment rather than the equipment provided by Emerson as was done for the Wheaton plant.□ □ For transmission system requirements, new controls will be installed 2 units at a time, thereby maintaining 4 units available for operation. This is a 3 year project starting in 2020 and ending in 2022.	The existing control system is obsolete and not supported by the manufacturer. Spare parts are difficult to find and costly to procure when located. The NSP fleet control systems are being standardized on Emerson Ovation to improve operations, maintainability, reliability, and availability.
NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	2,388,315	2023	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001575.190	Reliability/Performance Enhancement	HBC0-Diasys Controls Replacement-22	2,037,805	2023	Replacement of Mitsubishi's control system, Diasys, with a more updated system that includes both hardware and software.	Controls will be outdated and lack the necessary support for reliable turbine monitoring and controls.
NSP-Minnesota	A.0001574.672	Reliability/Performance Enhancement	SHC3C 36_1 & 36_2 FWHs Replace	2,014,385	2023	Replace the 36-1 and 36-2 Feedwater Heaters.	The heaters are original from 1987 and tube failures are projected to be significant enough to warrant replacement of these heaters.
NSP-Minnesota	A.0001573.500	Reliability/Performance Enhancement	BDS Emergent Fund -Other prod	2,011,050	2023	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001579.500	Reliability/Performance Enhancement	RIV Emergent Fund -Other prod	1,326,394	2023	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001574.804	Reliability/Performance Enhancement	SHC3-U3 DCS Workstation Upgrade 202	1,056,278	2023	Unit 3 DCS Workstation Upgrade 2023: □ Replacement of the Engineering and Operator Workstations hardware and software. This would include the Historian and other misc PC computers. Installation would take place during the Spring 2023 Major Outage on Unit 3. In addition, the Unit 3 Simulator will be upgraded.	Estimated end of life for the Workstation hardware and unsupported software by Microsoft and Invensys (Foxboro).□ □ It improves the system health score to be less than 30 which is significantly less critical than it is now at 60.□ □ Energy Supply Policy dictates that we do this project, it states"4.2.6 Current Operating Systems, Applications and Hardware: Plant networks should have current operating, hardware and software systems that are supported by the involved manufacturers to provide current antivirus and malware signatures and operational patches. A plant improvement project request shall be submitted using the EPM system if any plant network equipment is no longer supported by the vendor and requires upgrade in order to maintain current cyber-security protections."□ □ By doing this project we are regaining support form Microsoft, and Foxboro by having supported computer hardware, and anti-virus definitions.
NSP-Minnesota	A.0001611.009	Renewable and New Generation	PVW0-Pleasant Valley Gearbox Replac	1,046,925	2023	Replace failed gearboxes. Cost includes the crane and labor for overhaul of the rotor, gearbox and main shaft	Gearboxes fail with planetary section damage and need to be replaced
NSP-Minnesota	A.0001742.001	Renewable and New Generation	NRW North Wind Farms - Viking	1,033,834	2023	The Northern Wind Project is a Build, Own, Transfer (BOT) project between Xcel Energy and ALLETE Clean Energy (ACE) also known as ACE Mid-west Holdings LLC. ACE currently owns the projects and will manage the reconstruction of a new 80% Production Tax Credit (PTC) eligible wind farm. Xcel Energy will purchase and operate the site following construction.□ □ The Norther Wind Project consists of repowering two (2) existing wind sites comprised of the Chanarambie (85.5 Mega-Watt (MW)) and Viking (12MW) projects, along with the adjacent Rock Aetna (20MW) green-field wind project, all located in southwest Minnesota along the Buffalo Ridge. Chanarambie and Viking II wind farms are currently under a Power Purchase Agreement (PPA) with Northern States Power (NSP) and Rock Aetna is known as the expansion project pursuant to the Purchase and Sales Agreement (PSA) executed by the companies on February 4, 2021. The Northern Wind Project will update the existing generation with new technology providing up to 120 megawatts of power	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001575.500	Reliability/Performance Enhancement	HBR Emergent Fund -Other prod	970,807	2023	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001566.173	Renewable and New Generation	NBL0C Wind Tower Climb System-24814	968,431	2023	Installation of a new climbing system that will replace the existing climb assist□ system. The new system will be a Climb Auto or equivalent system that can□ support the full weight of a technician and lift them from the bottom of the turbine□ tower to the nacelle without the need to climb the ladder.	The system will provide long term reliability and safety benefits for the farm. It is□ estimated that each of the turbines will be off line 2 fewer hours for each of□ the 2 planned maintenance events per year. The additional benefits include□ reduced risk of climbing related injuries and fatigue related issues. Retention of□ qualified technicians will increase which results in lower training costs and□ reduced risk of errors. The towers on this site are 15 meters taller than several□ of our sites and will be a proving ground to determine if this system should be□ installed across the fleet.
NSP-Minnesota	A.0001575.167	Reliability/Performance Enhancement	HBC0-Evergreen Upgrade #2-16185	962,475	2023	Upgrade Ovation control system through the Emerson Evergreen program. The Evergreen program allows all controllers to be upgraded once during the Sure Service contract period.	Project is required to maintain the plant ahead of the digital asset obsolescence curve. This also enhances compliance with regulatory/security requirements. The project is based on replacing critical plant control system hardware/software components on a five-year cycle. There is Fleet goal/expectation that all units utilizing similar control systems vendors be at similar and current hardware/software revision. This keeps the plant in compliance with Cyber Infrastructure Protection (CIP) anti-virus requirements. There is difficulty with older systems in procuring replacement parts, finding good field service support, and meeting current cyber asset security requirements. Replacement of plant control system hardware is necessary to ensure that the equipment will continue to operate reliably, safely, and in compliance with environmental requirements. This Control System is responsible for controlling and monitoring most of the plant equipment, and failure could lead to significant equipment damage, environmental compliance issues and extended outages.
NSP-Minnesota	A.0001565.083	Environmental Enhancement	WLM0-Cap WLM Landfill Cells 8, 9, 1	881,472	2023	Project to cap three cells at the Wilmarth ADF (cells 8, 9 and 10). The total acreage is approximately 3 acres. The cost includes purchase of materials, contractor mobilization, erosion control, surveying, completion of work, QA/QC, engineering, site restoration and contingency. Per discussion in Fall 2016 with Wilmarth management and Xcel Environmental services, it was determined that there is an economic advantage to doing three cells at once versus the original plan of capping Cell 10 in 2017 and only doing Cells 8 and 9 in 2020.	We are required by permit (MPCA permit # SW-298-008) to cap landfill cells as necessary. Capping the three cells in one year (2020) versus capping Cell 10 in 2017 and Cells 8 and 9 in 2020 (as was the original plan) should help the company realize significant cost savings based on contractor mobilization costs (doing it once versus twice), purchasing greater quantity of materials, potential costs related to engineering, etc.
NSP-Minnesota	A.0001580.007	Renewable and New Generation	CWF0-Courtenay Gearbox Replacement	876,367	2023	Replace failed gearboxes. Cost includes the crane and labor for overhaul of the rotor, gearbox and main shaft	Gearboxes fail with planetary section damage and need to be replaced
NSP-Minnesota	A.0001574.307	Reliability/Performance Enhancement	SHC3 - Replace U3 Inverter - 23426	820,028	2023	This project encompasses replacement of the Unit 3 Essential Service Power System. The Unit 3 Essential Service Power Inverter Power Supply System provides an uninterruptible source of 120 volt, single-phase power to loads that cannot withstand power outages exceeding ¿ cycle, and that need to remain operational during loss of normal station AC power. The system consists of the Plant Inverter Power Supply System and the AQCS Inverter Power Supply System. Each inverter system includes, two inverter system cabinets, one 75 kVA voltage regulator, and four inverter panelboards. Each inverter system cabinet contains the uninterruptible power supply (UPS) equipment, which includes a 350-ampere battery charger (rectifier), a 75-kVA inverter, and a static switch with a manual bypass switch. The four inverter battery chargers each receive 480 VAC power from a respective MCC and supply 250 VDC power to the 32 Battery and to an associated inverter. Each of four inverters converts the 250 VDC to 120 VAC which feeds the respective essential loads such as the digital control system and other critical computers. Each inverter is capable of carrying 100% of all essential loads of the associated Plant Inverter Power Supply System or AQCS Inverter Power Supply System. Alternatively, this project could be divided to replace the two Unit 3 plant side inverter systems in 2023 ($700K), and replace the two AQCS inverter systems in 2026 ($700K).	The existing U3 battery chargers, inverters, static switches and voltage regulators are original equipment installed in 1986. Current reliability is questionable, they are obsolete (replacement components are hard to find or non-existent), they continue to degrade, and are becoming more difficult to maintain. There are very few left that are trained to trouble shoot and repair these devices.
NSP-Minnesota	A.0001574.173	Reliability/Performance Enhancement	SHC3C Emergent work	750,446	2023	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001565.077	Reliability/Performance Enhancement	WLM0C Slaker PLC Replacement	689,489	2023	Project to replace the existing Allen-Bradley PLC for the lime slaking system with a new DeltaV controller that will be fully integrated and provide better automation and control of the entire slaking system. Additionally, this project will involve moving the slaking equipment (lime grit auger motor VFD, slurry pumps A, B and C VFD's, etc.) into MCC44 with the rest of the lime slaking equipment. This will require moving some of the existing baghouse equipment currently residing in MCC44 over to MCC's 45 and 46 where the rest of the Baghouse equipment is. This would group all of the slaking and scrubber equipment for both units together in MCC44, while the equipment for each baghouse would then be in MCC45 and MCC46.	Slaker is one of the last systems at Wilmarth using IFIX. Project is to replace early 1990's PLCs and move to Delta V for the DCS as most of the rest of the plant is. Slaker is used to produce slurry, the PLCs/controls are used to control SO2 emissions. By making the slaking system more automated, the plant will be able to better realize its goal of meeting its SO2-reduction emissions requirements while utilizing less lime. This will result in greater O&M savings for the plant, as lime is one of the most expensive materials that the plants uses during the year. The plant has proven before that through more efficiently operating the amount of cooling water, the amount of slurry produced and the percent solids contained in the slurry that the total amount of lime consumed throughout the year can be reduced. By integrating these parameters into an upgraded controller, the amount of slurry produced and used can be monitored and adjusted in real time based on the different fuel composition that the plant sees. It would be most advantageous to automate this type of operation and be less reliant on operators to have to constantly monitor this and make adjustments manually.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001574.198	Reliability/Performance Enhancement	SHCCC 2017 Emergent Work	678,271	2023	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001565.151	Reliability/Performance Enhancement	WLM2-Replace Unit 2 Turbine Blades-	600,874	2023	Project to replace L-0, L-1 and L-2 blades during the scheduled Unit 2 Turbine Overhaul. This will be done based on recommendations by vendor and internal SME's (Fleet Engineering).	If the blade erosion becomes too severe, the plant will be unable to continue operating the machine reliably.
NSP-Minnesota	A.0001576.005	Renewable and New Generation	GDM0 - Gearbox replacements	590,243	2023	Replace failed gearboxes in GE 1.5 SLE wind turbines. Cost includes the crane and labor to remove the rotor, gearbox, and main shaft, and then reinstall the components.	Gearboxes fail with planetary section damage and need to be replaced.
NSP-Minnesota	A.0001575.174	Reliability/Performance Enhancement	HBC8- Rplc LP Lower Prehtr Header-1	583,948	2023	Replace lower preheater header.	In 2014, 86% of header stubs were found cracked. Operational changes made which may resolve the issue of thermal shocking of the preheater. Cracked tube stubs were cut out and replaced during the Spring 2014 outage as well as the Fall 2014 outage. NE quote for header is $110,000 per unit.
NSP-Minnesota	A.0001559.126	Reliability/Performance Enhancement	BLL0C Quarry Park Rd Driveway-24784	545,947	2023	Install a shared road and driveway for site access from the existing Quarry Park Road to the Blue Lake site to avoid the rail switchyard congestion on the only existing site access road.	An alternate site access is required to avoid the rail switchyard congestion which can delay access to the site by up to 3 hrs - access is required to ensure availability of dispatchable peaking generation.
NSP-Minnesota	A.0001571.105	Environmental Enhancement	ANS4C CDM Auto Tune-25062	535,595	2023	Installation of Gas Turbine Combustion Dynamics Monitoring System, and AutoTune for the combustion system.	In support of Energy Supply Strategic Objectives to boost Unit Availability, Reliability. This will provide a better operational range without seasonal tuning, protect the gas turbine due to variation in gas composition-ambient conditions and improve reliability.
NSP-Minnesota	A.0001572.161	Reliability/Performance Enhancement	ASK1-Nuva Feeder PLC Replaceme	509,403	2023	This project will bring the Nuva Feeder controls into the existing plant DCS control system. The construction work for this project can be done non-outage. Engineering and procurement of equipment will begin at the beginning of the year.	Parts are getting scarce on PLC's; there is inventory and risk reduction by moving this PLC into Ovation. Internal and External knowledge of PLC's is limited. Existing PLC systems have no redundancy and risk unavailability. Ovation is King's control system standard with trained personnel.
NSP-Minnesota	A.0001574.268	Reliability/Performance Enhancement	SHC1C Emergent Projects	480,979	2023	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001571.500	Reliability/Performance Enhancement	ANS Emergent Fund -Other prod	472,725	2023	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001572.500	Reliability/Performance Enhancement	ASK Emergent Fund -Steam prod	461,518	2023	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001572.177	Reliability/Performance Enhancement	ASK1C Repl ID Fan Suction Exp	461,368	2023	Replacement of four ID fan suction expansion joints.	Expansion joints are interior to the ID fan building and are over 40 years old. They are brittle and cannot be repaired.
NSP-Minnesota	A.0001579.156	Reliability/Performance Enhancement	RIV0-Replace Obsolete EDG Controls-	408,651	2023	Riverside diesel generator controls are obsolete and have a long history of failures. The Woodward load controllers, and synchronizers are obsolete and are no longer supported by the OEM. The plant is forced to purchase items on the second hand market if there is a failure. The Allen Bradley PLCs are also >20 Years old. The frequency and load control are also problematic rheostat controlled which have contributed to failed starts and trips of the units.□ □ This project scope would include full controls replacement, generator protection, and excitation/AVR control. These diesels should be able to Island and utility parallel to support plant rstabilization during black out conditions.	This obsolete equipment makes the diesel generator operation unreliable. These generators are needed during black out conditions to make sure the plant can be quickly available after a black out event. Reliability and simple/fast operation of these units is paramount to reduce equipment damage and lessen downtime during a loss of offsite power event.
NSP-Minnesota	A.0001561.039	Reliability/Performance Enhancement	IVHC Gas Vlv Ctrl Rplc	407,846	2023	Replace the existing obsolete gas control logic, gas control valves, wiring, and pressure switches on Units 5 & 6. This project is planned to be run in parallel with the turbine control replacement project because the software and microprocessor hardware for turbine control, gas valve control and fuel oil valve control is one integrated whole.□ □ Due to transmission system requirements the new gas control valves will be installed 2 units at a time; thereby maintaining 4 units available for concurrent operation.□ □ The new control valves are slightly narrower and a bit longer than the existing valve per initial vendor drawings. Per field measurements we expect that the new valves will fit in the same location with minor piping modifications. We do not expect to require gas valve cabinets and other major modifications.□ □ This is a 2 year project starting in 2020 and ending in 2021.	The servomotors that operate the gas control valves (GCV) are obsolete. They are controlled by obsolete Pacific-Scientific controllers. This control scheme has not proven to be very reliable over the years with numerous unit outages due to component failure and electrical/control/mechanical issues with gas operation. In addition these components are very difficult to troubleshoot and maintain in calibration.□ □ The existing control system is obsolete and not supported by the manufacturer. Spare parts are difficult to find and costly to procure when located. The NSP fleet control systems are being standardized on Emerson Ovation to improve operations, maintainability, reliability, and availability.
NSP-Minnesota	A.0001565.159	Reliability/Performance Enhancement	WLM2-New Unit 2 ID Fan Motor and VF	356,301	2023	Project to purchase and install a newer, larger motor and associated VFD on the Unit 1 ID Fan. The existing motor is a 450 HP. The new motor would be closer to 600 HP.	The current ID Fan motor consistently runs at or near FLA of the nameplate motor rating. This has caused accelerated wear and tear on the motor as well as occasional boilers trips due to tripping out on high amps unnecessarily. The VFDs have already reached obsolescence and will need to be replaced eventually.
NSP-Minnesota	A.0001574.816	Reliability/Performance Enhancement	SHC3-U3 Level 2 Mill OH 2023 Sprg-1	354,958	2023	Includes replacement of one or more of the following components: worn ceramic surfaces, wear liners, classifier vane blade replacements, air inlet vane replacement, RTV, roll to ring adjustment, hardwire weld overlay on floor, replace mill rolls, replace hardox wall liners, replace outlet valve discs, replace door springs, classifier replacement, inverted cone replacement, and replacement of pyrite supply valve and jet pump/piping.	Unit 3 has 10 coal mills whose performance is tracked though operating data (mill motor amps, coal fineness, etc.) to determine the frequency of Level 1, Level 2, and Level 3 overhauls. Typically there are 2-3 Level 2 overhauls per year.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001574.815	Reliability/Performance Enhancement	SHC3-U3 Level 2 Mill OH 2023 Fall-1	347,655	2023	Includes replacement of one or more of the following components: worn ceramic surfaces, wear liners, classifier vane blade replacements, air inlet vane replacement, RTV, roll to ring adjustment, hardwire weld overlay on floor, replace mill rolls, replace hardox wall liners, replace outlet valve discs, replace door springs, classifier replacement, inverted cone replacement, and replacement of pyrite supply valve and jet pump/piping.	Unit 3 has 10 coal mills whose performance is tracked though operating data (mill motor amps, coal fineness, etc.) to determine the frequency of Level 1, Level 2, and Level 3 overhauls. Typically there are 2-3 Level 2 overhauls per year.
NSP-Minnesota	A.0001575.183	Reliability/Performance Enhancement	HBC9- ST Vlv Overhaul-24034	328,422	2023	Disassembly, inspection, and installation of the CESP turbine valve assemblies on the U9 steam turbine. The valves that will be worked on as part of the Capital Project are: 2 HPSV's, 2 HPCV's, and 2 ICV's.□ Note: Work on 2 RSV's, 1 LPSV, and 1 LPCV will be completed at the same time, but under O&M.	Periodic inspection and repair of these critical turbine valves is recommended by the OEM and necessary to ensure safe and reliable operation of the unit.
NSP-Minnesota	A.0001572.246	Reliability/Performance Enhancement	ASK1-Protective Relay Upgrades-2423	326,470	2023	The protective relaying on each of the Main Plant's 6.9KV and 4.16KV Cubicles has reached an age in which replacement is needed. The existing mechanical relays are original 1969 vintage and are starting to fail. In addition, preventative maintenance of these relays is time consuming. Newer digital style would provide better reliability and ease of maintenance. There are 8 - 6.9KV and 22 - 4.16KV cubicles; cost per ~$5,000	This project would improve reliability for our Medium Voltage source cubicles for various motors and MCC feeds in the plant. It also simplifies maintenance work and would lengthen out the periods in which PM's would be required.
NSP-Minnesota	A.0001580.008	Renewable and New Generation	CWF1-Generator Rplacments	324,758	2023	Replace failed generator in Vestas V100 wind turbines. Cost includes the crane and labor for generator overhaul	Upon failure, the wind turbine can not be run
NSP-Minnesota	A.0001562.500	Reliability/Performance Enhancement	REW Emergent Fund -Steam prod	320,172	2023	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001573.217	Reliability/Performance Enhancement	BDS0-Repl Discharge Gate Comm Ctrl	318,996	2023	Replace the discharge gate control PLCs and radio link between the gate equipment and the plant.	The communications and control equipment for the outplant discharge gates is aging. It will be obsolete in the near future and require replacement. The gate control equipment consists primarily of a PLC at each gate house, the radio link includes transmit/receive electronics and hardware at both gates and at the plant. This equipment is used to control the discharge gates and maintain our environmental thermal discharge permit limits and lake level limits. Also, failed communications requires frequent trips by plant operations to the gates which is a significant burden on plant operations, and is also a safety concern in the winter time as access to the gates is limited and walkways are slippery.
NSP-Minnesota	A.0001574.820	Reliability/Performance Enhancement	SHC1-U1 Level 2 Mill OH 2023 Sprg-1	308,750	2023	Includes replacement of one or more of the following components: worn ceramic surfaces, wear liners, classifier vane blade replacements, air inlet vane replacement, RTV, roll to ring adjustment, hardwire weld overlay on floor, replace mill rolls, replace hardox wall liners, replace outlet valve discs, replace door springs, classifier replacement, inverted cone replacement, and replacement of pyrite supply valve and jet pump/piping.	Unit 1 has 7 mills whose performance is tracked through operating data (mill motor amps, coal fineess, etc.) to determine the frequency of Level 1, Level 2, and Level 3 overhauls. Typically there are 2-3 Level 2 overhauls per year.
NSP-Minnesota	A.0001575.189	Reliability/Performance Enhancement	HBC9-Vibration Monitoring System-19	305,642	2023	INSTALL GENERATOR ENDWINDING VIBRATION MONITORING SYSTEM ON UNIT 9	TO PREDICT GENERATOR ENDWINDING FAILURE
NSP-Minnesota	A.0001562.176	Environmental Enhancement	REW0-Metal Recovery System-24580	305,563	2023	This project will install an Eddy Current Machine, Magnetic Separator, and a system of conveyors in the ash building to separate metals out of any ash produced by the plant. The Eddy Current Machine, Acceleration Belt, and Transfer Conveyor will be reused from the Lab USA Facility demolition project at no cost to NSP. The Vibratory Pan Conveyor, Drum Magnet, and structural/electrical work will be purchased new for the install.	With the closure of the LabUSA facility at the Red Wing ADF, we are no longer doing anything with ash for beneficial reuse. Conditional Use Permit Resolution 6492 Section (S) dated 12/5/2012 states: "The applicant shall diligently pursue alternative methods of ash disposal and/or reuse and shall report such efforts at the two year review".
NSP-Minnesota	A.0001562.149	Reliability/Performance Enhancement	REW1 Rep U1 Superheater-Secondary-2	302,956	2023	This project will replace the entire U1 boiler secondary superheater. This portion of the superheater contains 19 pendants that each have 16 tubes (7 sets of u-bends and 2 hanger tubes). The tubes are made of 2.5" OD, 0.220" Wall SA210-A1 Carbon Steel. We will also replace all the 1/2" thick carbon steel tube shields on the leading and lagging edge tubes in the sootblower lane.	Past NDE data has shown that by year number 3, the secondary superheater is about 40% worn out. This means a lot of time is spent during the outage by replacing individual tubes on O&M. Tube leaks occur frequently which increases lost burn revenue and increases safety risk.
NSP-Minnesota	A.0001574.821	Reliability/Performance Enhancement	SHC1-U1 Level 2 Mill OH 2023 Fall-1	302,259	2023	Includes replacement of one or more of the following components: worn ceramic surfaces, wear liners, classifier vane blade replacements, air inlet vane replacement, RTV, roll to ring adjustment, hardwire weld overlay on floor, replace mill rolls, replace hardox wall liners, replace outlet valve discs, replace door springs, classifier replacement, inverted cone replacement, and replacement of pyrite supply valve and jet pump/piping.	Unit 1 has 7 mills whose performance is tracked through operating data (mill motor amps, coal fineess, etc.) to determine the frequency of Level 1, Level 2, and Level 3 overhauls. Typically there are 2-3 Level 2 overhauls per year.
NSP-Minnesota	A.0001565.500	Reliability/Performance Enhancement	WLM Emergent Fund -Steam prod	294,004	2023	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001574.814	Environmental Enhancement	SHC3-U3 landfill capping 2022-11340	287,665	2023	SHC0221 - Cap the next approximately 3 acres of Cell 4 of the Unit 3 Landfill.	Meet permit requirements by reducing water infiltration into the landfill, reducing the amount of leachate generated and providing protective cover. The solid waste permit requires capping within 180 days of reaching final elevation.

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NSP-Minnesota	A.0001572.176	Reliability/Performance Enhancement	ASK1C Repl Hydrojet PC HF Sens	284,009	2023	This project's scope includes the replacement of the existing hydrojet PC and software.	King's hydrojet software and PC are outdated and require replacement. PC issues have caused chronic hydrojet downtime, elevating furnace exit gas temperatures which threatens unit performance and possible derates. Also, upgraded software has the capability to integrate with King's intelligent sootblowing software Powerclean. Additional heat flux sensors will increase the number of cleaning zones, and provide more accurate cleaniness readings. With the recent past and current replacement of major waterwall panel's it is prudent to protect the waterwalls from excessive thermal shock. The upgraded software is designed to adjust spraying speeds and flows to limit the impact of thermal transients.
NSP-Minnesota	A.0001572.252	Environmental Enhancement	ASK1-13&14 Travel Water Screen - 23	281,635	2023	Replace Complete Rotating Assembly for King Plant #13 & #14 Traveling Water Screens. Complete Rotating Assembly includes: Head Shaft Assembly (torque tube), Foot Shaft Assembly, Bearings, Chain, Chain Guides, Basket Plates, Hardware, etc.	Replace Complete Rotating Assembly for King Plant #13 & #14 Traveling Water Screens required every 5 years to maintain reliability. Permit required for plant operation. #13 & #14 Traveling Water Screens last rebuilt in spring 2018.
NSP-Minnesota	A.0003000.698	Reliability/Performance Enhancement	SER-CHM-Misc Tools-MN	266,620	2023	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001565.144	Reliability/Performance Enhancement	WLM99-Replace Walking Floor 2022-17	259,553	2023	Replace Walking floor	O&M costs are too high
NSP-Minnesota	A.0001565.134	Reliability/Performance Enhancement	WLM2 Turbine Electronic Overspeed-2	252,066	2023	The scope of this project is to install a true electronic overspeed trip system on our Unit 2 turbine to replace the existing primary mechanical overspeed trip mechanism. This project would also replace the existing SKF Turbine monitoring system that has become obsolete. Replacing the monitoring system comes at the recommendation from Fleet Engineering.	The unit currently utilizes a mechanical bolt system as its primary overspeed tripping mechanism. Based on input from multiple SMEs including Fleet Engineering, Hazard Insurance, and Operations it has been recommended to convert to an electronic overspeed protection system. They are much more reliable than a mechanical system. Additionally, moving to an electronic overspeed system allows for much less risk when testing the overspeed. It would be a much safer system overall and eliminate the need to perform an annual test on the mechanical overspeed which has a lot of safety concerns and risk for damaging the equipment.
NSP-Minnesota	A.0001562.039	Environmental Enhancement	REW0 - EPA 316b-Svc Water Pumps - 2	249,919	2023	Two new redundant 75hp Screen House service water pumps will be installed to ensure an adequate flow of water through the screen house and to the plant. The main functionality of these pumps will be to aid in the correct flow of water through the traveling screens to maximize their effectiveness & ensure EPA 316b compliance.	This is a mandated environmental project by the MPCA to ensure we are compliant with EPA regulation 316(b) of the Clean Water Act. Section 316(b) requires that National Pollutant Discharge Elimination System permits be obtained by any facility that contains a cooling water intake structure to ensure that the engineering design of the structure minimizes harmful impacts on the environment.
NSP-Minnesota	A.0001574.844	Environmental Enhancement	SHC0-Pond 3S Ring Dike Phase II-242	242,275	2023	Use excavated Bottom Ash from BA Pond 1, to construct the Second Phase Ring Dike within Pond 3S.	The ring dike will allow the disposal of wet scrubber solids at a higher elevation within the existing Pond 3. This avoids the construction of a new Scrubber Pond and is the lowest cost method of gaining additional disposal capacity.
NSP-Minnesota	A.0001742.003	Renewable and New Generation	NRW North Wind Farms - Rock Aetna	238,138	2023	The Northern Wind Project is a Build, Own, Transfer (BOT) project between Xcel Energy and ALLETE Clean Energy (ACE) also known as ACE Mid-west Holdings LLC. ACE currently owns the projects and will manage the reconstruction of a new 80% Production Tax Credit (PTC) eligible wind farm. Xcel Energy will purchase and operate the site following construction.□ □ The Norther Wind Project consists of repowering two (2) existing wind sites comprised of the Chanarambie (85.5 Mega-Watt (MW)) and Viking (12MW) projects, along with the adjacent Rock Aetna (20MW) green-field wind project, all located in southwest Minnesota along the Buffalo Ridge. Chanarambie and Viking II wind farms are currently under a Power Purchase Agreement (PPA) with Northern States Power (NSP) and Rock Aetna is known as the expansion project pursuant to the Purchase and Sales Agreement (PSA) executed by the companies on February 4, 2021. The Northern Wind Project will update the existing generation with new technology providing up to 120 megawatts of power	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001574.421	Reliability/Performance Enhancement	SHC3C Fan Control Room Roof Re	235,017	2023		

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001573.206	Reliability/Performance Enhancement	BDS0C-Replace CV Positioners	234,838	2023	Replacement of existing positioners on 22 existing control valves at the Black Dog Power Plant with upgraded positioner design, which also include actual valve position feedback to the plant control system. Project includes engineering for project management, plant I&C labor to replace the positioners, and plant Electrician labor to pull new wire for those which are needed.□ □ This project also includes any required new Emerson DCS modules, new logic, new HMI screen updates for all digital and analog inputs and outputs required for the new equipment.	A substantial number of control valves at the Black Dog power plant utilize positioners that do not include means to provide actual valve feedback to the plant control system. For the majority of control valves at the plant presently the control system can only display the requested position only, meaning in the event the valve does not move to the requested position due to a component failure, Operations would not be immediately aware. A mis-positioned valve may not be evident until the operating system is already impacted, this could result in trips or equipment damage. Actual position feedback provides improved operator awareness and effectiveness which is critical as the operations staff has decreased in number, and supports the ongoing efforts to improve Ovation HMI. In addition there are several valve positioners that are obsolete/no longer supported by the manufacturer that need replacement.□ □ This project would replace 22 positioners on a variety of critical valves on multiple systems with newer positioners that are configured to provide actual valve position feedback to the plant control system and would include adding the position feedback to the existing control system.□ □ In addition the newer positioners are magnetic type, which are more reliable due to no moving mechanical parts.□ □ There have historically been trips and runbacks at Black Dog which have been attributed to both malfunctioning valves, and operator error, both of which this project would improve upon.
NSP-Minnesota	A.0001565.163	Reliability/Performance Enhancement	WLM0-Greensand Filter for RO Water-	232,407	2023	This project would involve procuring a greensand filtration system skid (2-4 greensand filter vessels, depending on the vendor), associated PLC, valves, and piping in order to allow the water going through the existing Reverse Osmosis system to come from our Shallow Well source instead of the City Water source it is currently on. The Shallow Well water pump has enough capacity that it can supply water to all of the cooling water processes and scrubber lances that it currently supplies to as well as supplying enough water through the RO. However, sending it straight to the RO from the well or through its existing filter skid only will not be sufficient and will likely cause damage to the RO media. It must be sent through a more rigorous filtering media before it gets to the RO.	By cleaning the water from the Shallow well so it is high enough quality to be sent through the RO, we can off of City Water for all major plant operating processes (i.e non-potable). This will further drive down O&M expenses and contribute to a lower cost/MWh.
NSP-Minnesota	A.0001574.309	Reliability/Performance Enhancement	SHC3 - Turb Cntrl Vlv Intnl 2023 -	230,048	2023	Replace main turbine control valve internals including, but not limited to stems, bushings, crosshead assemblies, balance chambers, plugs, and seats.	The valve internals have been subject to damage due to excessive wear and tear due to frequent unit cycling and more frequent economic outages. There are four control valves, all four of which experience significant degradation. The above work description is intended for all four control valves. The control valves are critical safety devices used to prevent turbine overspeed after a unit trip and are also responsible for regulating steam admission to the turbine. Their mechanical integrity is essential to safe and reliable operation of the turbine.
NSP-Minnesota	A.0001565.166	Reliability/Performance Enhancement	WLM99-New Magnetic Separator-24724	200,626	2023	Project to install a new magnetic separator to remove ferrous metals (iron, steel, etc.) from the fuel stream before it reaches the boiler. This would be installed upstream of the plant in the fuel transfer area (most likely at the tail end of the transfer belt in Transfer Tunnel 1). This project would include designing and fabricating a structural frame to mount the magnetic separator, determining and installing necessary power requirements and installing a chute and storage area for the recovered ferrous metals.	The heavy, ferrous metals that make it through the fuel transfer area into the boiler causes undue wear on our fuel transfer equipment such as the fuel transfer belts (that can rip when a large chunk of metal falls into it), fuel chutes, travelling grates, etc. Depending on what metal it is if the melting point of the ferrous metals are low enough it can cause operational issues with our grates (jamming, plugging holes, shearing pins and grate weights, etc.). Removing as much metal out of the fuel stream as possible would help reduce O&M costs and preserve existing fuel handling equipment.
NSP-Minnesota	A.0001565.165	Reliability/Performance Enhancement	WLM99-Eddy Current Separator-24723	200,543	2023	Project to install a new Eddy Current Separator in the fuel transfer area (most likely towards the end of the transfer belt in Transfer Tower 2) upstream of the plant to remove non-ferrous metals before they reach the boiler. This project would include designing and fabricating a structural frame to mount the eddy current separator to, determining and installing necessary power requirements and constructing a discharge chute to send the recovered non-ferrous metals to.	Any non-ferrous metals (most common one is aluminum) that make to the boilers melt in the furnace and cause many maintenance issues. The melted aluminum plugs the air holes in the travelling grates which blocks undergrate air from making it to the furnace and the it causes the grates to bind up towards the front the boiler as the grates are making their revolution. When the binding gets too severe, it will prevent the grate from travelling by either shearing pins, causing grate weights to fail or jamming up the grate bars. This can cause us to have to come offline in order to make these repairs. The melted non-ferrous metals are a large O&M expense during planned and unplanned outages and each grate bar has to be individually unblocked using a needle-gun. Anything we can do to prevent even some of the non-ferrous metals would help alleviate these constant O&M costs. We could also recycle the collected cans or sell them for scrap.
NSP-Minnesota	A.0003000.682	Reliability/Performance Enhancement	SHCJC Tools and Equip pur	200,000	2023	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001574.252	Reliability/Performance Enhancement	SHC99 Emergent work	197,227	2023	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001565.116	Reliability/Performance Enhancement	WLM1C U1 Static Exciter	191,050	2023	This project replaces the obsolete Basler 200 exciter with a DECS 400N, to bring the unit into compliance with the NSP fleet.	Current exciter OEM parts are obsolete, requiring work arounds to keep it running.
NSP-Minnesota	A.0001559.127	Reliability/Performance Enhancement	BLL7C Inlt Filter Evap Media Repl-2	185,859	2023	BLL 7 Inlet Filter & Evaporative Cooler Media Replacements	Inlet Filters and Evaporative Cooler Media are original from 2005.
NSP-Minnesota	A.0001559.128	Reliability/Performance Enhancement	BLL8C Inlt Filter Evap Media Repl-2	185,859	2023	BLL 8 Inlet Filter & Evaporative Cooler Media Replacements	Inlet Filters and Evaporative Cooler Media are original from 2005.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001573.179	Reliability/Performance Enhancement	BDS0C GSU Containment Const Spare	177,184	2023	Construction of a concrete containment pad in 2018 for the retired 3 GSU transformers which is being removed in spring of 2017 as part of the Black Dog site demolition project. This includes construction of a new concrete pad of approximately 30' x 40' with wall height of approximately 3', which will provide sufficient containment volume in the event of an oil leak from 3 GSU (8,635 gallons) and provide enough square footage to place the transformer. Electric power supply 240 VAC must be provided for control cabinet heating. Containment must be provided with a low-point sump and drainage provisions.	The transformer will be removed in the spring of 2017 and require a containment pad for long term storage as fleet spares. 3 GSU will serve as a spare transformer for Unit 2 at Black Dog. Utilizing the transformer as fleet spare is recommended due to significant costs and lead times associated with a new transformer to mitigate the risk of an extensive forced outage in the event of a GSU transformer failure.
NSP-Minnesota	A.0001574.791	Reliability/Performance Enhancement	SHC3-SHC3-Haul Road 2019 19889	171,387	2023	SHC3P Haul Road; Overlay 25% of Landfill Haul Road. $290K spend.	Haul road in poor repair is a major safety hazard and causes considerable damage to heavy equipment.
NSP-Minnesota	A.0001742.002	Renewable and New Generation	NRW North Wind Farms - Chanarambie	154,006	2023	The Northern Wind Project is a Build, Own, Transfer (BOT) project between Xcel Energy and ALLETE Clean Energy (ACE) also known as ACE Mid-west Holdings LLC. ACE currently owns the projects and will manage the reconstruction of a new 80% Production Tax Credit (PTC) eligible wind farm. Xcel Energy will purchase and operate the site following construction.□ □ The Norther Wind Project consists of repowering two (2) existing wind sites comprised of the Chanarambie (85.5 Mega-Watt (MW)) and Viking (12MW) projects, along with the adjacent Rock Aetna (20MW) green-field wind project, all located in southwest Minnesota along the Buffalo Ridge. Chanarambie and Viking II wind farms are currently under a Power Purchase Agreement (PPA) with Northern States Power (NSP) and Rock Aetna is known as the expansion project pursuant to the Purchase and Sales Agreement (PSA) executed by the companies on February 4, 2021. The Northern Wind Project will update the existing generation with new technology providing up to 120 megawatts of power	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001574.863	Reliability/Performance Enhancement	SHC0-Replace Well #4-24876	153,077	2023	Replace Well #4. This project will drill a new well next to the existing well and close the old well. The new well will be drilled just outside the existing building and will connect to the existing piping and pump control system. Recent inspections of the well have found the casing has holes in it which will continue to deteriorate and cause pump and motor failures as well as introduce silt into the system. This project is nearly identical to SHC-24053 performed in 2020 on Well #6 which is nearby Well #4 and the same age. The new well is expected to be at the same depth and capacity of the existing well.	This well is critical to operation of all three Sherco Units as well as any future units on site. Wells #4 and #6 provide the majority of the water to the site and are in a better location and newer than other wells on site. It is expected that these wells will continue to be in service for many years to come while other, older wells may be retired as they fail and there is less demand as coal units are retired.
NSP-Minnesota	A.0001573.059	Reliability/Performance Enhancement	BDS5C CT Remote Monitoring	150,550	2023	Installation of remote monitoring and diagnostic hardware and software for Unit 5 combustion turbine. This includes one-way firewall to protect plant control network from outside access and meet NERC CIP requirements, PI interface node and PI on-site server with rack, all required software (PI server, interfaces, communication), and communication hardware for connection to the remote monitoring center.	Remote monitoring by PSM or other vendor to monitor real-time data from Unit 5 combustion turbine to track key performance indicators, provide early warnings of potential issues, analyze causes and recommend solutions for both immediate fixes and long-term improvement. Parameters being monitored include Combustor Dynamics, Blade Path Spread, Exhaust Gas Temperature Spreads, Fuel Gas/Oil Temperature, Bearing Temperature & Vibration, Compressor Discharge Temperature & Pressure, Inlet Guide Vane Position, Turbine Speed, Compressor Inlet Temperature, Alarm Displays in the DCS, and Generator Monitoring.
NSP-Minnesota	A.0003000.658	Reliability/Performance Enhancement	ASK0C- Tool Blanket	150,000	2023	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001565.164	Reliability/Performance Enhancement	WLM0-Replace BFP #3-24707	146,369	2023	Project to replace the existing I-R splitcase pump with a new Carver ring section pump. This would include a new pump, motor, baseplate, etc. This project would also include any labor needed to modify the pump stand and piping modifications.	It is nearly the same price to provide an entire new pump assembly as it is to replace the rotating assembly in our existing #3 Boiler Feed Pump.
NSP-Minnesota	A.0001562.179	Reliability/Performance Enhancement	REW0-100% Circ Water Pump-24583	146,152	2023	This project will replace all rotating components of the 100% Circulating Water pump. This pump was last serviced in 2014 and by 2023 all internals will need to be replaced.	By this time the rotating components will be at end of life and exhibiting serious wear. If this pump fails beyond repair the Plant will only be able to run 1 unit until it is fixed.
NSP-Minnesota	A.0001565.052	Reliability/Performance Enhancement	WLM0-Replace Lime Mixer Grit S	140,495	2023	WLM0719 - 2500 lbs/hr CaO (Lime) slaker, 24 inch lime grit shaker, and floor replacement.	Current slaker and grit shaker were installed in 1992 along with most of the AQCS system. The machines have been very durable over the years but are now beginng to show there age. The agitator stub shaft on the slaker was found to be bent during our January 2009 outage which causes the seals to fail allowing slurry into the bearings if not closely watched. One of the liners was replaced in 2008 but the other liner will need to be replaced soon. The grit shaker has been repaired using O M dollars many times over the years; multiple motors, spring rebuild kits, screens, cords, seals and tubs. The slaker and grit shaker are vital to our burning RDF for without them we could not process the lime we use in the scrubbers for SO2 removal. The floor under the slaker and grit shaker developed holes years ago and has been repeatedly patched. We need to replace this floor because it is the ceiling to the slurry tank; crud and rust fall through the floor reaching the slurry tank plugging our system. The slaker and grit shaker need to be removed to replace the floor, now would be a good time to do all three.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001579.171	Reliability/Performance Enhancement	RIV9-Rpl Evap Cooler Media 2023-223	137,539	2023	Remove and replace evaporative cooler media. Media will be 14 years old in 2023. Normal life is 7 - 10 years.	If evaporative cooler media is not replaced when aged and deteriorating, it can break down and disintegrate, causing significant compressor damage up to and including total wreckage. If it has high pressure drop, it can result in significantly lower turbine output, and fail to perform its cooling function resulting in additional lost capacity. Estimate is estimated as 2016 dollars ($155,000) escalated at 3%/yr.
NSP-Minnesota	A.0001576.006	Renewable and New Generation	GDM0C Generator Replacements 2	134,936	2023	Replace failed generator in GE 1.5 SLE wind turbines. Cost includes the crane and labor to remove the generator and then reinstall it.	High operating temperatures in the compact design have caused a small amount of failures in the industry after 5 years of operation.
NSP-Minnesota	A.0001565.152	Reliability/Performance Enhancement	WLM2-New VFD for Unit 2 OFA Fan Mot	131,114	2023	Project to procure and install a new VFD for the Unit 2 Overfire Air Fan motor. With a new VFD, the plant would be able to have speed control which would reduce wear and tear on the OFA fan motor and make it easier to tune the boiler.	The existing motor softstart is obsolete.
NSP-Minnesota	A.0001572.107	Reliability/Performance Enhancement	ASK1C Inst GRF Damper Drives	129,244	2023	Replace the exising inlet damper drives with new damper drives during 2016 outage.	The existing Beck-brand drives do not control well.□ □ There are startup issues with control of the existing dampers at low percentage damper flows.
NSP-Minnesota	A.0001611.011	Renewable and New Generation	PVW1-Transformer Replacements	122,672	2023	Replace failed transformer in Vestas V100 wind turbines. Cost includes the crane and labor for overhaul of the transformer	Upon failure, the wind turbine can not be run
NSP-Minnesota	A.0001580.009	Renewable and New Generation	CWF1-Transformer Replacements	122,402	2023	Replace failed transformer in Vestas V100 wind turbines. Cost includes the crane and labor for transformer overhaul	Upon failure, the wind turbine can not be run
NSP-Minnesota	A.0001565.157	Reliability/Performance Enhancement	WLM2-New Unit 2 FD Fan motor and VF	121,086	2023	Project to procure and install a larger motor and VFD for the Unit 1 Forced Draft fan. The existing motor is 75 HP. The new motor would be 100 HP.	The existing motor is consistently running at or above FLA of the nameplate motor rating. This is causing accelerated wear and tear on the motor.
NSP-Minnesota	A.0001565.155	Reliability/Performance Enhancement	WLM0-New motor and VFD for #2 BFP-2	121,082	2023	Project to procure and install a new VFD-rated motor and VFD for our #2 Boiler Feed Pump. This project would need to be executed at the same time as when the motors on the FD fans are replaced because there will need to be additional work done to modify MCC 48 in order to fit the new VFDs in. It would make sense to do the MCC work for both projects at the same time.	Installing a VFD rated motor and VFD will allow us to run the pump at lower capacity which will save wear and tear on the pump and reduce O&M expenses against it.
NSP-Minnesota	A.0001562.165	Environmental Enhancement	REW1-Repl U1 CEMS Analyzers-22051	120,827	2023	This project would replace the CEMS flue gas analyzers on Unit 1.	The existing CEMS analyzers are outdated. The equipment being used is obsolete and replacement parts are becoming sparse. The existing equipment leads to unnecessary failures that have the potential to force the units offline.
NSP-Minnesota	A.0001562.170	Environmental Enhancement	REW2-Replace U2 CEMS Analyzers-2428	120,827	2023	This project will replace the CEMS flue gas analyzers on Unit 2. These analyzers are for 2 inlet samples and 4 outlet samples and were originally installed in 2009.	The current analyzers are becoming old and outdated. Any unnecessary failures in the existing equipment have the potential to force the units offline.
NSP-Minnesota	A.0001574.737	Reliability/Performance Enhancement	SHC0 Air Comp Controls U0	118,568	2023	Replace the existing air compressor controls on #1 and #2 Air Compressors with Case controls which are based on an Allen Bradley PLC platform.	The controls for each compressor need to be replaced for two reasons:□ 1. The existing controls were installed incorrectly by leaving a relay based control system in place and making the microprocessor based control system a slave of aux contacts on mechanical relays. This has lead to numerous control failures attributed to malfunctioning relays and immensely complicated troubleshooting.□ 2. It is anticipated the manufacturer of the existing control systems will be out of the market place in the near future. This leaves the house air and instrument air system vulnerable to an obsolete, proprietary microprocessor.
NSP-Minnesota	A.0001575.204	Reliability/Performance Enhancement	HBC8C Air Inlet Filter Repl-24728	114,441	2023	Replace all 450 Primary Air Filter Elements on the Unit 8 Combustion Turbine Air Intake during the Fall 2023 Winter Prep Outage. Materials and Labor.	The combustion turbine primary air filters remove dirt and debris from the incoming air. It is critical to maintain clean air into the compressor inlet, otherwise dirt and debris can plug cooling passages in the turbine or damage rotating blading. Overtime, the primary air filters get clogged with debris, which increases pressure loss and reduces the overall efficiency of the combustion turbine. Historically the High Bridge Plant has had to replace the primary air filters approximately every 5 years due to pluggage. They were last replaced in the Fall of 2018.
NSP-Minnesota	A.0001575.205	Reliability/Performance Enhancement	HBC7C Air Inlet Filter Repl-24729	114,437	2023	Replace all 450 Primary Air Filter Elements on the Unit 7 Combustion Turbine Air Intake during the Fall 2023 Winter Prep Outage. Materials and Labor.	The combustion turbine primary air filters remove dirt and debris from the incoming air. It is critical to maintain clean air into the compressor inlet, otherwise dirt and debris can plug cooling passages in the turbine or damage rotating blading. Overtime, the primary air filters get clogged with debris, which increases pressure loss and reduces the overall efficiency of the combustion turbine. Historically the High Bridge Plant has had to replace the primary air filters approximately every 5 years due to pluggage. They were last replaced in the Fall of 2018.
NSP-Minnesota	A.0001611.010	Renewable and New Generation	PVW1-Generator Replacements	112,202	2023	Replace failed generators. Cost includes the crane and labor for generator overhaul	Upon failure, the wind turbine can not be run
NSP-Minnesota	A.0001574.311	Reliability/Performance Enhancement	SHC99 -CESP 2023 #3 CC Rotor Asmbl-	105,706	2023	Change out the rotating hammer assembly with CESP rotor Assembly on Sherco #3 Coal Crusher. Also change out worn / thin cage pieces, and wear plating inside the crusher.	Crusher is worn out and cannot provide a consistent coal fineness to the plant. This in turn effects the efficiency , of the burning, of the coal in the plant.
NSP-Minnesota	A.0001574.572	Reliability/Performance Enhancement	SHC99 -CESP-2024 #4 CC Rotor Asmbl-	104,460	2023	Change out the rotating hammer assembly with CESP rotor Assembly on Sherco #4 Coal Crusher. Also change out worn / thin cage pieces, and wear plating inside the crusher.	Crusher is worn out and cannot provide a consistent coal fineness to the plant. This in turn effects the efficiency , of the burning, of the coal in the plant.
NSP-Minnesota	A.0001571.107	Reliability/Performance Enhancement	ANS0C Com Gas Line Pig Barrel-25061	101,881	2023	Anson Natural Gas Line Receiver Pigging Barrel Install	PHMSA (Pipeline and Hazardous Material Safety Administration) Required 7 year pipeline ILI study
NSP-Minnesota	A.0001562.185	Reliability/Performance Enhancement	REW1-U1 Lower Air Heater Baskets-24	100,703	2023	This project will replace the lower air heater baskets on Unit 1. The lower baskets are on a 5 year replacement cycle due to the high amount of dew point corrosion they see.	Once the air heater baskets reach the point where there is too much corrosion, sections of the baskets must be blanked off to prevent mixing between flue gas and supply air from the FD. If mixing occurs CO emissions are difficult to control. Also, boiler burn characteristics and the ID fans ability to control furnace pressure are impacted.
NSP-Minnesota	A.0003000.699	Reliability/Performance Enhancement	SER-SMC-Misc Tools & Equipment	100,000	2023	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001573.178	Reliability/Performance Enhancement	BDS0C Heating System Sample Panel	96,715	2023	Installation of a sample panel for the heating system condensate return including sample coolers and analyzers, and integration into the Ovation DCS control system for monitoring and alarming functions. This includes the sample panel, cooling water connections, and electrical requirements to perform the project.	The heating system returns currently have a single conductivity analyzer without a sample cooler which subjects the instrument to excessive temperature and erroneous readings. This analyzer is local indication only as well, so it does not provide adequate monitoring and alarming capability into the control room. Over the history of the plant, the heating system condensate returns have become contaminated due to various causes. These events sometimes cause contamination of the boiler water systems, resulting in higher than normal blowdowns and wasting water, which could also lead to forced outages from water chemistry impacts which has happened in the past at Black Dog. This project would make it possible to detect contamination early, making it possible to plan better for remedial action, and prevent operational issues.
NSP-Minnesota	A.0001574.677	Reliability/Performance Enhancement	SHC3C Air Comp Controls Replace	96,588	2023	Replace the existing air compressor controls on 31, 32, and 33 Air Compressors with Case controls which are based on an Allen Bradley PLC platform.	The controls for each compressor need to be replaced for two reasons:□ 1. The existing controls were installed incorrectly by leaving a relay based control system in place and making the microprocessor based control system a slave of aux contacts on mechanical relays. This has lead to numerous control failures attributed to malfunctioning relays and immensely complicated troubleshooting.□ 2. It is anticipated the manufacturer of the existing control systems will be out of the market place in the near future. This leaves the house air and instrument air system vulnerable to an obsolete, proprietary microprocessor.
NSP-Minnesota	A.0001574.535	Reliability/Performance Enhancement	SHC3C BFP Overhaul 33	95,318	2023	Overhaul Boiler Feed Pump□ Estimates: □ $100,000- Pump□ $3,000- Potential seal face renewal□ $6,000- Electrical□ $65,000- Maintenance□ $174,000- Total	Pump overhauls should be done on a 6 year interval to provide reliable operation.
NSP-Minnesota	A.0001573.275	Reliability/Performance Enhancement	BDS0-Plant Admin Area Roof Repl-240	86,598	2023	Replace plant administrative building roof.	Roof leaks have been an issue for the past few years, especially from the area underneath the Unit 5 combustion turbine air inlet ducting. Temporary repairs have been made that have mitigated, but not eliminated the leaks. Roof leaks have been located in mailroom and library areas which have resulted in damage and slip hazards.
NSP-Minnesota	A.0001562.164	Reliability/Performance Enhancement	REW2-Rep 21 Screw Feeder Augers-121	85,747	2023	- Replace the Screw Feeder Augers in Bin #21	0
NSP-Minnesota	A.0001562.163	Reliability/Performance Enhancement	REW2-Rep 22 Screw Feeder Augers-121	85,747	2023	- Replace the Screw Feeder Augers in Bin #22	0
NSP-Minnesota	A.0001566.168	Renewable and New Generation	NBL0 - Gearbox Replacements	84,984	2023	Replace failed gearboxes. Cost includes the crane and labor to remove the rotor, gearbox, and main shaft, and then reinstall the components.	Gearboxes fail with planetary section damage and need to be replaced.
NSP-Minnesota	A.0001574.778	Reliability/Performance Enhancement	SHC0-Lime slaking building roof 221	83,901	2023	Replace the roof on the Lime slaking building which is on the east side of the crusher building in the coal yard.	The roof is in poor shape and leaks on switchgear in the room. Replacement is required to maintain the functionality of the equipment inside.
NSP-Minnesota	A.0001574.824	Reliability/Performance Enhancement	SHC99-Tunnel Dust Collectors F.P.-2	81,504	2023	From 2014 All Risk Loss Prevention Report for Sherco, Recommendation SHC P 06-13: □ Install explosion isolation protection on the inlet and outlet ducts of the two Tunnel Dust Collectors drawing coal dust from the tunnel beneath the Coal Storage Barn.	These dust collectors have 4¿ diameter ducts that draw coal dust from the tunnel, the Coal Storage Barn, and return clean air back to the tunnel in the winter. If a coal dust explosion should occur in one of these dust collectors, the explosion would propagate back down the inlet and outlet ducts into the tunnel beneath the Coal Storage Barn. If there was significant dust in this tunnel, the explosion coming into this tunnel would put the coal dust in the tunnel into suspension and ignite it. Thus, resulting in a secondary explosion in the tunnel that would propagate down the tunnel destroying the conveyor, eliminating the ability to obtain coal from this source. Coal would have to be routed through the Stacker/Reclaimed to supply the boilers. Reference NFPA 850, Section 7.4.3.The Loss Expectancy associated with this condition is estimated at $1,000,000. The estimated cost to complete is $100,000.□ Means of explosion isolation protection that could be used include chemical isolation systems (similar to explosion suppression systems) or an abort gate capable of withstanding the pressures of the explosion.
NSP-Minnesota	A.0001574.308	Reliability/Performance Enhancement	SHC3 - Replace U3 TCS HMI - 22765	78,872	2023	Replace the Unit 3 Turbine Controls System (TCS) Human-Machine Interfaces (HMIs), or computers.	HMI's at this time have reached the end of their useful lifecycle. Critical Computer errors are morel likely to occur as the computers age, and replacement components will be difficult to find at this time. Spare parts created can also be used for Unit 2 Turbine Controls.□ □ This project will make us less vulnerable to cyber attacks by strengthening our anti-virus systems on the DCS.□ □ the System Health score of this system is at 100, and it will improve it to less than 30, nearing the blue "clear" color code.□ □ EPR 4.200 states "4.2.6 Current Operating Systems, Applications and Hardware: Plant networks should have current operating, hardware and software systems that are supported by the involved manufacturers to provide current antivirus and malware signatures and operational patches. A plant improvement project request shall be submitted using the EPM system if any plant network equipment is no longer supported by the vendor and requires upgrade in order to maintain current cyber-security protections."□ Because Windows 7 is no longer supported, this upgrade allows us to follow this mandate.

Company	Project ID	New Grandparent	Project Name	YE Amt ($s)	Activity Year	Project Description	Project Justification
NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001562.160	Reliability/Performance Enhancement	REW1-Replace Bin 12 Augers 2024-138	75,937	2023	This project will replace all six (6) RDF screw feeder augers in #12 metering bin. The new augers will be constructed with AR400 flighting and will be a near like for like replacement as to those currently in service.	The existing screw feeders have a 5 year expected life span, which has been seen throughout the life of the RDF burning process. After 5 years it has been noted that the structural barrel of the augers wear to approx. 1/2 of their nominal thickness. Due to the design of the auger assembly, it is difficult to repair the barrels instead of replacing them. When failures occur with the screw feeders, the unit must be taken off of RDF and placed on natural gas, this could cause a risk of having an Air Quality Permit violation/exceedance due to the quick swap of fuel sources. When the screw feeder flights are worn down, the chance for fuel to get wrapped around the barrel increases, this means more screw cleaning is needed by Operations. Cleaning screws is a very high risk activity for the operations staff.
NSP-Minnesota	A.0001574.269	Reliability/Performance Enhancement	SHC2C Emergent Projects	71,004	2023	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001574.847	Reliability/Performance Enhancement	SHC3-LFLeachate Truck Flll Station-	68,991	2023	Upgrade Landfill Water Truck Fill Tank to load trucks with Landfill Leachate Water for disposal at a Waste Water Treatment (WWTF). Costs include permitting efforts to receive approval for disposal at the WWTF.	Currently excess Landfill Leachate water is disposed in the Sherco Ash Ponds. Off-site disposal provides a backup disposal option, in-case the Ponds are unable to take the water during high level pond inventory emergencies.
NSP-Minnesota	A.0001579.017	Reliability/Performance Enhancement	RIV7C-71 UPS Battery Replaceme	68,647	2023	Replace 71 UPS back up batteries (incorrect title, should be 71 UPS not 61 UPS).	Batteries provide backup power for generator and breaker DC controls and alarms. Battery capacity test to be performed in 2015 - this will provide insight into criticality of battery replacement.
NSP-Minnesota	A.0001574.310	Reliability/Performance Enhancement	SHC99 - Rplc RCD DS Pipe 2023 - 234	66,316	2023	Replace sections of the Dust Suppression water line in the RCD building. This is a 6" pipe. Replace 20' feet or more.	Environmental - We are permitted to run DS when we are dumping trains. This run of piping has MIC corrosion and there are a lot of 'Patches' all over this pipe.
NSP-Minnesota	A.0001575.101	Reliability/Performance Enhancement	HBC7C CT Servo Replacement	60,400	2023	Replace/rebuild servo's on 7 CT. The OEM is no longer supporting the existing style of servo, and they have a compatible replacement. This project is to purchase and install "new" style servos that are supported by the OEM. A spare set will be kept in stock and rotated in to each CT to minimize outage duration and maintain reliability. The set that is removed will be inspected/refurbished and returned to stock.	The servo's are necessary for controlling combustor bypass, IGV's, and fuel gas to the combustion turbine. It is essential the servo's function properly. OEM recommends rebuilding these servo's every year. We haven't been since we changed the control oil to hydraulic oil and the varnishing has been reduced, adjustment to PM schedule will be made as needed.
NSP-Minnesota	A.0003000.679	Reliability/Performance Enhancement	RIV0C-Tool Blanket	60,000	2023	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001575.203	Reliability/Performance Enhancement	HBC8C Turning Gear Repl-24726	58,787	2023	Replace the Turning Gear Assembly consisting of a cyclo-speed reducer and drive motor during the Spring 2023 Major. The removed Turning Gear Assembly will be refurbished on O&M and placed into plant inventory.	The turning gear is a critical component that rotates the combustion turbine-generator rotor at low speed to keep the rotor straight. If the turning gear is not-operable, the combustion turbine-generator will be placed in a forced outage until repairs can be made. During the spring 2020 Unit 7 overhaul, the turning gear cyclo-drive required unexpected emergent repairs that required the unit to be shipped offsite for repair. Fortunately the OEM had replacement parts in stock and were able to repair the unit in approximately 15 days including transit time. If the turning gear fails unexpectedly and a spare unit is not available, the risk is that the combustion-turbine will enter a forced outage for approximately 3 weeks or longer(including procurement, offsite repair time, and removal/re-installation)
NSP-Minnesota	A.0001565.148	Reliability/Performance Enhancement	WLM2-Cooling Water Pump #2 VFD-2457	55,713	2023	Project to procure and install new VFD for Scrubber Cooling Water Pump #2. This project would also involve integrating the VFD into the existing MCC 48 using a spare bucket.	The existing VFD is obsolete. Parts are becoming more difficult to find.
NSP-Minnesota	A.0001575.051	Reliability/Performance Enhancement	HBC7C U7 CT Servo Replace 2	54,712	2023	Purchase new set of Moog servo valves for CT.	The currently installed servos are obsolete. Moog will not rebuild them anymore. The servo's are necessary for controlling the combustor bypass, IGV's, and fuel gas to the combustion turbine. It is essential the servo's be maintained to ensure safe and reliable control of critical CT systems.
NSP-Minnesota	A.0001574.417	Reliability/Performance Enhancement	SHC3C Bearing Fire Protect Pip	54,145	2023	Replace fire protection piping for the Steam Turbine and Generator and BFP and BFPT bearing fire protection. The current piping configuration was found unable to carry sufficient flow to all heads.□ □ The main bottleneck is the 3" supply to bearing protection valve GTG-3017. This line would be increased to 6" and the distribution downstream of the valve needs to be evaluated by a fire protection vendor for further improvements. The likely solution will be to run a 6" trunk to the mezz levelinstead of 16 individual 1-1/4" lines to each bearing to reduce pressure drop.	Should major fire occur on the turbine deck, this system, in its current configuration may not be sufficient to handle such an event.
NSP-Minnesota	A.0003000.669	Reliability/Performance Enhancement	HBC0C HB CC Tool Blanket	50,000	2023	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001574.313	Reliability/Performance Enhancement	SHC99-RR Return Track Crossing '23-	48,010	2023	Replace wood RR crossing on the return track coming out of the Rotary Car Dumper building leading to the pocket.	Safety - These crossing are needed to get around trains when on-site. Some of these are getting pretty deteriorated, and can cause problems with heavy equipment, especially in the winter months.
NSP-Minnesota	A.0001575.172	Reliability/Performance Enhancement	HBC0 - Rmv & Rplc BFP Spare YR2 - 2	43,208	2023	Supervision, labor, and consumables to remove boiler feed pump and install the rotating CESP pump in it's place.	Boiler feed pumps are severe duty critical plant equipment. Periodical overhauls are required. Two pumps are currently showing indications of thrust bearing degradation.
NSP-Minnesota	A.0003000.661	Reliability/Performance Enhancement	BDS0C Tool Blanket	42,850	2023	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001574.826	Reliability/Performance Enhancement	SHC99-3 Plow Fdr Obsolete upgrade-2	41,818	2023	Upgrade obsolete parts on #3 Rotary Plow Feeder in the bottom of the Barn. Currently Hyd Pump Controller, Travel Gearbox, and Hydraulic Motor (as a unit) are obsolete.	Safety - If we loose the capability to remove coal from the coal barn, the coal will start to spontaneously combust.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001574.861	Reliability/Performance Enhancement	SHC99-Coal Barn CO Detection Proj-2	40,000	2023	This project will consist of installing a new Carbon Dioxide (CO) detection system to monitor the coal barn storage area. The new system will need to be incorporated into the existing DCS system in the coal yard. This will replace the obsolete Methane Detection Equipment that was originally installed in the coal barn.	Safety - A waring system is needed in our coal barn to indicate the beginning of a fire, so we can have a better early indicator of a fire.□ □ Management Request - Sherco Yard Management has requested that we install a new CO monitoring system similar to what we have in other critical areas in the coal yard.□ □ Potential Coal Switch - There have been talks about needing to use the coal barn to store Wyoming coal in the future. Wyoming coal tends to spontaneously combust more often, so this system will help monitor any self heating of the coal.
NSP-Minnesota	A.0001574.860	Reliability/Performance Enhancement	SHC99-Replace Festoon Cable on #2 P	36,000	2023	This project consists of replacing the festoon cable on #2 plow in the coal barn.	This cable needs to be replaced due to a recent repair that shortened the cable. This replacement will allow for #2 Plow to regain its full range of motion. If the plow can not operate in its full range of motion, the potential for a fire in the barn significantly increases.
NSP-Minnesota	A.0003000.372	Reliability/Performance Enhancement	SER-CSC-Purchase Forklift #2	35,985	2023	CSC-Replace Forklift no. 2 Replace existing lower floor forklift (#2)	CSC-Replace Forklift no. 2 The existing lower floor Nissan 4000 lb capacity, propane-powered, adjustable forklift (#2) has been in service since 1996. The Hazardous Waste Storage Facility (HWSF) is a bi-level facility and it does not have its own ramp for traversing between the lower and upper floors; therefore, two forklifts are required for operations within the HWSF. The lower floor forklift is utilized for loading/unloading slide-loaded/drop-decks/low-boy trailers, drum and pallet handling and movement, roll-off disposal operations, intra-Chestnut transfers, transformer and bushing draining operations, and pre-load staging. The lower floor forklift also works in concert with the upper floor forklift for transferring materials between floors for waste acceptance, weighing, storage, and roll-off disposal. Without the lower floor forklift, any task involving a forklift would require the upper floor forklift to drive around to fulfill the lower floor tasks and then drive back around to the upper floor. Depending on the type of project, it may take anywhere between 1 and 50 trips back and forth to accomplish. This would be an incredibility slow process and result in higher labor charges and significantly increased usage and wear on the sole forklift.
NSP-Minnesota	A.0001574.862	Reliability/Performance Enhancement	SHC99-Replace Plow Feeder Gearbox-2	33,333	2023	This project consists of purchasing and installing a new rotary plow feeder gearbox.	This project is needed due to the fact that the existing gearbox is near the end of its life.
NSP-Minnesota	A.0003000.748	Renewable and New Generation	BS10-Blazing Star 1 Tools and Equip	30,000	2023	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.750	Renewable and New Generation	FTW0-Foxtail Tools and Equipment	30,000	2023	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001571.106	Reliability/Performance Enhancement	ANS0C Com Shop HVAC Repl-24743	29,825	2023	HVAC System Replacement	Roof Top Unit no longer supported by manufacturer and parts no longer available
NSP-Minnesota	A.0001561.500	Reliability/Performance Enhancement	IVH Emergent Fund -Other prod	27,874	2023	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001562.193	Reliability/Performance Enhancement	REW0-#1 BFWP VFD-24605	27,716	2023	This project will replace the #1 BFWP variable frequency drive. The current drive is a Yaskawa 200 HP P7 series VFD that is nearly obsolete and will be replaced with a newer model.	The current drive was installed in 2010 and has about a 10 year lifespan. If this drive were to fail we would lose all redundancy within the boiler feed system. With both units at full load we must run 2 out of the 3 BFPs. If for any reason, we were to lose a second pump, it would result in a dual unit forced shutdown.
NSP-Minnesota	A.0001562.192	Reliability/Performance Enhancement	REW1-U1 OFA Fan VFD-24603	27,716	2023	This project will replace the Unit 1 OFA Fan variable frequency drive. This is a Yaskawa 200 HP P7 series VFD that is now nearly obsolete and will be upgraded to the newer P1000 series.	This drive was originally installed in 2012. Based on manufacturer's recommendation, this VFD has a lifespan of 10 years.
NSP-Minnesota	A.0001559.500	Reliability/Performance Enhancement	BLL Emergent Fund -Other prod	27,320	2023	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0003000.657	Reliability/Performance Enhancement	ANS0C Tools and Equip Ca	20,000	2023	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.659	Reliability/Performance Enhancement	BLL0C Tools Blanket	20,000	2023	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.672	Reliability/Performance Enhancement	IVH0C Misc tools and Equip	20,000	2023	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.676	Reliability/Performance Enhancement	NBLCo Misc Tools and Equi	20,000	2023	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001571.103	Reliability/Performance Enhancement	ANS4C LCI Bard Unit Repl-24740	18,241	2023	HVAC System Replacement	Bard units no longer supported by manufacturer and parts no longer available
NSP-Minnesota	A.0001572.002	Reliability/Performance Enhancement	GMM0C-Investment Recovery Cap	17,672	2023		
NSP-Minnesota	A.0001562.194	Reliability/Performance Enhancement	REW1-U1 FD Fan VFD-24610	17,633	2023	This project will replace the Unit 1 FD Fan variable frequency drive. This is a Yaskawa 100 HP P7 series VFD that is now nearly obsolete and will be upgraded to the newer P1000 series.	This drive was originally installed in 2012. Based on manufacturer's recommendation, this VFD has a lifespan of 10 years.
NSP-Minnesota	A.0003000.671	Reliability/Performance Enhancement	HNIC0 Misc Tools and Equ	15,000	2023	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.680	Reliability/Performance Enhancement	REW0C Tool Blanket	15,000	2023	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.697	Reliability/Performance Enhancement	SER-MMR- Misc Tools & Equip	15,000	2023	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.

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NSP-Minnesota	A.0001574.805	Reliability/Performance Enhancement	SHC0-Coal conveyor F.P. 20631	12,500	2023	From 2014 All Risk Loss Prevention Report for Sherco, Recommendation SHC P 06-11.□ Extend the existing sprinkler protection for the following coal conveyors to include inside the metal enclosures over selected portions of the conveyors:□ ¿ Conveyor 52 located on the upper level of the east side of the Coal Storage Barn□ ¿ The head end of Conveyors 4A and 4B□ ¿ The tail end of Conveyors 4A and 4B□ ¿ The head end of the No. 1 Emergency Reclaim conveyor□ ¿ The tail and head end of Conveyor 2A□ ¿ The east end of Conveyor 1A□ ¿ The east end of Conveyor 55□ ¿ The head end of Conveyor 51□ ¿ The Crusher end of Conveyor 6A and 6B	Currently, these conveyors are sprinkler protected except for the enclosed portions indicated above. If a fire occurs on these conveyors inside the enclosures, there would be no sprinkler protection to control it until the fire exited the enclosure, which would result in greater damage than would otherwise occur. Therefore, this protection should be installed. Reference NFPA 850, Section 7.4. The Loss Expectancy associated with this condition is estimated at $5,000,000. The estimated cost to complete is $75,000.
NSP-Minnesota	A.0001565.147	Environmental Enhancement	WLM0-CEMS Room HVAC Replacement-245	10,000	2023	Project to replace the HVAC system for the plant CEMS room on the 3rd floor.	The existing HVAC equipment has not been replaced in roughly a decade and is requiring considerably more maintenance.
NSP-Minnesota	A.0003000.662	Renewable and New Generation	BRDR Small Tools Equip	10,000	2023	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.128	Renewable and New Generation	CWF Tools & Misc Equipment	10,000	2023	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.667	Renewable and New Generation	GDM0C Grand Mead Cap Tool	10,000	2023	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.678	Renewable and New Generation	PLV Tools Equip	10,000	2023	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001571.104	Reliability/Performance Enhancement	ANS4C PEECC Bard Unit Repl-24741	8,662	2023	HVAC System Replacement	Bard units no longer supported by manufacturer and parts no longer available
NSP-Minnesota	A.0001707.012	Environmental Enhancement	DKR Dakota Range PCMM New-23576	8,000	2023	To better understand the potential impacts to birds and bats, Xcel Energy executes a post-construction□ mortality monitoring (PCMM) study using methods developed in conjunction with U.S. Fish and Wildlife□ Service and Minnesota Department of Natural Resources as part of a Bird and Bat Conservation□ Strategy (BBCS).	The BBCS called for conducting a post-construction mortality monitoring study with the primary□ objectives of providing a summary of documented fatalities, presenting estimates of searcher efficiency□ and carcass persistence, and calculating fatality rates adjusted for bias during the study. The secondary□ objective was to monitor all turbines specifically for eagle and other large bird fatalities.
NSP-Minnesota	A.0001576.500	Reliability/Performance Enhancement	GDM Emergent Fund -Wind prod	7,002	2023	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001573.070	Reliability/Performance Enhancement	BDS5C U5 Ovation System Evergr	5,000	2023	This project is to replace the Black Dog Unit 5/2 Ovation System Hardware and Software.	Project is required to maintain the plant ahead of the digital asset obsolescence curve. This also enhances compliance with regulatory/security requirements. The project is based on replacing critical plant control system hardware/software components on a five-year cycle. There is Fleet goal/expectation that all units utilizing similar control systems vendors be at similar and current hardware/software revision. This keeps the plant in compliance with Cyber Infrastructure Protection (CIP) anti-virus requirements. There is difficulty with older systems in procuring replacement parts, finding good field service support, and meeting current cyber asset security requirements. Replacement of plant control system hardware is necessary to ensure that the equipment will continue to operate reliably, safely, and in compliance with environmental requirements. This Control System is responsible for controlling and monitoring most of the plant equipment, and failure could lead to significant equipment damage, environmental compliance issues and extended outages.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001579.072	Reliability/Performance Enhancement	RIV0C -- Replace Water Treamen	5,000	2023	Design, permit, fabricate, and install one new Reverse Osmosis (RO) Water Treatment System located In the approximate area of the existing equipment so that a new building and related infrastructure is not required. This is a scope reduction to the original project which included relocation of the new equipment to a new building which would require additional infrastructure such as electrical switchgear and additional piping, control wiring, HVAC fire protection, etc. That project was estimated at 3.7 million dollars, and would be too expensive to justify in Sharps. □ □ The revised scope it to replace the two existing RO's installed in 2000 and 2011 with two new RO's for a 2 pass system, or one two pass RO. The location of the new equipment is to be in the same or general area of the existing equipment to make use of the existing electrical and piping infrastructure - including location in an existing building. The new location can also utilize the Ovation system control cabinet - intertie that was originally installed to support the retired demineralizer system, but never used. The new system is sized for 1 x 90GPM nominal. 1st pass RO, 2nd pass RO, Electrodeionization (EDI) Skid, Clean-In-Place (CIP), Mixed Bed Polisher, and Chemical Feed systems. The new system will remove CO2 with either a membrane separator system, or a caustic feed system. The new system will be operated from a PLC to allow for future vendor interface. The only function from the maint control room is start/stop capability.□ □ There is now removal activities associated with this project. The new install cost is estimated at 2.35 million and removal at $175,000 for a total new installation estimated cost of 2.55 million, or a reduction of approximately 1.2 million from the original scope and estimate.	The present plant water treatment systems are a significant Operations and Maintenance burden. As plant staff is adjusted (reduced) to planned permanent levels there will not be resources available to devote to high maintenance ancillary (non-core) plant equipment.□ □ By the year 2021, the existing 1st pass RO, controls, pressure vessels, ancillary equipment, etc. will be 20 years old, and the existing 2nd pass RO will be 10 years old. The membranes will be in need of replacing - and the system will be operating at a significantly higher cost than necessary due to the lack of a CDI - deionizer system for the necessary condensate polishing. It would not be advised to update the old and antiquated system with a new CDI system addition since the controls, valves, transmitters, and operator interface equipment the existing equipment relies on is all past end of life and likely of multiple failures each year that risk availability of the generating plant due to loss of water production capability. A new 90 gpm system is recommended to be installed prior to 2022. □ □ □ The new estimate of 2.525 million dollars is what should be used as an estimate based on the 2019 revised scope recommendation.
NSP-Minnesota	A.0001571.102	Reliability/Performance Enhancement	ANS0C Clear Well Pump Repl-24742	4,583	2023	Replace Clear Well Pump	Pump is 15 years old and sister pump failed in 2020
NSP-Minnesota	A.0001571.098	Reliability/Performance Enhancement	ANS0C PDC Bard Unit Repl-24736	2,917	2023	HVAC System Replacement	Bard units no longer supported by Manufacture and parts no longer available
NSP-Minnesota	A.0003000.752	Renewable and New Generation	FBWO Freeborn Tools and Equipment	2,727	2023	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.751	Renewable and New Generation	LBW0-Lake Benton Tools-Equip	2,727	2023	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.757	Renewable and New Generation	MWF0 - Mowers Tools-Equip	2,727	2023	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001571.101	Reliability/Performance Enhancement	ANS4C PDC Bard Unit Repl-24739	2,042	2023	HVAC System Replacement	Bard units no longer supported by manufacturer and parts no longer available
NSP-Minnesota	A.0001565.124	Environmental Enhancement	WLM2C Replace U2 Baghouse Bag	2,000	2023	Replace six modules (1260 total) of baghouse bags and cages. This project would also include a series of mechanical work to the baghouse modules including replacement of the bottom hoppers, patching of the walls at the tops of the modules above and below the tubesheet, replacement of electrical wiring, sand-blasting the inside of the module and coating it with an anti-corrosive coating, re-tinning and re-insulating the modules, etc.	Permit required to meet opacity standards. Bags are on a five year frequency to be changed out. The bags were on a six plus year changeout in the past but it was determined that changing out the bags more frequently saves on material loss on boiler tubes. It has been determined that after five years the bags begin to blind/plug and no longer allow enough air flow to operate the units at their full potential. Because of the plugged bags the air flow through the unit is decreased causing a high differential pressure reducing load capability and allowing the flue gas to consume more of the tube material throughout the boiler. Whenever change outs of bags and cages occur, there are always areas found that are in need of repair. The plant has observed severe thinning in some areas of the conical hoppers at the bottom of the baghouse modules. Some areas have gotten so bad that weldments have fallen off. Because of the age of the baghouse modules and the amount of welded repairs that have been performed in the past, the plant is running out of the necessary amount of true base material to continue performing these sorts of weld repairs for much longer. By taking the opportunity to replace conical hoppers and then coating them with a suitable anti-corrosion coating this will lessen the amount of mechanical work necessary in future years and help reduce or eliminate the amount of tramp air seeping into the modules.
NSP-Minnesota	A.0001574.190	Reliability/Performance Enhancement	SHC3C 2018 Small Project Routi	736	2023	Labor and materials that are categorized as capital expenditures. Must meet capitalization criteria categories and include material costs greater than $2,500, but total cost less than $50,000.	These are small projects such as valve replacement, motors, etc that have failed during plant operation.
NSP-Minnesota	A.0001571.100	Environmental Enhancement	ANS3C CEMS Bard Unit Repl-24738	708	2023	HVAC System Replacement	Bard units no longer supported by manufacturer and parts no longer available
NSP-Minnesota	A.0001571.099	Environmental Enhancement	ANS2C CEMS Bard Unit Repl-24737	675	2023	HVAC System Replacement	Bard units no longer supported by manufacturer and parts no longer available
NSP-Minnesota	A.0003000.749	Renewable and New Generation	CRW0-Crowned Ridge Tools-Equip	312	2023	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001564.500	Reliability/Performance Enhancement	St Anthony Falls Emergent -Other Pr	74	2023	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001574.174	Reliability/Performance Enhancement	SHCJC 2018 Small Project routi	5	2023	Labor and materials that are categorized as capital expenditures. Must meet capitalization criteria categories and include material costs greater than $2,500, but total cost less than $50,000.	These are small projects such as valve replacement, motors, etc that have failed during plant operation.
NSP-Minnesota	A.0001574.893	Renewable and New Generation	SHC Solar Generating Plant Phase 2	305,794,548	2024	New 230MWac solar generating plant	Need to meet IRP Alternate Plan modeling asset capacity and energy additions

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001575.194	Reliability/Performance Enhancement	HBC7 Hot Gas Path-24006	7,591,889	2024	Hot Gas Path (HGP) Inspection outage for High Bridge Combined Cycle Unit #8. Included in this capital project is labor, material and rental equipment needed to perform a Hot Gas Path (HGP). Parts installed include: fuel nozzles, combustor baskets, transitions, and rows 1-3 of the turbine.	The combustion turbine OEM, Mitsubishi Heavy Industries (MHI) recommends that at 25,000 EOH or 900 starts, whichever comes first, a HGP inspection be performed.
NSP-Minnesota	A.0001579.147	Reliability/Performance Enhancement	RIV9 - Hot Gas Path - 23487	5,283,834	2024	Hot Gas Path Outage for Riverside Unit 9. The project includes replacement of the following standard□ hot gas path parts per the PSM parts contract; transitions, liners, liner end caps, fuel nozzle assemblies,□ stage 1 buckets/nozzles/shroud blocks, stage 2 buckets/shroud blocks.	A Hot Gas Path Outage is required every 24,000 operating hours or 900 starts per the OEM and the PSM parts□ Contract
NSP-Minnesota	A.0001559.121	Reliability/Performance Enhancement	BLL U7 Hot Gas Path-21337	5,245,647	2024	Hot gas path inspection for U7 at Blue Lake. The project includes replacement of the following standard hot gas path parts per the PSM parts contract; transitions, liners, liner end caps, fuel nozzle assemblies, stage 1 buckets/nozzles/shroud blocks, stage 2 buckets/shroud blocks. The project also includes replacing the R0 (1st stage) compressor blades to mitigate a design issue with the OEM blades.	The HGP inspection is required at 24,000 operating hours or 900 starts per the OEM and the PSM parts contract.
NSP-Minnesota	A.0001573.276	Reliability/Performance Enhancement	BDS0-Plant Flood Berm Hght to 720'-	4,014,834	2024	Increase flood berm height to elevation 720' MSL.	After the plant site flood berm was first constructed, the top of the berm has been raised in response to flood forecasts, so the top of the berm is currently at elevation 715' MSL. During the year 2019, flood forecasting indicated that the Minnesota River could have reached and exeeded this level, which is the elevation of the plant's turbine floor. Much effort and dollars went into sandbagging the flood berm in 2019 to near this height. This project would permanently raise the top of the flood berm to the 720' MSL level, avoiding the significant O&M emergent spending experienced in 2019, and minimizing the risk of catastrophic flooding into the plant building. Insurance estimated this loss at approximately $75 million if water were to breach the plant.
NSP-Minnesota	A.0001572.242	Environmental Enhancement	ASK1-Repl AQCS Baghouse Bags 2023-1	3,541,711	2024	Replace bags in all sixteen compartments of baghouse filter bags due to end of life. The last time these bags were replaced was 2019, and it is recommended to replace these bags every four years. Each of the 16 compartments holds 1,040 bags for a total of 17,000 bags including some spares. Purchase replacement wire cages (tub and lock style recommended) during this outage, because the existing cages have been showing signs of corrosion during previous inspections.	Increased occurrences of bag failures from being at end of manufacturer's recommended life. Potential for opacity exceedences due to bag failures with high dP. Industry standard and OEM's recommendation for bag replacement is four years. The current air permit requires us to operate AQCS equipment to manufacturer's recommendations. Availability - Estimated derate of 6000 MWH in 2023 (5 days x 24 hours x 25 MW x 2 times per year) due to increasing failures. Assume that 2 times in 2023 the unit will be derated due to compartments out of service beyond the minimum (14 of 16) allowed for full service. Spare bags will be installed to replace failures. Estimate 5 days derate per event for inspection, scaffold, and replacement. The frequency of failures would progressively get worse with time until replacement.
NSP-Minnesota	A.0001575.202	Reliability/Performance Enhancement	HBC7C GT EXHAUST REPL-24689	3,409,792	2024	Replace the Unit 7 Combustion Turbine Exhaust Duct and Aft Exhaust Manifold during the 2024 Hot Gas Path Outage. Materials and Field Service Labor will be provided by Mitsubishi, the Combustion Turbine OEM. The replacement exhaust has a 16 month lead time and will need to be ordered in the Fall of 2022.	Continued degradation of the Unit 7 exhaust duct and aft exhaust manifold was observed during the Spring 2020 outage. There is significant distortion of the exhaust duct and through wall cracking around the stiffening ribs. The expansion joint flange is cracked and displaced over a significant portion of the circumference. Temporary repairs have been made previously, but it is only feasible to keep repairing the exhaust for a finite amount of time.
NSP-Minnesota	A.0001573.169	Reliability/Performance Enhancement	BDS0C Reverse Osmosis 2nd Ps (WTS)-	2,777,926	2024	Installation of a new 100 GPM (outlet) water treatment system. This new system will be located in the basement of Unit 2 - located just north of the existing vacuum pumps. This project includes new equipment, piping, wiring, instrumentation, conduit, controls, and associated auxiliary equipment (softener, pre-filtration, chemical feed, EDI, CIP skid, etc). The new equipment will be operated by an Allen Bradley PLC (with HMI screen at the equipment skid). The system will have the ability to be remote controlled by the Ovation DCS in the control room. There is no DCS operator screen at the equipment skid.□ □ The existing demin will be retired in-place and neutralized. The existing demin will remain in place.	This project will provided needed redundancy for the boiler water makeup system at the Black Dog plant, after the recent retirement of the 1960's No. 1 ion exchange demineralizer. Under normal plant conditions, the No. 2 RO demineralizer, capacity 50 gpm, installed with the Repowering Project in 2002, meets the boiler water and evaporative cooler makeup demand of the Units 5&2 combined cycle unit. The installation of Black Dog Unit 6 in 2018 adds to the demand for demineralized water, for the Unit 6 evaporative cooler. So far, Marketing has not called for the Unit 6 evaporative cooler to be in service much, due to Marketing's reluctance to limit the load following capability of Unit 6, which happens when the Unit 6 evaporative coolers are in service. Several operating scenarios could overtax the capability of the existing No. 2 RO demineralizer to provide demineralized water, such as more Unit 6 evaporative cooler operation, more Unit 5 HRSG boiler blowdowns due to water chemistry excursions, and more on and off line cycling duty of the Units 5&2 combined cycle unit, which uses demineralized water much more than continuous on-line operation. In addition, scheduled No. 2 RO demineralizer maintenance, such as RO membrane chemical cleaning or replacement, softener resin sampling and replacement, must be done during scheduled outages, in order to avoid the cost of trucking water to the plant. Installation of a second RO and retirement of the existing Demineralizer equipment is recommended by the Xcel Energy Chemistry Resources department.
NSP-Minnesota	A.0001573.226	Environmental Enhancement	BDS0 -BlackDog Rd Erosion Wall -232	2,717,905	2024	Installation of sheet pile wall or alternative means of correcting and preventing erosion between Black Dog Road and the Minnesota River between Lyndale Gates and the main plant entrance. It is estimated that approximately 600 linear feet of river wall will be required, subject to final engineering and design performed during the project.	There are several locations along Black Dog Road which have eroded significantly from the Minnesota River and requires permanent repair and corrections for ensuring safe travel into and out of the generating station. A temporary solution to mitigate the rate of erosion is being implemented in 2018 / 2019 but it is expected that a more permanent solution will be required in the next 5 years. This project is scheduled to be performed in 2021 or later to reduce the impact to the ongoing site demolition and remediation projects which require significant truck traffic into the site.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001572.122	Environmental Enhancement	ASK1C- Replace SCR Catalyst 20	2,082,914	2024	Replace the middle layer (143 modules) of the SCR with new catalyst during the 2020 annual outage. Each catalyst module has rough dimensions of 64" x 75" x 38" and weighs 2,900 lbs each. The lead times for new catalyst require that the purchase order be placed with catalyst supplier in the year prior to installation.□ □ The scope of the project to include the procurement and installation of new catalyst, removal and proper disposal of the existing catalyst, and ammonia injection tuning after installation.	Environmental. Compliance of NOx emissions.
NSP-Minnesota	A.0001573.500	Reliability/Performance Enhancement	BDS Emergent Fund -Other prod	2,001,401	2024	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001576.022	Renewable and New Generation	GDM Grand Meadow Repower	1,951,568	2024		
NSP-Minnesota	A.0001579.500	Reliability/Performance Enhancement	RIV Emergent Fund -Other prod	1,815,745	2024	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001575.500	Reliability/Performance Enhancement	HBR Emergent Fund -Other prod	1,757,564	2024	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001574.268	Reliability/Performance Enhancement	SHC1C Emergent Projects	1,223,786	2024	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001574.198	Reliability/Performance Enhancement	SHCCC 2017 Emergent Work	842,467	2024	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001611.009	Renewable and New Generation	PVW0-Pleasant Valley Gearbox Replac	800,084	2024	Replace failed gearboxes. Cost includes the crane and labor for overhaul of the rotor, gearbox and main shaft	Gearboxes fail with planetary section damage and need to be replaced
NSP-Minnesota	A.0001580.007	Renewable and New Generation	CWF0-Courtenay Gearbox Replacement	748,673	2024	Replace failed gearboxes. Cost includes the crane and labor for overhaul of the rotor, gearbox and main shaft	Gearboxes fail with planetary section damage and need to be replaced
NSP-Minnesota	A.0001573.218	Environmental Enhancement	BDS5-Replace SCR catalyst-15648	708,282	2024	Replace SCR catalyst.	SCR catalyst eventually becomes poisoned and needs to be replaced to remain effective. Assume frequency of replacement to be 9 years
NSP-Minnesota	A.0001571.500	Reliability/Performance Enhancement	ANS Emergent Fund -Other prod	693,880	2024	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001565.150	Reliability/Performance Enhancement	WLM1-Replace U1 Turbine Blades-2461	600,886	2024	Project to replace L-0, L-1 and L-2 blades during the scheduled Unit 1 Turbine Overhaul. This will be done based on recommendations by vendor and internal SME's (Fleet Engineering).	If the blade erosion becomes too severe, the plant will be unable to continue operating the machine reliably.
NSP-Minnesota	A.0001572.500	Reliability/Performance Enhancement	ASK Emergent Fund -Steam prod	534,677	2024	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001573.282	Reliability/Performance Enhancement	BDS0-Install liq cw chem treatment-	521,851	2024	BDS0816 - Install a Liquid Circulating Water Chemical Treatment System in the Black Dog Screen House, replacing the existing solid bromicide system. It will be comprised of a dual chemical feed system that uses bromine and sodium hypochlorite (bleach). The bleach will be contained in a 3000 gallon HDLPE plastic tank, and the bromine will be in a separate replaceable tote to be serviced by provider of system. Both chemicals will be pumped into a common pipe from the supplied dual feed pump skid and injected into the intake water. The rate of feed will be controlled and monitored remotely through a supplied controller. Sensors at the intake and discharge points will show over/under treatment, and adjustments will be able to be made by controller.	Benefits of liquid chemical treatment system: Lower water chemical costs by $18,000 /year, reduce heat exchanger/strainer O M costs by $18,000 /year, and will extend life of units 2, 3, 4 condensers by 5% in conjunction with auto ball cleaner systems. Will also have better chemical treatment through tighter control of chemical feed, it will decreased possibility of an environmental exceedance, i.e., exceeding permit residual, through better feed control, and decreased exposure of personnel to chemicals through elimination of manual filling of brominators.
NSP-Minnesota	A.0001572.239	Reliability/Performance Enhancement	ASK1-Main Station Battery Repl-2053	504,510	2024	Replace 125V station batteries for the main plant. There are 58 total cells in this system.	These batteries are associated with NERC requirements, and are showing signs of deteriation.
NSP-Minnesota	A.0001580.008	Renewable and New Generation	CWF1-Generator Rplacments	490,889	2024	Replace failed generator in Vestas V100 wind turbines. Cost includes the crane and labor for generator overhaul	Upon failure, the wind turbine can not be run
NSP-Minnesota	A.0001574.173	Reliability/Performance Enhancement	SHC3C Emergent work	479,238	2024	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001565.129	Reliability/Performance Enhancement	WLM1-Replace U1 Superhtr Bundle -12	469,458	2024	- Replace U1 Superhtr Bundle 23	Replace U1 Superhtr Bundle 23
NSP-Minnesota	A.0001574.314	Reliability/Performance Enhancement	SHC1 -Turb Ctrl Vlv Internals 2024-	436,847	2024	Replace main turbine control valve internals including, but not limited to stems, balance chambers, plugs, and seats.	The valve internals have been subject to damage due to excessive wear and tear due to frequent unit cycling and more frequent economic outages. There are four control valves, all four of which experience significant degradation. The above work description is intended for all four control valves. The control valves are critical safety devices used to prevent turbine overspeed after a unit trip and are also responsible for regulating steam admission to the turbine. Their mechanical integrity is essential to safe and reliable operation of the turbine.
NSP-Minnesota	A.0001565.119	Reliability/Performance Enhancement	WLM1C Replace U1 Boiler Tubes 2022	429,685	2024	- Replace U1 Boiler Tubes 2020	Replace U1 Boiler Tubes 2020
NSP-Minnesota	A.0001562.500	Reliability/Performance Enhancement	REW Emergent Fund -Steam prod	405,698	2024	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001565.081	Reliability/Performance Enhancement	WLM2C Repl U2 Boiler Tubes 201	405,684	2024	- Replace U2 Boiler Tubes 2021	Replace U2 Boiler Tubes 2021
NSP-Minnesota	A.0001565.500	Reliability/Performance Enhancement	WLM Emergent Fund -Steam prod	397,748	2024	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001565.037	Reliability/Performance Enhancement	WLM1C Replace U1 Rear Wall	378,958	2024	Replace quantity 39 rear wall tubes that will be rolled 0.5" into the Mud Drum and attached approximately 24" above the lower membrane waterwall header. The tubes will Inconel-cladded on all sides at 0.100" thick. This project will involve procuring and installing the new Rear Wall tubes as well as installation of new refractory, insulation and boiler skin to facilitate installation of new tubes.	Rear wall was last replaced in 1997 and rotated 180 degrees in 2007 to gain 10 more years. There have been wall failures at Wilmarth in the past, by replacing the wall we greatly reduce the chance of another failure.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001611.010	Renewable and New Generation	PVW1-Generator Replacements	365,626	2024	Replace failed generators. Cost includes the crane and labor for generator overhaul	Upon failure, the wind turbine can not be run
NSP-Minnesota	A.0001574.315	Reliability/Performance Enhancement	SHC1 -Level 2 Mill OH 2024 Spring -	356,675	2024	Project consists of replacing capital components as needed including but not limited to new journal assemblies, floor segments, classifier blades, and vane wheel.	Unit 1 has 7 mills whose performance is tracked through operating data (mill motor amps, coal fineess, etc.) to determine the frequency of overhauls. The major grinding components tend to wear out after about 1.5 million tons of throughput, or every 3-7 years depending upon usage. Maintaining pulverizer performance is essential to maintain boiler reliability, performance, and to stay within emission regulations.
NSP-Minnesota	A.0001565.160	Reliability/Performance Enhancement	WLM1New Unit 1 ID Fan Motor and VFD	354,464	2024	Project to purchase and install a newer, larger motor and associated VFD on the Unit 1 ID Fan.	The current ID Fan motor consistently runs at or near FLA of the nameplate motor rating. This has caused accelerated wear and tear on the motor as well as occasional boilers trips due to tripping out on high amps unnecessarily. The existing VFD's have already reach obsolescence and will need to be replaced eventually.
NSP-Minnesota	A.0001574.574	Reliability/Performance Enhancement	SHC1 -U1 Level 2 Mill OH 2024 Fall-	353,600	2024	Project consists of replacing capital components as needed including but not limited to new journal assemblies, floor segments, classifier blades, and vane wheel.	Unit 1 has 7 mills whose performance is tracked through operating data (mill motor amps, coal fineess, etc.) to determine the frequency of overhauls. The major grinding components tend to wear out after about 1.5 million tons of throughput, or every 3-7 years depending upon usage. Maintaining pulverizer performance is essential to maintain boiler reliability, performance, and to stay within emission regulations.
NSP-Minnesota	A.0001572.152	Reliability/Performance Enhancement	ASK1-480V Plant Swgr Bus 3-4 R	334,133	2024	Replace 480V main plant switchgear bus 3/4 lineup during 2018 outage. These switchgears are 1968 vintage. There are eight busses total in the plant and four in the coal yard. The replacement would include the disconnects, dry transformers (not oil filled), main breakers, tie breaker and feeder breakers, along with protective relaying. This continues a series of switchgear bus replacement projects, with the first one during the 2015 outage.	- Upgrade capacity. Due to projects installed over the last decade or so, the MCCs in the plant (boiler/□ turbine rooms) have been filling up to capacity. Some MCCs are currently triple subfed, which leads to□ relay coordination issues and circuit coordination issues. The electrical system in the AQCS and cooling□ tower areas have good capacity. However the systems in the plant (boiler/turbine rooms) are nearing□ their designed capacity.□ □ - Due to the age of the switchgear and lack of replacement and spare parts, there are challenges to keep□ the switchgear operational. There have been issues with breakers not opening. On average two□ breakers per outage have not been opening without forcing them to open, risking some to start asking□ questions about safety.
NSP-Minnesota	A.0001574.316	Reliability/Performance Enhancement	SHC3 -Level 2 Mill OH 2024 Spring -	330,689	2024	Replace major mill components including but not limited to roll-wheel assemblies, floor segments, classifier, pyrite box, pyrite gate valves, and rotating throat assembly	The Sherco 3 Pulverizers require overhauls to replace grinding surfaces every 1.5 million to 2 million tons ground, which equates to about every 4-7 years.
NSP-Minnesota	A.0001572.243	Reliability/Performance Enhancement	ASK1-480V Plant Swgr Bus 5-6 Repl-1	303,515	2024	Replace 480V main plant switchgear bus 5/6 lineup during 2019 outage. These switchgears are 1968 vintage. There are eight busses total in the plant and four in the coal yard. The replacement would include the disconnects, dry transformers (not oil filled), main breakers, tie breaker and feeder breakers, along with protective relaying. This continues a series of switchgear bus replacement projects, with the first one during the 2015 outage.	- Upgrade capacity. Due to projects installed over the last decade or so, the MCCs in the plant (boiler/□ turbine rooms) have been filling up to capacity. Some MCCs are currently triple subfed, which leads to□ relay coordination issues and circuit coordination issues. The electrical system in the AQCS and cooling□ tower areas have good capacity. However the systems in the plant (boiler/turbine rooms) are nearing□ their designed capacity.□ □ - Due to the age of the switchgear and lack of replacement and spare parts, there are challenges to keep□ the switchgear operational. There have been issues with breakers not opening. On average two□ breakers per outage have not been opening without forcing them to open, risking some to start asking□ questions about safety.
NSP-Minnesota	A.0001572.222	Reliability/Performance Enhancement	ASK99C 480V Coal Yrd Swgr Bus3-4 Rp	289,636	2024	Replace the 480V coal yard switchgear bus 3/4 lineup during the spring outage. These switchgears are 1968 vintage. There are eight busses total in the plant and three in the coal yard. The replacement would include the disconnects, dry transformers (not oil filled), main breakers, tie breaker and feeder breakers, along with protective relaying.	- Upgrade capacity. Due to projects installed over the last decade or so, the MCCs in the plant (boiler/□ turbine rooms) have been filling up to capacity. Some MCCs are currently triple subfed, which leads to□ relay coordination issues and circuit coordination issues. The electrical system in the AQCS and cooling□ tower areas have good capacity. However the systems in the plant (boiler/turbine rooms) are nearing□ their designed capacity.□ - Due to the age of the switchgear and lack of replacement and spare parts, there are challenges to keep□ the switchgear operational. There have been issues with breakers not opening. On average two□ breakers per outage have not been opening without forcing them to open, risking some to start asking□ questions about safety.
NSP-Minnesota	A.0001574.418	Reliability/Performance Enhancement	SHC3C ID Fan Building Roof Rep	289,384	2024	Remove the existing roof and install a new roof over the unit 3 ID fan building. The roof area is approximately 21,000. A substructure conditional assessment will be made during the tear off and be addressed at that time.	The roof system is over 30 yrs old and will need replacement due to mounting repair and maintenance to it from leaking during rain and snow melts. The new system will include a 20 year warranty.
NSP-Minnesota	A.0001574.252	Reliability/Performance Enhancement	SHC99 Emergent work	277,941	2024	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.

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NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001561.500	Reliability/Performance Enhancement	IVH Emergent Fund -Other prod	265,909	2024	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001565.133	Reliability/Performance Enhancement	WLM1 Turbine Electronic Overspeed-2	251,968	2024	The scope of this project is to install a true electronic overspeed trip system on our Unit 1 turbine to replace the existing primary mechanical overspeed trip mechanism. This project will also replace the existing SKF turbine monitoring system which has become obsolete. Upgrading the monitoring system is based on a recommendation from Fleet Engineering.	The unit currently utilizes a mechanical bolt system as its primary overspeed tripping mechanism. Based on input from multiple SMEs including Fleet Engineering, Hazard Insurance, and Operations it has been recommended to convert to an electronic overspeed protection system. They are much more reliable than a mechanical system. Additionally, moving to an electronic overspeed system allows for much less risk when testing the overspeed. It would be a much safer system overall and eliminate the need to perform an annual test on the mechanical overspeed which has a lot of safety concerns and risk for damaging the equipment.
NSP-Minnesota	A.0001579.076	Reliability/Performance Enhancement	RIV0C -- Upgrade Emerg Warning	249,388	2024	The existing emergency warning system in the steam turbine building needs to be upgraded. There are areas of the plant that cannot hear the emergency annoucements clearly. There are few speakers which broadcast very loudly but cannot be heard in some areas of plant. Emergency warning system should be upgraded to install speakers in areas which are occupied by personnel after the conversion of Riverside Plant from coal to natural gas. In addition, system is becoming old and outdated and equipment is expected to fail and become more difficult to maintain. Riverside Plant property contains a training building, welding school building, three special construction buildings.	This is a safety item since some areas of the plant cannot clearly undestand the emergency announcements. After the Riverside Plant converted from coal to natural gas, there are areas where individuals reside that cannot clearly understand the announcements. For example, the maintenance machine shop has moved, the stockroom has been moved, womens locker room has been moved, there is no speaker in 7 relay room, the phone demarcation room has moved. In addition, there are remote buildings located on the Riverside Plant property which should have their emergency warning system upgraded.
NSP-Minnesota	A.0003000.698	Reliability/Performance Enhancement	SER-CHM-Misc Tools-MN	235,900	2024	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001573.283	Reliability/Performance Enhancement	BDS0-Install Security Badge Readers	225,440	2024	Installation of new identification badge readers to screen access to sensitive areas of the plant. This project includes installation of the readers, wiring, conduit, and other hardware to connect the new readers to the security network. This includes new readers at each entrance to the control room, breaker rooms, DCS and network rooms, and general plant access doors which are currently not equipped with card readers.	Additional card readers at sensitive locations around the plant would promote higher levels of security and prevent the risk of unauthorized entrants purposely or mistakenly controlling, manipulating, tampering, or otherwise sabotaging plant equipment.
NSP-Minnesota	A.0001566.168	Renewable and New Generation	NBL0 - Gearbox Replacements	219,866	2024	Replace failed gearboxes. Cost includes the crane and labor to remove the rotor, gearbox, and main shaft, and then reinstall the components.	Gearboxes fail with planetary section damage and need to be replaced.
NSP-Minnesota	A.0001575.094	Reliability/Performance Enhancement	HBC0C Plant Instrum M&D	209,824	2024	Installation of new plant instrumentation identified by M&D initiative gap analysis. Includes installation of field instrumentation and logic changes to bring points into DCS.	As part of the M&D initiative a gap analysis will be performed at each plant to determine if additional data points are needed. This project is for the installing instrumentation in the plant to close deficiencies identified.
NSP-Minnesota	A.0001573.050	Reliability/Performance Enhancement	BDS5C U5 HRSG Steam Drain Sys	207,189	2024	This project would install piping, fittings, instrumentation, and controls to upgrade and automate the Unit 5 HSRG boiler steam section drains.	The Black Dog Unit 5 HRSG Boiler was designed and built before current standards for HRSG steam section drain systems were well established. The Unit 5 HRSG boiler steam drain system has no instrumentation, and proper drainage of condensate within the HRSG steam sections is uncertain. The risks of damage to steam pressure parts from improper draining of steam section condensate, especially during startups and during off line time periods are well known in the HRSG industry. This project would install a system consisting of piping, fittings, instrumentation, and controls to achieve proper automatic draining of the steam sections of the HRSG.
NSP-Minnesota	A.0003000.682	Reliability/Performance Enhancement	SHCJC Tools and Equip pur	200,000	2024	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001571.108	Environmental Enhancement	ANS0C CEMS Upgrade Project-24693	198,719	2024	Upgrade of all CEMS Equipment	No longer supported by manufacturer and parts are no longer available
NSP-Minnesota	A.0001559.500	Reliability/Performance Enhancement	BLL Emergent Fund -Other prod	185,817	2024	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	180,000	2024	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001579.159	Reliability/Performance Enhancement	RIV10-Replace U10 CT Inlet Filters-	178,556	2024	Changed to Capital in 2020, Costs are escalated to 2024 => $208,710 ~ JGC□ □ Moved to 2025 per Scott Ewing ~ HK 3.19.2018□ □ Replace CT inlet filters for 2nd time. Typical filter life is anywhere from 4 - 8 years.	If filters get too dirty, efficiency and maximum load will decrease, heat rate will go up (get worse). Filters may damage the turbine if deterioration is allowed. Plugged filters are more susceptible to collapse under snow or frost conditions, and may cause a unit trip and forced outage.
NSP-Minnesota	A.0001611.011	Renewable and New Generation	PVW1-Transformer Replacements	169,838	2024	Replace failed transformer in Vestas V100 wind turbines. Cost includes the crane and labor for overhaul of the transformer	Upon failure, the wind turbine can not be run
NSP-Minnesota	A.0001580.009	Renewable and New Generation	CWF1-Transformer Replacements	169,809	2024	Replace failed transformer in Vestas V100 wind turbines. Cost includes the crane and labor for transformer overhaul	Upon failure, the wind turbine can not be run
NSP-Minnesota	A.0001574.837	Reliability/Performance Enhancement	SHC1-12 Boiler Feed Pump-24003	163,767	2024	Replace the rotating assembly in the 12 Boiler Feed Pump.	These feed pumps are critical to reliable plant operation. Rebuilding these pumps every 6 years has given excellent reliability.
NSP-Minnesota	A.0001559.116	Reliability/Performance Enhancement	BLL8-U8 Turning Gear Repl-24221	163,151	2024	Replace existing turning gear package with a variable speed drive and VFD motor to allow for reduced turning gear speeds.	The combustion turbine spends a substantial amount of time on turning gear. Reducing the turning gear speed would substantially reduce wear on the machine while on gear.□ □ GE Gas Turbines of this vintage, experience 1st stage bucket rock while on turning gear. This rocking over time will result in the need to replace the rotor disks. Rotor disc replacement is very expensive and should be avoided.

Company	Project ID	New Grandparent	Project Name	YE Amt ($s)	Activity Year	Project Description	Project Justification
NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001571.021	Reliability/Performance Enhancement	ANS0-C-Upgrade U2 3 Protect. R	160,304	2024	- Replace U2/3 Protective Relay.	Existing relay system is over 20 years old. Parts are difficult to get.
NSP-Minnesota	A.0001559.117	Reliability/Performance Enhancement	BLL7-U7 Turning Gear Repl-24220	153,470	2024	Replace existing turning gear package with a variable speed drive and VFD motor to allow for reduced turning gear speeds.	The combustion turbine spends a substantial amount of time on turning gear. Reducing the turning gear speed would substantially reduce wear on the machine while on gear.□ □ GE Gas Turbines of this vintage, experience 1st stage bucket rock while on turning gear. This rocking over time will result in the need to replace the rotor disks. Rotor disc replacement is very expensive and should be avoided.
NSP-Minnesota	A.0001573.231	Reliability/Performance Enhancement	BDS2 -Ovhl #21 Circ Water Pump -236	152,861	2024	Overhaul of No. 21 Condenser Circulating Water Pump. Assumes replacement of complete rotating assembly or replacement of complete stationary assembly, or both.	Condenser circulating water pumps require periodic overhaul, in order to maintain performance. During the warmer half of the year, both 21 and 22 circulating water pumps must be in service, or a unit derate will result.
NSP-Minnesota	A.0001579.172	Reliability/Performance Enhancement	RIV10-Rpl Evap Cooler Media 2024-22	152,861	2024	Remove and replace evaporative cooler media. Media will be 15 years old in 2024. Normal life is 7 - 8 years.	If evaporative cooler media is not replaced when aged and deteriorating, it can break down and disintegrate, causing significant compressor damage up to and including total wreckage. If it has high pressure drop, it can result in significantly lower turbine output, and fail to perform its cooling function resulting in additional lost capacity. Estimate is in 2016 dollars ($155,000) escalated at 3%/yr.
NSP-Minnesota	A.0003000.658	Reliability/Performance Enhancement	ASK0C- Tool Blanket	150,000	2024	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.697	Reliability/Performance Enhancement	SER-MMR- Misc Tools & Equip	148,000	2024	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001562.034	Reliability/Performance Enhancement	REW0C BOILER BLDG ROOF REPL	135,776	2024	Replace roof on the Boiler Building. This roof is original to the plant (about 70 years old).	There are several leaks identified in this roof.
NSP-Minnesota	A.0001565.130	Reliability/Performance Enhancement	WLM2-Replace U2 Lower Air Htr-12354	133,009	2024	- Replace U2 Lower Air Htr 2021	Replace U2 Lower Air Htr 2021
NSP-Minnesota	A.0001565.127	Reliability/Performance Enhancement	WLM1-Replace U1 Lower Air Htr-12315	131,913	2024	- Replace U1 Lower Air Htr 2021	Replace U1 Lower Air Htr 2021
NSP-Minnesota	A.0001565.123	Reliability/Performance Enhancement	WLM2C Replace U2 B22 Screw Auger 20	131,170	2024	- Replace U2 B22 Screw Auger 20	Replace U2 B22 Screw Auger 20
NSP-Minnesota	A.0001565.153	Reliability/Performance Enhancement	WLM1-New VFD for Unit 1 OFA Fan Mot	131,138	2024	Project to procure and install a new VFD for the Unit 1 Overfire Air Fan motor. With a new VFD there would be reduced wear and tear on the OFA motor as well as make it easier to tune the boiler.	The existing softstart is obsolete.
NSP-Minnesota	A.0001565.158	Reliability/Performance Enhancement	WLM1-New Unit 1 FD Fan motor and VF	121,673	2024	Project to procure and install a larger motor and VFD for the Unit 1 Forced Draft fan. The existing motor is 75 HP. The new motor would be 100 HP.	The existing motor is consistently running at or above FLA of the nameplate motor rating. This is causing accelerated wear and tear on the motor.
NSP-Minnesota	A.0001565.156	Reliability/Performance Enhancement	WLM0-New Motor and VFD for #1 BFP-2	121,668	2024	Project to procure and install a new VFD-rated motor and VFD for our #1 Boiler Feed Pump. This project would need to be executed at the same time as when the motors on the FD fans are replaced because there will need to be additional work done to modify MCC 47 in order to fit the new VFDs in. It would make sense to do the MCC work for both projects at the same time.	Installing a VFD rated motor and VFD will allow us to run the pump at lower capacity which will save wear and tear on the pump and reduce O&M expenses against it.
NSP-Minnesota	A.0001565.154	Reliability/Performance Enhancement	WLM0-New Motor and VFD for #3 BFP-2	121,668	2024	Project to procure and install new VFD-rated motor and VFD for our #3 Boiler Feed Pump. The new motor and VFD would be incorporated into our existing MCC 42 as part of this project.	Installing a VFD rated motor and VFD will allow us to run the pump at lower capacity which will save wear and tear on the pump and reduce O&M expenses against it.
NSP-Minnesota	A.0001565.168	Reliability/Performance Enhancement	WLM99-Replace Distribution Conveyor	121,476	2024	Project to replace major components of Distribution Conveyor including new bearings, new sprockets, new chains, new idlers, new shafts, new wear bars, new idler side plates and various conveyor skin replacement work.	The DC hasn't been rebuilt in over 10 years and is really starting to break down. There have been over 32 work orders written for repairs against it in 2020 alone. Every time a repair to the DC is needed we have to suspend burning RDF which cuts into our revenues. In 2020 so far, repairs to the DC has costs us over $46,000 in lost RDF revenue. Some areas of the DC, namely on tail end where the RDF dumps into it from Transfer Conveyor 2, have holes large enough for a hand or arm to fit through. When this happens large amounts of fuel can get spewed out and it can create an open conveyor hazard.
NSP-Minnesota	A.0001701.021	Environmental Enhancement	BS1-Blazing Star 1 ETP 23578-New	111,166	2024	This project supports the activities required to coordinate and manage an Eagle Take Permit. The tasks associated with this include: Point Count Surveys, Aerial Nest Survey, Weekly Nest Monitoring, Application Fee, and Consulting Services.	An Eagle Take Permit is required by State and Federal agencies. The agencies involved are DNR (Department of Natural Resources), USFWS (US Fish and Wildlife Services), and EERA (Energy Environmental Review and Analysis).
NSP-Minnesota	A.0001574.571	Reliability/Performance Enhancement	SHC99 -CESP-2024 #1 CC Rotor Asmbl-	106,263	2024	Change out the rotating hammer assembly with CESP rotor Assembly on Sherco #1 Coal Crusher. Also change out worn / thin cage pieces, and wear plating inside the crusher.	Crusher is worn out and cannot provide a consistent coal fineness to the plant. This in turn effects the efficiency , of the burning, of the coal in the plant.
NSP-Minnesota	A.0001571.093	Reliability/Performance Enhancement	ANS0 - Replace UPS Battery - 16602	100,370	2024	UPS Battery replacement. Spring of 2024	Inspections show batteries have reached end of life. It is important to have battery backup for critical equipment.
NSP-Minnesota	A.0003000.699	Reliability/Performance Enhancement	SER-SMC-Misc Tools & Equipment	100,000	2024	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001576.006	Renewable and New Generation	GDM0C Generator Replacements 2	98,268	2024	Replace failed generator in GE 1.5 SLE wind turbines. Cost includes the crane and labor to remove the generator and then reinstall it.	High operating temperatures in the compact design have caused a small amount of failures in the industry after 5 years of operation.
NSP-Minnesota	A.0001576.005	Renewable and New Generation	GDM0 - Gearbox replacements	98,088	2024	Replace failed gearboxes in GE 1.5 SLE wind turbines. Cost includes the crane and labor to remove the rotor, gearbox, and main shaft, and then reinstall the components.	Gearboxes fail with planetary section damage and need to be replaced.
NSP-Minnesota	A.0001702.017	Environmental Enhancement	BS2 Eagle Take Permit New-23579	92,800	2024	This project supports the activities required to coordinate and manage an Eagle Take Permit. The tasks□ associated with this include: Point Count Surveys, Aerial Nest Survey, Weekly Nest Monitoring,□ Application Fee, and Consulting Services.	An Eagle Take Permit is required by State and Federal agencies. The agencies involved are DNR□ (Department of Natural Resources), USFWS (US Fish and Wildlife Services), and EERA (Energy□ Environmental Review and Analysis).

Company	Project ID	New Grandparent	Project Name	YE Amt ($s)	Activity Year	Project Description	Project Justification
NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0001573.229	Reliability/Performance Enhancement	BDS0 - Rplc #41 Screen Wash Pump -	91,717	2024	Replace 41 Screen Wash Pump bowl and rotating assembly, including stainless steel impellers and abrasion resistant Greene Tweed bearings for the bowl assembly.	Based on historical performance, 41 Screen Wash Pump will be in need of an overhaul in 2022. Previous overhauls have shown extensive damage and wear to the impellers and bowl assemblies, requiring replacement of the existing damaged bowl assemblies with OEM recommended upgrades to SS impellers and abrasion resistant bearings. Historical overhaul results also indicate there will likely be flow path damage.
NSP-Minnesota	A.0001571.092	Reliability/Performance Enhancement	ANS0 - Replace Well Piping - 10342	85,150	2024	ANS0221 - Replace well pipe into plant from well in field.	The line was inspected in 2010 and was in good shape. The well water is critical for running units 2&3 for water injection. We will continue to inspect every 5 years and move project as needed.
NSP-Minnesota	A.0003000.679	Reliability/Performance Enhancement	RIV0C-Tool Blanket	60,000	2024	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001572.165	Reliability/Performance Enhancement	ASK1 - Replace Sootblower 2024	55,955	2024	Replace one IK sootblower during calendar year.□ □ Boiler engineer to determine the specific blower to be replaced at the beginning of the calendar year.	Maintenance. □ It will be less expensive to replace the capitalized unit rather vs. repair.
NSP-Minnesota	A.0001562.196	Reliability/Performance Enhancement	REW0-Security Cameras-24657	52,851	2024	Replace all 17 security cameras onsite (9 fixed, 8 PTZ). During this time new ethernet cable will be run.	The current cameras are wired via coaxial cable that is old and quite unreliable. Cameras are used by Operations to monitor fuel unloading in the receiving barn and along the entire fuel path through to the boiler. They are also used for general site security and to monitor both entry gates.
NSP-Minnesota	A.0003000.669	Reliability/Performance Enhancement	HBC0C HB CC Tool Blanket	50,000	2024	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001575.173	Reliability/Performance Enhancement	HBC0 - Rmv & Rplc BFP Spare YR3 - 2	46,026	2024	Supervision, labor, and consumables to remove boiler feed pump and install the rotating CESP pump in it's place.	Boiler feed pumps are severe duty critical plant equipment. Periodical overhauls are required. Two pumps are currently showing indications of thrust bearing degradation.
NSP-Minnesota	A.0003000.661	Reliability/Performance Enhancement	BDS0C Tool Blanket	42,850	2024	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001562.159	Reliability/Performance Enhancement	REW0 Repl 40% CW internals-22045	40,472	2024	This project would replace the internals on the 40% circ water pump. The internals have a finite functional life and require replacement in order to continue operating within vibration and flow requirements.	The vibration and flow characteristics are out of acceptable range.
NSP-Minnesota	A.0001572.246	Reliability/Performance Enhancement	ASK1-Protective Relay Upgrades-2423	31,927	2024	The protective relaying on each of the Main Plant's 6.9KV and 4.16KV Cubicles has reached an age in which replacement is needed. The existing mechanical relays are original 1969 vintage and are starting to fail. In addition, preventative maintenance of these relays is time consuming. Newer digital style would provide better reliability and ease of maintenance. There are 8 - 6.9KV and 22 - 4.16KV cubicles; cost per ~$5,000	This project would improve reliability for our Medium Voltage source cubicles for various motors and MCC feeds in the plant. It also simplifies maintenance work and would lengthen out the periods in which PM's would be required.
NSP-Minnesota	A.0003000.748	Renewable and New Generation	BS10-Blazing Star 1 Tools and Equip	30,000	2024	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.750	Renewable and New Generation	FTW0-Foxtail Tools and Equipment	30,000	2024	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.685	Reliability/Performance Enhancement	WLM0C Tools & Equipment B	30,000	2024	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001573.217	Reliability/Performance Enhancement	BDS0-Repl Discharge Gate Comm Ctrl	28,417	2024	Replace the discharge gate control PLCs and radio link between the gate equipment and the plant.	The communications and control equipment for the outplant discharge gates is aging. It will be obsolete in the near future and require replacement. The gate control equipment consists primarily of a PLC at each gate house, the radio link includes transmit/receive electronics and hardware at both gates and at the plant. This equipment is used to control the discharge gates and maintain our environmental thermal discharge permit limits and lake level limits. Also, failed communications requires frequent trips by plant operations to the gates which is a significant burden on plant operations, and is also a safety concern in the winter time as access to the gates is limited and walkways are slippery.
NSP-Minnesota	A.0001562.186	Reliability/Performance Enhancement	REW2-U2 OFA Fan VFD-24602	27,719	2024	This project will replace the Unit 2 OFA Fan variable frequency drive. This is a Yaskawa 200 HP P7 series VFD that is now nearly obsolete and will be upgraded to the newer P1000 series.	This drive was originally installed in 2012. Based on manufacturer's recommendation, this VFD has a lifespan of 10 years.
NSP-Minnesota	A.0001565.146	Reliability/Performance Enhancement	WLM1-Unit 1 Drip Tank Motor VFD-245	21,231	2024	Project to remove the existing line starter and install a new VFD on the Unit 1 Condensate Drip Tank pump motor.	The existing line starter is obsolete. Installing a new VFD would help reduce wear and tear on the motor.
NSP-Minnesota	A.0001565.149	Reliability/Performance Enhancement	WLM2-Unit 2 Drip Tank Motor VFD-245	21,231	2024	Project to remove the existing line starter and install a new VFD on the Unit 2 Condensate Drip Tank pump motor.	The existing line starter is obsolete. Installing a new VFD would help reduce wear and tear on the motor.
NSP-Minnesota	A.0003000.657	Reliability/Performance Enhancement	ANS0C Tools and Equip Ca	20,000	2024	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.659	Reliability/Performance Enhancement	BLL0C Tools Blanket	20,000	2024	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.672	Reliability/Performance Enhancement	IVH0C Misc tools and Equip	20,000	2024	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.676	Reliability/Performance Enhancement	NBLCo Misc Tools and Equi	20,000	2024	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001562.195	Reliability/Performance Enhancement	REW2-U2 FD Fan VFD-24611	17,635	2024	This project will replace the Unit 2 FD Fan variable frequency drive. This is a Yaskawa 100 HP P7 series VFD that is now nearly obsolete and will be upgraded to the newer P1000 series.	This drive was originally installed in 2012. Based on manufacturer's recommendation, this VFD has a lifespan of 10 years.
NSP-Minnesota	A.0003000.671	Reliability/Performance Enhancement	HNIC0 Misc Tools and Equ	15,000	2024	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.680	Reliability/Performance Enhancement	REW0C Tool Blanket	15,000	2024	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.

Company	Project ID	New Grandparent	Project Name	YE Amt ($s)	Activity Year	Project Description	Project Justification
NSP-Minnesota	A.0001566.172	Renewable and New Generation	NBL Nobles Wind Repower	230,427,916	2022	Repower of the existing Nobles Wind Farm.	The project was spurred by the Minnesota Public Utilities Commission's request for projects that could help the economy recover from the COVID-19 pandemic and recession, putting people to work and increasing the amount of renewable energy customers receive, while also reducing costs.
NSP-Minnesota	A.0003000.662	Renewable and New Generation	BRDR Small Tools Equip	10,000	2024	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.128	Renewable and New Generation	CWF Tools & Misc Equipment	10,000	2024	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.667	Renewable and New Generation	GDM0C Grand Mead Cap Tool	10,000	2024	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0003000.678	Renewable and New Generation	PLV Tools Equip	10,000	2024	Purchase various new or replacement capital tools and equipment for the facility	The addition and replacement of capital tools and equipment is necessary to maintain the safety and productivity of the operating and maintenance personnel.
NSP-Minnesota	A.0001574.677	Reliability/Performance Enhancement	SHC3C Air Comp Controls Replace	8,604	2024	Replace the existing air compressor controls on 31, 32, and 33 Air Compressors with Case controls which are based on an Allen Bradley PLC platform.	The controls for each compressor need to be replaced for two reasons:□ 1. The existing controls were installed incorrectly by leaving a relay based control system in place and making the microprocessor based control system a slave of aux contacts on mechanical relays. This has lead to numerous control failures attributed to malfunctioning relays and immensely complicated troubleshooting.□ 2. It is anticipated the manufacturer of the existing control systems will be out of the market place in the near future. This leaves the house air and instrument air system vulnerable to an obsolete, proprietary microprocessor.
NSP-Minnesota	A.0001574.269	Reliability/Performance Enhancement	SHC2C Emergent Projects	7,687	2024	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001574.847	Reliability/Performance Enhancement	SHC3-LFLeachate Truck FIll Station-	6,146	2024	Upgrade Landfill Water Truck Fill Tank to load trucks with Landfill Leachate Water for disposal at a Waste Water Treatment (WWTF). Costs include permitting efforts to receive approval for disposal at the WWTF.	Currently excess Landfill Leachate water is disposed in the Sherco Ash Ponds. Off-site disposal provides a backup disposal option, in-case the Ponds are unable to take the water during high level pond inventory emergencies.
NSP-Minnesota	A.0001571.106	Reliability/Performance Enhancement	ANS0C Com Shop HVAC Repl-24743	5,833	2024	HVAC System Replacement	Roof Top Unit no longer supported by manufacturer and parts no longer available
NSP-Minnesota	A.0001579.156	Reliability/Performance Enhancement	RIV0-Replace Obsolete EDG Controls-	5,077	2024	Riverside diesel generator controls are obsolete and have a long history of failures. The Woodward load controllers, and synchronizers are obsolete and are no longer supported by the OEM. The plant is forced to purchase items on the second hand market if there is a failure. The Allen Bradley PLCs are also >20 Years old. The frequency and load control are also problematic rheostat controlled which have contributed to failed starts and trips of the units.□ □ This project scope would include full controls replacement, generator protection, and excitation/AVR control. These diesels should be able to Island and utility parallel to support plant rstabilization during black out conditions.	This obsolete equipment makes the diesel generator operation unreliable. These generators are needed during black out conditions to make sure the plant can be quickly available after a black out event. Reliability and simple/fast operation of these units is paramount to reduce equipment damage and lessen downtime during a loss of offsite power event.
NSP-Minnesota	A.0001565.083	Environmental Enhancement	WLM0-Cap WLM Landfill Cells 8, 9, 1	3,000	2024	Project to cap three cells at the Wilmarth ADF (cells 8, 9 and 10). The total acreage is approximately 3 acres. The cost includes purchase of materials, contractor mobilization, erosion control, surveying, completion of work, QA/QC, engineering, site restoration and contingency. Per discussion in Fall 2016 with Wilmarth management and Xcel Environmental services, it was determined that there is an economic advantage to doing three cells at once versus the original plan of capping Cell 10 in 2017 and only doing Cells 8 and 9 in 2020.	We are required by permit (MPCA permit # SW-298-008) to cap landfill cells as necessary. Capping the three cells in one year (2020) versus capping Cell 10 in 2017 and Cells 8 and 9 in 2020 (as was the original plan) should help the company realize significant cost savings based on contractor mobilization costs (doing it once versus twice), purchasing greater quantity of materials, potential costs related to engineering, etc.
NSP-Minnesota	A.0001576.500	Reliability/Performance Enhancement	GDM Emergent Fund -Wind prod	758	2024	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001574.190	Reliability/Performance Enhancement	SHC3C 2018 Small Project Routi	80	2024	Labor and materials that are categorized as capital expenditures. Must meet capitalization criteria categories and include material costs greater than $2,500, but total cost less than $50,000.	These are small projects such as valve replacement, motors, etc that have failed during plant operation.
NSP-Minnesota	A.0003000.372	Reliability/Performance Enhancement	SER-CSC-Purchase Forklift #2	15	2024	CSC-Replace Forklift no. 2 Replace existing lower floor forklift (#2)	CSC-Replace Forklift no. 2 The existing lower floor Nissan 4000 lb capacity, propane-powered, adjustable forklift (#2) has been in service since 1996. The Hazardous Waste Storage Facility (HWSF) is a bi-level facility and it does not have its own ramp for traversing between the lower and upper floors; therefore, two forklifts are required for operations within the HWSF. The lower floor forklift is utilized for loading/unloading slide-loaded/drop-decks/low-boy trailers, drum and pallet handling and movement, roll-off disposal operations, intra-Chestnut transfers, transformer and bushing draining operations, and pre-load staging. The lower floor forklift also works in concert with the upper floor forklift for transferring materials between floors for waste acceptance, weighing, storage, and roll-off disposal. Without the lower floor forklift, any task involving a forklift would require the upper floor forklift to drive around to fulfill the lower floor tasks and then drive back around to the upper floor. Depending on the type of project, it may take anywhere between 1 and 50 trips back and forth to accomplish. This would be an incredibility slow process and result in higher labor charges and significantly increased usage and wear on the sole forklift.
NSP-Minnesota	A.0001564.500	Reliability/Performance Enhancement	St Anthony Falls Emergent -Other Pr	8	2024	This fund covers unexpected equipment failures and discovery issues from overhaul inspections.	Emergent work for unexpected and unplanned equipment failures.
NSP-Minnesota	A.0001574.174	Reliability/Performance Enhancement	SHCJC 2018 Small Project routi	1	2024	Labor and materials that are categorized as capital expenditures. Must meet capitalization criteria categories and include material costs greater than $2,500, but total cost less than $50,000.	These are small projects such as valve replacement, motors, etc that have failed during plant operation.

Chemical Costs: 2018-2024
($s)

NSPM Total Company

	2018 Actual	2019 Actual	2020 Actual	2018-2020 Avg	2021 Forecast	2022 Budget	2023 Budget	2024 Budget
Lime	$ 2,855,981	$ 2,077,916	$ 1,813,902	$ 2,249,266	$ 1,831,916	$ 1,213,420	$ 1,197,846	$ 1,446,104
Mercury Sorbent	$ 1,023,097	$ 1,015,989	$ 1,243,068	$ 1,094,051	$ 615,593	$ 610,507	$ 573,243	$ 487,907
Ammonia	$ 1,848,248	$ 1,334,444	$ 713,562	$ 1,298,751	$ 1,059,306	$ 588,835	$ 570,252	$ 651,669
Sulfuric Acid	$ 763,803	$ 831,254	$ 523,380	$ 706,146	$ 539,544	$ 275,962	$ 285,030	$ 279,381
Other Chemicals	$ 374,007	$ 429,757	$ 380,762	$ 394,842	$ 631,326	$ 401,278	$ 401,278	$ 349,434
Total	**$ 6,865,136**	**$ 5,689,360**	**$ 4,674,675**	**$ 5,743,057**	**$ 4,677,685**	**$ 3,090,002**	**$ 3,027,648**	**$ 3,214,496**

Minnesota Jurisdiction (Net of Interchange Billings)

	2018 Actual	2019 Actual	2020 Actual	2018-2020 Avg	2021 Forecast	2022 Budget	2023 Budget	2024 Budget
Lime	$ 2,110,205	$ 1,517,591	$ 1,328,239	$ 1,652,012	$ 1,335,179	$ 885,120	$ 872,302	$ 1,051,366
Mercury Sorbent	$ 755,938	$ 742,020	$ 910,243	$ 802,734	$ 448,671	$ 445,330	$ 417,450	$ 354,725
Ammonia	$ 1,365,619	$ 974,601	$ 522,509	$ 954,243	$ 772,068	$ 429,521	$ 415,272	$ 473,785
Sulfuric Acid	$ 564,353	$ 607,100	$ 383,248	$ 518,234	$ 393,243	$ 201,298	$ 207,566	$ 203,119
Other Chemicals	$ 276,343	$ 313,870	$ 278,815	$ 289,676	$ 460,138	$ 292,709	$ 292,221	$ 254,050
Total	**$ 5,072,458**	**$ 4,155,182**	**$ 3,423,055**	**$ 4,216,898**	**$ 3,409,299**	**$ 2,253,978**	**$ 2,204,811**	**$ 2,337,045**

Chemical Usage and Costs by Plant and Type: 2018-2024

Major Chemical Usage	2018 Actuals	2019 Actuals	2020 Actuals	2018-2021 Avg	2021 Forecast	2022 Budget	2023 Budget	2024 Budget
	[PROTECTED DATA BEGINS							
Lime (tons)								
AS King Plant								
Sherco Unit 3								
Red Wing Plant								
Wilmarth Plant								
Sub-total:								
Mercury Sorbent (tons)								
AS King Plant								
Sherco Plant								
Sub-total:								
Ammonia (tons)								
AS King Plant								
Black Dog Plant								
High Bride Plant								
Riverside Plant								
Sub-total:								
Major Chemical Price ($/ton)	**2018 Actuals**	**2019 Actuals**	**2020 Actuals**	**2018-2021 Avg**	**2021 Forecast**	**2022 Budget**	**2023 Budget**	**2024 Budget**
Lime								
AS King Plant								
Sherco Unit 3 (Unallocated rate)								
Red Wing Plant								
Wilmarth Plant								
Mercury Sorbent								
AS King Plant								
Sherco Plant								
Ammonia								
AS King Plant								
Black Dog Plant								
High Bride Plant								
Riverside Plant								
Overall Cost	**2018 Actuals**	**2019 Actuals**	**2020 Actuals**	**2018-2021 Avg**	**2021 Forecast**	**2022 Budget**	**2023 Budget**	**2024 Budget**
Lime								
AS King Plant								
Sherco Unit 3								
Red Wing Plant								
Wilmarth Plant								
Sub-total:								
Mercury Sorbent								
AS King Plant								
Sherco Plant								
Sub-total:								
Ammonia								
AS King Plant								
Black Dog Plant								
High Bride Plant								
Riverside Plant								
Sub-total:								
Other Chemicals								
AS King Plant								
Black Dog Plant								
High Bride Plant								
Riverside Plant								
Sherco Plant (Allocated)								
Red Wing Plant								
Wilmarth Plant								
Sub-total:								
Total Chemical (Allocated)								

PROTECTED DATA ENDS]

Chemical Usage and Costs by Plant and Type: 2018-2024

Overall Cost By Plant ($1000)	2018 Actuals	2019 Actuals	2020 Actuals	2018-2021 Avg	2021 Forecast	2022 Budget	2023 Budget	2024 Budget
	[PROTECTED DATA BEGINS							
AS King Plant								
Black Dog Plant								
High Bride Plant								
Riverside Plant								
Sherco Plant (Allocated)								
Red Wing Plant								
Wilmarth Plant								
Total Chemical (Allocated)								

PROTECTED DATA ENDS]

2021

Unit	MW	Start	End	Days	Driver	Scope
Wilmarth1	9	1/10/2021	1/20/2021	10	Boiler Clean/Inspect/Repair	Boiler Clean/Inspect/Repair
Wilmarth2	9	1/11/2021	1/21/2021	10	Boiler Clean/Inspect/Repair	Boiler Clean/Inspect/Repair
BlackDog6	212	1/13/2021	1/15/2021	2	Phase 2 Substation Work (OMC)	Phase 2 Substation Work (OMC)
Riverside9	227	1/30/2021	6/10/2021	131	Summer Prep	Summer Prep
Riverside10	227	1/30/2021	6/17/2021	138	CT Major, Unit 7 Steam Turbine, U7 Turbine valves	CT Major, Unit 7 Steam Turbine, U7 Turbine valves
RedWing1	9	1/31/2021	4/16/2021	75	Fuel Chutes, Boiler clean/inspect/repair, Turbine	Fuel Chutes, Boiler clean/inspect/repair, Turbine
RedWing2	9	2/14/2021	3/6/2021	20	Boiler clean/inspect/repair, Replace Boiler Rear Wall	Boiler clean/inspect/repair, Replace Boiler Rear Wall
SherCo1	712	3/3/2021	4/30/2021	58	Boiler overhaul,turbine valves	Boiler overhaul,turbine valves
BayFront_Boiler_1-2	20	3/5/2021	4/23/2021	49	B1 secondary superheat replacement	B1 secondary superheat replacement
BlackDog5	282	3/7/2021	3/16/2021	9	Summer Prep	Summer Prep
ASKing1	511	3/22/2021	3/26/2021	4	MATS Inspections	MATS Inspections
AngusAnson3	90	4/3/2021	4/11/2021	8	Generator Breaker Replacement	Generator Breaker Replacement
Wheaton1	44	4/5/2021	4/16/2021	11	Summer prep	Summer prep
Wheaton2	55	4/5/2021	4/16/2021	11	Summer prep	Summer prep
SherCo2	712	4/9/2021	4/25/2021	16	Dual Unit Stack Inspections/Repairs	Dual Unit Stack Inspections/Repairs
Monticello1	617	4/17/2021	5/16/2021	29	Refueling	Refueling
Wheaton3	44	4/19/2021	4/30/2021	11	Summer prep	Summer prep
Wheaton4	47	4/19/2021	4/30/2021	11	Summer prep	Summer prep
Wheaton6	48	5/3/2021	5/14/2021	11	Summer prep	Summer prep
HighBridge7	265	5/3/2021	5/23/2021	20	Summer prep, MS Block vlv replc	Summer prep, MS Block vlv replc
HighBridge8	265	5/3/2021	5/23/2021	20	Summer prep, MS Block Vlv Rplc	Summer prep, MS Block Vlv Rplc
BlackDog6	212	5/23/2021	5/29/2021	6	Borescope Inspection	Borescope Inspection
FrenchIsland2	7	9/6/2021	10/25/2021	49	Unit 2 Turbine and Generator overhaul.	Unit 2 Turbine and Generator overhaul.
ASKing1	511	9/10/2021	10/29/2021	50	LP expansion joint replacement, generator inspection, DCS upgrade	LP expansion joint replacement, generator inspection, DCS upgrade
Wilmarth1	9	9/12/2021	9/19/2021	8	Boiler Clean, DCS Upgrade, CEMS Analyzers	Boiler Clean, DCS Upgrade, CEMS Analyzers
Wheaton1	44	9/13/2021	9/24/2021	12	Winter Prep	Winter Prep
Wheaton2	55	9/13/2021	9/24/2021	12	Winter Prep	Winter Prep
Wilmarth2	9	9/13/2021	9/20/2021	8	Boiler Clean, DCS Upgrade, CEMS analyzers	Boiler Clean, DCS Upgrade, CEMS analyzers
BlueLake7	150	9/18/2021	10/31/2021	44	Control System replacement	Control System replacement
BlueLake8	150	9/18/2021	10/31/2021	44	Control system replacement	Control system replacement
SherCo3	900	9/18/2021	9/25/2021	8	State Required Internal Boiler Inspection	State Required Internal Boiler Inspection
Wheaton3	44	9/27/2021	10/8/2021	11	Winter Prep	Winter Prep
Wheaton4	47	9/27/2021	10/8/2021	11	Winter Prep	Winter Prep
PrairieIsland2	546	10/2/2021	10/31/2021	29	Refueling	Refueling
HighBridge7	265	10/2/2021	10/11/2021	4	Fall Warranty Outage - Mitsubishi to replace R3 turbine blades and fuel nozzles	Fall Warranty Outage - Mitsubishi to replace R3 turbine blades and fuel nozzles
HighBridge8	265	10/4/2021	10/8/2021	4	Fall Condenser Cleaning	Fall Condenser Cleaning
AngusAnson4	147	10/4/2021	10/17/2021	14	Turning Gear Replacement	Turning Gear Replacement
BlackDog5	282	10/10/2021	10/16/2021	7	Winter Prep	Winter Prep
Wheaton6	48	10/11/2021	10/22/2021	11	Winter Prep	Winter Prep
Riverside10	227	10/18/2021	10/22/2021	4	Fall Condenser Cleaning	Fall Condenser Cleaning
Riverside9	227	10/18/2021	10/22/2021	4	Fall Condenser Cleaning	Fall Condenser Cleaning
AngusAnson2	90	11/15/2021	11/21/2021	7	ANS0-U2-3-4 BOPEvergreen Ctrl Sys Upg	ANS0-U2-3-4 BOPEvergreen Ctrl Sys Upg
AngusAnson3	90	11/15/2021	11/21/2021	7	ANS0-U2-3-4 BOPEvergreen Ctrl Sys Upg	ANS0-U2-3-4 BOPEvergreen Ctrl Sys Upg
AngusAnson4	147	11/15/2021	11/21/2021	7	ANS0-U2-3-4 BOPEvergreen Ctrl Sys Upg	ANS0-U2-3-4 BOPEvergreen Ctrl Sys Upg

2022

Unit	MW	Start	End	Days	Driver	Scope
Wilmarth1	9	1/12/2022	2/2/2022	22	Boiler Clean/Inspect/Repair, Gratebed replacement	Boiler Clean/Inspect/Repair, Gratebed replacement
Wilmarth2	9	1/15/2022	2/5/2022	22	Boiler Clean/Inspect/Repair, Baghouse Project, Conveyor VFD Replacements, Tube Re	Replacements
RedWing1	9	1/16/2022	3/18/2022	62	Boiler Clean/Inspect/Repair	Boiler Clean/Inspect/Repair
RedWing2	9	1/16/2022	3/4/2022	48	Boiler Clean/Inspect/Repair, Turbine Overhaul	Boiler Clean/Inspect/Repair, Turbine Overhaul
SherCo2	712	2/26/2022	3/20/2022	23	MATS inspection, NERC testing, summer prep	MATS inspection, NERC testing, summer prep
SherCo1	712	3/1/2022	3/17/2022	17	Dual Unit outage to perform common stack and breeching inspections	Dual Unit outage to perform common stack and breeching inspections
AngusAnson2	90	3/1/2022	4/17/2022	48	GCB Replacement	GCB Replacement
BayFront5	18	3/4/2022	4/23/2022	51	Major overhaul; generator feeder cable replacement (6 weeks), turbine blading	Major overhaul; generator feeder cable replacement (6 weeks), turbine blading
BayFront_Boiler_1-2	20	3/4/2022	4/25/2022	53	General boiler maintenance	General boiler maintenance
AngusAnson4	147	3/7/2022	4/17/2022	42	EX2000 Replacement, LCI, Mark 5 Controls Upgrades	EX2000 Replacement, LCI, Mark 5 Controls Upgrades
BlueLake7	150	3/12/2022	3/27/2022	16	Exhaust Silencer & Air Filter Replacement	Exhaust Silencer & Air Filter Replacement
BlackDog6	212	3/28/2022	4/3/2022	7	Borescope Inspection	Borescope Inspection
HighBridge7	265	4/4/2022	4/13/2022	10	Summer Prep	Summer Prep
HighBridge8	265	4/4/2022	4/13/2022	10	Summer Prep	Summer Prep
Wheaton1	44	4/4/2022	4/15/2022	12	Summer Prep	Summer Prep
Wheaton2	55	4/4/2022	4/15/2022	12	Summer Prep	Summer Prep
InverHills3	47	4/9/2022	5/20/2022	42	Controls Upgrade	Controls Upgrade
InverHills4	47	4/9/2022	5/20/2022	42	Controls Upgrade	Controls Upgrade
Wheaton4	47	4/18/2022	4/29/2022	12	Summer Prep	Summer Prep
AngusAnson4	147	4/23/2022	5/25/2022	33	Hot Gas Path Inspection	Hot Gas Path Inspection
Riverside10	227	4/25/2022	5/4/2022	10	Summer Prep; Borescope; Condenser Clean	Summer Prep; Borescope; Condenser Clean
Riverside9	227	4/25/2022	5/4/2022	10	Summer Prep; Borescope; Condenser Clean	Summer Prep; Borescope; Condenser Clean
BlackDog5	282	5/1/2022	5/21/2022	21	Hot Gas Path Inspection, Summer Prep	Hot Gas Path Inspection, Summer Prep
Wheaton6	48	5/2/2022	5/13/2022	12	Summer Prep	Summer Prep
AngusAnson2	90	9/7/2022	4/23/2023	229	CT Major	CT Major
Wilmarth2	9	9/10/2022	9/25/2022	16	Boiler Clean, Scalping Conveyor replacement, Slaker PLC, Lime mixer grit shaker replac	replacement, boiler grate replacement
Wilmarth1	9	9/11/2022	9/24/2022	14	Boiler Clean, C7, C8, C3, C4 VFD's	Boiler Clean, C7, C8, C3, C4 VFD's
Wheaton1	44	9/12/2022	9/23/2022	12	Winter Prep	Winter Prep
Wheaton2	55	9/12/2022	9/23/2022	12	Winter Prep	Winter Prep
BlueLake7	150	9/17/2022	10/9/2022	23	CEMS CDM AutoTune	CEMS CDM AutoTune
BlueLake8	150	9/17/2022	10/9/2022	23	CEMS CDM AutoTune	CEMS CDM AutoTune
BlackDog5	282	9/21/2022	12/2/2022	73	Turbine HP, Turbine LP, Turbine Valves	Turbine HP, Turbine LP, Turbine Valves
Wheaton4	47	9/26/2022	10/7/2022	12	Winter Prep	Winter Prep
HighBridge7	265	10/1/2022	10/7/2022	7	Winter Pre outage, misc valve work, instrument calibrations	Winter Pre outage, misc valve work, instrument calibrations
HighBridge8	265	10/1/2022	10/7/2022	7	Winter Prep outage, misc valve work, instrument calibrations	Winter Prep outage, misc valve work, instrument calibrations
ASKing1	511	10/8/2022	10/25/2022	18	Boiler cleaning	Boiler cleaning
Wheaton6	48	10/10/2022	10/21/2022	12	Winter Prep	Winter Prep
PrairieIsland1	521	10/15/2022	11/8/2022	25	Refueling	Refueling
Riverside9	227	10/24/2022	10/28/2022	5	Fall Condenser Cleaning	Fall Condenser Cleaning
Riverside10	227	10/24/2022	10/28/2022	5	Fall Condenser Cleaning	Fall Condenser Cleaning

2023

Unit	MW	Start	End	Days	Driver	Scope
Wilmarth2	9	1/11/2023	2/27/2023	48	Boiler Clean/Inspect/Repair	Boiler Clean/Inspect/Repair
Wilmarth1	9	1/14/2023	2/4/2023	22	Boiler General Maintenance, Turbine Valves, Turbine Major, Generator Major	Boiler General Maintenance, Turbine Valves, Turbine Major, Generator Major
RedWing1	9	2/6/2023	2/24/2023	19	Boiler General Maintenance	Boiler General Maintenance
RedWing2	9	2/13/2023	3/3/2023	19	Boiler General Maintenance	Boiler General Maintenance
HighBridge8	265	2/18/2023	4/5/2023	47	Major Overhaul	Major Overhaul
SherCo3	900	2/25/2023	4/24/2023	59	Boiler overhaul, generator, BFPT, valves.	Boiler overhaul, generator, BFPT, valves.
BayFront_Boiler_1-2	20	3/3/2023	4/14/2023	43	General boiler maintenance	General boiler maintenance
BlueLake1	39	3/6/2023	3/10/2023	5	NERC Required Relay Testing	NERC Required Relay Testing
BlueLake2	39	3/6/2023	3/10/2023	5	NERC Required Relay Testing	NERC Required Relay Testing
BlueLake3	36	3/6/2023	3/10/2023	5	NERC Required Relay Testing	NERC Required Relay Testing
BlueLake4	39	3/6/2023	3/10/2023	5	NERC Required Relay Testing	NERC Required Relay Testing
InverHills1	47	3/6/2023	3/17/2023	12	Circuit Breaker Maintenance 13.4kv, 6.4kv	Circuit Breaker Maintenance 13.4kv, 6.4kv
InverHills2	47	3/6/2023	3/17/2023	12	Circuit Breaker Maintenance 13.4kv, 6.4kv	Circuit Breaker Maintenance 13.4kv, 6.4kv
InverHills3	47	3/6/2023	3/17/2023	12	Circuit Breaker Maintenance 13.4kv, 6.4kv	Circuit Breaker Maintenance 13.4kv, 6.4kv
InverHills4	47	3/6/2023	3/17/2023	12	Circuit Breaker Maintenance 13.4kv, 6.4kv	Circuit Breaker Maintenance 13.4kv, 6.4kv
InverHills5	47	3/6/2023	3/17/2023	12	Circuit Breaker Maintenance 13.4kv, 6.4kv	Circuit Breaker Maintenance 13.4kv, 6.4kv
InverHills6	47	3/6/2023	3/17/2023	12	Circuit Breaker Maintenance 13.4kv, 6.4kv	Circuit Breaker Maintenance 13.4kv, 6.4kv
BlueLake7	150	3/13/2023	3/17/2023	5	NERC Required Relay Testing	NERC Required Relay Testing
BlueLake8	150	3/13/2023	3/17/2023	5	NERC Required Relay Testing	NERC Required Relay Testing
HighBridge7	265	3/18/2023	3/27/2023	10	Summer Prep	Summer Prep
Wheaton1	44	4/3/2023	4/14/2023	12	Summer Prep	Summer Prep
Wheaton2	55	4/3/2023	4/14/2023	12	Summer Prep	Summer Prep
InverHills5	47	4/8/2023	5/19/2023	42	Controls Upgrade	Controls Upgrade
InverHills6	47	4/8/2023	5/19/2023	42	Controls Upgrades	Controls Upgrades
BlackDog6	212	4/10/2023	4/16/2023	7	Borescope Inspection	Borescope Inspection
Monticello1	617	4/15/2023	5/14/2023	30	Refueling	Refueling
Riverside10	227	4/17/2023	4/26/2023	10	Summer prep. Borescope, Condenser Clean	Summer prep. Borescope, Condenser Clean
Riverside9	227	4/17/2023	4/26/2023	10	Summer prep. Borescope, Condenser Clean	Summer prep. Borescope, Condenser Clean
Wheaton3	44	4/17/2023	4/28/2023	12	Summer Prep	Summer Prep
Wheaton4	47	4/17/2023	4/28/2023	12	Summer Prep	Summer Prep
BlackDog5	282	4/30/2023	5/9/2023	10	Summer Prep	Summer Prep
Wheaton6	48	5/1/2023	5/12/2023	12	Summer Prep	Summer Prep
Wilmarth1	9	9/10/2023	9/17/2023	8	Fuel system/Boiler Clean/Inspect/Repair	Fuel system/Boiler Clean/Inspect/Repair
Wilmarth2	9	9/11/2023	9/18/2023	8	Fuel system/Boiler Clean/Inspect/Repair	Fuel system/Boiler Clean/Inspect/Repair
BlueLake7	150	9/16/2023	10/1/2023	16	Inlet Filter Media Replacement	Inlet Filter Media Replacement
PrairieIsland2	546	9/30/2023	10/29/2023	30	Refueling outage	Refueling outage
BlackDog5	282	10/1/2023	10/7/2023	7	Winter prep	Winter prep
Wheaton1	44	10/2/2023	10/13/2023	12	Winter Prep	Winter Prep
Wheaton2	55	10/2/2023	10/13/2023	12	Winter Prep	Winter Prep
BlueLake8	150	10/7/2023	10/22/2023	16	Inlet Filter Media Replacement	Inlet Filter Media Replacement
HighBridge7	265	10/9/2023	10/13/2023	5	Fall Condenser Cleaning	Fall Condenser Cleaning
Wheaton3	44	10/16/2023	10/27/2023	12	Winter Prep	Winter Prep
Wheaton4	47	10/16/2023	10/27/2023	12	Winter Prep	Winter Prep
Riverside10	227	10/23/2023	10/27/2023	5	Fall Condenser Cleaning	Fall Condenser Cleaning
Riverside9	227	10/23/2023	10/27/2023	5	Fall Condenser Cleaning	Fall Condenser Cleaning
Wheaton6	48	10/30/2023	11/10/2023	12	Winter Prep	Winter Prep

2024

Unit	MW	Start	End	Days	Driver	Scope
Wilmarth1	9	1/10/2024	2/26/2024	48	Boiler Clean/Inspect/Repair	Boiler Clean/Inspect/Repair
Wilmarth2	9	1/13/2024	2/3/2024	22	Boiler General Maintenance, Turbine Valves, Turbine Major, Generator Major	Boiler General Maintenance, Turbine Valves, Turbine Major, Generator Major
RedWing1	9	2/11/2024	2/28/2024	18	Boiler General Maintenance	Boiler General Maintenance
RedWing2	9	2/19/2024	3/7/2024	18	Boiler General Maintenance	Boiler General Maintenance
SherCo1	712	2/24/2024	4/22/2024	59	MATS Inspection, NERC testing, summer prep	MATS Inspection, NERC testing, summer prep
ASKing1	511	2/24/2024	5/15/2024	82	MATS inspections, NERC compliance, ELG Compliance	MATS inspections, NERC compliance, ELG Compliance
BayFront_Boiler_1-2	20	3/8/2024	4/19/2024	43	General Boielr Maintenance	General Boielr Maintenance
HighBridge7	265	3/9/2024	4/7/2024	30	U9 steam turbine valves, replace GSU bushing, summer Prep	U9 steam turbine valves, replace GSU bushing, summer Prep
HighBridge8	265	3/9/2024	4/7/2024	30	U9 steam turbine valves, replace GSU bushing, summer Prep	U9 steam turbine valves, replace GSU bushing, summer Prep
HighBridge7	265	3/11/2024	3/24/2024	14	Hot Gas Path Inspection	Hot Gas Path Inspection
Wheaton1	44	4/1/2024	4/12/2024	12	Summer Prep	Summer Prep
Wheaton2	55	4/1/2024	4/12/2024	12	Summer Prep	Summer Prep
BlackDog6	212	4/1/2024	4/7/2024	7	Borescope Inspection	Borescope Inspection
BlueLake8	150	4/1/2024	4/14/2024	14	Hot Gas Path Inspection	Hot Gas Path Inspection
Wheaton3	44	4/15/2024	4/26/2024	12	Summer Prep	Summer Prep
Wheaton4	47	4/15/2024	4/26/2024	12	Summer Prep	Summer Prep
Riverside10	227	4/22/2024	5/1/2024	10	Summer Prep	Summer Prep
Riverside9	227	4/22/2024	5/1/2024	10	Summer Prep	Summer Prep
BlueLake7	150	4/22/2024	5/6/2024	15	Hot Gas Path Inspection	Hot Gas Path Inspection
Wheaton6	48	4/29/2024	5/10/2024	12	Summer Prep	Summer Prep
BlackDog5	282	5/5/2024	5/14/2024	10	Summer Prep	Summer Prep
SherCo3	900	5/11/2024	5/20/2024	10	Boiler chemical cleaning	Boiler chemical cleaning
SherCo1	712	5/11/2024	5/20/2024	10	Boiler chemical cleaning	Boiler chemical cleaning
Wilmarth1	9	9/8/2024	9/15/2024	8	Fuel system/Boiler Clean/Inspect/Repair	Fuel system/Boiler Clean/Inspect/Repair
Wilmarth2	9	9/9/2024	9/16/2024	8	Fuel system/Boiler Clean/Inspect/Repair	Fuel system/Boiler Clean/Inspect/Repair
Riverside9	227	9/30/2024	10/22/2024	23	Hot Gas Path	Hot Gas Path
Wheaton1	44	9/30/2024	10/11/2024	12	Winter Prep	Winter Prep
Wheaton2	55	9/30/2024	10/11/2024	12	Winter Prep	Winter Prep
BlackDog5	282	10/6/2024	10/12/2024	7	Winter Prep	Winter Prep
Riverside10	227	10/7/2024	10/11/2024	5	Fall Condenser Cleaning	Fall Condenser Cleaning
PrairieIsland1	521	10/12/2024	11/3/2024	23	Refueling	Refueling
Wheaton3	44	10/14/2024	10/25/2024	12	Winter Prep	Winter Prep
Wheaton4	47	10/14/2024	10/25/2024	12	Winter Prep	Winter Prep
Wheaton6	48	10/28/2024	11/8/2024	12	Winter Prep	Winter Prep
HighBridge7	265	11/11/2024	11/15/2024	5	Fall Condenser Cleaning	Fall Condenser Cleaning
HighBridge8	265	11/11/2024	11/15/2024	5	Fall Condenser Cleaning	Fall Condenser Cleaning

Location and Capacity Rating in MWs - 2021 Capacity Ratings

Plant Description	Address	Unit Type	Net Max Capacity (NMC)	Net Dependable Capacity (NDC)	Net Max Capacity (NMC)	Net Dependable Capacity (NDC)	Net Max Capacity (NMC)	Net Dependable Capacity (NDC)	Net Max Capacity (NMC)	Net Dependable Capacity (NDC)	Net Max Capacity (NMC)	Net Dependable Capacity (NDC)
			2017	2017	2018	2018	2019	2019	2020	2020	2021	2021
Base Load Coal												
Allen S King 1	1103 King Plant Road, Bayport MN 55003	FC/Steam	511.0	511.0	511.0	511.0	511.0	511.0	511.0	511.0	511.0	511.0
Sherburne 1,2,3*	13999 Industrial Blvd., Becker MN 55308	FC/Steam	1879.0	1879.0	1879.0	1879.0	1879.0	1879.0	1879.0	1879.0	1879.0	1879.0
Intermediate												
Black Dog 2	1400 Black Dog Road, Burnsville, MN 55337	Gas CC	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0
Black Dog 5**	1400 Black Dog Road, Burnsville, MN 55337	FC/Steam	181.0	165.0	181.0	165.0	181.0	165.0	181.0	165.0	181.0	165.0
High Bridge 7,8**	501 Shepard Road, St. Paul MN. 55102	Gas CC	370.0	304.0	370.0	304.0	370.0	304.0	370.0	304.0	344.0	304.0
High Bridge 9	501 Shepard Road, St. Paul MN. 55102	FC/Steam	236.0	226.0	236.0	226.0	236.0	226.0	236.0	226.0	236.0	226.0
Riverside 9,10**	3100 Marshall Street NE, Minneapolis, MN 55418	Gas CC	342.0	294.0	342.0	294.0	342.0	294.0	342.0	294.0	342.0	294.0
Riverside 7	3100 Marshall Street NE, Minneapolis, MN 55418	FC/Steam	160.0	160.0	160.0	160.0	160.0	160.0	16.0	16.0	171.0	147.0
Biomass / RDF												
Red Wing 1,2	801 E 5th Street, Redwing MN 55066	RDF/Steam	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Wilmarth 1,2	800 Summit Ave, Mankato MN 56001	RDF/Steam	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Wind												
Blazing Star I	600 E Railroad St, Hendricks,MN 56136	Wind	-	-	-	-	-	-	200.0	33.3	200.0	35.2
Blazing Start II	600 E Railroad St, Hendricks,MN 56136	Wind	-	-	-	-	-	-	-	-	200.0	35.2
Border Wind	5190 107th Street NE, Rolla, ND 58367	Wind	148.00	23.10	148.00	23.10	148.00	22.50	147.9	23.2	147.9	24.6
Community Wind	600 E Railroad St, Hendricks,MN 56136	Wind									25.9	4.3
Courtenay Wind	1401 Hwy 9 SE, Courtenay, ND 53426	Wind	195.00	30.40	195.00	30.40	195.00	29.60	190.2	29.9	190.2	31.6
Crowned Ridge II	46351 164th St, Watertown SD 57201	Wind	-	-	-	-	-	-	-	-	192.2	31.9
Dakota Range I, II	45912 149th St, Summit SD 57266	Wind	-	-	-	-	-	-	-	-	199.9	33.2
Foxtail	7208 91st SE, Kulm, ND 58456	Wind	-	-	-	-	-	-	150.0	25.0	150.0	26.4
Freeborn	10854 840th Ave, Glenville, MN 56036	Wind	-	-	-	-	-	-			297.6	49.4
Grand Meadow	228 Industrial Park Dr, Dexter, MN 55926	Wind	100.50	15.70	100.50	15.70	100.50	15.30	99.4	15.6	99.4	16.5
Jeffers Wind	1973 170th Ave, Holland, MN 56139	Wind	-	-	-	-	-	-			43.1	7.2
Lake Benton II	1973 170th Ave Holland,MN 56139	Wind	-	-	-	-	99.0	15.5	99.0	15.5	98.8	16.4
Mower County	72506 180th Street Grand Meadow, MN 55936	Wind	-	-	-	-	-	-	-	-	96.6	16.0
Nobles Wind	19469 McCall Avenue, Reading, MN 56165	Wind	200.00	31.20	200.00	31.20	200.00	30.40	197.2	31.0	197.2	32.7
Pleasant Valley Wind	228 Industrial Park Dr, Dexter, MN 55926	Wind	196.00	30.60	196.00	30.60	196.00	29.80	195.8	30.7	195.8	32.5
Hydro Production												
Hennepin ISD**	31 3rd Ave SE, Minneapolis MN	Hydro	13.9	6.3	13.9	6.3	13.9	6.3	13.9	6.3	13.9	6.3
St Croix Falls**	St Croix Falls, WI	Hydro	25.9	15.0	25.9	15.0	25.9	15.0	25.9	15.0	25.9	15.0
Peaking (NDC-Summer)												
Angus Anson 2,3,4**	7100 E Rice Street, Sioux Falls, SD 57110	CT	386.0	327.0	386.0	327.0	386.0	327.0	386.0	327.0	386.0	327.0
Black Dog 6**	1400 Black Dog Road, Burnsville, MN 55337	CT	0.0	0.0	0	0	228.0	212.0	228.0	212.0	228.0	212.0
Blue Lake 1-4, 7,8**	1200 70th Street, Shakopee, MN 55379	CT	545.0	453.0	545.0	453.0	545.0	453.0	545.0	453.0	543.0	447.0
Inver Hills 1,2,3,4,5,6**	3185 117th Street, Inver Grove Heights, MN 55077	CT	371.0	282.0	371.0	282.0	371.0	282.0	371.0	282.0	348.0	252.0
Diesel Engine Peaking												
Inver Hills	3185 117th Street, Inver Grove Heights, MN 55077	Diesel	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
No Generation at these locations												
Minn Valley	Hwy 212 East, Granite Falls, MN 56241	Retired	-	-	-	-	-	-	-	-	-	-
Lake Benton I	1740 US Hwy 14, Lake Benton, MN 56149	-	-	-	-	-	-	-	-	-	-	-
West Faribault	Co Rd 18 & Hwy 65, Faribault MN 55021	CT	-	-	-	-	-	-	-	-	-	-
Wind Storage	800 S Kniss Ave, Luverne, MN 56156	-	-	-	-	-	-	-	-	-	-	-
Key City 2,3,4	PO Box 1090, Mankato MN 56002	CT	-	-	-	-	-	-	-	-	-	-
Granite City 1,2,3,4**	Hwy 10 & East St Germain, St Cloud MN 56302	CT	64.0	52.0	64.0	52.0	64.0	52.0	-	-	-	-
United Hospital	6300 Olson Memorial Hwy., Golden Valley, MN 55427	Diesel	4.8	4.8	-	-	-	-	-	-	-	-

* Sherco 3 capacity ratings are shown as Xcel Energy allocation
** Capacity rating is for **summer dispatch**

Monthly Generation
2018-2021

Net kWh	2018 JAN-2018	FEB-2018	MAR-2018	APR-2018	MAY-2018	JUN-2018	JUL-2018	AUG-2018	SEP-2018	OCT-2018	NOV-2018	DEC-2018
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Base Load Coal												
Allen S. King 1	277486000	219119000	216313000	-4891000	19296000	195494000	321554000	219281000	245051000	344839000	296996000	348153000
Sherburne Co. 1	366738000	226999000	-3130000	-2085000	97760000	303417000	323327000	284916000	135015000	323055000	407110000	390582000
Sherburne Co. 2	395804000	336902000	331721000	308358000	310319000	350819000	321950000	373057000	364889000	427843000	413940000	419394000
Sherburne Co. 3*	299787000	241232000	242696000	259757000	287623000	192869000	281442000	293106000	262553000	140471000	304660000	303825000
Sub-Total:	1339815000	1024252000	787600000	561139000	714998000	1042599000	1248273000	1170360000	1007508000	1236208000	1422706000	1461954000
Intermediate												
Black Dog 5/2	-1314740	-916620	-317000	-1007000	98514000	121075000	163719000	157620000	106386000	82799000	42060040	38094040
High Bridge 7	96529000	64415000	86583000	79993000	82265000	85702670	106829840	96238000	61691000	-189000	20827000	39399000
High Bridge 8	53284000	52367000	71505000	61729000	74574490	53913240	107241270	89615000	56061000	-190000	15437000	38489000
High Bridge 9	76224000	59348000	83383000	75883000	91952000	81539000	127702000	111595000	69427000	k -	19040000	41094000
Riverside 7	59396000	63065000	98698000	86867000	37999000	87082000	107946000	106298000	102197000	56770000	61054000	34545000
Riverside 9	58713000	66289000	99823000	86751000	48111000	77081000	98990000	97653000	97924000	54981000	62499000	33312000
Riverside 10	65510000	66700000	98659000	78962000	21943000	85473000	104416000	99292000	91808000	53285000	52850000	30326000
Sub-Total:	408341260	371267380	538334000	469178000	455358490	591865910	816844110	758311000	585494000	247456000	273767040	255259040
Biomass / RDF												
Red Wing 1	6407600	6271960	5278270	3990730	6429170	6110520	6045830	6259350	5770960	6270530	6364420	5555940
Red Wing 2	0	0	0	0	5579130	6595140	5801360	7051020	5999110	6763130	6364420	6431320
Wilmarth 1	1013570	5057110	5453810	5852410	5359950	4425010	5546240	5963700	2351570	6307290	6938140	6172740
Wilmarth 2	3209630	4188060	4794130	5533600	5349250	3338170	5502050	5616300	278820	0	0	2185100
Sub-Total:	10630800	15517130	15526210	15376740	22717500	20468840	22895480	24890370	14400460	19340950	19666980	20345100
Wind												
Blazing Star I												
Blazing Star II												
Borders	62289090	58599280	49621000	51799790	46360020	42485600	44599950	40668590	51018960	60019780	46601770	55453310
Courtenay	62773310	57713440	53701930	70502850	65318220	59401050	48980410	35204880	49071420	59395010	53944390	62773310
Community WInd												
Crowned Ridge II												
Dakota Range I,II												
Foxtail Wind												
Freeborn												
Grand Meadow	34263240	21807810	26226450	21859140	18556000	22862790	14169090	13410210	19514280	25177090	26647540	26368110
Jeffers Wind												
Lake Benton II												
Mower County												
Nobles Wind Farm	71507540	59118900	66423790	58565060	47533150	56867140	36702440	36709790	55070150	55191000	53917350	53597840
Pleasant Valley	85995840	61784770	71208990	64161390	51516340	62459050	46326850	42147680	61037590	67922000	72732390	69357420
Sub-Total:	316829020	259024200	267182160	266888230	229283730	244075630	190778740	168141150	235712400	267704880	253843440	267549990
Hydro Production												
St. Anthony Falls All	3226000	2993000	5817000	6267000	6682000	1985000	9096000	6799000	5783000	5086000	3933000	3483000
St. Croix Falls All	7324000	5968000	9035000	12109000	14730000	12576000	11871000	7304000	7123000	9237000	7982000	8565000
Sub-Total:	10550000	8961000	14852000	18376000	21412000	14561000	20967000	14103000	12906000	14323000	11915000	12048000
Peaking												
Angus Anson 2	-151600	-277120	-160970	827170	5076740	1408350	7801560	1757760	392890	7420	194890	65480
Angus Anson 3	930600	-277120	-160970	-111420	2142260	-79900	-86280	-85940	-53110	-122430	-103750	-114000
Angus Anson 4	-269210	-105700	264520	9787510	28209820	11158940	22725190	16512490	6196930	6671430	527260	-202240
Black Dog 6	0	0	0	9517000	38112000	20776000	32506000	25903000	12581000	19667000	5626890	2676890
Blue Lake 1	-80000	-68500	-60000	-49000	-27500	-28500	127500	-4000	0	0	0	0
Blue Lake 2	-80000	-68500	-60000	-49000	-27500	-27500	118500	-4000	0	0	0	0
Blue Lake 3	-42500	-41000	71500	-33500	-24000	-3500	-21500	164000	6000	-36500	0	-35500
Blue Lake 4	-42500	-41000	-40500	-33500	-24000	-4500	-21500	178000	36000	-36500	0	-36500
Blue Lake 7	-96000	2157000	-116000	3554000	13864000	1859000	10394000	3195000	5183000	4441000	0	-144000
Blue Lake 8	-162000	2147000	2701000	6274000	23833000	2911000	11053000	6987000	2433000	3472000	0	-210000
Granite City 1	-19640	-17220	-15000	-13980	-9580	-8220	-8140	-8160	-2420	-7380	-14840	-16420
Granite City 2	-19640	-17220	-15000	-13980	-9580	-8220	-8140	-8160	6580	-6380	-14840	-16420
Granite City 3	-19640	-17220	-15000	-13980	-9580	-8220	-8140	-8160	-2420	-7380	-14840	-16420
Granite City 4	-19640	-17220	-15000	-13980	-9580	-8220	-8140	-8160	-2420	-7380	-14840	-16420
Inver Hills 1	-57000	248000	18000	118000	1787000	84000	539000	452000	931000	-253000	-44000	-82000
Inver Hills 2	113000	-34000	-25000	17000	273000	-9000	404000	226000	49000	407000	41000	-18000
Inver Hills 3	154000	107000	-34000	7000	654000	-26000	263000	221000	-39000	-29000	39000	-31000
Inver Hills 4	109000	155000	-28000	15000	1010000	12000	520000	459000	89000	-23000	63000	-24000
Inver Hills 5	71000	-28000	-21000	-22000	539000	-15000	408000	328000	1039000	335000	37000	-30000
Inver Hills 6	149000	122000	17000	15000	464000	-13000	328000	170000	1063000	323000	55000	-19000
Sub-Total:	467230	3926180	2305580	29777340	115823500	37969510	87025910	56426670	29907030	34794900	6376930	1730450
TOTAL:	2086633310	1682947890	1625799950	1360735310	1559593220	1951539890	2386784240	2192232190	1885927890	1819827730	1988275390	2018886580

*Only Xcel Portion

Monthly Generation
2018-2021

Net kWh	2019 JAN-2019	FEB-2019	MAR-2019	APR-2019	MAY-2019	JUN-2019	JUL-2019	AUG-2019	SEP-2019	OCT-2019	NOV-2019	DEC-2019
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Base Load Coal												
Allen S. King 1	335309000	237045000	81650000	-7465000	229658000	272070000	223992000	28327000	89477000	19897000	106358500	122860000
Sherburne Co. 1	206791000	362043000	392538000	262755000	346688000	301480000	357925000	282826000	113386000	68301000	243525000	272694000
Sherburne Co. 2	400446000	165629000	-1665000	22507000	289602000	290832000	381735000	343740000	297565000	303265000	211187000	223139000
Sherburne Co. 3*	342126000	295948000	295738000	208032000	174141000	240376000	280533000	260029000	228371000	216227000	362383000	283158000
Sub-Total:	1284672000	1060665000	768261000	485829000	1040089000	1104758000	1244185000	914922000	728799000	607690000	923453500	901851000
Intermediate												
Black Dog 5/2	55793040	66765000	115819000	143348000	123548000	106382000	177982000	177917000	123017000	149877000	91084000	164715000
High Bridge 7	96383000	124438000	113546000	116654000	66686000	85593000	101180000	108364810	87773700	92355960	75981040	89733610
High Bridge 8	10674000	120335000	104338000	113841000	56950000	76363000	113294000	109036990	80286700	105595460	64741540	92548920
High Bridge 9	54117000	124249000	115585000	135287000	73824000	102048000	146827000	137752540	104380000	117869000	77716000	100676000
Riverside 7	67577000	105350000	73651000	68772000	82623000	103236000	108068000	114655000	100242000	77222000	60434000	84395000
Riverside 9	71423000	110627000	79933000	71330000	76207000	95787000	99651000	107629000	90589000	75008000	79516000	112836000
Riverside 10	69055000	110986000	72920000	69944000	77598000	96073000	103097000	107248000	89768000	70350000	40463000	61298000
Sub-Total:	425022040	762750000	675792000	719176000	557436000	665482000	850099000	862603340	676056400	688277420	489935580	706202530
Biomass / RDF												
Red Wing 1	6621830	2628630	3660100	6321100	6013450	6490770	5374740	6134260	5903090	6738330	6377320	7022400
Red Wing 2	6490550	4882410	4339430	7046160	6475850	6955020	6388390	7617130	6284620	6919070	4248480	0
Wilmarth 1	3995300	4210600	4339620	5310980	4880880	4666400	4842910	5415480	1752400	4892460	5215350	3697800
Wilmarth 2	4299800	3445040	3989800	5102710	4293630	4171480	4470380	4899720	2141820	5979680	4624930	5160490
Sub-Total:	21407480	15166680	16328950	23780950	21663810	22283670	21076420	24066590	16081930	24529540	20466080	15880690
Wind												
Blazing Star I												
Blazing Star II												
Borders	51793400	42860250	62089420	53146050	53091620	44741870	40392110	47821690	47257020	63413260	52743090	53023780
Courtenay	57713440	53701930	70502850	65318220	59401050	48980410	35204880	49071420	59395010	81878580	63416820	65187520
Community WInd												
Crowned Ridge II												
Dakota Range I,II												
Foxtail Wind												
Freeborn												
Grand Meadow	27385280	18544510	28649890	26129500	23657310	15706610	11659680	10499470	21519470	27535600	26747540	27341510
Jeffers Wind												
Lake Benton II											19777530	34024920
Mower County												
Nobles Wind Farm	59923500	49217310	65275640	49969240	60948520	39508460	36498350	29061240	52714260	71319780	62561250	57137570
Pleasant Valley	71855720	54544440	76872900	78071650	63970340	48564230	42522010	37378600	68466190	81361960	73124380	76192900
Sub-Total:	268671340	218868440	303390700	272634660	261068840	197501580	166277030	173832420	249351950	325509180	298370610	312908200
Hydro Production												
St. Anthony Falls All	1875000	3102000	3356000	452000	6868000	7444000	8375000	8877000	7556000	6375000	5730000	4169000
St. Croix Falls All	7724000	6256000	9640000	9614000	12180000	11787000	12403000	8594000	13127000	11143000	1232200	12610000
Sub-Total:	9599000	9358000	12996000	10066000	19048000	19231000	20778000	17471000	20683000	17518000	6962200	16779000
Peaking												
Angus Anson 2	3622130	-136890	-116460	-86060	903100	-67370	1969290	-80230	742810	-76650	110500	-56740
Angus Anson 3	-124730	-136890	-116440	-86060	2258790	1132950	2694830	-80230	380430	9390	-107830	500460
Angus Anson 4	-197810	-142140	-173440	7378000	11972100	13511660	23207210	15768110	10435660	12561610	1259150	370670
Black Dog 6	2532890	8558000	5719000	37969000	18596000	26807000	61778000	51193000	21235000	47004000	7454000	4045000
Blue Lake 1	-22500	-69500	-66500	-32500	-28000	-19000	-21500	-29000	-20000	-32500	2000	-93000
Blue Lake 2	500	-69500	-66500	-32500	-28000	-19000	-21500	306000	-20000	-32500	-33000	-93000
Blue Lake 3	897000	-37500	-42500	-32500	-29500	-3500	-15500	149500	-22000	-32000	21000	-83500
Blue Lake 4	-72000	-37500	74500	-32500	-29500	-3500	-15500	187500	-22000	-32000	13000	-83500
Blue Lake 7	-252000	-141000	-156000	1611000	4612000	2645000	16118000	11679000	-129000	3000	-144000	232000
Blue Lake 8	-241000	-188000	-183000	-165000	4609000	2669000	12223000	11546000	-161000	322000	168000	149000
Granite City 1	-19280	-37240	-15280	-11880	-10620	-8100	-5540	-4480	-6360	0	0	0
Granite City 2	-19280	-37240	-15280	-11880	-10620	-8100	-5540	-4480	-6360	0	0	0
Granite City 3	-19280	-37240	-15280	-11880	-10620	-8100	-5540	-4480	-636000	0	0	0
Granite City 4	-19280	-37240	-15280	-11880	-10620	-8100	-5540	-4480	-6360	0	0	0
Inver Hills 1	290000	-104000	-45000	20000	34000	194000	-4000	-73000	-52000	-61000	-76000	-80000
Inver Hills 2	359000	-36000	0	51000	37000	225000	32000	-12000	-2000	1000	-22000	-15000
Inver Hills 3	208000	-47000	-56000	-44000	-33000	211000	311000	-26000	-18000	-33000	-30000	-23000
Inver Hills 4	225000	-40000	-39000	-26000	-20000	233000	83000	-16000	-8000	-23000	-5000	-40000
Inver Hills 5	323000	-47000	-40000	-38000	-33000	204000	290000	-24000	-16000	9000	-10000	-45000
Inver Hills 6	368000	-36000	-26000	-19000	-14000	226000	246000	-10000	-2000	31000	-1000	-34000
Sub-Total:	7838360	7140120	4605540	46387360	42764510	47913840	118852170	90460730	31666820	59618350	8598820	4650390
TOTAL:	2017210220	2073948240	1781374190	1557873970	1942070160	2057170090	2421267620	2083356080	1722639100	1723142490	1747786790	1958271810

*Only Xcel Portion

Monthly Generation
2018-2021

Net kWh	2020 JAN-2020	FEB-2020	MAR-2020	APR-2020	MAY-2020	JUN-2020	JUL-2020	AUG-2020	SEP-2020	OCT-2020	NOV-2020	DEC-2020
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Base Load Coal												
Allen S. King 1	115,957,000.00	(5,560,000.00)	(5,390,000.00)	(5,236,000.00)	(1,912,000.00)	38,133,000.00	277,739,000.00	347,021,000.00	15,241,000.00	(4,747,000.00)	(4,544,100.00)	(5,402,000.00)
Sherburne Co. 1	284,261,000.00	160,228,000.00	217,946,000.00	42,691,000.00	119,373,000.00	168,122,000.00	307,015,000.00	388,728,000.00	229,682,000.00	281,054,000.00	300,563,000.00	338,227,000.00
Sherburne Co. 2	37,092,000.00	169,788,000.00	232,217,000.00	211,680,000.00	104,276,000.00	82,538,000.00	328,043,000.00	439,962,000.00	230,706,000.00	103,923,000.00	147,746,000.00	394,664,000.00
Sherburne Co. 3*	372,699,000.00	230,089,000.00	(4,576,000.00)	(5,129,000.00)	141,243,000.00	191,610,000.00	467,681,000.00	199,538,000.00	453,462,000.00	516,839,000.00	492,350,000.00	376,658,000.00
Sub-Total:	810,009,000.00	554,545,000.00	440,197,000.00	244,006,000.00	362,980,000.00	480,403,000.00	1,380,478,000.00	1,375,249,000.00	929,091,000.00	897,069,000.00	936,114,900.00	1,104,147,000.00
Intermediate												
Black Dog 5/2	158,507,000.00	126,750,000.00	109,316,000.00	95,595,000.00	101,001,000.00	123,958,000.00	161,063,000.00	120,741,000.00	75,557,000.00	99,155,000.00	(706,000.00)	35,369,000.00
High Bridge 7	123,389,520.00	24,908,870.00	22,376,000.00	71,908,000.00	75,848,660.00	71,646,240.00	86,045,450.00	66,724,310.00	43,193,000.00	77,497,000.00	31,448,000.00	75,124,000.00
High Bridge 8	124,007,080.00	86,713,000.00	51,556,580.00	77,821,420.00	80,929,730.00	75,783,520.00	88,464,680.00	67,016,800.00	52,181,000.00	86,247,000.00	24,223,000.00	93,027,000.00
High Bridge 9	140,338,000.00	64,886,000.00	45,282,000.00	91,623,000.00	95,668,000.00	98,328,000.00	116,514,000.00	86,544,740.00	58,341,000.00	99,200,000.00	32,545,000.00	100,739,000.00
Riverside 7	95,067,000.00	80,529,000.00	65,173,000.00	33,663,000.00	36,097,000.00	68,262,000.00	84,645,000.00	74,980,000.00	38,586,000.00	33,447,000.00	57,169,000.00	78,592,000.00
Riverside 9	114,901,000.00	96,533,000.00	80,278,000.00	32,323,000.00	35,741,000.00	55,533,000.00	68,435,000.00	61,781,000.00	16,791,000.00	11,734,000.00	54,388,000.00	82,161,000.00
Riverside 10	81,529,000.00	68,851,000.00	47,130,000.00	31,585,000.00	30,698,000.00	71,240,000.00	87,544,000.00	71,336,000.00	51,712,000.00	50,629,000.00	54,299,000.00	76,052,000.00
Sub-Total:	837,738,600.00	549,170,870.00	421,111,580.00	434,518,420.00	455,983,390.00	564,750,760.00	692,711,130.00	549,123,850.00	336,361,000.00	457,909,000.00	253,366,000.00	541,064,000.00
Biomass / RDF												
Red Wing 1	5,613,180.00	1,752,550.00	7,328,060.00	6,224,760.00	6,701,270.00	5,618,390.00	5,990,020.00	6,162,630.00	6,263,650.00	6,166,200.00	6,285,900.00	5,831,480.00
Red Wing 2	6,895,960.00	3,487,290.00	6,082,450.00	6,696,080.00	7,451,910.00	6,954,450.00	6,653,650.00	6,564,160.00	6,828,750.00	4,776,010.00	6,604,820.00	6,400,080.00
Wilmarth 1	384,410.00	2,952,900.00	5,874,240.00	5,707,000.00	4,658,000.00	5,361,600.00	5,565,380.00	5,780,260.00	3,842,090.00	6,623,880.00	5,519,700.00	5,062,200.00
Wilmarth 2	1,049,965.00	4,900,570.00	5,499,800.00	5,022,420.00	5,497,000.00	5,259,400.00	5,082,600.00	5,496,100.00	3,448,470.00	6,069,160.00	4,994,000.00	4,301,840.00
Sub-Total:	13,943,515.00	13,093,310.00	24,784,550.00	23,650,260.00	24,308,180.00	23,193,840.00	23,291,650.00	24,003,150.00	20,382,960.00	23,635,250.00	23,404,420.00	21,595,600.00
Wind												
Blazing Star I	-	-	-	53,182,666.00	64,382,430.00	59,481,313.00	41,783,992.00	50,294,625.00	71,284,751.00	70,403,870.00	81,858,718.00	74,522,170.00
Blazing Star II	-	-	-	-	-	-	-	-	-	-	-	-
Borders	52,039,352.00	56,530,674.00	62,391,659.00	53,016,160.00	54,351,106.00	56,651,716.00	45,294,886.00	44,132,712.00	62,948,256.00	62,330,845.00	62,540,250.00	61,139,668.00
Courtenay	59,492,423.00	65,129,695.00	67,130,803.00	60,766,198.00	63,703,331.00	62,757,251.00	41,120,529.00	39,116,101.00	54,870,642.00	60,856,243.00	58,446,513.00	69,074,354.00
Community WInd												
Crowned Ridge II												
Dakota Range I,II	-	-	-	-	-	-	-	-	-	-	-	-
Foxtail Wind	22,255,233.00	52,911,395.00	56,268,040.00	54,657,313.00	52,013,269.00	52,370,769.00	43,531,773.00	38,505,339.00	56,689,828.00	56,942,387.00	70,581,342.00	57,751,733.00
Freeborn	-	-	-	-	-	-	-	-	-	-	-	-
Grand Meadow	22,069,750.00	23,991,131.00	16,217,974.00	17,005,173.00	20,144,145.00	19,337,348.00	9,347,706.00	14,262,324.00	14,098,053.00	20,938,019.00	31,403,749.00	15,862,840.00
Jeffers Wind	-	-	-	-	-	-	-	-	-	-	-	-
Lake Benton II	31,487,024.00	43,507,475.00	42,529,453.00	35,304,102.00	34,703,084.00	37,065,976.00	26,123,877.00	33,101,584.00	40,933,165.00	41,434,199.00	44,308,163.00	44,496,917.00
Mower County	-	-	-	-	-	-	-	-	-	-	-	-
Nobles Wind Farm	46,156,543.00	65,708,214.00	68,133,220.00	58,261,695.00	53,741,099.00	62,285,294.00	31,934,890.00	41,472,040.00	49,898,845.00	60,935,222.00	72,586,388.00	56,780,770.00
Pleasant Valley	61,923,746.00	76,482,667.00	76,384,003.00	69,495,369.00	64,710,987.00	69,223,238.00	37,048,585.00	55,168,178.00	64,787,058.00	73,667,172.00	83,171,688.00	57,451,912.00
Sub-Total:	295,424,071.00	384,261,251.00	389,055,152.00	401,688,676.00	407,749,451.00	419,172,905.00	276,186,238.00	316,052,903.00	415,510,598.00	447,507,957.00	504,896,811.00	437,080,364.00
Hydro Production												
St. Anthony Falls All	4,490,000.00	2,548,000.00	6,749,000.00	4,589,000.00	7,094,000.00	6,301,000.00	8,326,000.00	6,747,000.00	7,492,000.00	4,767,000.00	4,119,000.00	3,637,000.00
St. Croix Falls All	12,618,000.00	9,904,000.00	14,126,000.00	13,277,000.00	13,772,000.00	8,221,000.00	9,896,000.00	11,187,000.00	6,613,000.00	10,079,000.00	12,929,000.00	8,000,000.00
Sub-Total:	17,108,000.00	12,452,000.00	20,875,000.00	17,866,000.00	20,866,000.00	14,522,000.00	18,222,000.00	17,934,000.00	14,105,000.00	14,846,000.00	17,048,000.00	11,637,000.00
Peaking												
Angus Anson 2	(164,800.00)	406,650.00	233,620.00	(109,120.00)	598,260.00	884,000.00	4,712,670.00	1,288,330.00	92,930.00	(115,870.00)	193,960.00	(149,750.00)
Angus Anson 3	136,430.00	(128,260.00)	302,240.00	175,440.00	662,260.00	831,000.00	6,865,280.00	2,346,210.00	73,100.00	589,790.00	375,970.00	(149,750.00)
Angus Anson 4	(348,920.00)	(261,590.00)	1,537,810.00	3,927,770.00	9,801,130.00	19,094,000.00	33,702,720.00	19,449,670.00	7,483,330.00	14,167,100.00	5,209,450.00	(310,530.00)
Black Dog 6	13,910,000.00	7,636,000.00	40,085,000.00	26,555,000.00	27,033,000.00	58,822,000.00	72,880,000.00	26,694,000.00	9,668,000.00	49,229,000.00	5,238,000.00	19,539,000.00
Blue Lake 1	(92,500.00)	(93,500.00)	(56,000.00)	46,000.00	(34,500.00)	(29,500.00)	345,500.00	(32,000.00)	(23,000.00)	(48,000.00)	(52,500.00)	(77,500.00)
Blue Lake 2	(92,500.00)	(93,500.00)	(56,000.00)	(46,000.00)	(34,500.00)	(29,500.00)	237,500.00	(32,000.00)	(31,000.00)	(48,000.00)	(52,500.00)	(77,500.00)
Blue Lake 3	(32,000.00)	(34,000.00)	(37,500.00)	(33,500.00)	(28,000.00)	(21,500.00)	309,500.00	(23,000.00)	(1,500.00)	-	(25,000.00)	(36,500.00)
Blue Lake 4	(32,000.00)	(34,000.00)	(37,500.00)	(33,500.00)	(28,000.00)	(21,500.00)	292,500.00	(23,000.00)	(1,500.00)	-	(25,000.00)	(36,500.00)
Blue Lake 7	418,000.00	5,144,000.00	2,504,000.00	7,995,000.00	6,284,000.00	13,281,000.00	33,841,000.00	9,711,000.00	(18,000.00)	(78,000.00)	(58,000.00)	5,873,000.00
Blue Lake 8	213,000.00	(202,000.00)	5,166,000.00	5,166,000.00	3,871,000.00	11,635,000.00	26,788,000.00	7,997,000.00	(7,000.00)	(128,000.00)	(99,000.00)	7,826,000.00
Granite City 1	-	-	-	-	-	-	-	-	-	-	-	-
Granite City 2	-	-	-	-	-	-	-	-	-	-	-	-
Granite City 3	-	-	-	-	-	-	-	-	-	-	-	-
Granite City 4	-	-	-	-	-	-	-	-	-	-	-	-
Inver Hills 1	(103,000.00)	(70,000.00)	(77,000.00)	(68,000.00)	(61,000.00)	264,000.00	2,448,000.00	842,000.00	(58,000.00)	27,000.00	(28,000.00)	(103,000.00)
Inver Hills 2	(36,000.00)	(7,000.00)	(24,000.00)	(18,000.00)	(9,000.00)	202,000.00	551,000.00	70,000.00	(13,000.00)	(10,000.00)	(24,000.00)	(30,000.00)
Inver Hills 3	(45,000.00)	(17,000.00)	(33,000.00)	(28,000.00)	(13,000.00)	623,000.00	1,767,000.00	(7,000.00)	(28,000.00)	71,000.00	(31,000.00)	(40,000.00)
Inver Hills 4	(41,000.00)	(16,000.00)	(30,000.00)	(24,000.00)	(5,000.00)	529,000.00	2,378,000.00	1,157,000.00	(17,000.00)	1,089,000.00	(29,000.00)	(32,000.00)
Inver Hills 5	(44,000.00)	(16,000.00)	(19,000.00)	(18,000.00)	(13,000.00)	213,000.00	1,291,000.00	645,000.00	(28,000.00)	198,000.00	(31,000.00)	(38,000.00)
Inver Hills 6	(35,000.00)	24,000.00	(10,000.00)	130,000.00	-	750,000.00	2,295,000.00	1,105,000.00	(7,000.00)	225,000.00	(20,000.00)	(30,000.00)
Sub-Total:	13,610,710.00	12,237,800.00	49,448,670.00	43,617,090.00	48,023,650.00	107,026,000.00	190,704,670.00	71,188,210.00	17,084,360.00	65,168,020.00	10,542,380.00	32,126,970.00
TOTAL:	1987833896	1525760231	1345471952	1165346446	1319910671	1609068505	2581593688	2353551113	1732534918	1,906,135,227.00	1,745,372,511.00	2,147,650,934.00

*Only Xcel Portion

Monthly Generation
2018-2021

Net kWh	2021 JAN-2021 JAN	FEB-2021 FEB	MAR-2021 MAR	APR-2021 APR	MAY-2021 MAY	JUN-2021 JUN	JUL-2021 JUL	AUG-2021 AUG	SEP-2021 SEP	OCT-2021 OCT	NOV-2021 NOV	DEC-2021 DEC
Base Load Coal												
Allen S. King 1	(3,612,000.00)	303,843,000.00	7,728,000.00	(3,947,000.00)	(3,338,000.00)	272,183,000.00	310,226,100.00	-	-	-	-	-
Sherburne Co. 1	228,744,000.00	328,927,000.00	(4,591,000.00)	(1,925,000.00)	49,906,000.00	308,831,000.00	-68,880,497.22	-	-	-	-	-
Sherburne Co. 2	264,541,000.00	328,887,000.00	305,808,000.00	207,192,000.00	349,344,000.00	236,846,000.00	375,276,502.78	-	-	-	-	-
Sherburne Co. 3*	432,602,000.00	490,677,000.00	201,680,000.00	131,344,000.00	(8,878,000.00)	369,174,000.00	384,648,000.00	-	-	-	-	-
Sub-Total:	922,275,000.00	1,452,334,000.00	510,625,000.00	332,664,000.00	387,034,000.00	1,187,034,000.00	1,001,270,105.56					
Intermediate												
Black Dog 5/2	115,617,000.00	109,168,000.00	57,175,000.00	156,929,000.00	155,913,000.00	176,867,000.00	430,386,580.00	-	-	-	-	-
High Bridge 7	69,790,000.00	68,084,000.00	43,102,000.00	36,551,320.00	89,688,530.00	89,756,420.00	133,896,884.72	-	-	-	-	-
High Bridge 8	94,646,520.00	86,264,980.00	63,127,000.00	35,352,790.00	90,610,680.00	88,347,050.00	134,195,968.06	-	-	-	-	-
High Bridge 9	97,763,000.00	85,729,000.00	61,502,000.00	43,129,000.00	112,774,300.00	122,526,000.00	170,844,398.89	-	-	-	-	-
Riverside 7	61,598,000.00	(2,000.00)	(2,000.00)	(2,000.00)	(2,000.00)	16,688,000.00	(43,707,622.22)	-	-	-	-	-
Riverside 9	69,067,000.00	(690,000.00)	(588,000.00)	(385,000.00)	(592,000.00)	19,767,000.00	79,201,500.00	-	-	-	-	-
Riverside 10	58,146,000.00	(1,339,000.00)	(1,282,000.00)	(909,000.00)	(1,410,000.00)	11,487,000.00	74596336.11	-	-	-	-	-
Sub-Total:	566,627,520.00	347,214,980.00	223,034,000.00	270,666,110.00	446,982,510.00	525,438,470.00	979,414,045.56					
Biomass / RDF												
Red Wing 1	6,593,670.00	(321,750.00)	(281,660.00)	3,387,780.00	6,035,630.00	5,546,660.00	5,929,950.00	-	-	-	-	-
Red Wing 2	7,212,180.00	3,538,470.00	4,497,700.00	7,236,830.00	6,893,920.00	7,028,760.00	6,288,800.00	-	-	-	-	-
Wilmarth 1	2,127,210.00	2,704,220.00	3,290,200.00	5,264,900.00	4,168,950.00	3,854,480.00	6,302,000.00	-	-	-	-	-
Wilmarth 2	2,493,980.00	2,133,810.00	5,478,240.00	5,393,070.00	5,060,520.00	4,528,340.00	6,012,750.00	-	-	-	-	-
Sub-Total:	18,427,040.00	8,054,750.00	12,984,480.00	21,282,580.00	22,159,020.00	20,958,240.00	24,533,500.00					
Wind												
Blazing Star I	68,692,120.00	50,909,348.00	75,086,438.00	83,681,049.00	65,581,191.00	52,709,112.00	43,309,142.91	-	-	-	-	-
Blazing Star II	10,478,797.00	47,023,414.00	73,074,673.00	80,937,759.00	66,832,021.00	53,686,300.00	44,830,910.60	-	-	-	-	-
Borders	48,438,595.00	49,422,050.00	63,931,496.00	55,738,540.00	38,045,491.00	45,791,885.00	38,504,301.61	-	-	-	-	-
Courtenay	54,222,785.00	42,925,998.00	75,947,694.00	73,840,675.00	62,362,269.00	42,231,285.00	44,349,268.44	-	-	-	-	-
Community WInd	8,204,230.44	6,902,241.89	11,250,886.19	10,983,315.11	9,390,276.91	7,119,458.19	6,053,185.49	-	-	-	-	-
Crowned Ridge II	74,979,416.57	55,685,379.73	87,636,876.63	88,152,551.25	70,339,753.67	53,396,371.15	51,627,688.59	-	-	-	-	-
Dakota Range I,II	-	-	-	-	-	-	-	-	-	-	-	-
Foxtail Wind	39,639,781.00	39,162,393.00	54,768,673.00	64,457,292.00	52,637,854.00	37,239,655.00	44,016,578.20	-	-	-	-	-
Freeborn	-	-	-	-	7,865,501.07	45,299,974.89	27,621,335.90	-	-	-	-	-
Grand Meadow	17,508,162.00	20,478,085.00	15,661,108.00	20,343,339.00	22,876,291.00	12,538,140.00	6,398,221.94	-	-	-	-	-
Jeffers Wind	13,171,065.63	12,350,706.26	19,037,925.00	16,543,221.88	15,071,181.25	11,132,565.63	8,927,296.88	-	-	-	-	-
Lake Benton II	42,499,292.00	29,647,366.00	46,269,904.00	45,475,994.00	37,457,948.00	28,393,475.00	23,895,378.00	-	-	-	-	-
Mower County	-	-	11,411,190.32	30,590,799.05	30,279,055.20	19,598,220.66	10,383,787.79	-	-	-	-	-
Nobles Wind Farm	33,649,628.00	21,156,136.00	22,189,904.00	34,384,141.00	30,148,478.00	26,982,833.00	22,579,183.75	-	-	-	-	-
Pleasant Valley	58,764,856.00	59,735,235.00	76,858,376.00	68,890,727.00	62,889,277.00	42,743,454.00	23,791,593.45	-	-	-	-	-
Sub-Total:	470,248,728.64	435,398,352.88	633,125,144.14	674,019,403.30	571,776,588.09	478,862,729.52	396,287,873.54					
Hydro Production												
St. Anthony Falls All	3,520,000.00	3,427,000.00	6,022,000.00	6,517,000.00	8,577,000.00	4,481,000.00	3,045,004.17	-	-	-	-	-
St. Croix Falls All	8,314,000.00	5,636,000.00	12,181,000.00	12,825,000.00	11,441,000.00	6,153,000.00	15,624,000.83	-	-	-	-	-
Sub-Total:	11,834,000.00	9,063,000.00	18,203,000.00	19,342,000.00	20,018,000.00	10,634,000.00	18,669,005.00					
Peaking												
Angus Anson 2	11,690.00	6,109,900.00	325,120.00	(111,120.00)	797,680.00	2,730,990.00	3,326,346.94	-	-	-	-	-
Angus Anson 3	23,610.00	4,518,800.00	(104,450.00)	481,890.00	1,133,230.00	3,609,960.00	4,247,396.94	-	-	-	-	-
Angus Anson 4	(310,240.00)	(354,440.00)	6,772,460.00	3,144,540.00	7,873,360.00	30,005,090.00	29,696,846.67	-	-	-	-	-
Black Dog 6	1,182,000.00	(365,000.00)	17,302,000.00	58,542,000.00	28,574,000.00	-	70,843,463.33	-	-	-	-	-
Blue Lake 1	(52,000.00)	990,500.00	(62,000.00)	(41,500.00)	(30,000.00)	(33,000.00)	13.89	-	-	-	-	-
Blue Lake 2	(52,000.00)	2,580,500.00	29,000.00	(41,500.00)	(30,000.00)	212,000.00	13.89	-	-	-	-	-
Blue Lake 3	(11,500.00)	2,593,500.00	(30,000.00)	(28,000.00)	(23,000.00)	131,500.00	13.89	-	-	-	-	-
Blue Lake 4	(19,500.00)	(45,500.00)	(26,000.00)	(28,000.00)	(23,000.00)	131,500.00	13.89	-	-	-	-	-
Blue Lake 7	(146,000.00)	(135,000.00)	1,727,000.00	3,747,000.00	14,152,000.00	36,581,000.00	8,726,148.33	-	-	-	-	-
Blue Lake 8	(222,000.00)	(206,000.00)	119,000.00	4,326,000.00	13,839,000.00	33,635,000.00	9,552,149.17	-	-	-	-	-
Granite City 1	-	-	-	-	-	-	-	-	-	-	-	-
Granite City 2	-	-	-	-	-	-	-	-	-	-	-	-
Granite City 3	-	-	-	-	-	-	-	-	-	-	-	-
Granite City 4	-	-	-	-	-	-	-	-	-	-	-	-
Inver Hills 1	(83,000.00)	4,838,000.00	(81,000.00)	688,000.00	1,101,000.00	2,563,000.00	5,186,633.89	-	-	-	-	-
Inver Hills 2	(22,000.00)	4,359,000.00	(23,000.00)	674,000.00	683,000.00	2,319,000.00	-	-	-	-	-	-
Inver Hills 3	(28,000.00)	4,466,000.00	(35,000.00)	805,000.00	867,000.00	3,511,000.00	6,119,417.22	-	-	-	-	-
Inver Hills 4	(26,000.00)	4,836,000.00	(27,000.00)	1,519,000.00	1,263,000.00	3,657,000.00	6,120,450.56	-	-	-	-	-
Inver Hills 5	(33,000.00)	4,663,000.00	(37,000.00)	926,000.00	671,000.00	3,277,000.00	4,984,050.28	-	-	-	-	-
Inver Hills 6	(22,000.00)	5,003,000.00	(24,000.00)	954,000.00	574,000.00	3,762,000.00	5,499,417.22	-	-	-	-	-
Sub-Total:	190,060.00	43,852,260.00	25,825,130.00	75,557,310.00	71,422,270.00	126,093,040.00	154,302,376.11					
TOTAL:	1,989,602,348.64	2,295,917,342.88	1,423,796,754.14	1,393,531,403.30	1,519,392,388.09	2,349,020,479.52	2,574,476,905.76					

*Only Xcel Portion

Rate Base 2018-2021

	2018	2019	2020
Demand Prod MN Jur %	**87.6880%**	**86.9990%**	**87.2741%**
Energy Prod MN Jur %	**87.1688%**	**86.6960%**	**86.7579%**
Demand MN Co %	**84.2615%**	**83.9342%**	**83.7498%**
Demand After Interchange %	**73.8872%**	**73.0219%**	**73.0919%**
Energy After Interchange %	**73.4497%**	**72.7676%**	**72.8195%**

Plant Description	2018 Rate Base	2018 MN Jurisdiction Rate Base	2019 Rate Base	2019 MN Jurisdiction Rate Base	2020 Rate Base	2020 MN Jurisdiction Rate Base
Hydro Production						
Hennepin ISD**	$ 10,621,077	$ 7,847,619	$ 9,939,930	$ 7,258,327	$ 8,915,896	$ 6,516,796
Lower Dam**	$ -	$ -		$ -		$ -
St Croix Falls*	$ 1,758,678	$ 1,299,438	$ 1,612,484	$ 1,177,467	$ 1,315,963	$ 961,862
Upper Dam**	$ 1,281,414	$ 946,801	$ 1,166,463	$ 851,773	$ 1,052	$ 769
Sub-Total:	$ 13,661,169	$ 10,093,859	$ 12,718,877	$ 9,287,567	$ 10,232,911	$ 7,479,427
Other Production						
Alliant Tech	$ -	$ -		$ -		$ -
Black Dog	$ 181,286,817	$ 133,947,797	$ 174,599,074	$ 127,495,587	$ 173,181,056	$ 126,581,297
Blue Lake	$ 22,636,749	$ 16,725,665	$ 20,694,650	$ 15,111,629	$ 21,762,493	$ 15,906,616
Blazing Star I					$ 271,251,401	$ 197,524,048
Blazing Start II						
Border Wind	$ 148,105,211	$ 108,782,890	$ 137,480,746	$ 100,041,431	$ 126,351,830	$ 92,008,833
Community Wind						
Courtenay Wind	$ 192,609,052	$ 141,470,845	$ 175,537,822	$ 127,734,650	$ 159,119,992	$ 115,870,461
Crowned Ridge II Wind						
Dakota Range I,II Wind						
Foxtail Wind					$ 185,062,265	$ 134,761,507
Freeborn Wind						
Grand Meadow Wind	$ 72,324,874	$ 53,122,431	$ 67,887,244	$ 49,399,914	$ 61,378,576	$ 44,695,602
Granite City	$ (2,471,393)	$ (1,826,044)	$ (2,456,644)	$ (1,793,889)	$ (2,764,758)	$ (2,020,814)
High Bridge	$ 223,371,066	$ 165,042,680	$ 225,439,532	$ 164,620,263	$ 221,220,571	$ 161,694,284
Inver Hills	$ 3,699,772	$ 2,733,659	$ 4,167,088	$ 3,042,887	$ 2,598,887	$ 1,899,576
Jeffers Wind						
Key City*	$ (2,357,749)	$ (1,742,075)	$ (2,192,589)	$ (1,601,070)	$ (2,522,843)	$ (1,843,993)
Lake Benton 75*	$ 624,558	$ 461,468	$ 653,814	$ 477,428	$ 606,857	$ 443,563
Lake Benton Wind*	$ 30,787,797	$ 22,748,249	$ 166,450,664	$ 121,545,462	$ 138,725,774	$ 101,397,282
Mower County Wind						
Nobles Wind	$ 200,038,972	$ 146,928,102	$ 188,369,913	$ 137,072,254	$ 175,793,965	$ 128,012,373
Pleasant Valley Wind	$ 185,720,618	$ 136,411,308	$ 171,531,363	$ 124,819,246	$ 157,610,281	$ 114,771,096
Riverside	$ 169,853,751	$ 125,500,222	$ 162,657,540	$ 118,775,650	$ 168,565,769	$ 123,207,897
United Hospital*	$ (46,424)	$ (34,301)	$ (24,672)	$ (18,016)	$ (11,943)	$ (8,729)
West Faribault*	$ 613,704	$ 453,449	$ 617,530	$ 450,932	$ 617,128	$ 451,071
Wind Storage*	$ 1,057,307	$ 781,215	$ 869,073	$ 634,613	$ 615,618	$ 449,967
Angus Anson	$ 25,752,888	$ 19,028,094	$ 27,686,594	$ 20,217,281	$ 27,553,262	$ 20,139,198
Sub-Total:	$ 1,453,607,572	$ 1,070,535,654	$ 1,519,968,743	$ 1,108,026,253	$ 1,886,716,181	$ 1,375,941,134
Steam Production						
Allen S King	$ 319,755,762	$ 236,258,657	$ 295,849,112	$ 216,034,686	$ 273,443,381	$ 199,864,919
Black Dog	$ 707,976	$ 523,104	$ 3,258,419	$ 2,379,360	$ (9,040,119)	$ (6,607,593)
High Bridge	$ (26,865)	$ (19,850)	$ (32,417)	$ (23,672)	$ (37,916)	$ (27,714)
Minn Valley*	$ (10,929,646)	$ (8,075,612)	$ (9,775,022)	$ (7,137,909)	$ (9,566,645)	$ (6,992,441)
Red Wing	$ 9,898,564	$ 7,313,774	$ 7,948,393	$ 5,804,069	$ 8,658,343	$ 6,328,546
Riverside	$ 7,068,998	$ 5,223,086	$ 6,827,147	$ 4,985,314	$ 6,569,680	$ 4,801,903
Sherburne	$ 328,993,549	$ 243,084,201	$ 301,852,431	$ 220,418,424	$ 280,570,981	$ 205,074,616
Wilmarth	$ 8,812,711	$ 6,511,467	$ 7,599,400	$ 5,549,227	$ 6,154,639	$ 4,498,542
Sub-Total:	$ 664,281,047	$ 490,818,826	$ 613,527,463	$ 448,009,500	$ 556,752,344	$ 406,940,778
Total Production:	$ 2,131,549,788.45	$ 1,571,448,339.15	$ 2,146,215,083.23	$ 1,565,323,321.23	$ 2,453,701,436.06	$ 1,790,361,340.13

*No generation at these locations
**Saint Anthony Falls

Unit Outage Information

Unit	Outage Category	Primary Reason for Outage	Outage Dates Start	End	Duration (Days)	Equipment that Resulted in the Forced Outage	Description of Equipment Failure	Change in Energy Costs ($s)	Steps Taken to Alleviate Reoccurrence
								[Protected Data Begins	
JANUARY 2018									
King_G1	Forced	Reheater plugged derate	01/21/2018	01/24/2018	**3**	First Reheater Slagging Or Fouling	Fouling/plugging of the Reheater section of the boiler resulted in high differential pressure.		The contributing factors were; extended high load operation, higher sodium content coal and higher FEGT operations. Actions taken; operational procedures are in place to ensure that an adequate load reduction and subsequent slag shed occur during extended high load operations. Fuels is restricting the amount of high sodium coal delivered.
SHERCO_G1	Forced	Unit derate to 530 MWn due to cleaning on U/L fields	01/01/2018	01/02/2018	**1**	Scrubber Modules	Ash buildup on fields, spargers, and other components resulting in inefficient particulate removal and high stack opacity. Aging of equipment requires regular maintenance. Unit needed to be derated to perform other normal cleaning functions such as flushing, high voltage cleaning, and manual nightly cleaning. Upgrades to emissions control equipment have resulted in the need for more aggressive cleaning in addition to normal equipment maintenance.		Cleaning frequency for each scrubber module (12 total per unit) has increased from once a year to once every 8 months. This strategy will still require some smaller derates to complete all required cleaning evolutions but these smaller derates should be limited mainly to the spring and fall when energy prices are historically less. We are testing a chemical additive in one of the modules that may reduce the amount of time a module has to be out of service for manual cleaning.
SHERCO_G1	Forced	Derate to HOL of 420 MW net. (7) scrubber module operation for HV cleaning and flushing.	01/06/2018	01/08/2018	**2**	Scrubber Modules	Ash buildup on fields, spargers, and other components resulting in inefficient particulate removal and high stack opacity. Aging of equipment requires regular maintenance. Unit needed to be derated to perform other normal cleaning functions such as flushing, high voltage cleaning, and manual nightly cleaning. Upgrades to emissions control equipment have resulted in the need for more aggressive cleaning in addition to normal equipment maintenance.		Cleaning frequency for each scrubber module (12 total per unit) has increased from once a year to once every 8 months. This strategy will still require some smaller derates to complete all required cleaning evolutions but these smaller derates should be limited mainly to the spring and fall when energy prices are historically less. We are testing a chemical additive in one of the modules that may reduce the amount of time a module has to be out of service for manual cleaning.
SHERCO_G1	Forced	Derate to HOL. Scrubber module HV cleaning, flushing and NOx reduction.	01/27/2018	01/29/2018	**2**	Scrubber Modules	Ash buildup on fields, spargers, and other components resulting in inefficient particulate removal and high stack opacity. Aging of equipment requires regular maintenance. Unit needed to be derated to perform other normal cleaning functions such as flushing, high voltage cleaning, and manual nightly cleaning. Upgrades to emissions control equipment have resulted in the need for more aggressive cleaning in addition to normal equipment maintenance.		Cleaning frequency for each scrubber module (12 total per unit) has increased from once a year to once every 8 months. This strategy will still require some smaller derates to complete all required cleaning evolutions but these smaller derates should be limited mainly to the spring and fall when energy prices are historically less. We are testing a chemical additive in one of the modules that may reduce the amount of time a module has to be out of service for manual cleaning.
SHERCO_G2	Forced	Derate due to 5 coal mill operation.	01/09/2018	01/13/2018	**4**	24 Coal Mill	While 23 mill was out of service for a gearbox inspection, 24 coal mill removed from service due to excessive spillage.		Mill floor clamp ring segment came loose and lodged under journal. The segment was replaced and bolted back into place. Bolts likely failed due to mechanical fatigue or possibly due to tramp metal going through the mill
SHERCO_G2	Forced	Derate to HOL. Scrubber module HV cleaning, flushing and NOx reduction.	01/27/2018	01/29/2018	**2**	Scrubber Modules	Ash buildup on fields, spargers, and other components resulting in inefficient particulate removal and high stack opacity. Aging of equipment requires regular maintenance. Unit needed to be derated to perform other normal cleaning functions such as flushing, high voltage cleaning, and manual nightly cleaning. Upgrades to emissions control equipment have resulted in the need for more aggressive cleaning in addition to normal equipment maintenance.		Cleaning frequency for each scrubber module (12 total per unit) has increased from once a year to once every 8 months. This strategy will still require some smaller derates to complete all required cleaning evolutions but these smaller derates should be limited mainly to the spring and fall when energy prices are historically less. We are testing a chemical additive in one of the modules that may reduce the amount of time a module has to be out of service for manual cleaning.
SHERC3	Forced	31 Condensate Pump Issues. Pump removed from service.	01/01/2018	01/31/2018	**31**	31 Condensate Pump	The motor had been removed to resolve a chronic leak, upon re-install the pump failed to deliver flow. The pump shaft failed along with first stage impeller key resulting in additional damage to the pump.		Pump was rebuilt by a vendor including modifications to change the pump head. A new spare pump is being purchased from the OEM to minimize future down time.
French_1	Maintenance	U1 Boiler Cleaning and Inspection	01/26/2018	01/30/2018	**3**	Boiler	Preventative maintenance outage for periodic cleaning and inspection.		Preventative maintenance cycle to periodically address boiler fouling, fuel delivery system and other components to aid reliable operation.
Redwing_2	Forced	Generator Rewind Needed	01/01/2018	01/31/2018	**30**	Main Generator	Generator synched out of phase due to a delayed closure of the output control breaker.		Generator output breaker replaced and the Generator was rewound.
CCRiverside1	Forced	Hydrogen leak on U7 steam turbine generator required unit shut down and de-gas of generator for repairs	01/04/2018	01/08/2018	**4**	Unit 7 Steam Turbine Generator, NOTE: CCRiverside 1 refers to Unit 9 Combustion Turbine plus 1/2 of Unit 7 Steam Turbine. Steam turbine is common to both combustion turbines.	Following the Fall 2017 Major Steam Turbine Overhaul a hydrogen leak developed on the generator end bells. Thus, the steam turbine and generator were unavailable until repaired which also makes both combustion turbines unavailable.		Generator end bells were inspected and re-secured , no leakage issues experienced since.
CCRiverside2	Forced	Hydrogen leak on U7 steam turbine generator required unit shut down and de-gas of generator for repairs	01/04/2018	01/08/2018	**4**	Unit 7 Steam Turbine Generator, NOTE: CCRiverside 2 refers to Unit 10 Combustion Turbine plus 1/2 of Unit 7 Steam Turbine. Steam turbine is common to both combustion turbines.	Same event as Riverside1, above.		Same event as Riverside1, above. Corrective actions to unit 7 address both Riverside1 and Riverside2 events.
King_G1	Forced	Unit to come offline to repair 17A HP Feedwater Heater leak	01/06/2018	01/07/2018	**1**	17A Feedwater Heater	Four previously install tube plugs were leaking		The leaking plugs were replaced with welded plugs.

Unit Outage Information

Unit	Outage Category	Primary Reason for Outage	Outage Dates Start	Outage Dates End	Duration (Days)	Equipment that Resulted in the Forced Outage	Description of Equipment Failure	Change in Energy Costs ($s)	Steps Taken to Alleviate Reoccurrence
									[Protected Data Begins
King_G1	Forced	Reheater plugged - offline to clean	01/24/2018	01/27/2018	**3**	First Reheater Slagging Or Fouling	First Reheater Slagging Or Fouling.		The contributing factors were; extended high load operation, higher sodium content coal and higher FEGT operations. Actions taken; operational procedures are in place to ensure that an adequate load reduction and subsequent slag shed occur during extended high load operations. Fuels is restricting the amount of high sodium coal delivered.
FEBRUARY 2018									
SHERCO_G1	Forced	Circulating Water Systems	02/11/2018	02/22/2018	**11**	11 Boiler Circulating Water Pump Motor	Motor Electrical Failure		This motor was scheduled to be replaced with a rewound motor during the overhaul but failed two weeks early. Replacement occurred during the overhaul.
SHERCO_G2	Forced	Wet Scrubbers	02/10/2018	02/12/2018	**2**	Scrubber Modules	Ash buildup on fields, spargers, and other components resulting in inefficient particulate removal and high stack opacity. Aging of equipment requires regular maintenance. Unit needed to be derated to perform other normal cleaning functions such as flushing, high voltage cleaning, and manual nightly cleaning. Upgrades to emissions control equipment have resulted in the need for more aggressive cleaning in addition to normal equipment maintenance.		Cleaning frequency for each scrubber module (12 total per unit) has increased from once a year to once every 8 months. This strategy will still require some smaller derates to complete all required cleaning evolutions but these smaller derates should be limited mainly to the spring and fall when energy prices are historically less. We are testing a chemical additive in one of the modules that may reduce the amount of time a module has to be out of service for manual cleaning.
SHERCO_G2	Forced	Wet Scrubbers	02/24/2018	02/25/2018	**2**	Scrubber Modules	Ash buildup on fields, spargers, and other components resulting in inefficient particulate removal and high stack opacity. Aging of equipment requires regular maintenance. Unit needed to be derated to perform other normal cleaning functions such as flushing, high voltage cleaning, and manual nightly cleaning. Upgrades to emissions control equipment have resulted in the need for more aggressive cleaning in addition to normal equipment maintenance.		Cleaning frequency for each scrubber module (12 total per unit) has increased from once a year to once every 8 months. This strategy will still require some smaller derates to complete all required cleaning evolutions but these smaller derates should be limited mainly to the spring and fall when energy prices are historically less. We are testing a chemical additive in one of the modules that may reduce the amount of time a module has to be out of service for manual cleaning.
SHERC3	Forced	Condensate System	02/01/2018	02/28/2018	**27**	31 Condensate Pump	The motor had been removed to resolve a chronic leak, upon re-install the pump failed to deliver flow. The pump shaft failed along with first stage impeller key resulting in additional damage to the pump.		Pump was rebuilt by a vendor including modifications to change the pump head. A new spare pump is being purchased from the OEM to minimize future down time.
Wilmart_1	Forced	Slag and Ash Removal	02/11/2018	02/27/2018	**15**	C-9, DC conveyor, RDF Scalper	Main RDF fuel supply to the plant broken pans causing scalper to be unable to run.		Repaired broken pans on scalper. Scheduled for replacement in 2022
Wilmart_2	Forced	Boiler Fuel Supply to Bunker	02/19/2018	02/27/2018	**7**	RDF Scalper	Main RDF fuel supply to the plant broken pans causing scalper to be unable to run.		Repaired broken pans on scalper. Scheduled for replacement in 2022
King_G1	Forced	Boiler Tube Fireside Slagging or Fouling	02/05/2018	02/10/2018	**5**	First Reheater Slagging Or Fouling	First Reheater Slagging Or Fouling		The contributing factors were; extended high load operation, higher sodium content coal and higher FEGT operations. Actions taken; operational procedures are in place to ensure that an adequate load reduction and subsequent slag shed occur during extended high load operations. Fuels is restricting the amount of high sodium coal delivered.
French_1	Forced	Generator	02/06/2018	02/28/2018	**22**	Generator	The rotor windings retaining blocks were breaking causing high vibrations.		All retaining blocks on the generator rotor were replaced.
Redwing_2	Forced	Generator	02/01/2018	02/28/2018	**27**	Main Generator	Generator synched out of phase due to a delayed closure of the output control breaker.		Generator output breaker replaced and the Generator was rewound.
MARCH 2018									
SHERCO_G2	Forced	Boiler Air and Gas Systems	03/01/2018	03/02/2018	**1**	24 ID Fan	Broken inlet damper linkage. The threaded stud which connects the west inlet damper clevis to the damper operating mechanism had broken just where the thread met the existing weld. It was noted that there had been an existing crack evidenced by oxidation. Due to years of operation, constant motion, the stud failed. Condition based wear likely due to cycling/load follow operations.		Thorough inspection of ID fan linkages will be performed during the 2019 overhaul. Inspections were completed on the Unit 1 linkages during the 2018 overhaul.
SHERCO_G2	Forced	Boiler Fuel Supply from Bunkers to Boiler	03/12/2018	03/13/2018	**1**	22 Coal Mill	Mill and transport line fire. Damage to transport line gaskets, classifier bearings, classifier rotor, mill floor, and mill liners. Derate until 21 mill which had been out for maintenance could be restored.		Classifier was completely rebuilt, piping gaskets were replaced, and mill liners were repaired/replaced. Hot spots, which ignite mill fires, typically occur near areas of worn liners. Plant plans to continually to inspect all mills annually as a minimum.
SHERCO_G2	Forced	Boiler Fuel Supply from Bunkers to Boiler	03/19/2018	03/20/2018	**2**	21 Coal Feeder motor	Failed clutch on the motor. Loss of redundancy with 22 mill out of service following fire event.		Clutch was replaced.
SHERCO_G2	Forced	Boiler Fuel Supply from Bunkers to Boiler	03/26/2018	03/31/2018	**5**	25 Coal Mill	Bowl hub cover had come loose and pyrite skirt was badly damaged due to tramp metal going through the mill. Repairs completed while 22 Mill was unavailable due to repairs sustained during the fire event resulting in only 5 coal mills being available.		The bowl hub cover and the pyrite skirts were repaired. Sherco Coal Yard is taking steps to identify areas that may have tramp iron and to segregate from rest of coal pile.
SHERC3	Forced	Condensate System	03/01/2018	03/31/2018	**30**	31 Condensate Pump	The motor had been removed to resolve a chronic leak, upon re-install the pump failed to deliver flow. The pump shaft failed along with first stage impeller key resulting in additional damage to the pump.		Pump was rebuilt by a vendor including modifications to change the pump head. A new spare pump is being purchased from the OEM to minimize future down time.

Unit Outage Information

Unit	Outage Category	Primary Reason for Outage	Outage Dates Start	Outage Dates End	Duration (Days)	Equipment that Resulted in the Forced Outage	Description of Equipment Failure	Change in Energy Costs ($s)	Steps Taken to Alleviate Reoccurrence
									[Protected Data Begins
Redwing_2	Forced	Generator	03/01/2018	03/31/2018	**30**	Main Generator	Generator synched out of phase due to a delayed closure of the output control breaker.		Generator output breaker replaced and the Generator was rewound.
APRIL 2018									
SHERCO_G2	Forced	5 Mill Coal operation due to high door temps on 25 Mill	04/01/2018	04/28/2018	**27**	25 Coal Mill	Bowl hub cover had come loose and pyrite skirt was badly damaged due to tramp metal going through the mill. Repairs completed while 22 Mill was unavailable due to repairs sustained during the fire event resulting in only 5 coal mills being available. 25 mill returned on 4/13/2018 at which time 27 mill was taken out for overhaul as we anticipated it would fail prior to 22 mill return.		The bowl hub cover and the pyrite skirts were repaired. Sherco Coal Yard is taking steps to identify areas that may have tramp iron and to segregate from rest of coal pile.
SHERC3	Forced	31 Condensate Pump Issues. Pump removed from service.	04/01/2018	04/30/2018	**29**	31 Condensate Pump	The motor had been removed to resolve a chronic leak, upon re-install the pump failed to deliver flow. The pump shaft failed along with first stage impeller key resulting in additional damage to the pump.		Pump was rebuilt by a vendor including modifications to change the pump head. A new spare pump is being purchased from the OEM to minimize future down time.
Anson_G4	Forced	LCI power supply	04/18/2018	04/21/2018	**3**	Power Supply	Complete Loss of functionality.		Power Supply Replaced.
Redwing_2	Forced	Generator Rewind Needed	04/01/2018	04/30/2018	**29**	Main Generator	Generator synched out of phase due to a delayed closure of the output control breaker.		Generator output breaker replaced and the Generator was rewound.
MAY 2018									
King_G1	Forced	High Pressure Turbine	05/29/2018	05/31/2018	**2**	High Pressure Turbine	Turbine over thrust event which occurred during system testing.		Complete review of logic associated with turbine trip restoration for consistency with Alstom guidance specifically as it pertains to turbine flow paths. Placed moratorium on the practice of relatching the steam turbine following a turbine trip from 3600 RPM.
CCRiverside1	Forced	Circulating Water Systems	05/25/2018	05/31/2018	**6**	#6 Circulating Water Pump	Circulating Water Pump developed high vibrations requiring the pump to be removed for inspection. With warmer river temperatures (above 50 F) condenser vacuum can not be maintained when running both Riverside units. Therefore, one CT must be held out of service.		Condition based wear on #6 Circulating Water Pump which was sent off site for inspection and repair. Bearings were replaced. Going forward, each of the two circulating water pumps will be overhauled every two years during the winter months to minimize impact of pump outages.
SHERCO_G1	Forced	Boiler Fuel Supply from Bunkers to Boiler	05/18/2018	05/30/2018	**12**	12 PA Fan	Unit derate to high vibration until troubleshooting efforts could be completed.		Rotor indications were blend-grinded, four of which required weld repair. Replaced outboard bearing. Corrected inlet vane rubbing issue, the vanes were removed and the shafts were trimmed. Tightened loose motor hold-down bolts.
SHERCO_G1	Forced	Boiler Fuel Supply from Bunkers to Boiler	05/30/2018	05/31/2018	**2**	12 PA Fan	Unit off-line to repair fan. Completed NDE inspections of the rotor, inspections of the inlet vanes, outlet vanes, ductwork, fan inlets (pantlegs), inlet cones,etc. Discovered several indications on the rotor (likely original fabrication defects). 4 of the 12 inlet vanes on the inboard side of the fan were threaded too far into the collar allowing the inlet vane shafts to rub on the main fan shaft.		Rotor indications were blend-grinded, four of which required weld repair. Replaced outboard bearing. Corrected inlet vane rubbing issue, the vanes were removed and the shafts were trimmed. Tightened loose motor hold-down bolts.
SHERCO_G2	Forced	Boiler Fuel Supply from Bunkers to Boiler	05/01/2018	05/31/2018	**31**	27 Coal Mill	27 coal mill taken out of service to complete needed mill overhaul while 22 coal mill was out of service for fire event repairs		This was not a failure. 27 mill was taken out for a needed overhaul while 22 was out for repairs to avoid any damage which would extend out of service time and increase cost.
SHERCO_G2	Forced	Boiler Tube Leaks	05/17/2018	05/19/2018	**2**	Waterwall leak near B23	Tube adjacent to the west offset tube for wallblower B23 brought the unit offline due to a leak. The tube leak was repaired with the through-wall repair strategy.		We will inspect tubes near wall blowers for thinning and cracking during the 2019 overhaul.
SHERC3	Forced	Condensate System	05/01/2018	05/04/2018	**4**	31 Condensate Pump	The motor had been removed to resolve a chronic leak, upon re-install the pump failed to deliver flow. The pump shaft failed along with first stage impeller key resulting in additional damage to the pump.		Pump was rebuilt by a vendor including modifications to change the pump head. A new spare pump is being purchased from the OEM to minimize future down time.
SHERC3	Forced	Boiler Fuel Supply from Bunkers to Boiler	05/04/2018	05/10/2018	**6**	310 Coal Mill	Discovered one rotating throat segment where all three bolts had failed and the lower support clip had broken off, allowing it to rub against the mill wall. They also found several other sheared rotating throat bolts that all required repair. In addition to the bolts, they found that many of the lower support clips under the rotating throat assembly had cracked welds where they attach to the extension ring.		Repaired failed rotating throat bolts, replaced lower support clips and added additional weld to strengthen the connection to the ring seat. The OEM has proposed a design modification that should mitigate these bolt and clip failures. This design modification will be installed in the next mill overhaul.
Anson_G3	Forced	Miscellaneous (Gas Turbine)	05/25/2018	05/31/2018	**7**	Turbine Vibration	High Vibration due condition based wear.		Unit held out until completion of Major Overhaul Scheduled for September 2018
CC Highbridge2	Forced	HRSG Boiler Piping System	05/09/2018	05/11/2018	**2**	U8 HRH Bypass Valve	Bypass Valve stuck due to magnetite binding between plug and guide bushing.		Plant has ordered modified valve trim with an integral strainer and modified plug to extend valve maintenance interval without sticking.
Redwing_2	Forced	Generator	05/01/2018	05/04/2018	**4**	Main Generator	Generator synched out of phase due to a delayed closure of the output control breaker.		Generator output breaker replaced and the Generator was rewound.
CCRiverside1	Planned	Miscellaneous (Balance of Plant)	05/09/2018	05/24/2018	**16**	This is not a Forced Outage. Plant performed a Planned Outage during this time window.	No equipment failures.		Not applicable. Planned outage.

Unit Outage Information

Unit	Outage Category	Primary Reason for Outage	Outage Dates Start	Outage Dates End	Duration (Days)	Equipment that Resulted in the Forced Outage	Description of Equipment Failure	Change in Energy Costs ($s)	Steps Taken to Alleviate Reoccurrence
									[Protected Data Begins
CCRiverside2	Planned/Mainten	Miscellaneous (Balance of Plant)\Circulating Water Systems	05/07/2018	05/24/2018	**17**	Planned Outage for entire plant from 5/9 - 5/24 (see line item above for Riverside1). The dates of 5/7-5/8 were a maintenance outage	Maintenance outage portion related to #6 Circulating Water pump issues (see line 112 above). Pump developed high vibration and needed to be repaired.		Maintenance outage portion is the same event as Riverside1, see line item 112 above. Corrective actions to address both Riverside1 and Riverside2.
CCRiverside2	Forced	Miscellaneous (Gas Turbine)	05/30/2018	05/31/2018	**2**	#6 Circulating Water Pump	Continuation of previous event. Circulating Water Pump developed high vibrations requiring the pump to be removed for inspection. With warmer river temperatures (above 50 F) condenser vacuum can not be maintained when running both Riverside units. Therefore, one CT must be held out of service.		Condition based wear on #6 Circulating Water Pump which was sent off site for inspection and repair. Bearings were replaced. Going forward, each of the two circulating water pumps will be overhauled every two years during the winter months to minimize impact of pump outages.
JUNE 2018									
SHERCO_G1	Forced	Circulating Water Systems	06/07/2018	06/30/2018	**23**	11 Boiler Circulating Water Pump	Excessive vibration on the pump required removal from service and subsequent derate. Currently suspect a bent shaft or wear ring alignment issue.		Pump will be removed during the upcoming chemical clean outage in September 2018 and repairs made. Corrective actions will be taken once the failure mechanism is understood.
SHERCO_G2	Forced	Boiler Fuel Supply from Bunkers to Boiler	06/01/2018	06/02/2018	**2**	27 Coal Mill	27 coal mill taken out of service to complete needed mill overhaul while 22 coal mill was out of service for fire event repairs.		This was not a failure. 27 mill was taken out for a needed overhaul while 22 was out for repairs to avoid any damage which would extend out of service time and increase cost.
SHERCO_G2	Forced	Boiler Fuel Supply from Bunkers to Boiler	06/06/2018	06/07/2018	**1**	25 Coal Mill Classifier	Classifier drive belt failure.		Alternative design drive belt installed allowing for faster changeout, however, we are finding they only last about 9 months compared to 3 years for the original. Original style belt will be installed during next mill overhaul as it lasts longer.
SHERCO_G2	Forced	Boiler Fuel Supply from Bunkers to Boiler	06/20/2018	06/21/2018	**2**	27 Coal Mill	High Vibration. Unit was derated to perform troubleshooting on this mill.		27 mill taken out of service for internal inspection. No issues were identified that could cause high vibration.
SHERC3	Forced	Feedwater System	06/01/2018	06/05/2018	**4**	36-1 High Pressure Feedwater Heater	Due to single block isolation valve arrangement on these heaters, the unit had to be removed from service to facilitate repairs. This time period is the derate required with the heater out of service until unit was taken off line for repairs on 6/5/2018.		This heater is original equipment. All four high pressure feedwater heaters are nearing end of life and are scheduled to be replaced in the 2020 and 2023 overhauls. A double isolation valve arrangement will also be installed in 2020 to facilitate on line repairs.
SHERC3	Forced	Feedwater System	06/05/2018	06/08/2018	**3**	36-1 High Pressure Feedwater Heater	Due to single block isolation valve arrangement on these heaters, the unit had to be removed from service to facilitate repairs. One new leaking tube, one leaking welded plug and eight previously plugged tubes missing plugs discovered.		Leaking tube and three surrounding plugged and missing plugs replaced. Stabilizer cable installed on inlet side of leaking tube. This heater is original equipment. All four high pressure feedwater heaters are nearing end of life and are scheduled to be replaced in the 2020 and 2023 overhauls. A double isolation valve arrangement will also be installed in 2020 to facilitate on line repairs.
SHERC3	Forced	Feedwater System	06/08/2018	06/10/2018	**2**	36-2 High Pressure Feedwater Heater	Due to single block isolation valve arrangement on these heaters, the unit had to be removed from service to facilitate repairs. This time period is the derate required with the heater out of service until unit was taken off line for repairs on 6/10/2018.		This heater is original equipment. All four high pressure feedwater heaters are nearing end of life and are scheduled to be replaced in the 2020 and 2023 overhauls. A double isolation valve arrangement will also be installed in 2020 to facilitate on line repairs.
SHERC3	Forced	Feedwater System	06/10/2018	06/13/2018	**3**	36-2 High Pressure Feedwater Heater	Due to single block isolation valve arrangement on these heaters, the unit had to be removed from service to facilitate repairs. One failed welded plug and one failed pop-a-plug discovered.		Leaking plugs welded, eight additional pitted tube plugged. This heater is original equipment. All four high pressure feedwater heaters are nearing end of life and are scheduled to be replaced in the 2020 and 2023 overhauls. A double isolation valve arrangement will also be installed in 2020 to facilitate on line repairs.
SHERC3	Forced	Boiler Air and Gas Systems	06/25/2018	06/26/2018	**1**	32 Secondary Air Heater	Motor Electrical Failure		Replaced Motor. Check magnetic coupling every overhaul for proper alignment. Replace motor every 6 years, Replace motor bearings in the overhaul year when motor is not being replaced.
Wilmart_2	Forced	Boiler Tube Leaks	06/23/2018	06/27/2018	**4**	Boiler superheat tube	Boiler superheat tube leak		Superheater scheduled replacement during fall outage 2018.
King_G1	Forced	Boiler Tube Leaks	06/20/2018	06/29/2018	**9**	Secondary Superheater (SSH) boiler tube	Final SSH section on the leading edge of the tube. There was moderate collateral damage to the surrounding tubes.		Damaged boiler tubes were replaced or repaired. Six sections of tube needed to be replaced and 5 pad welds on surrounding tubes.
French_2	Forced	Circulating Water Systems\Boiler Tube Leaks	06/22/2018	06/27/2018	**5**	Boiler economizer	Tube leaks.		It is scheduled for replacement in fall of 2018.
CC Highbridge2	Forced	HRSG Boiler Piping System	06/06/2018	06/07/2018	**1**	U8 HRH Bypass Valve	Bypass Valve stuck due to magnetite binding between plug and guide bushing.		Plant has ordered modified valve trim with an integral strainer and modified plug valve to reduce frequency of sticking. Installation Fall 2018.
CC Highbridge2	Forced	Condensate System	06/08/2018	06/10/2018	**2**	U8 LP Preheater in HRSG	Tube leak at lower header due to corrosion fatigue cracking.		Major NDE inspection with ultrasonic phased array testing to identify additional cracks requiring repair is planned for Fall 2018.
CC Highbridge2	Forced	HRSG Boiler Internals and Structures	06/22/2018	06/25/2018	**2**	U8 HP steam drum door	Steam leak on drum door		New style gasket installed that is designed to handle thermal cycling was installed. New 6 bolt drum doors have been ordered and will be installed in Fall 2018 outage.

Unit Outage Information

Unit	Outage Category	Primary Reason for Outage	Outage Dates Start	Outage Dates End	Duration (Days)	Equipment that Resulted in the Forced Outage	Description of Equipment Failure	Change in Energy Costs ($s)	Steps Taken to Alleviate Reoccurrence
									[Protected Data Begins
CCRiverside1	Forced	Auxiliary	06/03/2018	06/05/2018	**2**	Unit 9 Hydraulic Pump fitting failure.	Hydraulic oil line fitting developed leak which required the unit to be removed from service for repair and oil clean up.		Root cause was a failed o-ring. O-ring was replaced along with checking other fittings to ensure no other issues identified.
JULY 2018									
BayFrnt_G6	Forced	Exciter\Boiler Tube Leaks	07/28/2018	07/31/2018	**3**	1) Reserve Exciter 2) Boiler #2 Superheat Tubes	1) The brushes on the reserve exciter failed causing a loss of the unit 2) There were 2 leaks found in the secondary superheat tubes		1) Increased inspections of reserve exciter brushes 2) Boiler #2 Superheat tubes (primary and secondary) were replaced in September - October 2018 as a planned capital project.
SHERCO_G1	Forced	Circulating Water Systems	07/01/2018	07/31/2018	**30**	11 Boiler Circulating Pump	The thrust disc assembly un-bonded during the initial startup of the pump indicating a manufacturing defect of the thrust disc assembly. This in turn caused high vibrations on the pump.		Thrust disc assembly and other resultant damage to the pump was refurbished by Hayward Tyler. A blanking plate was purchased to facilitate removal of a pump and returning to on line status during any future required repairs to all the boiler circ pumps.
Anson_G3	Forced	Miscellaneous (Gas Turbine)	07/01/2018	07/31/2018	**30**	Turbine	High vibration on turbine bearings		A major, rotor out overhaul was conducted and the unit was put back into service in May of 2019
Blk_Dog_G6	Forced	Auxiliary	07/01/2018	07/02/2018	**1**	Turbine Hydraulic Oil	Hydraulic manifold developed a leak and required the unit to be held out of service and the turbine compartment to be cleaned.		Hydraulic manifold was inspected and loose plug was found. Plug was reinstallated and torqued properly and verified.
French_1	Forced	Generator	07/05/2018	07/09/2018	**4**	Generator	Hign Vibrations		We performed a balance shot.
French_1	Forced	Boiler Overhaul and Inspections	07/26/2018	07/30/2018	**4**	Boiler	This was a maintenance outage for periodic cleaning and inspection.		RDF fuel causes boiler fouling. We believe we are cleaning at appropriate intervals.
French_2	Forced	Boiler Tube Leaks	07/18/2018	07/23/2018	**5**	Boiler	Boiler tube leaks.		We have replaced the tubes that were worn.
Redwing_1	Forced	Miscellaneous Boiler Tube Problems	07/10/2018	07/13/2018	**2**	Boiler	Boiler tube fouling		Cleaned boiler
Redwing_2	Forced	Miscellaneous Boiler Tube Problems	07/08/2018	07/12/2018	**4**	Boiler	Boiler tube fouling		Cleaned boiler
SHERCO_G2	Forced	Boiler Tube Leaks	07/28/2018	07/31/2018	**3**	Sootblower Supply Piping	Unit taken off line to repair a previously identified leak in the penthouse. Leak was on the sootblower supply piping coming off of the west inlet SH pendant platen header on the fillet weld of the stub tube to the header.		Through wall weld repair completed on the leak. MT survey was completed on the rest of the welds on the piping system. Four more welds were identified to have linear crack-like indications which were also repaired.
AUGUST 2018									
King_G1	Forced	Boiler Piping System\Controls	08/21/2018	08/31/2018	**10**	12 superheaeter attemperator spray	12 superheater attemperator packing leak		12 superheater attemperator valve along with other attemperator valves were repacked to prevent future issues.
SHERCO_G1	Forced	Boiler Piping System	08/18/2018	08/22/2018	**5**	11 Boiler Circulating Pump	Unit taken off line to install blanking plate which was recently purchased from Hayward Tyler to facilitate removal and repair to 11 Boiler Circulating Pump while returning the Unit to an on line status. Unit was restored to on line on 8/20/18. The following day, 8/21/18, the installed blanking plate developed a leak on the drain plug which forced the unit off line for repair.		Seal welded the drain plug in the blanking plate. Blanking plate will remain on site as a contingency to facilitate removal of a pump and returning to on line status during any future required repairs to all the boiler circ pumps.
SHERCO_G2	Forced	Boiler Tube Leaks	08/01/2018	08/02/2018	**1**	Sootblower Supply Piping	Unit taken off line to repair a previously identified leak in the penthouse. Leak was on the sootblower supply piping coming off of the west inlet SH pendant platen header on the fillet weld of the stub tube to the header.		Through wall weld repair completed on the leak. MT survey was completed on the rest of the welds on the piping system. Four more welds were identified to have linear crack-like indications which were also repaired.
SEPTEMBER 2018									
BayFrnt_G5	Forced	Boiler Internals and Structures	09/01/2018	09/03/2018	**2**	Boiler #1 Grating System - Corrected Dates to 9/1/18 - 9/3/18	The retaining pins on 2 of the boiler grates failed causing the grates to jam up.		Inspected retaining pins on other grates and replaced those showing wear. The entire boiler grating system was replaced in March 2019 as a planned capital project.
King_G1	Forced	Controls	09/01/2018	09/02/2018	**1**	Feedwater transmitter braided hose	Feedwater transmitter braided hose failure		All feedwater transmitter braided hoses were hard piped and fittings replaced to prevent future failure
Blue_Lk_G7	Forced	Electrical	09/19/2018	09/21/2018	**2**	Generator Circuit Breaker Charging Motor Power Supply Breaker	Component Failed		Breaker Replaced
Blue_Lk_G8	Forced	Generator	09/17/2018	09/30/2018	**13**	#1 Generator Bearing	High Temperature		Alignment Adjustment
SHERCO_G1	Forced	Boiler Piping System	09/05/2018	09/08/2018	**2**	11 Boiler Circulating Pump	This was a maintenance outage to remove the recently installed blanking plate and restore the refurbished 11 Boiler Circulating Pump to service prior to the planned boiler chemical clean outage.		Thrust disc assembly and other resultant damage to the pump was refurbished by Hayward Tyler. A blanking plate was purchased to facilitate removal of a pump and returning to on line status during any future required repairs to all the boiler circ pumps.

Unit Outage Information

Unit	Outage Category	Primary Reason for Outage	Outage Dates Start	Outage Dates End	Duration (Days)	Equipment that Resulted in the Forced Outage	Description of Equipment Failure	Change in Energy Costs ($s)	Steps Taken to Alleviate Reoccurrence
								[Protected Data Begins	
SHERCO_G1	Forced	Boiler Tube Leaks	09/29/2018	09/30/2018	**1**	Steam Cooled Wall Screen Tube	Vibration snubber originally installed on the unit had deteriorated through the years. This caused the initiating failure of both this and the 1/17/19 event to be the #5 steam cooled wall screen tube due to reverse bending fatigue failure. In addition, there was significant collateral damage to the primary superheat assemblies. However, during this first event, the evidence found in the damage lead engineering to believe the initiating event was on the leading edge tube of the primary superheat from short term overheating precipitated by oxide blockage. The sheared steam cooled wall screen tube was originally thought to be caused by the impact of the superheat rupture which careened the U-bend into the team cooled wall screen tube.		Tube replacements consisting of 23 total tube welds and 12 pad welds were completed. An air test was completed to confirm no further leads were present.
OCTOBER 2018									
BayFrnt_G5	Forced	Condensing System	10/01/2018	10/19/2018	**19**	Condenser Low Vacuum Trip Bellows - Note that outage started 9/4/2018	Leak developed in the condenser low vacuum trip bellows assembly - could not draw a vacuum in the condenser		Replaced the low vacuum trip bellows assembly and purchased a spare unit.
Blk_Dog_G52	Forced	Total site gas supply outage to install relief valves	10/07/2018	10/16/2018	**9**	Gas supply regulating station	Gas supply regulating station outage to install additional overpressurization protection in the fuel gas yard. Work scope was added to the fall outage plan. Outside of plant jurisdiction.		Equipment was installed as planned during the outage.
SHERCO_G1	Forced	Boiler Tube Leaks	10/01/2018	10/06/2018	**6**	Steam Cooled Wall Screen Tube	Vibration snubber originally installed on the unit had deteriorated through the years. This caused the initiating failure of both this and the 1/17/19 event to be the #5 steam cooled wall screen tube due to reverse bending fatigue failure. In addition, there was significant collateral damage to the primary superheat assemblies. However, during this first event, the evidence found in the damage lead engineering to believe the initiating event was on the leading edge tube of the primary superheat from short term overheating precipitated by oxide blockage. The sheared steam cooled wall screen tube was originally thought to be caused by the impact of the superheat rupture which careened the U-bend into the team cooled wall screen tube.		Tube replacements consisting of 23 total tube welds and 12 pad welds were completed. An air test was completed to confirm no further leads were present.
SHERC3	Forced	Boiler Tube Leaks	10/04/2018	10/14/2018	**10**	Finishing Superheat Tube	Initiating tube failure was short term overheating due to oxide exfoliation pluggage, tube #14 on assembly #41. Significant collateral damage spread across 3 assemblies on the finishing superheat.		19 Tube replacements were completed in addition to pad welding on 4 other tubes. An air test was completed prior to returning the unit to service. Continue practice of ramping through the 50-100 MW range during startup to avoid oxide collection in the superheat section.
SHERC3	Forced	Boiler Tube Leaks	10/16/2018	10/22/2018	**6**	Finishing Superheat Tube	Initiating tube failure was short term overheating due to oxide exfoliation pluggage, tube #3 on assembly #74. Collateral damage was minimal because the leak was identified immediately. Following analysis of the oxide sample removed during this outage, it was determined that the source of the oxide was from the outlet headers downstream of the finishing superheat assemblies. This indicates the oxide traveled backwards from the headers into the pendants. It is theorized this could happen during boiler air tests, during shutdowns when the steam inside the pendants and header are condensing, or during boiler drains when vents and drains are manipulated.		Tube section was replaced. TEAM Industrial Services was brought in to perform digital readiography on a select number of lower loops on the finishing superheat. If the 5 assemblies, two tubes were found with oxide pluggage on Pendant 42, loops 4 and 5. These tubes were cut, oxide removed, and welded back together. Oxide sample sent to Xcel metallurgist for analysis.
Redwing_2	Forced	Circulating Water Systems	10/21/2018	10/24/2018	**2**	Condenser	Took unit 2 off-line to coincide with river dredging near plant intake screenhouse		Completed dredging and returned unit to service.
NOVEMBER 2018									
BayFrnt_G4	Forced	T4-Generator Rotor Failed Inspection/Waiting retirement approval	11/15/2018	11/30/2018	**15**	Unit 4 Generator Rotor	During unit overhaul multiple cracks were found during the boresonic inspection of the generator rotor		Decision was made to retire the unit due to age and cost to replace the rotor

Unit Outage Information

Unit	Outage Category	Primary Reason for Outage	Outage Dates Start	Outage Dates End	Duration (Days)	Equipment that Resulted in the Forced Outage	Description of Equipment Failure	Change in Energy Costs ($s)	Steps Taken to Alleviate Reoccurrence
									[Protected Data Begins
SHERCO_G2	Forced	Scrubber module cleaning and maintenance.	11/09/2018	11/10/2018	**1**	Scrubber Modules	Ash buildup on fields, spargers, and other components resulting in inefficient particulate removal and high stack opacity. Aging of equipment requires regular maintenance. Unit needed to be derated to perform other normal cleaning functions such as flushing, high voltage cleaning, and manual nightly cleaning. Upgrades to emissions control equipment have resulted in the need for more aggressive cleaning in addition to normal equipment maintenance. With 2 modules out for major clean at a time we lose our normal redundancy.		Cleaning frequency for each scrubber module (12 total per unit) has increased from once a year to once every 8 months. This strategy will still require some smaller derates to complete all required cleaning evolutions but these smaller derates should be limited mainly to the spring and fall when energy prices are historically less. There will also be derates due to loss of other module components during times which we need to have two major cleans in progress at once due to the loss of redundancy. We are perusing ways of minimizing the amount of time required to complete a major clean.
SHERCO_G2	Forced	9 Module operation - loss of 203 Spray pump.	11/17/2018	11/19/2018	**1**	Scrubber Modules	Ash buildup on fields, spargers, and other components resulting in inefficient particulate removal and high stack opacity. Aging of equipment requires regular maintenance. Unit needed to be derated to perform other normal cleaning functions such as flushing, high voltage cleaning, and manual nightly cleaning. Upgrades to emissions control equipment have resulted in the need for more aggressive cleaning in addition to normal equipment maintenance. With 2 modules out for major clean at a time we lose our normal redundancy.		Cleaning frequency for each scrubber module (12 total per unit) has increased from once a year to once every 8 months. This strategy will still require some smaller derates to complete all required cleaning evolutions but these smaller derates should be limited mainly to the spring and fall when energy prices are historically less. There will also be derates due to loss of other module components during times which we need to have two major cleans in progress at once due to the loss of redundancy. We are perusing ways of minimizing the amount of time required to complete a major clean.
King_G1	Forced	Forced outage due to generator pot transformer issues	11/09/2018	11/12/2018	**3**	Generator pot transformer fuse	Generator pot transformer fuse clip failure		Installation of new style clip for holding fuses in place were installed preventing the stretching that occurred on old style clips
SHERC3	Forced	repair steamleak on DP supply line	11/01/2018	11/03/2018	**2**	Deaerator Steam Supply Piping	Crack in the weld on the aux steam supply piping to the deaerator about eight inches long, in a weld at the end of a 60 degree elbow.		Damaged area was excavated and re-welded. Other welds on the elbow were inspected for cracking. Additional inspections are planned for upcoming overhauls to ensure this condition is corrected.
DECEMBER 2018									
BayFrnt_G4	Forced	Miscellaneous (Generator)	12/01/2018	12/14/2018	**14**	Unit 4 Generator Rotor	During unit overhaul multiple cracks were found (November 2018) during the boresonic inspection of the generator rotor		Awaiting approval for retirement of unit
BayFrnt_G4	Forced	Miscellaneous (Generator)	12/17/2018	12/31/2018	**14**	Unit 4 Generator Rotor	During unit overhaul multiple cracks were found (November 2018) during the boresonic inspection of the generator rotor		Awaiting approval for retirement of unit
BayFrnt_G4	Forced	Boiler Piping System	12/14/2018	12/17/2018	**3**	Boiler 2 Attemperator Valve	Valve body material failed		Valve was replaced
SHERC3	Forced	Boiler Fuel Supply from Bunkers to Boiler	12/13/2018	12/18/2018	**5**	301 Coal Mill Motor	306 Mill was out for major overhaul and 302 mill was out for internal inspections when this motor failed which forced us into a derate with only 7 mIls available.		Motor was swapped with the motor previously on 306 mill. Original motor was sent to Lewis Motor for refurbishment.
SHERCO_G1	Forced	Wet Scrubbers	12/01/2018	12/03/2018	**2**	Scrubber Modules	Ash buildup on fields, spargers, and other components resulting in inefficient particulate removal and high stack opacity. Aging of equipment requires regular maintenance. Unit needed to be derated to perform other normal cleaning functions such as flushing, high voltage cleaning, and manual nightly cleaning. Upgrades to emissions control equipment have resulted in the need for more aggressive cleaning in addition to normal equipment maintenance. With 2 modules out for major clean at a time we lose our normal redundancy. In this instance, 24 hour high voltage cleans needed to be completed.		Cleaning frequency for each scrubber module (12 total per unit) has increased from once a year to once every 8 months. This strategy will still require some smaller derates to complete all required cleaning evolutions but these smaller derates should be limited mainly to the spring and fall when energy prices are historically less. There will also be derates due to loss of other module components during times which we need to have two major cleans in progress at once due to the loss of redundancy. We are perusing ways of minimizing the amount of time required to complete a major clean. When high voltage cleans are required, which typically is every thirty days on each module, we can normally wait until the weekend and perform multiple high voltage cleans during that time period.
SHERCO_G1	Forced	Wet Scrubbers	12/08/2018	12/10/2018	**2**	Scrubber Modules	Ash buildup on fields, spargers, and other components resulting in inefficient particulate removal and high stack opacity. Aging of equipment requires regular maintenance. Unit needed to be derated to perform other normal cleaning functions such as flushing, high voltage cleaning, and manual nightly cleaning. Upgrades to emissions control equipment have resulted in the need for more aggressive cleaning in addition to normal equipment maintenance. With 2 modules out for major clean at a time we lose our normal redundancy. In this instance, 24 hour high voltage cleans needed to be completed.		Cleaning frequency for each scrubber module (12 total per unit) has increased from once a year to once every 8 months. This strategy will still require some smaller derates to complete all required cleaning evolutions but these smaller derates should be limited mainly to the spring and fall when energy prices are historically less. There will also be derates due to loss of other module components during times which we need to have two major cleans in progress at once due to the loss of redundancy. We are perusing ways of minimizing the amount of time required to complete a major clean. When high voltage cleans are required, which typically is every thirty days on each module, we can normally wait until the weekend and perform multiple high voltage cleans during that time period.

Unit Outage Information

Unit	Outage Category	Primary Reason for Outage	Outage Dates Start	End	Duration (Days)	Equipment that Resulted in the Forced Outage	Description of Equipment Failure	Change in Energy Costs ($s)	Steps Taken to Alleviate Reoccurrence
								[Protected Data Begins	
JANUARY 2019									
BayFrnt_G4	Forced	Miscellaneous (Generator)	01/01/2019	01/31/2019	**31**	Unit 4 Generator Rotor	During unit overhaul multiple cracks were found (November 2018) during the boresonic inspection of the generator rotor		Awaiting approval for retirement of unit
SHERCO_G1	Forced	Loss of 12 Transfer Hopper Feeder Belt - Only able to maintain coal in 3 coal silos.	01/02/2019	01/03/2019	**1**	12 Transfer Hopper Feeder Belt	Tensioner on 12 feeder belt failed causing the belt to run off the pulley, damaging the belt to an unusable state.		The belt and tensioner were replaced. Maintenance plans created to inspect feeder belts and tensioners on the units.
SHERCO_G2	Forced	Must remove 22 FD fan from service. Duct work / lagging damage.	01/07/2019	01/08/2019	**1**	22 Forced Draft Fan ductwork lagging	Large section of ductwork lagging was found hanging/loose in the Unit 2 fan room. Due to safety implications, 22 forced draft fan was removed from service so loose tin could be accessed by scaffold and removed.		Loose tin was removed. Permanent repair made during the February 2019 maintenance outage.
SHERCO_G2	Forced	Sherco 2 derate due to Reheater tube leak. Derate to MWn to reduce boiler Reheat pressure.	01/20/2019	01/31/2019	**11**	Reheat Tube leak	Unit 2 had a known reheat leak which was being monitored with the projection that we could operate until the 2/9/19 schedule maintenance outage. Unit 1 was forced off line for its own tube leak on 1/17/19. The rate of degradation on the Unit 2 reheater leak increased, so a management decision was made to conservatively derate the unit to lower reheat pressure to prevent a second Sherco Unit from being forced off line. Once Unit 1 was stabile following its return, the derate was terminated.		Tube #2 on assembly #1 was repaired during the scheduled maintenance outage along with minor repairs to the rear reheat, mainly leading edge tube shields. The failure was caused by sootblower tube thinning.
SHERC3	Forced	Derated due to max steam flow limitations with Unit 1 being offline and supplying steam to PAS header.	01/24/2019	01/31/2019	**7**	Aux Steam header supply valve	PAS 2701, pegging aux steam supply valve from Unit 2 was inoperable. With Unit 1 off line for tube leak repair and extreme cold temperatures, building heating needed to be supplied by steam from Unit 3. This caused us to challenge our environmental administrative steam flow limit. The unit needed to be derated to maintain compliance until Unit 1 returned to service.		PAS 2701. aux steam header supply valve, was repaired during the Unit 2 overhaul.
Redwing_2	Forced	Repair rails on DC conveyor	01/21/2019	01/21/2019	**1**	Distribution Conveyor - Corrected date, about 4 hour outage on 1/21/2019	Chain Derailment		Modified load rails for better chain tracking
CC Highbridge1	Forced	Circulating Water Systems Work	01/18/2019	01/19/2019	**1**	Circ Water T-screens	Plugged with Frazil Ice		None
SHERCO_G1	Forced	Unit coming off line because of tube leak	01/17/2019	01/31/2019	**15**	Steam Cooled Wall Screen Tube	Vibration snubber originally installed on the unit had deteriorated through the years. This caused the initiating failure of both this and the 1/17/19 event to be the #5 steam cooled wall screen tube due to reverse bending fatigue failure. In addition, there was significant collateral damage to the finishing superheat assemblies.		Total of 23 tube replacements and 7 pad welds completed between the steam cooled wall screen tube and finishing superheat tube damage. A vibration snubber consisting of stainless steel angle iron affixed to the tubes with stainless steel U-bolts was completed to add rigidity to the tubes. Vibration snubber for Unit 2 was inspected during the 2019 overhaul and found to be intact.
Wheaton_3	Forced	Turbine Heaters failed	01/25/2019	01/26/2019	**1**	Turbine heater	Turbine heater electric contractor coil failed.		Rebuilt the contactor for the heater.
Wheaton_3	Forced	GF STP VLV OPN TO NOT 20FG TRIP	01/30/2019	01/31/2019	**1**	Stop Valve	Control air supply to purge valves contained water and froze which prevented valves from operating.		Constructed temporary structure and heating to thaw piping and blew down with nitrogen. Installing heat tape and insulation for long term correction.
FEBRUARY 2019									
King_G1	Forced	Feedwater	02/18/2019	02/20/2019	**1**	Feedwater line radiograph plug	Feedwater line radiograph plug leak		Repaired leaking plug, inspected piping and replaced section that was found to have areas that had thin spots to prevent future leaks.
BayFrnt_G4	Forced	Miscellaneous (Generator)	02/01/2019	02/28/2019	**28**	Unit 4 Generator Rotor	During unit overhaul multiple cracks were found (November 2018) during the boresonic inspection of the generator rotor		Awaiting approval for retirement of unit
SHERCO_G2	Forced	Boiler Tube Leaks	02/01/2019	02/05/2019	**5**	Reheat Tube leak	Unit 2 had a known reheat leak which was being monitored with the projection that we could operate until the 2/9/19 schedule maintenance outage. Unit 1 was forced off line for its own tube leak on 1/17/19. The rate of degradation on the Unit 2 reheater leak increased, so a management decision was made to conservatively derate the unit to lower reheat pressure to prevent a second Sherco Unit from being forced off line. Once Unit 1 was stabile following its return, the derate was terminated.		Tube #2 on assembly #1 was repaired during the scheduled maintenance outage along with minor repairs to the rear reheat, mainly leading edge tube shields. The failure was caused by sootblower tube thinning.
SHERC3	Forced	Other Operating Environmental Limitations	02/01/2019	02/03/2019	**3**	Aux Steam header supply valve	PAS 2701, pegging aux steam supply valve from Unit 2 was inoperable. With Unit 1 off line for tube leak repair and extreme cold temperatures, building heating needed to be supplied by steam from Unit 3. This caused us to challenge our environmental administrative steam flow limit. The unit needed to be derated to maintain compliance until Unit 1 returned to service.		PAS 2701. aux steam header supply valve, was repaired during the Unit 2 overhaul.
King_G1	Forced	Feedwater	02/20/2019	02/22/2019	**3**	Feedwater line radiograph plug	Feedwater line radiograph plug leak		Repaired leaking plug, inspected piping and replaced section that was found to have areas that had thin spots to prevent future leaks.

Unit Outage Information

Unit	Outage Category	Primary Reason for Outage	Outage Dates Start	Outage Dates End	Duration (Days)	Equipment that Resulted in the Forced Outage	Description of Equipment Failure	Change in Energy Costs ($s)	Steps Taken to Alleviate Reoccurrence
								[Protected Data Begins	
SHERCO_G1	Forced	Boiler Tube Leaks	02/01/2019	02/03/2019	**3**	Steam Cooled Wall Screen Tube	Vibration snubber originally installed on the unit had deteriorated through the years. This caused the initiating failure of both this and the 1/17/19 event to be the #5 steam cooled wall screen tube due to reverse bending fatigue failure. In addition, there was significant collateral damage to the finishing superheat assemblies.		Total of 23 tube replacements and 7 pad welds completed between the steam cooled wall screen tube and finishing superheat tube damage. A vibration snubber consisting of stainless steel angle iron affixed to the tubes with stainless steel U-bolts was completed to add rigidity to the tubes. Vibration snubber for Unit 2 was inspected during the 2019 overhaul and found to be intact.
MARCH 2019									
SHERC3	Forced	Miscellaneous (Pollution Control Equipment)	03/09/2019	03/16/2019	**6**	33 Baghouse	High dp and high opacity in 33 baghouse due to aging bags.		Capital project to begin bag replacement in 2020 was moved up to this year and is in progress.
King_G1	Forced	Exciter	03/18/2019	03/19/2019	**1**	Exciter	High vibrations on exciter		The exciter collector rings and brush assemblies were repaired. Generator shaft bearings and associated seals were also repaired. The plant has limited ramp rate in an attempt to prevent future failure.
King_G1	Forced	Exciter	03/19/2019	03/31/2019	**12**	Exciter	High vibrations on exciter		The exciter collector rings and brush assemblies were repaired. Generator shaft bearings and associated seals were also repaired. The plant has limited ramp rate in an attempt to prevent future failure.
Wilmarth_1	Forced	Ash building roof collapsed, cannot haul out ash, unit off line.	03/10/2019	03/14/2019	**4**	Ash load out building/discharge from C-9	03/09/2019 - Heavy unseasonable rainfall following snow storms caused excessive weight on building roof causing it to collapse		Emergent capital project 2019 to replace structure. Continue structural inspections per SAP maintenance plan 10012853.
Wilmarth_2	Forced	Ash building roof collapsed, cannot haul out ash, unit off line.	03/09/2019	03/14/2019	**4**	Ash load out building/discharge from C-9	03/09/2019 - Heavy unseasonable rainfall following snow storms caused excessive weight on building roof causing it to collapse		Emergent capital project 2019 to replace structure. Continue structural inspections per SAP maintenance plan 10012853.
APRIL 2019									
BayFrnt_G4	Forced	T4-Generator Waiting retirement approval	04/01/2019	04/30/2019	**30**	Unit 4 Generator Rotor	During unit overhaul multiple cracks were found (November 2018) during the boresonic inspection of the generator rotor		Awaiting approval for retirement of unit. Retirement was approved and unit officially retired on 6/01/2019.
SHERC3	Forced	Boiler Fuel Supply from Bunkers to Boiler	04/23/2019	04/26/2019	**3**	308 Coal Mill	306 Mill was out for major overhaul and 302 mill was out for a coal leak repair. 308 mill was removed from service for internal inspection. 3 bolts and welds on the rotating throat assembly had failed.		This was an upgraded design provided by the OEM installed after a previous failure, however, the bolts used were Grade 8. We have switched to a more ductile bolt, Grade 5 Heavy Duty.
King_G1	Forced	Unit Tripped due to excier, issues are on going	04/01/2019	04/30/2019	**30**	Exciter	High vibrations on exciter		The exciter collector rings and brush assemblies were repaired. Generator shaft bearings and associated seals were also repaired. The plant has limited ramp rate in an attempt to prevent future failure.
MAY 2019									
King_G1	Forced	Exciter	05/07/2019	05/16/2019	**9**	Exciter	High vibrations on exciter		The exciter collector rings and brush assemblies were repaired. Generator shaft bearings and associated seals were also repaired. The plant has limited ramp rate in an attempt to prevent future failure.
SHERCO_G2	Forced	Boiler Air and Gas Systems	05/02/2019	05/03/2019	**1**	22 Primary Air Fan motor	Broken connection on the motor side of the A-phase connector.		Motor was meggered to ensure motor winding integrity and connector was replaced.
King_G1	Forced	Exciter	05/01/2019	05/07/2019	**6**	Exciter	High vibrations on exciter		The exciter collector rings and brush assemblies were repaired. Generator shaft bearings and associated seals were also repaired. The plant has limited ramp rate in an attempt to prevent future failure.
SHERC3	Forced	Boiler Fuel Supply from Bunkers to Boiler	05/23/2019	05/24/2019	**1**	306 Coal Mill	Excessive slag buildup was noted on the burners of 306 mill during the internal boiler inspection due to the long duration 306 mill had been out for overhaul.		Slag buildup was removed. Different options are being looked at to improve mill overhaul turn around time.
SHERC3	Forced	Boiler Tube Leaks	05/27/2019	05/31/2019	**4**	Finishing Superheat Tube	Initiating tube failure was short term overheating due to oxide exfoliation pluggage. It is hypothesized that the source of this oxide is from the outlet headers downstream of the finishing superheat assemblies. This indicates the oxide traveled backwards from the headers into the pendants. It is theorized this could happen during boiler air tests, during shutdowns when the steam inside the pendants and header are condensing, or during boiler drains when vents and drains are manipulated.		Eight tubes were identified for replacement; tubes 10 through 15 on pendant 80 and tubes 10 and 11 on pendant 79. Ultrasonic thickness testing (UT) was performed on surrounding tubes to identify collateral damage that did not result in a tube rupture. Four tubes were identified for pad welding; tubes 16 and 17 on pendant 80 and tubes 9 and 12 on pendant 79. Changes to the startup procedure were made to incorporate a strategy of maximizing steam velocity to sweep debris from the pendants including running at full load and steam flow for six hours following a startup.

Unit Outage Information

Unit	Outage Category	Primary Reason for Outage	Outage Dates Start	Outage Dates End	Duration (Days)	Equipment that Resulted in the Forced Outage	Description of Equipment Failure	Change in Energy Costs ($s)	Steps Taken to Alleviate Reoccurrence
								[Protected Data Begins	
JUNE 2019									
NONE					**0**				
JULY 2019									
Redwing_1	Forced	Unit 1 OFA fan motor failure	07/06/2019	07/09/2019	**3**	Over Fired Air Fan	Motor Failure		Replaced motor
CCRiverside1	Forced	Significant rain/river debris resulted in trip of No. 6 Circ Water pump and loss of vacuum on steam turbine.	07/15/2019	07/16/2019	**1**	#6 Debris Filter	Backwash discharge valve failed in closed position which prevented backwashing of the debris filter screen. The filter screen plugged to the point that #6 circulating water pump had to be removed from service. With 1 of 2 circulating pumps out of service, condenser vacuum could not be maintained and the steam turbine (unit 7) tripped off line. With the steam turbine not available, both combustion turbing units are also not available.		Valve plug was removed during this short forced outage to allow for continuous backwashing of the debris filter. The valve will be replaced during the next planned outage (October 14-18, 2019).
CCRiverside2	Forced	Significant rain/river debris resulted in trip of No. 6 Circ Water pump and loss of vacuum on steam turbine.	07/15/2019	07/16/2019	**1**	#6 Debris Filter	Backwash discharge valve failed in closed position which prevented backwashing of the debris filter screen. The filter screen plugged to the point that #6 circulating water pump had to be removed from service. With 1 of 2 circulating pumps out of service, condenser vacuum could not be maintained and the steam turbine (unit 7) tripped off line. With the steam turbine not available, both combustion turbing units are also not available.		Valve plug was removed during this short forced outage to allow for continuous backwashing of the debris filter. The valve will be replaced during the next planned outage (October 14-18, 2019).
AUGUST 2019									
NONE									
SEPTEMBER 2019									
Blk_Dog_G52	Forced	Forced Outage due to the failure of 5 GSU protective relay DPR-102	09/23/2019	09/25/2019	**2**	Generator Transformer Protective Relay DPR-102	Protective relay was found to be in alarm and required the unit to be taken out of service. The relay was replaced.		A new protective relay was installed.
Blue_Lk_G7	Forced	gas valve dcs issue	09/03/2019	09/30/2019	**28**	Emergency Gas Isolation Valve Solenoid	Lightning Stike Caused U7 & U8 Solenoids to Fail		Spares are in Stock now due to long lead time
Blue_Lk_G8	Forced	gas valve dcs issue	09/03/2019	09/30/2019	**28**	Emergency Gas Isolation Valve Solenoid	Lightning Stike Caused U7 & U8 Solenoids to Fail		Spares are in Stock now due to long lead time
OCTOBER 2019									
SHERC3	Forced	Loss of Mills due to water valve open	10/26/2019	10/30/2019	**4**	Wash Water introduced into coal silos 308,309,and 310.	Water was being used by employees cleaning 4 transfer house, drain line was left open in 32 cascade house after wash pump was shut down. When pump was restarted later, water entered 308, 309, and 310 coal silos, inhibiting the ability to reach full load.		Training for new employees has been restructured to include wash water and system interconnections.
Blue_Lk_G7	Forced	gas valve dcs issue\B-disconnect fail	10/01/2019	10/31/2019	**31**	Emergency Gas Isolation Valve Solenoid	Lightning Stike Caused U7 & U8 Solenoids to Fail		Spares are in Stock now due to long lead time
Blue_Lk_G8	Forced	gas valve dcs issue	10/01/2019	10/28/2019	**27**	Emergency Gas Isolation Valve Solenoid	Lightning Stike Caused U7 & U8 Solenoids to Fail		Spares are in Stock now due to long lead time
SHERC3	Forced	Boiler tube leak. Must begin immediate unit shutdown.	10/11/2019	10/20/2019	**9**	Finishing Superheat Tube	Initiating tube failure was short term overheating due to oxide exfoliation pluggage. It is hypothesized that the source of this oxide is from the outlet headers downstream of the finishing superheat assemblies. This indicates the oxide traveled backwards from the headers into the pendants. It is theorized this could happen during boiler air tests, during shutdowns when the steam inside the pendants and header are condensing, or during boiler drains when vents and drains are manipulated.		Twenty tubes were identified for replacement; tubes 5 through 10 on pendant 48, tubes 8 through 10 on pendant 49, tubes 7 through 11 on pendant 66, tubes 5 through 10 on pendant 67, and tubes 8 and 9 on pendant 68. In addition to the changes in the startup procedure and maximation of steam flow velocity as implemented previously, the shutdown procedure has been modified in the boiler cooldown section to minimize any condensate flashing occurring in the pendants which may be causing the exfoliation to be carried from the header into the pendants.
NOVEMBER 2019									
SHERCO_G1	Forced	112 module	11/09/2019	11/11/2019	**1**	Scrubber Modules	Ash buildup on fields, spargers, and other components resulting in inefficient particulate removal and high stack opacity. Aging of equipment requires regular maintenance. Unit needed to be derated to perform other normal cleaning functions such as flushing, high voltage cleaning, and manual nightly cleaning. Upgrades to emissions control equipment have resulted in the need for more aggressive cleaning in addition to normal equipment maintenance.		Cleaning frequency for each scrubber module (12 total per unit) has increased from once a year to once every 8 months. This strategy will still require some smaller derates to complete all required cleaning evolutions but these smaller derates should be limited mainly to the spring and fall when energy prices are historically less. There will also be derates due to loss of other module components during times which we need to have two major cleans in progress at once due to the loss of redundancy. We are perusing ways of minimizing the amount of time required to complete a major clean.

Unit Outage Information

Unit	Outage Category	Primary Reason for Outage	Outage Dates Start	Outage Dates End	Duration (Days)	Equipment that Resulted in the Forced Outage	Description of Equipment Failure	Change in Energy Costs ($s)	Steps Taken to Alleviate Reoccurrence
									[Protected Data Begins
SHERCO_G2	Forced	Scrubber module High Voltage cleaning	11/16/2019	11/18/2019	**2**	Scrubber Modules	Ash buildup on fields, spargers, and other components resulting in inefficient particulate removal and high stack opacity. Aging of equipment requires regular maintenance. Unit needed to be derated to perform other normal cleaning functions such as flushing, high voltage cleaning, and manual nightly cleaning. Upgrades to emissions control equipment have resulted in the need for more aggressive cleaning in addition to normal equipment maintenance.		Cleaning frequency for each scrubber module (12 total per unit) has increased from once a year to once every 8 months. This strategy will still require some smaller derates to complete all required cleaning evolutions but these smaller derates should be limited mainly to the spring and fall when energy prices are historically less. There will also be derates due to loss of other module components during times which we need to have two major cleans in progress at once due to the loss of redundancy. We are perusing ways of minimizing the amount of time required to complete a major clean.
SHERCO_G1	Forced	8N17 Breaker Failure (OMC)	11/03/2019	11/05/2019	**1**	GCB 8N17 345KV Generator Output Breaker	During startup of Unit 1, with the generator field breaker closed, generator output breaker 345KV 8N17 experienced a failure on the B phase. Resultant of this failure was a lockout on Sherco 345KV Bus 2 due to incorrect settings on secondary relays, and generator lockouts on all 3 Sherco Units due to auto transfer of 345KV bus pot paralleling scheme being in an off normal configuration.		B Phase of 8N17 has been replaced. Team has been formed to improve communication with transmission and the plant for abnormal substation configurations.
Anson_G4	Forced	Exhaust Repairs	11/08/2019	11/15/2019	**7**	Exhaust Silencer Baffles	Maintenance overhaul to repair silencers that are degrading and failing causing foreign material to escape out the stack during equipment operation		Boilermakers were brought in to do weld repairs as they are every fall. The degradation was worse than previous years and 3 of the baffles had to be removed as they were beyond repair. A capital project for replacement is in place for 2021 and 2022
Redwing_2	Forced	Boiler Air and Gas Systems	11/22/2019	11/30/2019	**8**	Boiler	Routine boiler cleaning due to tube fouling. This is a planned evolution which occurs multiple times per year.		Routine Boiler Cleaning
DECEMBER 2019									
Redwing_2	Forced	VFD for Unit 2 ID fan faulted	12/01/2019	12/31/2019	**31**	Induced Draft Fan Variable Frequency Drive	VFD faulted		Replaced unit 2 ID Fan VFD
JANUARY 2020									
NONE									
FEBRUARY 2020									
SHERCO_G1	Forced	PA Fan operation after start-up	02/21/2020	02/22/2020	**1**	11 PA Fan would not start - electricians investigating	Fan motor received a lockout due to a degraded connection on a single phase on the motor side of an Elastimold connector.		Elastimold connector was replaced.
SHERC3	Forced	7 COAL MILL OPERATION	02/12/2020	02/13/2020	**1**	coal feeder motor being replaced.	Electrical clutch on the feeder motor was not engaging.		Feeder motor was replaced.
MARCH 2020									
NONE									
APRIL 2020									
CC Highbridge1	Forced	having stability issues at high loads and warm weather.	04/17/2020	04/23/2020	**7**	Refurbished fuel nozzles installed during Major overhaul by Mitsubishi	Fuel nozzles resulted in high dynamics and NOx emissions at high loads. Mitsubishi retuned combustor and activated a 20 degree exhaust temperature bias resulting in derate.		Fuel Gas Temperature was raised to 400 F for Summer which alleviated the derate. Working with Mitsubishi on replacement fuel nozzles as the issue will resurface with the return of cold weather in Fall 2020
MAY 2020									
SHERC3	Forced	Dry Scrubbers\Performance	05/26/2020	05/28/2020	**3**	CEMS (Continuous Emissions Monitoring System)	Increasing SO2 emissions required the unit to derate until the cause could be discovered and corrected. There is a lag time on knowing actual SO2 emissions as our official reporting method is from coal samples which are sent off stie to be analyzed. Our in line SO2 detector which is used for control cannot be certified due to duct configuration.		Issue with the SO2 inlet analyzer was discovered which wasn't allowing the correct amount of flow through the analyzer. This was corrected by our technician. We are exploring the possibility of relocation of the inlet analyzer so it could be certified.
JUNE 2020									
SHERCO_G1	Forced	Scrubber Module operation	06/01/2020	06/02/2020	**2**	Derated due to 9 Scrubber Module operation	102 scrubber module out for major clean, we experienced a low flow condition on 103 module spray pump and a soft start module failure on 108 module spray pump which caused the derate.		103 module was opened up and the reaction tank cleaned up to the suction strainer due to plugging. 108 module spray pump soft start module was replaced.
SHERC3	Forced	Feedwater heater tube leak	06/01/2020	06/02/2020	**1**	Feedwater heater tube leak on HP Heater 37-1. Heater string removed from service.	This feedwater heater had just been replaced during the spring overhaul as part of a capital project replacement. Following placing in service, a pin hole leak developed on the nitrogen blanket port which is a plug that is threaded in place and seal welded at the factory.		Plug was re-seal welded.
SHERC3	Forced	high amp and fan stall alarms	06/08/2020	06/10/2020	**2**	Derated due to high amp and fan stall alarms for 31 & 32 FD Fans.	Plugged secondary air preheat air coils caused high amps and fan stall alarms on the forced draft fans resulting in a unit derate.		Ash buildup in the coils was able to be pressure washed clean.
SHERC3	Forced	Tube leak	06/10/2020	06/12/2020	**3**	Tube leak on HP Feedwater Heater 36-1 requires feedwater string to be isolated.	Tube (54-4) was found to be leaking, tube (2-1) had a failed plug from a previous repair, and some minor tube plug weld leaks in the outlet on the right hand corner of the heater.		Leaking tubes and their surrounding tubes were plugged with welded plugs. Heater was air tested. This heater is original equipment. Both 36-1 and 36-2 heaters are scheduled to be replaced in 2023. The 37 heaters were just replaced during the 2020 overhaul.

Unit Outage Information

Unit	Outage Category	Primary Reason for Outage	Outage Dates Start	Outage Dates End	Duration (Days)	Equipment that Resulted in the Forced Outage	Description of Equipment Failure	Change in Energy Costs ($s)	Steps Taken to Alleviate Reoccurrence
									[Protected Data Begins
SHERCO_G1	Forced	DA steam leak repair	06/25/2020	06/30/2020	**6**	Deareator	There was a single leak point in the weld between one of the downcomers and the DA shell. This was a partial penetration weld that had a defect in it that went almost to the inside surface of the DA. Some erosion took place and resulted in removal of weld material such that it connected to the defect resulting in a through wall leak		Area was excavated and rewelded. The excavated area was approximately 3" long and ½" deep. Grinding was started with another check for cracking. Air pressure was applied to the weep hole where the steam was initially coming out of, the inside surface was inspected with snoop and only the one spot had any air leakage. Further excavation was performed and the flaw in the weld remained localized to the area. Once fully excavated, it was seen that the weld contained a defect and no cracking was observed.
JULY 2020									
SHERCO_G1	Forced	3 scubber modules unavailable requiring immediate derate.	07/14/2020	07/16/2020	**2**	Scrubber Modules	112 scrubber module out for major clean, failed inlet damper linkage on 111 module requiring off line repair, 105 module bleed pump flush valve..		111 module inlet damper linkage repaired during the September 5th maintenance outage. 105 module bleed pump flush valve was replaced.
SHERCO_G1	Forced	Air emission control/ opacity reduction, 8 scrubber modules in service.	07/16/2020	07/21/2020	**6**		112 scrubber module out for major clean, failed inlet damper linkage on 111 module requiring off line repair, 102 module spray pump soft start. Needed to take modules out for flushing and cleaning to maintain in service scrubbers operational.		111 module inlet damper linkage repaired during the September 5th maintenance outage. 102 module spray pump soft start module was replaced.
SHERCO_G1	Forced	Air emission control - 3 Scrubber modules out of service - 102 (soft start), 111 (inlet damper), and 112 (major)	07/21/2020	07/24/2020	**2**		112 scrubber module out for major clean, failed inlet damper linkage on 111 module requiring off line repair, 102 spray pump module soft start.		111 module inlet damper linkage repaired during the September 5th maintenance outage. 102 module spray pump soft start module was replaced.
SHERCO_G1	Forced	Derate needed because of failure of thickener drive rake mech.	07/24/2020	07/31/2020	**8**	Unit 1 Thickener Gear Box	Gearbox on Unit 1 Thickener failed. One of two thickeners is available for service to serve the needs of both Units 1 and 2 scrubber modules. Derate of both units required to permit time to prep and fill the redundant, Unit 2 thickener.		Unit 2 Thickener placed in service. Gearboxes are nearing end of life. Capital replacement is being perused for the Unit 1 thickener gear box.
SHERCO_G2	Forced	CMILL internal fire. Suspect failed Classifier. Only 5 CMILLs in service.	07/01/2020	07/14/2020	**14**	27 Coal Mill	Internal mill fire caused damage to the rotating classifier vanes.		All rotating classifier vanes were replaced.
SHERCO_G2	Forced	26 Coal Mill roll issue, removed from service. Down to 4 coal mills in service.	07/06/2020	07/09/2020	**3**	26 Coal Mill	Bearing failure on one mill roll assembly.		Replaced roll with assembly from 27 Mill which was OOS due to fire. Damaged Roll assembly was sent to Riley Power for rebuild. 26 Mill is next for Level II Capital Overhaul.
SHERCO_G2	Forced	Derate needed because of failure of thickener drive rake mech.	07/24/2020	07/31/2020	**8**	Unit 1 Thickener Gear Box	Gearbox on Unit 1 Thickener failed. One of two thickeners is available for service to serve the needs of both Units 1 and 2 scrubber modules. Derate of both units required to permit time to prep and fill the redundant, Unit 2 thickener.		Unit 2 Thickener placed in service. Gearboxes are nearing end of life. Capital replacement is being perused for the Unit 1 thickener gear box.
SHERC3	Forced	Available 860 MWN due to Fan Stall Alarms coming in.	07/06/2020	07/31/2020	**25**	Derated due to high amp and fan stall alarms for 31 & 32 FD Fans.	Plugged secondary air preheat air coils caused high amps and fan stall alarms on the forced draft fans resulting in a unit derate.		Ash buildup in the coils was able to be pressure washed clean.
SHERC3	Forced	Abnormal noise in 310 coal mill. Following burning out coal silo, remove from service resulting in 7 coal mill operation.	07/09/2020	07/15/2020	**6**	310 coal mill	Rotating throat assembly failure.		As mills experience failures and during mill overhauls, we will be going back to a bolted lower support bracket design as opposed to a pinned attachment. This will restrict movement of the rotating throats.
King_G1	Forced	Wet Coal. Heavy rains resulted in wet coal pile.	07/26/2020	07/31/2020	**5**	Stockfeeders/coal silos	Unable to keep coal feeding from coal silos to stockfeeders and unable to keep stockfeeders from plugging up		Work with yard on maintaining coal live pile levels higher when the chance of major precipitation is expected. Work with fuel supply to turn over storage piles so that reclaim coal doesn't become as saturated from sitting on the group for extended periods of time.
SHERCO1_ G1	Forced	Unit required offline for DA steam leak repair	07/01/2020	07/03/2020	**2**	Deareator	Continuation of 6/25/2020 event. There was a single leak point in the weld between one of the downcomers and the DA shell. This was a partial penetration weld that had a defect in it that went almost to the inside surface of the DA. Some erosion took place and resulted in removal of weld material such that it connected to the defect resulting in a through wall leak		Continuation of 6/25/2020 event. Area was excavated and rewelded. The excavated area was approximately 3" long and ½" deep. Grinding was started with another check for cracking. Air pressure was applied to the weep hole where the steam was initially coming out of, the inside surface was inspected with snoop and only the one spot had any air leakage. Further excavation was performed and the flaw in the weld remained localized to the area. Once fully excavated, it was seen that the weld contained a defect and no cracking was observed.
AUGUST 2020									
SHERCO_G1	Forced	Wet Scrubbers	08/03/2020	8/31/2020	**28**	Scrubber Modules	With two other modules out of service for major cleaning to maintain our 8 month cleaning schedule, 111 module inlet damper failed resulting in the derate. The inlet dampers are hung from the upper bearing and the upper shaft is welded on top of the damper just below the duct ceiling. That weld failed causing the damper to drop down onto the floor. Unit needed to be off line to repair, this was done during a 9/15/20 maintenance outage.		The inlet damper was jacked back up into place and rewelded back to the shaft. To strengthen the weld, a small window was cut out in the damper itself and a seal weld was completed on the inside as well.

Unit Outage Information

Unit	Outage Category	Primary Reason for Outage	Outage Dates Start	End	Duration (Days)	Equipment that Resulted in the Forced Outage	Description of Equipment Failure	Change in Energy Costs ($s)	Steps Taken to Alleviate Reoccurrence
									[Protected Data Begins
SHERCO_G2	Forced	Coal Mill Feeder tripped	08/03/2020	8/5/2020	**2**	26 Coal Mill Feeder	Failed motor on the feeder while redundant mill was out for overhaul.		Replaced Feeder Motor.
SHERCO_G2	Forced	Load reduction to maintain environmental margins for SO2 removal on Common Stack	08/29/2020	8/31/2020	**3**	Scrubber Modules	Units required to take periodic derates due to high daily common stack SO2 averages which reduced margin to the compliant 30 day rolling average of 0.05 lbs/MMBtu		A team was formed including plant management, engineering, environmental services, and the services of a retired former plant engineer with extensive experience on the scrubber modules. Causes for higher SO2: 1)Unusually high U1&2 loads compared to past operation. (Largest contributor) 2)Low calcium to sulfur ratios in some of U1&2's recent coal trains. (Large contributor) 3)Lower than normal reaction tank levels, and scrubber imbalances in U1&2's wet scrubber modules. (Contributing factor) 4)Lower than normal slurry spray flows in U1&2's wet scrubber modules. (Contributing factor) Corrective Actions: 1)Increase tank levels to higher than we have typically run 2)Balanced modules on multiple occasions 3)During Unit 1 outage in early September a.Cleaned 101 module strainer, suspected plugging as the cause for lower spray flows b.Replaced 103 module plugged PC spray nozzles, that is the suspected cause for lower spray flows c.Replaced plugged makeup nozzles on 106 module, module was having trouble keeping up tank level d.12 drain pump discharge line was cleaned, weren't getting valid slurry samples for the modules e.Rodded out all U1 Module Level probes to verify accurate level readings 4)Starting cleaning 2 modules on Unit 1 to get caught up on the cleaning schedule 5)Notifications written for Unit 2 Scrubber Makeup headers that appear to be restricted
SHERC3	Forced	Available 860 MWN due to Fan Stall Alarms coming in.	08/01/2020	8/10/2020	**9**	Derated due to high amp and fan stall alarms for 31 & 32 FD Fans.	Continuation of 7/6/20 event. Plugged secondary air preheat air coils caused high amps and fan stall alarms on the forced draft fans resulting in a unit derate.		Continuation of 7/6/20 event. Ash buildup in the coils was able to be pressure washed clean.
SHERC3	Forced	Derate to 680 MWN due to only 4 available SDA"s.	08/10/2020	8/11/2020	**1**	36 Additive Feed Pump	While operating with 32 and 37 SDAs out of service due to issues with their associated additive feed pumps and 38 SDA out of service due to CSC CV 3016 being stuck at 75% open, 36 Additive feed pump was discovered to have a belt failure and the lines from the pump to SDA were plugging up		The supply lines for the various additive feed pump supplies to their respective SDA's were cleaned and the belt replaced on 36 pump. Overhauls will include cleaning of these lines while the unit is off line.
PR_ISLD_1	Forced	Unit tripped, power range flux rate instrumentation	08/26/2020	8/30/2020	**4**	Power range Neutron Monitor	While testing the redundant channel, a spurious trip occurred on this equipment. A plant trip occurs when both channel trip together.		repaired equipment, initiated study to determine opportunities to bypass the trip function during testing thereby maintaining a single failure proof set up
CCRiverside1	Forced	Unit 9 in outage due to water intake restrictions	08/11/2020	8/14/2020	**3**		Riverside Unit 9 was unavailable due to work downstream of the plant intake. The river level required to perform the downstream work was lower than what is needed to run both circulating water pumps. Without both circulating water pumps in service, condenser vacuum can not be maintained with higher summer river temperatures when operating in 2X1 mode. Therefore, Riverside was only available for 1x1 operation during this work.		This event is considered to be "Outside of Management Control". There are currently no actions to be taken by the Riverside Plant to alleviate this event from reoccurrence.
SHERC3	Forced	Boiler Tube Leaks	08/11/2020	8/21/2020	**9**	Boiler Economizer	Sootblower erosion caused a tube failure on a horizonal reheat tube. The steam from the failure caused collateral damage to an adjacent economizer support tube that also ruptured.		Limitoque was sent off site for repairs.
SHERC3	Forced	Boiler Tube Leaks	08/22/2020	8/29/2020	**7**	Boiler Final Superheat	Initiating tube failure was short term overheating due to oxide exfoliation pluggage. It is hypothesized that the source of this oxide is from the outlet headers downstream of the finishing superheat assemblies. This indicates the oxide traveled backwards from the headers into the pendants. It is theorized this could happen during boiler air tests, during shutdowns when the steam inside the pendants and header are condensing, or during boiler drains when vents and drains are manipulated.		Two window welds were done on this tube section to complete the repair.

Unit Outage Information

Unit	Outage Category	Primary Reason for Outage	Outage Dates Start	End	Duration (Days)	Equipment that Resulted in the Forced Outage	Description of Equipment Failure	Change in Energy Costs ($s)	Steps Taken to Alleviate Reoccurrence
								[Protected Data Begins	
SEPTEMBER 2020									
SHERCO_G2	Forced	Derate for Exciter Cooler East Hot Sensor Issue	09/09/2020	9/10/2020	**1**	Exciter Cooler temperature RTD	Exciter East Hot air temperature RTD failed. After testing to verify this, the unit was released for normal dispatch.		RTD was replaced during the next off line opportunity.
SHERCO_G1	Forced	Derated due to 12 LP Heater Extraction Block Valve not opening	09/15/2020	9/30/2020	**15**	12 Feedwater Heater Extraction Block Valve	Following startup of the unit, it was discovered that 12 FW heater extraction block valve, LE WV 1001, would not open electrically or manually. Unit had to be derated to 610 MWn based on GE recommendations. Limitorque actuator failure which could not be removed safely until the unit was taken off line during the reheater tube leak repair.		Limitoque was sent off site for repairs.
SHERCO_G2	Forced	U2 offline for boiler leak discovered after unit shutdown. Couton bottom tube leak.	09/20/2020	9/25/2020	**5**	Boiler Couton Bottom	Following shutdown for economy, a tube leak was discovered which was located on the bottom of the first tube on the southeast couton bottom. It appears the leak developed right at the end of where a wear bar was welded onto the tube		Two window welds were done on this tube section to complete the repair.
PR_ISLD_2	Forced	Circ Pump Trip	09/22/2020	9/28/2020	**5**	Circ water pump trip	failure of control circuitry		replaced failed component, completed causal evaluation on the trip
OCTOBER 2020									
SHERCO_G1	Forced	Derated due to 12 LP Heater Extraction Block Valve not opening	10/01/2020	10/30/2020	**30**	12 Feedwater Heater Extraction Block Valve	Continuation of 9/15/20 event. Following startup of the unit, it was discovered that 12 FW heater extraction block valve, LE WV 1001, would not open electrically or manually. Unit had to be derated to 610 MWn based on GE recommendations. Limitorque actuator failure which could not be removed safely until the unit was taken off line during the reheater tube leak repair.		Limitoque was sent off site for repairs.
SHERCO_G1	Forced	Reduced to MIN load to investigate detected tube leak - Reheat tube leak.	10/22/2020	10/25/2020	**4**	Boiler Reheater	Tube leak could be heard outside the boiler near the reheater section. Unit was derated to reduce boiler pressure to prevent collateral damage until unit could be taken off line for repairs.		Through wall tube repairs were completed on the leaking tubes when the unit came off line.
SHERCO_G2	Forced	Derated due to Deaerator water makeup limitations.	10/26/2020	10/28/2020	**2**	Condensate Drag Valve	Condensate drag valve, CV CD 2010, lost its auto function and would not control in manual.		Drag valve was repaired by I&C technicians.
SHERCO_G1	Forced	Reheater tube leak repairs	10/26/2020	10/30/2020	**5**	Boiler Reheater	Two tube leaks were discovered in the rear Reheater section on pendants 105 and 106.		Through wall tube repairs were completed on the leaking tubes.
NOVEMBER 2020									
SHERCO_G1	Forced	ACG not available because of a stuck superheat spray block valve. Load reduced to maintain superheat temps.	11/01/2020	11/3/2020	**2**	Desuperheat Spray DC Block Valve	Block valve failed closed during unit startup. Unit needed to be derated to control steam temperatures until it was taken off line for repair.		Limitoque was sent off site for repairs and reinstalled.
SHERCO_G1	Forced	Reduced load to allow Module Upper Field drying 108 MOD UPR Field OOS. This is to maintain margin to Environmental limits (Opacity).	11/14/2020	11/15/2020	**1**	Scrubber Modules	With two other modules out of service for major cleaning to maintain our 8 month cleaning schedule, the upper field on 108 module failed so the unit needed to be derated to stay below our opacity compliance limits.		Capacitors on the module field power supplies are being changed out with an improved design as well as cooling fans being added to the power supplies. Cleaning frequency for each scrubber module (12 total per unit) has increased from once a year to once every 8 months. This strategy will still require some smaller derates to complete all required cleaning evolutions but these smaller derates should be limited mainly to the spring and fall when energy prices are historically less. There will also be derates due to loss of other module components during times which we need to have two major cleans in progress at once due to the loss of redundancy.
SHERCO_G1	Forced	Derate due to 3 scrubber modules out of service. 103 and 106 Modules in major cleans and emergent failure of 110 module spray pump.	11/20/2020	11/21/2020	**1**	Scrubber Modules	With two other modules out of service for major cleaning to maintain our 8 month cleaning schedule, the spray pump on 110 module failed, causing the derate.		Spray pump was repaired. Cleaning frequency for each scrubber module (12 total per unit) has increased from once a year to once every 8 months. This strategy will still require some smaller derates to complete all required cleaning evolutions but these smaller derates should be limited mainly to the spring and fall when energy prices are historically less. There will also be derates due to loss of other module components during times which we need to have two major cleans in progress at once due to the loss of redundancy.
SHERCO_G1	Forced	Need to come off to repair desuperheat spray DC block valve.	11/03/2020	11/9/2020	**6**	Desuperheat Spray DC Block Valve	Limitorque failure which prevented the valve from opening and preventing the unit from going over 215MWn. Unit needed to be taken off line to safely remove actuator.		Limitoque was sent off site for repairs and reinstalled.
DECEMBER 2020									
CC Highbridge1	Forced	U7 is derated due to combustion issues	12/01/2020	12/31/2020	**31**	Refurbished fuel nozzles installed during Major overhaul by Mitsubishi	Fuel nozzles resulted in high dynamics and NOx emissions at high loads. Mitsubishi retuned combustor and activated a 20 degree exhaust temperature bias resulting in derate.		Working with Mitsubishi on replacement fuel nozzles. Same issue resurfaced with the return of cold weather as in April 2020.

Unit Outage Information

Unit	Outage Category	Primary Reason for Outage	Outage Dates Start	End	Duration (Days)	Equipment that Resulted in the Forced Outage	Description of Equipment Failure	Change in Energy Costs ($s)	Steps Taken to Alleviate Reoccurrence
									[Protected Data Begins
SHERCO_G1	Forced	Derated due to feed water side relief valve failure.	12/14/2020	12/15/2020	1	17 Feedwater Heater relief valve	17 Feedwater Heater feedwater side relief valve failed open. Heater needed to be bypassed and isolated to perform repairs, causing the derate.		Relief valve was replaced.
SHERCO_G2	Forced	Derated due to loss of 23 cmill feeder control. Unable to operate 5 mill operation available.	12/05/2020	12/7/2020	2	23 Coal Mill Feeder	Clutch failure on motor would cause feeder to ramp up to maximum speed.		Coal Feeder Motor was replaced.
SHERCO_G2	Forced	Unit derate for 5 mill operation. 21 mill internal temp.	12/13/2020	12/16/2020	3	21 Coal Mill	Mill needed to be taken out of service to investigate a hot door temperature alarm.		Mill was opened up and nothing was noted which may have caused this. Placed back in service.
SHERCO_G2	Forced	21 CMILL Internal temp issues. 5 Mill operation.	12/16/2020	12/18/2020	2	21 Coal Mill	Mill needed to be taken out of service to investigate a hot door temperature alarm.		Mill was opened up and nothing was noted which may have caused this but a small adjustment was made on the air inlet vanes which seems to have corrected the problem.
SHERC3	Forced	Derate due to severe packing leak on 32 second stage superheat attemperation spray control valve.	12/09/2020	12/15/2020	5	32 Second Stage Superheat Attemperation Control Valve	Severe packing leak required a unit derate to lower pressure to reduce collateral damage risk in the area until unit could be taken off line for repair.		Packings replaced on this valve and the other three attemperation control valves.
CC Highbridge1	Forced	Mitsubishi returning to site to correct burner issues causing derate.	12/01/2020	12/2/2020	1	Refurbished fuel nozzles installed during Major overhaul by Mitsubishi	Fuel nozzles resulted in high dynamics and NOx emissions at high loads. Mitsubishi retuned combustor and activated a 20 degree exhaust temperature bias resulting in derate.		Mitsubishi replaced refurbished fuel nozzles with new fuel nozzles under warranty and issue is still not resolved. Mitsubishi is resizing orifices in another set of fuel nozzles to be installed when available in 2021.
SHERCO_G1	Forced	Unit needs to be offline for investigation and repairs to suspected leak on CRH header.	12/07/2020	12/14/2020	7	Cold Reheat Pipe	Small leak was found on a gasket on a flanged spool piece section of the pipe. The unit was taken off line so scaffold could be installed and insulation removed to determine if their was a risk of catastrophic failure of the pipe.		Repairs will be made during the Unit 1 overhaul scheduled for spring of 2021.
SHERC3	Forced	Coal silo burn down to repair possible superheat leak.	12/15/2020	12/20/2020	5	36-1 High Pressure Feedwater Heater	Leaks were found on already plugged tubes in the corner section of the heater as well as one new leaking tube. The new leaking tube is in close proximity to tubes that had their tube plugs fail. Due to proximity to the tubes with the failed plugs, there is a high degree of confidence that damage from previous failed tubes in the area caused this tube to fail. It is also likely that the failed tube plugs at least contributed to, if not caused, this failure by opening up a previously failed tube		The failed plug welds were removed and the tubes were replugged via buildup of new weld material. An additional three tubes were plugged due to their proximity to the new leaking tube and tubes with leaking plugs. Both 36-1 and 36-2 heaters are scheduled to be replaced in 2023.
JANUARY 2021									
SHERCO_G2	Forced	5 CMILL OPERATION. 24 Cmill classifier belt, 23 Cmill OH.	01/27/2021	1/28/2021	1	24 Coal Mill	With 23 Coal Mill out of service for a planned overhaul, failure of 24 Coal Mill's classifier belt resulted in a derate until the belt could be replaced.		Alternative design drive belt installed allowing for faster changeout, however, we are finding they only last about 9 months compared to 3 years for the original. Original style belt will be installed during next mill overhaul as it lasts longer.
FEBRUARY 2021									
SHERCO_G1	Forced	11 coal mill classifier out of service and requires derate to replace the classifier belts	02/01/2021	02/03/2021	2	11 Coal Mill	With 13 Coal Mill out of service for a planned overhaul, failure of 11 Coal Mill's classifier belt resulted in a derate until the belt could be replaced.		Alternative design drive belt installed allowing for faster changeout, however, we are finding they only last about 9 months compared to 3 years for the original. Original style belt will be installed during next mill overhaul as it lasts longer.
SHERCO_G1	Forced	Derate needed to Maintain margin for environmental permit.	02/08/2021	02/09/2021	1	Scrubber Modules	With 101 Module out of service for Major Clean, a failure of 102 Modules Upper Field and 112 Modules Spray Pump requiring a repack, derate taken to allow repair of 112 Modules spray pump and 102 Modules Upper Field.		Capacitors on the module field power supplies are being changed out with an improved design as well as cooling fans being added to the power supplies. Spray pump was repacked and module returned to service. Cleaning frequency for each scrubber module (12 total per unit) has increased from once a year to once every 8 months. This strategy will still require some smaller derates to complete all required cleaning evolutions but these smaller derates should be limited mainly to the spring and fall when energy prices are historically less. There will also be derates due to loss of other module components during times which we need to have two major cleans in progress at once due to the loss of redundancy.
SHERCO_G1	Forced	Derate needed to Maintain margin for environmental permit.	02/19/2021	02/24/2021	6	Scrubber Modules	Following an extended period of full power operations due to polar vortex, common stack was approaching the 30 day Nox limit. Derate necessary to maintain margin for environmental NOx limitations.		Operation of both units at their top operating level typically causes the daily NOx average to be at or above 0.15 lb/MMBtu. Extended periods of operation at these levels causes the 30 day rolling average to approach the 0.15 lb/MMBtu limit. Normal daily operation typically results in approximately 0.135 lb/MMBtu. Derate following the polar vortex event allowed for restoring the margin to environmental limits such that the units would be available to meet extended full power operation again should it be required.

Unit Outage Information

Unit	Outage Category	Primary Reason for Outage	Outage Dates Start	End	Duration (Days)	Equipment that Resulted in the Forced Outage	Description of Equipment Failure	Change in Energy Costs ($s)	Steps Taken to Alleviate Reoccurrence
									[Protected Data Begins
SHERCO_G2	Forced	Derate needed to Maintain margin for environmental permit.	02/19/2021	02/24/2021	**6**	Scrubber Modules	Following an extended period of full power operations due to polar vortex, common stack was approaching the 30 day Nox limit. Derate necessary to maintain margin for environmental NOx limitations.		Operation of both units at their top operating level typically causes the daily NOx average to be at or above 0.15 lb/MMBtu. Extended periods of operation at these levels causes the 30 day rolling average to approach the 0.15 lb/MMBtu limit. Normal daily operation typically results in approximately 0.135 lb/MMBtu. Derate following the polar vortex event allowed for restoring the margin to environmental limits such that the units would be available to meet extended full power operation again should it be required.
MARCH 2021									
CC Highbridge1	Forced	Immediate unit 7 outage to address aux gearbox noise	03/24/2021	3/30/2021	**6**	U7 Combustion Turbine Aux Gear Box	U7 aux gear box had a bearing failure requiring replacement prior to damaging gears.		Bearing was replaced proactively during 2019 major overhaul.
APRIL 2021									
SHERCO_G2	Forced	Derate needed to maintain environmental margin for NOx limitations	04/15/2021	4/22/2021	**8**	2 GSU Transformer	Following an extended period of operation with U1 offline and U2 firing to maintain steam supply to LPI while 2 GSU transformer was being repaired, the common stack 30 day rolling NOx average increased above 0.14 lb/MMBtu. Derate necessary to maintain margin for environmental NOx Limitations.		U1 was offline for major overhaul and 2 GSU transformer failed. The desire to maintain steam supply to LPI while generator was offline resulted in a mix of fuel oil use and a single coal mill to maintain this supply. This caused the 30 day rolling average to approach the 0.15 lb/MMBtu limit. Completion of the install of the new Aux Boiler will alleviate the condition where either U1 or U2 would be required to be online to support LPI steam supply. Aux boiler commissioning is schedule for December 2021.
CC Highbridge1	Forced	Unit 8 Hot Reheat bypass valve is not sealing. Need to disassemble to repair. Requires total plant outage and cool down.	04/21/2021	4/22/2021	**2**	U8 Hot Reheat Bypass Valve	U8 Hot Reheat Bypass valve internals were replaced with rebuilt plug and seat during Spring outage. Upon return, the valve did not seat and leaked by enough to exceed downstream temp limits whil on-line.		Plant will use a different vendor for refurbishment and ensure contact checks are made for the plug/seat combination.
CC Highbridge2	Forced	Unit 8 Hot Reheat bypass valve is not sealing. Need to disassemble to repair. Requires total plant outage and cool down.	04/21/2021	4/22/2021	**2**	U8 Hot Reheat Bypass Valve	U8 Hot Reheat Bypass valve internals were replaced with rebuilt plug and seat during Spring outage. Upon return, the valve did not seat and leaked by enough to exceed downstream temp limits whil on-line. U7 required off-line to repair Unit 8 due to isolation requirements.		Plant will use a different vendor for refurbishment and ensure contact checks are made for the plug/seat combination.
SHERCO_G2	Forced	Generator Transformer Trouble - repairs to bladders on transformer needed.	04/05/2021	4/15/2021	**9**	2 GSU Transformer	Failure of 2 GSU transformer's bladder resulted in the unit being taken offline to drain oil from the transformer and replace the bladders.		Bladders were replaced and Performance Optimization group was tasked with reviewing PM frequency for transformer oil bladder replacement.
MAY 2021									
SHERCO_G1	Forced	Derate until relief valves can be set post overhaul. Currently scheduled for 5/3.	05/01/2021	05/03/2021	**1**	Boiler Relief Valves	Derate to maintain boiler pressure at lower level until the associated boiler relief valves replaced during unit outage could be set by independent contractor.		Contractor brought in and coordinated with operations to go to full load/pressure to perform post outage boiler relief valve setpoint verifications.
SHERCO_G1	Forced	Derated due to 14 Boiler Circ pump trouble\ failure.	05/04/2021	05/31/2021	**27**	14 Boiler Circ Pump	Following replacement of 14 BCP during the U1 overhaul, during normal operation of the pump, the pump tripped offline. Investigation revealed a shorted winding which would require the pump to be removed and sent off site for rewind and repair. With only 3 of 4 BCPs available, unit derated to 610 MWn.		Pump/Motor assemble was removed, blank installed and sent to Hayward Tyler for evaluation, quote, rewind and repair. Motor shipped back to the site on 7/30/21 and arrived on site on 8/2/21.
SHERCO_G2	Forced	High Condenser Back Pressure 3.00 psia, derate for turbine safety. Outer condenser loop out of service	05/19/2021	05/26/2021	**7**	Circ Water Cooling	Fouling of the outer loop of Circ Water cooling to the HP condenser required taking that loop out of service to clean the water boxes and tubes. Cause of the tubes being fouled was due to extended operations with no AMER tap system in service coupled with not cleaning the tubes during the U2 outage in 2019.		Loop was isolated to clean water boxes and tubes. Ammerman system for outer loop was repaired and returned to service. Cleaning of the units inner loop proactively scheduled during U2 seasonal operations.
JUNE 2021									
SHERCO_G1	Forced	Derated due to 14 Boiler Circ pump trouble\ failure.	06/04/2021	06/30/2021	**26**	14 Boiler Circ Pump	Following replacement of 14 BCP during the U1 overhaul, during normal operation of the pump, the pump tripped offline. Investigation revealed a shorted winding which would require the pump to be removed and sent off site for rewind and repair. With only 3 of 4 BCPs available, unit derated to 610 MWn.		Pump/Motor assemble was removed, blank installed and sent to Hayward Tyler for evaluation, quote, rewind and repair. Motor shipped back to the site on 7/30/21 and arrived on site on 8/2/21.
SHERCO_G2	Forced	Tube leak outage to allow for lowering throttle pressure in order to minimize damage from leak.	06/01/2021	06/10/2021	**9**	Boiler Couton Bottom	Management decision to conservatively keep pressure lower following discovery of a tube leak to minimize potential damage to surrounding tubes until unit could be removed for repair.		Maintenance worked with engineering to drill through the membrane and find the leaking tube. The faulty tube was removed and a window weld performed to replace the cutout section of tubing. Air test was performed as post maintenance test. Engineering determined that most likely cause was quench cracking event due to plugged bottom ash overflows causing abnormally high levels in the bottom ash hoppers. Seal trough drains and bottom ash overflows were cleaned to prevent recurrence.

Unit Outage Information

Unit	Outage Category	Primary Reason for Outage	Outage Dates Start	End	Duration (Days)	Equipment that Resulted in the Forced Outage	Description of Equipment Failure	Change in Energy Costs ($s)	Steps Taken to Alleviate Reoccurrence
									[Protected Data Begins
SHERC3	Forced	Bag house availability. This derate needed to maintain margin to environmental limits.	06/04/2021	06/07/2021	**3**	Fabric Filter Compartments	FF Compartments 31-08, 32-16 and 33-02 were out of service for capital bag replacement project. FF Compartment 32-03 was isolated for spring retensioning. During startup, unit received opacity spikes. Unit derated to take offending compartments out of service and maintain compartment D/P limits in order to maintain environmental limits.		Fabric filter compartments with leaks were repaired and returned to service allowing for return to full power operation.
SHERC3	Forced	Apparent tube like in feed water heater tube leak in FWH 36-2/37-2 string.	06/24/2021	06/30/2021	**6**	37-2 Feedwater Heater	During startup of Unit 3, operations personnel was unable to place high pressure heater string 36-2/37-2 in service due an apparent tube leak. Heater string was isolated and a tube leak was verified in 37-2 feedwater heater. Unit derated due to feedwater heater string out of service.		Heater string removed from service and unit derated until a favorable market condition would allow for unit to be taken offline to repair the tube leak. Working with marketing determined that the best time for this would be during the planned outage for state mandated boiler inspection in September. Heater will be repaired and remaining tubes will have eddy current testing performed to determine if there are any other suspectable tubes.
SHERCO_G1	Forced	Remove 14 Boiler Circ Pump and install blank , replace drum relief valve - crack in the nozzle.	06/01/2021	06/04/2021	**4**	14 Boiler Circ Pump	Unit taken off line to remove failed 14 BCP and install blanking plate until 14 BCP could be repaired and an outage taken to remove the blanking plate and reinstall the pump.		Pump/Motor assemble was removed, blank installed and sent to Hayward Tyler for evaluation, quote, rewind and repair. Motor shipped back to the site on 7/30/21 and arrived on site on 8/2/21.
SHERCO_G2	Forced	Tube leak discovered while unit was in reserve shutdown for economics.	06/22/2021	06/25/2021	**4**	Boiler Couton Bottom	Following taking unit offline for economic shutdown, the location of the tube leak noted on 6/1/21 was found. Based on failure analysis it was determined to have been from a quenching event due to high levels in the bottom ash hopper.		Maintenance worked with engineering to drill through the membrane and find the leaking tube. The faulty tube was removed and a window weld performed to replace the cutout section of tubing. Air test was performed as post maintenance test. Engineering determined that most likely cause was quench cracking event due to plugged bottom ash overflows causing abnormally high levels in the bottom ash hoppers. Seal trough drains and bottom ash overflows were cleaned to prevent recurrence.
SHERCO_G2	Forced	Outage extension, difficult in finding tube leak and subsequent repair.	06/25/2021	06/30/2021	**5**	Boiler Couton Bottom	Following taking unit offline for economic shutdown, the location of the tube leak noted on 6/1/21 was found. Based on failure analysis it was determined to have been from a quenching event due to high levels in the bottom ash hopper. Difficulty in locating the failed tube and accessing for repair caused the maintenance outage to extend.		Maintenance worked with engineering to drill through the membrane and find the leaking tube. The faulty tube was removed and a window weld performed to replace the cutout section of tubing. Air test was performed as post maintenance test. Engineering determined that most likely cause was quench cracking event due to plugged bottom ash overflows causing abnormally high levels in the bottom ash hoppers. Seal trough drains and bottom ash overflows were cleaned to prevent recurrence.
JULY 2021									
SHERCO_G1	Forced	Derated due to 14 Boiler Circ pump trouble\ failure.	07/01/2021	7/31/2021	**31**	14 Boiler Circ Pump	Following replacement of 14 BCP during the U1 overhaul, during normal operation of the pump, the pump tripped offline. Investigation revealed a shorted winding which would require the pump to be removed and sent off site for rewind and repair. With only 3 of 4 BCPs available, unit derated to 610 MWn.		Pump/Motor assemble was removed, blank installed and sent to Hayward Tyler for evaluation, quote, rewind and repair. Motor shipped back to the site on 7/30/21 and arrived on site on 8/2/21.
SHERCO_G2	Forced	Derate to 610 MWn due to failure of 24 BCP breaker. Only 3 out of 4 BCP"s available.	07/01/2021	7/9/2021	**8**	24 Boiler Circ Pump	Operations was contacted by engineering about smoke coming from the breaker associated with 24 Boiler Circ Pump. Operations was unable to trip the breaker remotely. Once the breaker was tripped locally, the breaker was found with charring in the control portion of the breaker. Troubleshooting revealed a ground on the Bus 24 cubicles 16 through 25 which included 24 Boiler Circ Pump. Unit derated until breaker could be repaired and tested.		Repaired cause of the ground, restored affected Bus 24 cubicles. Following repair of breaker for 24 Boiler Circ Pump, the breaker was reinstalled and the pump restored.
SHERC3	Forced	Apparent water heater tube leak in FWH 36-2/37-2 string, requiring derate to 755 MW.	07/01/2021	7/9/2021	**9**	37-2 Feedwater Heater	During startup of Unit 3, operations personnel was unable to place high pressure heater string 36-2/37-2 in service due an apparent tube leak. Heater string was isolated and a tube leak was verified in 37-2 feedwater heater. Unit derated due to feedwater heater string out of service.		Heater string removed from service and unit derated until a favorable market condition would allow for unit to be taken offline to repair the tube leak. Working with marketing determined that the best time for this would be during the planned outage for state mandated boiler inspection in September. Heater will be repaired and remaining tubes will have eddy current testing performed to determine if there are any other suspectable tubes.
CCRiverside1	Forced	In order to maintain compliance with river temperature environmental permits, Unit 9 must be taken off-line	07/03/2021	7/6/2021	**3**	No equipment failures were involved with this unit outage..	This was an outage to maintain compliance with an environmental permit requirement. River temperature limits related to environmental permits would be exceeded if the unit remained on-line. No equipment failure were involved.		No equipment failures were involved with this unit outage. This was an outage to maintain compliance with an environmental permit requirement. River temperature limits related to environmental permits would be exceeded if the unit remained on-line. No equipment failure were involved.
									Protected Data Ends]

Xcel Energy	XES 2.600
Energy Supply Policy System	Revision: 6.1
TITLE: *Event Learning & Root Cause Analysis*	Page 1 of 13

1.0 PURPOSE

This policy establishes the requirements for Event Learning and Root Cause Analysis (RCA), provides guidelines for conducting an RCA, establishes a forum for the dissemination of results and engagement in the analysis process, and an exchange of lessons learned throughout the Energy Supply Organization.

2.0 APPLICABILITY

All Energy Supply personnel

3.0 REPONSIBILITIES

3.1 Energy Supply leadership is responsible to ensure that the Event Learning process and Root Cause Analysis process are implemented as required by this policy.

3.2 All Business Areas ***SHALL*** be responsible for assistance in analysis and lessons learned for incidents where they have expertise.

3.3 Plant Management ***SHALL*** notify the Hazard Insurance Department of any physical damage loss in excess of $500,000 or any fire involving activation or malfunction of a fixed fire extinguishing or detection system.

3.4 Plant Management and Fleet Engineering ***SHALL*** determine if a Generator trip was due to a generator Protection System mis-operation. Generator trips will be investigated in accordance with EPR 5.730P01 Protection System Failure and Mis-operation Reporting Procedure. The plant will forward the Corrective Action Plan for any Generator Protection System mis-operation to Fleet Engineering who will coordinate with the Energy Supply Compliance team.

4.0 REQUIREMENTS

4.1 The following events require an Event Learning Report to be completed:

4.1.1 Unplanned unit outage or unit derate which limits the unit as required for NERC Generating Available Data System (GADS) reporting.

4.1.1.1 The Event Learning process is not required for hydro units, except Cabin Creek.

4.1.1.2 The Event Learning process is not required for simple cycle combustion turbine units <50MW.

4.1.1.3 The event learning process is not required for the steam unit that is derated due to a combustion turbine outage (combined cycle facilities).

4.1.1.4 Outside Management Control (OMC) events.

4.1.2 Any environmental non-compliance (including exceedances and deviations (e.g. EPA, State)).

4.1.3 A human performance error that had the potential to cause an injury or reliability event. The threshold for evaluating and documenting the event will be determined by site leadership, based on the learning opportunity.

4.1.4 Event Learnings may also be required per Energy Supply leadership discretion (e.g. Human Performance events, large equipment failures that do not result in a GADS event, etc.)

4.2 Energy Supply Leadership ***SHALL*** determine when an RCA will be initiated for generation events. Events that are unique, not well understood, first time events, have a large business impact, etc., where there is business value to understand the cause, the contributing factors, and to mitigate the potential impact across the fleet ***SHALL*** be a priority for an RCA.

4.2.1 An RCA is required for any environmental event in which a permit limit is exceeded and/or a notification to a Regulatory Agency (e.g. Environmental Protection Agency, Minnesota Pollution Control Agency, etc.) is required).

4.2.2 A review of all Event Learning events ***SHALL*** be done on routine frequency to determine if additional RCA's are required to be performed (repetitive events, high impact events, etc.) per section 4.6.

4.3 All Event Learning and Root Cause Analysis reports ***SHALL*** be entered into APM.

4.4 Event Learning Process

4.4.1 The Event Learning entry into APM (Asset Performance Management software) ***SHALL*** be initiated by operations leadership after the event information has been entered into GADS and when the PCI for the event has been transitioned to “Completed”. Event Learning entries ***SHALL*** include:

4.4.1.1 Interviewing personnel involved in the event to capture all pertinent information associated with the event.

4.4.1.2 Collecting all documentation associated with the event (e.g. log entries, PCI entries, Work Orders, etc.).

4.4.1.3 Complete all required inputs in the Event Learning report, including all collected information.

4.4.1.4 Making the determination of any immediate corrective action items needed and entering the information into the Event Learning corrective action item datasheet.

4.4.1.5 If a root cause or contributing factor is believed to be training related, then the XES 2.600A01 Training Analysis for Learning Events policy will be used to evaluate if training is required.

4.4.2 Once the Event Learning information is entered into APM, change the state from Pending to Request for Review. This will trigger an e-mail notification to the applicable department manager that the Event Learning entry is ready for review. The initial entry and the transition from Pending to Request for Review ***SHALL*** take place within 48 hours.

4.4.3 Upon receipt of the notification that the Event Learning is ready for review, the applicable department Manager ***SHALL***:

4.4.3.1 Review the draft Event Learning to ensure completeness and accuracy.

4.4.3.2 Review any/all supporting documentation pertinent to the event.

4.4.3.3 For repetitive events where an Event Learning or RCA has been completed previously AND corrective actions have been defined and are in progress to prevent recurrence, the department manager ***SHALL*** provide electronic approval of the Event Learning in APM.

4.4.3.4 Approval ***SHALL*** be completed within 30 calendars days of the Event Learning initiation within APM.

4.4.3.5 Non-repetitive Event Learnings ***SHALL*** be forwarded for final review and approval per Section 4.4.4.

4.4.4 Event Learning Review and Approval

4.4.4.1 Upon completion of the Event Learning manager review, the responsible department Manager ***SHALL*** forward the completed Event Learning to the Plant Director, Performance Optimization Reliability Engineering Manager, and the Site Human Performance Team for final review.

4.4.4.2 The Plant Director and Performance Optimization Reliability Engineering Manager ***SHALL*** provide electronic approval in APM. Upon approval, the Site Human Performance team electronically acknowledges the Event Learning in APM.

4.4.4.3 Final approval ***SHALL*** be completed within 30 calendars days of receipt of the Event Learning report from the department manager.

4.5 Root Cause Analysis

4.5.1 Energy Supply Leadership ***SHALL*** determine when to initiate an RCA. Energy Supply Leadership are Plant Directors/Managers, Performance Optimization Directors, and Environmental Services Directors.

4.5.1.1 Energy Supply Leadership ***SHALL*** agree upon and assign an RCA leader

4.5.2 The RCA leader ***SHALL*** assign personnel to the RCA team including personnel involved in the event, operations management, subject matter experts, Performance Optimization personnel, and other resources to

ensure the analysis and resulting conclusion and recommendations are as accurate as possible.

4.5.3 The RCA team ***SHALL*** utilize proper event learning techniques to complete the RCA.

4.5.3.1 Focus on the accurate determination of the root cause of the event and any contributing factors.

4.5.3.2 Determine appropriate corrective/improvement actions to prevent event recurrence.

4.5.3.3 If a root cause or contributing is believed to be training related, then XES 2.600A01 Training Analysis for Learning Events will be used to evaluate if training is required.

4.5.4 The result of the Root Cause Analysis ***SHALL*** be documented in APM. All completed root cause events ***SHALL*** include:

4.5.4.1 A complete and accurate description of the event including date and time.

4.5.4.2 Identification of all personnel involved in the event.

4.5.4.3 Identification of the person in charge of the activity at the time of the event.

4.5.4.4 Identification of any/all procedures, Work Orders, etc., pertinent to the event.

4.5.4.5 Identification of equipment (components, system, tools, etc.).

4.5.4.6 The problem statement or undesirable results of the event.

4.5.4.7 The apparent cause and contributing factors.

4.5.4.8 The root cause and contributing factors.

4.5.4.9 Identification of corrective/improvement actions recommended as a result of the event.

4.5.5 Root Cause Analysis Review and Approval

4.5.5.1 Upon completion of the RCA, the RCA Leader ***SHALL*** notify their management to review the RCA and forward the RCA to the applicable Site Human Performance Team for review.

4.5.5.2 Following their final review, the responsible department Manager ***SHALL*** notify the Plant Director and the Performance Optimization Reliability Engineering Manager requesting electronic approval in APM. Upon approval, the Site Human Performance team electronically acknowledges the RCA in APM.

4.5.5.3 Following approval of the Plant Director and Performance Optimization Reliability Engineering Manager the RCA ***SHALL*** be reviewed by peer members of each organization and by the next level of management in both organizations, to confirm that the accurate determination of the root cause and appropriate corrective/improvement actions have been identified to prevent reoccurrence.

4.6 Review and tracking of Event Learning, Root Cause Analysis, and corrective action items

4.6.1 All events requiring Event Learning ***SHALL*** be summarized and tracked.

4.6.1.1 The Analytics and Practices department ***SHALL*** provide on a monthly basis, a list of operating events requiring Event Learning.

4.6.1.2 This list ***SHALL*** document Event Learning not started, not completed, and completed.

4.6.1.3 This list ***SHALL*** be provided to the regional Plant Directors and Reliability Engineering Managers. The Plant Directors ***SHALL*** be responsible to ensure the Event Learning process is initiated for all identified events and completed in the timeline required.

4.6.2 Monthly, the Plant Directors and Reliability Engineering Managers ***SHALL*** review the list of operating events and through collaboration identify if additional RCA's should be initiated.

4.6.3 Quarterly, the Analytics and Practices department ***SHALL*** review and analyze all Event Learning and RCA reports to identify trends, common events, repetitive events, common equipment failures, etc. to identify areas for Energy Supply to prioritize resources to correct. This ***SHALL*** be summarized and presented at the quarterly Event Learning/RCA Governance meeting.

4.6.4 All corrective action items developed and assigned as a result of Event Learnings and RCA's ***SHALL*** be tracked to completion though APM . APM will send electronic reminders via e-mail to those responsible for completion of corrective action items.

4.6.5 The list of current open corrective action items ***SHALL*** be reviewed during the Event learning/RCA Governance meeting.

4.7 Environmental Permit Deviations

4.7.1 Plant directors ***SHALL*** notify the General Manager in their region within 24 hours of a confirmed permit deviation.

4.7.2 The Plant Director of the facility with the permit deviation ***SHALL*** contact the Plant Environmental Analyst (PEA) and determine a time in the immediate future (not to exceed 72 hours) to conduct a conference call with senior management to discuss the event. The Plant Director ***SHALL*** schedule the call with senior management. Attendees, at a minimum, ***SHALL*** include the Plant Director, PEA, the General Manager from each region, the Senior Director of Environmental Services, the Director of Environmental Services for the region, and the Performance Optimization Reliability Engineering manager.

4.7.3 The Plant Director, or designee, ***SHALL*** complete the initial Event Learning and send notification that it is complete prior to the senior management call. During the call, staff ***SHALL*** discuss the event to include deviation, potential cause, corrective actions and next steps to include completion of an RCA and timing. General Managers from the other regions ***SHALL*** assess whether the potential for a similar

occurrence exists in their region and implement appropriate preventative measures commensurate with the risk.

4.7.4 The facility with the deviation ***SHALL*** complete an RCA for the event in accordance with Section 4.5. Additionally, the facility ***SHALL*** develop a one- page summary of the event using the designated template (Attachment 1) to include the following:

- Event Details
- Cause
- Corrective Actions
- Next Steps

4.7.5 On a monthly basis, permit deviations ***SHALL*** be discussed during the Energy Supply Process Performance Call administered by Energy Supply. The discussion will include the following:

- The permit deviations for the previous month utilizing the one-page summary (Attachment 1) of the event. The facility will answer questions and share any lessons learned.

- Documentation for each monthly call will be maintained with Energy Supply Process Performance Call information.

4.7.6 This same process will be followed if the permit deviation is attributable to another group outside Energy Supply plant operations (Energy Supply support organizations). In this scenario, plant directors will be replaced by the Director in the area of responsibility.

4.8 Event Learning and RCA Governance

4.8.1 An Event Learning and RCA Governance team ***SHALL*** be created within Energy Supply. Team Sponsors are the VP Operations, VP Projects, Senior Directors of Environmental Services and Performance Optimization. Team members include the Regional General Managers, Senior Director Renewable Operations, and the Directors from Environmental Services and Performance Optimization.

4.8.2 The Governance team ***SHALL*** meet quarterly to:

4.8.2.1 Review a summary of all Event Learning, RCA, on-going Fleet Learning Events, Repetitive/Systemic events, open policy/training updates, and open corrective actions items.

4.8.2.2 Ensure Process Accountability: Track, measure, and take actions to ensure process accountability and success.

4.8.2.3 Identify Fleet Learning Events: Identify Event Learning and RCA events that are applicable to multiple units, multiple plants, or the Energy Supply fleet. Prioritize the most critical events to Energy Supply. Track in APM and assign a Governance Team member as responsible to lead the corrective actions to all applicable units, plants, fleet, etc. to ensure fleet learning and fleet continuous improvement.

4.8.2.4 Identify Repetitive/Systemic Events: Review analytical analysis of all Event Learning and RCA events. Determine specific focus areas that require additional resources to correct repetitive/systemic event issues within Energy Supply. Prioritize the most critical to Energy Supply. Track in APM and assign a Governance Team member as responsible to lead the corrective actions as agreed upon, to ensure fleet learning and fleet continuous improvement.

4.8.2.5 Determine Systemic Learning/Training: Determine and ensure development of process, policy, and training updates that are required based upon the Event Learning and the RCA process. Identify, track in APM, and assign a Governance team member responsibility for completion. Ensure business updates are made to institutionalize learning to ensure long term continuous improvement within Energy Supply.

4.8.2.6 Review events identified as Outside of Management Control OMC) from NERC GADS data. For Events that are OMC due to accountability and/or corrective actions item responsibility being outside of Energy Supply (e.g. Transmission, Gas, etc.) these shall be summarized and communicated to those Business Units and to the Senior Vice President of Energy Supply.

4.8.2.7 Present bi-annually, a summary to the Senior Vice President of Energy Supply regarding the Energy Supply Event Learning and RCA processes and accountabilities

5.0 REQUIRED RECORDS

5.1 All records ***SHALL*** be retained in APM.

6.0 DEFINITIONS & REFERENCES

6.1 Definitions

6.1.1 Root Cause Analysis is the process of determining, using facts, data, and logic, the cause and effect relationships that result in an undesirable event occurring and determination of effective and efficient corrective actions to break the cause and effect chain to prevent recurrence. It is a Management System tool to determine how to prevent those things that stand in the way of continuous improvement in business processes.

6.1.2 Generator Protection System Mis-operations is 1) failure of a relay to operate for a fault when it should, 2) operation of a relay when it shouldn't operate either a fault outside of its zone of protection or when no fault exists (aka spurious trip).

6.1.3 Generating Available Data System (GADS): Net Maximum Capacity is defined by the North American Electric Reliability Council (NERC), Generating Available Data System, Data Reporting Instructions. ODMS Cause Code Impact and Event Summary reports provide calculation of Equipment Hours and Lost MWhs for forced outages, maintenance outages, and forced deratings. These calculations are after the fact, to provide for timely initiation of RCA and estimate should be used.

6.2 References

6.2.1 Energy Supply 2.600_A02 - Energy Supply Event Learning Report

REVISION HISTORY

Date	Revision	Change Description
	1.0	Original Issue

Author: Timothy Laplant	Revised by: Event Learning Team	Approved By: Teresa Mogensen (electronic approval on file)
Effective Date: 4/12/2012	Date: 5/05/2021	Approved Date: 1/01/2021

01-06-2012	3.0	Major rewrite
04-06-2016	4.0	All safety events referred to Energy Supply 4.103 Safety/Health Event Reporting and Investigation policy. Several sections rewritten and process map updated to reflect change in process to enter all Event Learnings in Meridium and any RCA to be attached or entered into the Meridium RCA module.
01-22-2018	5.0	Revised to include for tracking and evaluating environmental permit deviations.
04-01-2019	5.1	Very minor grammatical changes added
03-04- 2020	5.2	Reworded requirement for Safety events and near misses to indicate they will follow the Event Learning process led by Corporate Safety and that safety events will not be entered into APM (Meridium). Clarified some wording on RCA documentation requirements. Updated Meridium references to APM (Meridium).
07-10- 2020	5.3	Revised 4.12.3 Requires Performance Optimization review and approval of all EA's.
01-01- 2021	6.0	Major re-write to Event Learning
05-05-2021	6.1	Addition of sections 4.4.4.5 and 4.5.3.3.

Xcel Energy	XES 2.600
Energy Supply Policy System	Revision: 6.1
TITLE: *Event Learning & Root Cause Analysis*	Page 12 of 13

Attachment 1 – Environmental Permit Deviation Summary

Responsible by Nature

Environmental Permit Deviation Review

Event: (enter title)

Event Details

Cause

Corrective Action(s)

Next Steps

Location: PSCo

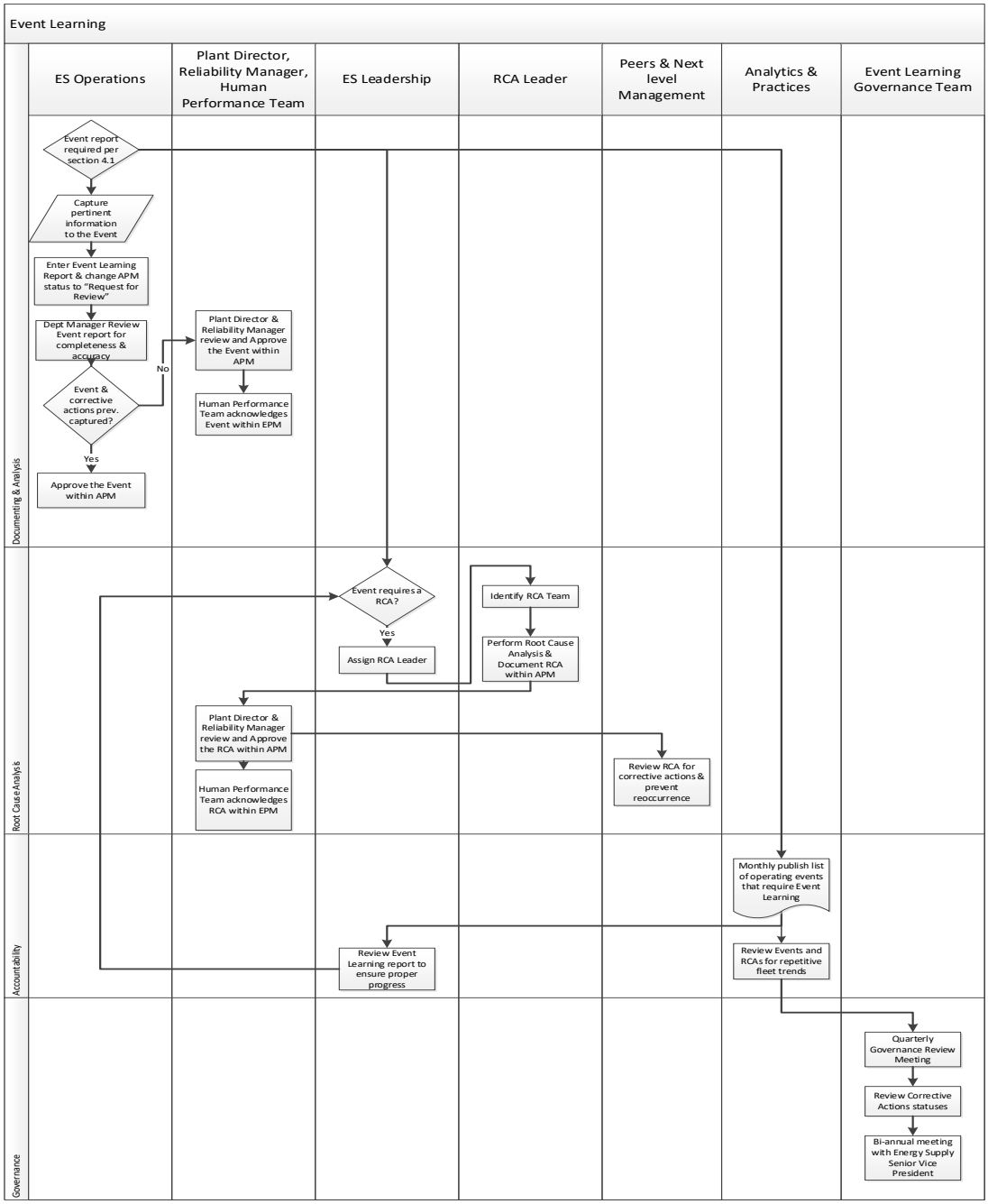
Date:

Content Author:

Xcel Energy

Xcel Energy	XES 2.600
Energy Supply Policy System	Revision: 6.1
TITLE: *Event Learning & Root Cause Analysis*	Page 13 of 13

Attachment 1 – Event Learning Process Mapping



Author: Timothy Laplant	Revised by: Event Learning Team	Approved By: Teresa Mogensen (electronic approval on file)
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