Direct Testimony and Schedules
Mary P. Palkovich

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 Natural Gas Service in Minnesota

Docket No. G002/GR-21-678
Exhibit___(MPP-1)

Gas Operations – Peaking Plants

November 1, 2021

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I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND OCCUPATION.

A. My name is Mary Palkovich. I serve as a Gas Project Management Executive for Xcel Energy Services Inc. (XES), the service company affiliate of Northern States Power Company, a Minnesota corporation (NSPM) and an operating company of Xcel Energy Inc. (Xcel Energy).

Q. PLEASE SUMMARIZE YOUR QUALIFICATIONS AND EXPERIENCE.

A. My educational background includes a Civil Engineering Degree from Michigan Technological University, and a Mathematics and Computer Science degree from University of Missouri at Kansas City. I have also received post graduate training from Northwestern University.

My work experience in the Energy industry began in 1982 with eight years at Panhandle Eastern Pipeline Company (Panhandle) in Colorado, Kansas, Missouri, and Texas, where I worked in the field performing pipeline inspections then later in the office completing FERC applications and simulating pipeline requirements and compressor additions.

After Panhandle, I worked for 22 years at CenterPoint Energy in Minnesota, Texas, Arkansas, Oklahoma, Mississippi, and Louisiana. Beginning as an engineer in 1989, I progressed to executive capacity over Gas Transmission, Gas Supply and Gas Control, including peak shaving plants (Liquefied Natural Gas, Propane Air, Underground Storage, and Compression).

I then worked for eight years at Consumers Energy (a CMS Energy Company) in Michigan, where I was responsible for Natural Gas Transmission, Distribution, Storage, Compression and Electric Transmission and Distribution. In 2018, I served as a loaned executive to the American Gas Association, where I performed peer reviews of major investor-owned utilities across the nation and conducted audits of pipeline safety management systems. In January 2019, I was appointed by the U.S. Secretary of Transportation to the Federal Gas Pipeline Advisory Committee, where I represented the industry and negotiated pipeline safety regulations into law.

After retirement from Consumers Energy on March 31, 2021, I began working as supplemental staff to Xcel Energy and am leading the Gas Plants Remediation project I describe in this testimony. A description of my qualifications, duties, and responsibilities is provided as Exhibit___(MPP-1), Schedule 1.

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

A. In this testimony, I provide support for certain capital investments required to ensure safe and reliable gas service delivered by Xcel Energy's peaking plants in Minnesota. These plants include the Wescott Liquefied Natural Gas (LNG) Plant in Inver Grove Heights (Wescott), the Sibley Propane Air Plant in Mendota Heights (Sibley), and the Maplewood Propane Air Plant in Maplewood (Maplewood).

Q. PLEASE PROVIDE A SUMMARY OF YOUR TESTIMONY.

A. As described in detail in the Direct Testimony of Company witness Ms. Joni H. Zich, the Company's LNG and propane peaking plants have served

customers well for many years, performing consistently from the 1950s and 1970s through the winter of 2019-2020. As a result of routine testing that began in late 2020 and subsequent inspections and further testing in early 2021, the Company identified specific capital investments that would be needed before the peaking plants could provide any future service to customers. My testimony supports these investments, as well as additional reliability and safety work the Company is undertaking concurrently to take advantage of efficiencies during project implementation. My testimony will support and illustrate the necessity and prudency of these investments.

Q. FOR CONTEXT, CAN YOU PROVIDE AN OVERVIEW OF THE WORK BEING DONE AT EACH OF THE COMPANY'S GAS PEAKING PLANTS?

A. Yes. The most urgent plant needs, and the focus of my testimony, are the investments needed to ensure safe and reliable vaporization during the 2021-2022 heating season. This work is currently underway at all the peak shaving facilities and planned for completion in 2021. The work at Wescott primarily involves upgrading or installing equipment to ensure protection against overpressure events. The vaporization work at Sibley and Maplewood is primarily related to replacement of equipment that is near the end of its life expectancy, which includes core components of the vaporization process. At Wescott, projects will also include work in 2022 on the equipment necessary to liquefy natural gas, which will next be necessary late in the Spring of 2022. At Sibley and Maplewood, tank bank piping and valve repairs will extend into 2022. Additional safety and reliability work at each of the plants includes fire protection upgrades and pipe integrity assessments, a portion of which is being completed in 2021, with additional work scheduled for 2022. The work to be completed at the plants in 2022 is necessary; however, it is not required prior

to the plants being returned to service for vaporization for the 2021-2022 heating season.

Q. HOW HAVE YOU ORGANIZED YOUR TESTIMONY?

A. The remainder of my testimony is organized into the following sections:

- *Section II* – Overview of Peaking Plant Investments
- *Section III* – Peaking Plants Capital Investments
- *Section IV* – Conclusion

II. OVERVIEW OF PEAKING PLANTS AND RENEWAL PROJECTS

Q. PLEASE DESCRIBE THE COMPANY'S PEAKING PLANTS.

A. The Company owns and operates three peaking facilities, including the Wescott Liquefied Natural Gas (LNG) plant, built in the 1970s, and the Sibley and Maplewood Propane Air plants, built in the 1950s. These plants essentially store liquefied natural gas or liquid propane gas that can be vaporized and injected into the system to help meet firm customer requirements on the coldest winter days when demand is at its peak. Ms. Zich provides additional discussion of the customer benefits provided by the peaking plants as part of the Company's natural gas system, and overall plant operations, in her Direct Testimony.

Q. CAN YOU PROVIDE A HIGH-LEVEL DESCRIPTION OF THE WESCOTT PLANT OPERATIONS?

A. Yes. The Wescott plant includes two tanks that store liquefied natural gas. During non-winter months, the Company purchases natural gas for delivery to Wescott, which is cooled to approximately -260°F when it turns into a liquid form and is then stored in the tanks. This process is known as liquefaction. The gas is then stored in a liquefied state until it is needed during the heating season. When the plant is called upon as a peak-shaving resource during the heating season, the reverse process occurs, known as vaporization. The LNG is heated until it turns back to its gaseous form and is injected into the Company's distribution system to be delivered to customers.

Q. PLEASE PROVIDE A HIGH-LEVEL DESCRIPTION OF THE PROPANE PLANT OPERATIONS.

A. Propane is delivered in its liquid state via truck to the Sibley and Maplewood plants and is stored at the plants until needed during the heating season. When dispatched during winter months, the Company vaporizes the propane by heating it, mixing it with air and injects the gas into the distribution system, where it is blended with natural gas and ultimately delivered to customers.

Ms. Zich provides additional discussion of peaking plant operations in her Direct Testimony.

Q. WHEN DID THE COMPANY BEGIN TO OBSERVE THE NEED FOR THE ADDITIONAL PEAKING PLANT INVESTMENTS THAT YOU SUPPORT IN YOUR TESTIMONY?

A. In late 2020, the Company began its annual testing of certain components of the vaporization equipment at Wescott in preparation for winter operations, as explained in Ms. Zich's Direct Testimony. During planned tests in

December 2020 and January 2021, some vaporization equipment exceeded design pressure, causing safety relief valves to lift (i.e., open) resulting in an unplanned release of natural gas to the atmosphere.

Q. WHAT STEPS DID THE COMPANY TAKE AS A RESULT OF THIS TESTING?

A. Ms. Zich discusses in more detail the steps the Company took as a result of this occurrence. In summary, the Company: (1) ceased operations at the Wescott plant in order to investigate; (2) reported the releases to the National Response Center and Minnesota Office of Pipeline Safety (MNOPS); (3) given the discovery of safety issues at Wescott, ceased operations at Sibley and Maplewood so that a review of the vaporization processes at those plants could be conducted as well; (4) conducted a comprehensive investigation to identify the root cause and necessary remediation at Wescott; and (5) conducted a similar review of the Sibley and Maplewood systems to ensure safety. As part of a pipeline safety management system, it was prudent of the Company to take these steps to ensure future events not occur at not only Wescott but also Sibley and Maplewood.

Q. WHAT TYPES OF INVESTMENTS WERE IDENTIFIED AS A RESULT OF THE INVESTIGATIONS AND REVIEW OF PLANT OPERATIONS AND EQUIPMENT?

A. The results of the investigations identified that systems work at the plants would be necessary and appropriate before Wescott should again safely vaporize and return to service or resume the post-heating season liquefaction process. During the parallel processes, the Company also identified work that would be needed at Sibley and Maplewood, as the vaporization systems at both plants are nearing the end of their life expectancy. The comprehensive

reviews also identified investments that would enhance reliability and improve safety systems.

Q. AT WHAT POINT DID YOU BEGIN WORKING ON THIS PROJECT?

A. In mid-April 2021, as the investigations were underway, I was brought in as the program executive for the Gas Plants Remediation Project.

Q. PLEASE DESCRIBE THE PLANT INVESTMENTS THAT YOU SUPPORT IN YOUR TESTIMONY.

A. At a high level, the Company is making significant investments to refurbish the plants and ensure that they are valuable resources on the system for the next 20 years or more. In my testimony, I support investments included in the Distribution Plants budget, both those necessary to resume vaporization and liquefaction and the additional safety and reliability investments identified as noted above. The Company is implementing the additional safety and reliability investments at the same time to ensure efficiency of investments and overall project implementation at the plants.

Q. WHAT DO YOU MEAN BY EFFICIENCY OF INVESTMENTS?

A. Because the plants are currently offline while the work necessary to resume vaporization is underway, other projects that have been identified as prudent can be completed efficiently without the need to again take the plants offline later for implementation. Further, the contractors able to complete the additional safety and reliability work are already mobilized and on-site. Some examples of projects that benefit from these efficiencies include:

- *Certify integrity of pipes.* The Company is required to periodically validate the integrity of certain pipes and to document the results in accordance

with applicable regulations. With the plants offline and no gas in the systems, the Company can certify pipe safety (pressure test, non-destructive testing, coupon removal, and other methods as appropriate) for those pipes that are offline. The Company is working with the Minnesota Office of Pipeline Safety to prioritize the integrity validation of piping to ensure fitness for service and align on scheduling of the integrity assessment work.

- *New and Additional Safety Valves.* The Company is installing new safety equipment at the propane plants, including inlet isolation valves and emergency shut-down (ESD) valves. While installing the new ESD valves, the Company is also installing an additional valve to provide manual "double-block" isolation of the facility to aid in purging and isolation operations in the event of an emergency or an abnormal operating condition. It is efficient to implement these upgrades and additions while the plants are already offline.

I discuss efficiencies further in Section III below, where I talk about the individual projects at the plants.

Q. WHAT TYPES OF INVESTMENT IS THE COMPANY MAKING IN THE WESCOTT PLANT TO ADDRESS RECENT EVENTS?

A. The investments necessary for vaporization and liquefaction at Wescott primarily involve upgrading or installing equipment necessary to ensure protection against future system overpressure events like the one that caused the unplanned release in January 2021. At the Wescott plant, the Company will (1) install two variable frequency drive units on the LNG pumps to limit their output; (2) route and manifold all thermal relief valves on the

vaporization system to a remote knockout drum and vent stack with new root valves and test points, thereby enabling effective maintenance and testing; (3) install new process relief measures (including switches that disrupt electrical flow) to limit overpressure and replace control and manual isolation valves to allow for safe sectionalizing of the system; (4) install fire protection safety upgrades to increase reliability; and (5) replace obsolete software and hardware to provide real time data to the plant control center for flow path operations and system control. Additional work will be completed at the plants in 2022 to get the system ready for liquefaction in the Spring.

I describe the basis for each of these investments in more detail in the next section of my testimony.

Q. WHAT TYPES OF INVESTMENTS IS THE COMPANY MAKING IN THE SIBLEY AND MAPLEWOOD PLANTS TO ADDRESS RECENT EVENTS?

A. The vaporization system at Sibley is near the end of asset life expectancy, as described by Ms. Zich in her Direct Testimony. The reliability projects in 2021 are required to commence vaporization operations safely and effectively during the 2021 heating season. Projects planned and underway for Sibley include vaporizer system upgrades such as a new vaporizer, super heater, pre-heater, mixing system, and all associated piping and valving within the existing vaporizer building. Replacement of boiler feedwater pumps and installation of new wiring will also be part of the project. The Company will primarily replace aging equipment including valves, vaporizers, and the boiler systems, as well as associated piping and electrical components. As described later in this testimony, additional work will be completed in 2022 to ensure reliability while also improving safety.

The vaporization system at Maplewood is past the end of asset life expectancy, but operationally, the plant had not experienced any issues and had been performing as expected until it was taken offline in early 2021, as described by Ms. Zich. The reliability projects in 2021 are required to commence vaporization operations safely and effectively during the 2021 heating season and will extend the operational life of the plant. At Maplewood, the systems to be upgraded are the vaporizer system, pad gas, plant air, and boiler systems. The projects include a new vaporizer, super heater, pre-heater, mixing system, and replacement of piping and valving within the existing vaporizer building. In addition, the Company will implement new piping from the pumps to the vaporizer building and modifications to the plant air piping, and add a plant air dryer with new steam piping boiler feedwater pumps and instrumentation and wiring. As described later in this testimony, additional work will be completed in 2022 to ensure reliability.

At both plants, the Company will also make modifications to the electronic controls systems for the equipment. Additionally, the Company will make improvements to safety systems, such as installation of additional gas detection equipment and upgraded fire extinguishers.

I describe the basis for each of these investments in more detail in the next section of my testimony.

Q. ARE ALL OF THE PROJECTS SUMMARIZED ABOVE INCLUDED IN THE GAS OPERATIONS BUDGET?

A. The majority of the capital projects noted above are included in the Gas Operations capital budget for 2021 and 2022, which is summarized overall in

Ms. Zich's Direct Testimony. I address each individual project in Section III below. A component of the overall plant refurbishment project is the replacement of the Supervisory Control and Data Acquisition (SCADA) operating system for the peaking plants. The project will replace the existing SCADA operating system at Wescott, Sibley, and Maplewood with a new Delta V solution. This is an information technology (IT) project that is included in the Business Systems budget. While Company witness Mr. Michael O. Remington supports the Business Systems support of the IT capital additions, I describe the need for the project and the benefits of the SCADA DeltaV control system upgrade in Section III below.

Q. WHEN DOES THE COMPANY ANTICIPATE RETURNING THE PEAKING PLANT FACILITIES TO SERVICE?

A. We expect each of the peaking plants to be operational during the 2021-2022 heating season. The Wescott projects are expected to be in service by November 30, 2021, with a few post-vaporization items scheduled to be completed in 2022. The Sibley and Maplewood projects are expected to be in service December 31, 2021, with additional post-vaporization items going into service in 2022. The 2022 items are necessary but may be more effectively completed after the plants return to service.

Q. HAS THE COMPANY PROVIDED THE COMMISSION AND OTHER STAKEHOLDERS WITH INFORMATION REGARDING THE OCCURRENCES AT THE PEAKING PLANTS IN 2020 THROUGH OTHER COMMISSION PROCEEDINGS?

A. Yes. The Company provided information on these peaking plants in its April 9, 2021 Report in Docket No. G999/CI-21-135, the Commission's Investigation into the Impact of Severe Weather in February 2021

on Minnesota Natural Gas Utilities and Customers. Additionally, on October 22, 2021, the Company filed testimony in the contested case proceeding associated with that investigation (Docket No. G002/CI-21-610/Office of Administrative Hearings Docket No. 71-2500-37763). The Company also included information on the peaking plants in its July 30, 2021 Petition for Approval of a Change in Contract Demand Entitlements, submitted pursuant to Minn. Stat. § 216B.16, Subd. 7 and Minn. Rule 7825.2910, Subp. 2. My testimony is specific to supporting the capital investments in the peaking plants that are necessary to return the plants to service, and the additional safety and reliability components of the overall Gas Plants Remediation Project.

III. PLANT RENEWAL CAPITAL INVESTMENTS

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

A. In this section of my testimony, I discuss the Company's planned capital investments for the gas peaking plants as part of the Gas Plant Remediation Project. Ms. Zich provides the overall Gas Operations capital data, including peaking plant total costs. I walk through the planned remediation investments at each facility in more detail, identify the work to be done, how it was planned and budgeted, what alternatives were considered, how the work is being managed, and why the investments are reasonable overall.

A. Overview of Capital Investments

Q. HOW DOES NSPM BUDGET FOR CAPITAL SPENDING AT ITS PEAKING PLANTS?

A. In her Direct Testimony, Ms. Zich discusses Gas Operations' overall budgeting process and the Company process for development of larger

individual project budgets. Budgeting for the peaking plant additions I discuss in my testimony is governed by the well-defined process Ms. Zich describes, which is used to identify and prioritize projects and develop comprehensive budgets. Proposed budgets are subject to robust review and approval processes, and detailed monitoring of capital expenditures is carried out through the project implementation phase.

Q. HOW DID THE COMPANY IDENTIFY THE NECESSARY PLANT INVESTMENTS YOU SUPPORT IN YOUR TESTIMONY?

A. As described by Ms. Zich, the Company conducted extensive investigations of the plants in January 2021 through mid-2021 to determine the needs of the plant and to lay out an appropriate scope of work to address those needs. These investigations were conducted by Company personnel in conjunction with outside experts Campos EPC and Quest Consultants serving as facilitator of the investigation.

Q. HOW DID THE COMPANY AND ITS CONSULTANTS CONDUCT THE INSPECTIONS AND WORK PLANNING?

A. We conducted detailed engineering analyses during the investigation phase at each plant to determine the appropriate projects and project scope to achieve the safe and reliable operations. At each plant, necessary projects were identified and prioritized according to whether they are necessary to return the plant to service or are prudent investments to enhance reliability and safety systems to allow us to rely on the plants for the next 20 years or more.

Q. DID THE INVESTIGATIONS IDENTIFY ANY POTENTIAL PROJECTS THAT THE COMPANY ELECTED NOT TO PURSUE?

A. No. However, the plant reviews identified some projects and upgrades that are not critical to be implemented in 2021. The plant reviews were comprehensive in that they assigned risk, ranked, and prioritized projects. For projects that were not necessary to maintain safe and reliable plant operations, or to comply with any safety standards or codes, the Company elected to implement those projects in 2022 or 2023 to ensure appropriate and manageable project scope and for prudent cost control for customers. For 2021, the Company is focusing on the critical projects and those additional safety and reliability projects that would provide the most benefit if implemented at the same time as the other remediation work.

Q. HOW DID THE COMPANY PROCEED ONCE THE NECESSARY PROJECTS WERE IDENTIFIED?

A. Once the projects were identified, the Company assessed options for engaging an engineering firm and contractors to complete the work at the plants, considering the work in three general categories:

- critical projects necessary for the plants to vaporize (2021);
- projects associated with vaporization that are necessary but may be completed after the plants return to service, and projects necessary for liquefaction at Wescott (2022); and
- additional reliability and safety enhancements.

The Company's primary goal was to have all projects necessary for vaporization completed so that all three plants would be operational during the 2021-2022 heating season. Given the short timeframe for the critical vaporization projects (Phase 1), the Company determined that negotiating an

Engineering, Procurement, and Construction (EPC) contract would be efficient and cost effective. For this work, the Company considered its contractors currently holding competitively bid Master Service Agreements (MSAs) for unit work. The Company took this approach because it would take approximately three to four months to develop and execute an EPC bid package for this work and it was critical to get the plants operational prior to heating season, so time was of the essence. The Company ultimately selected Campos to provide engineering, procurement, and construction services for Phase 1 projects, the critical projects at each plant necessary for the plant to vaporize during the 2021-2022 heating season. Company leadership approved this sourcing strategy in May 2021, and the Company began to negotiate an EPC Agreement with Campos. The EPC Agreement was executed on July 21, 2021.

Q. WHY WAS CAMPOS SELECTED?

A. Based on the analysis described above, Campos was selected with the following considerations:

- Campos has a proven track record with Xcel Energy and is a current Engineering Design Contractor having significant industry EPC pipeline work and plant experience.
- Campos EPC completed the engineering site analysis for Wescott, Sibley, and Maplewood during the plant investigations and reviews, so was already knowledgeable about the work to be completed at the peaking plants.
- Campos held a competitively bid Master Services Agreement for work at the plants.

- Campos has demonstrated expertise and experience with other similar gas plant facilities.

Q. ARE THERE OTHER CONTRACTORS WORKING ON THE PHASE 1 VAPORIZATION PROJECTS AT THE PLANTS?

A. Yes. Under the EPC contract, other entities' work on the projects will subcontract through Campos. Contractors currently holding MSAs with Xcel Energy were invited to participate in the Campos bidding process for 2021 work at the peaking plants. Primary subcontractors include Michels Pipeline performing mechanical work at Wescott and Snelson Pipeline performing the mechanical work at both Sibley and Maplewood. Details related to the work at each plant are addressed in the individual plant sections below. Xcel Energy has a Special Construction Division that is also doing work at the peaking plants.

Q. DID THE COMPANY CONDUCT OTHER ASSESSMENTS TO DETERMINE WHAT PROJECTS WERE NECESSARY TO BE COMPLETED PRIOR TO RESUMING VAPORIZATION AT THE PLANTS?

A. Yes. In response to plant investigation findings, the Company, in conjunction with Campos under the EPC contract, conducted a review of all fire, gas, and life safety systems at the plants to identify any necessary upgrades and develop a plan for implementation. The objective was to identify any fire protection upgrade projects that would be necessary to maintain compliance with all National Fire Protection Association (NFPA) codes and standards. This holistic approach included a gap analysis, system and equipment reviews, and hydraulic modeling. Some of the upgrades have been identified as necessary prior to beginning vaporization during the 2021-2022 heating season, and

some will be completed in 2022. This approach is similar to the Company's review and planning for implementation of all of the peaking plant investments and renewal projects, where the Company has identified the projects critical to resume vaporization as the most urgent to be completed during Phase 1 (2021). Campos engaged a nationally-recognized expert in fire suppression system engineering and code compliance for this effort. The Company has also worked with local fire chiefs, the authorities having jurisdiction (AHJs) as defined by the NFPA, who have confirmed the Company's assessments and approved the implementation plans.

Q. WHAT ARE THE COMPANY'S PLANS WITH RESPECT TO THE FIRE PROTECTION UPGRADES NECESSARY BEFORE RESUMING VAPORIZATION AT THE PLANTS DURING THE 2021-2022 HEATING SEASON?

A. The fire protection upgrades necessary prior to resuming vaporization at the plants are included in the scope of work under the Campos EPC contract. The extensive work has been prioritized, and the most critical items that are necessary for safe vaporization are being completed in 2021. Additional fire protection and life safety upgrades will be completed in 2022.

Q. WHAT OTHER WORK DID THE COMPANY CONSIDER AS IT DEVELOPED ITS COMPREHENSIVE WORK PLANS FOR THE GAS PLANT REMEDIATION PROJECTS?

A. In planning the overall projects at the gas plants, the Company assessed additional safety work related to pipe integrity assessments. The Company is required to periodically assess the integrity of certain pipes and to document the test results in accordance with regulations. With the plants offline and no gas in the systems during the remediation work in 2021, the Company can conduct many of these integrity assessments more efficiently to certify pipe

safety going forward. The integrity assessments are being conducted in accordance with the American Petroleum Institute (API 570) standard for risk-based assessment to identify potential integrity threats against the piping system and determine useful remaining life of the components. The Company has worked with and will continue working with the Minnesota Office of Pipeline Safety to prioritize the integrity assessments and align on scheduling. The Company has scheduled a portion of the integrity assessment work to be completed under the Campos EPC contract during 2021. Additional integrity assessment work will be completed in 2022 consistent with our prioritized pipe assessment plan.

Q. HOW DID THE COMPANY DEVELOP ITS BUDGET FOR THESE INVESTMENTS?

A. The budgets for these investments were based on the engineering analysis and assessment described above. The Company, in conjunction with Campos, developed cost estimates and detailed work scope for each of the projects required to bring the plants back online safely and effectively. These detailed engineering assessments were used by the Company to create comprehensive budgets for the capital investments and work in the field to ensure reliability and safety at the Minnesota gas plants. The budget for the work orders and related costs were developed by the Company engineers with support from contracted engineering firms and suppliers.

Q. HOW ARE YOU MANAGING THE PHASE 1 WORK AT THE PLANTS TO ENSURE IT IS SUCCESSFUL AND COMPLETED AT REASONABLE COSTS?

A. Campos is managing the project under the EPC contract with Company oversight. As the projects are underway, they are subject to multiple scope reviews to ensure constructability and that successful project completion has

occurred and will continue to occur over the life of the project. Additionally, the EPC contract specifies terms related to plant performance, quality, and accountability, which include details to facilitate the change management processes and provide for robust and timely review of any cost or scope changes. The Company's project managers are actively engaged in any scope change and ensure that the process for approval of any change is being adhered to.

Q. PLEASE SUMMARIZE THE CAPITAL INVESTMENTS IN THE PEAKING PLANTS THAT ARE INCLUDED IN THIS RATE CASE.

A. Table 1 below summarizes the peaking plant capital additions I support in my testimony, shown for each plant for 2021 and the 2022 test year.

Table 1
Gas Peaking Plant Capital Additions
State of Minnesota ($ millions)

Peaking Plant Additions	2021 Forecast	2022 Test Year
Wescott	$5.7	$5.4
Sibley	$12.6	$7.0
Maplewood	$12.7	$5.5
Total	**$31.1**	**$17.8**
Any differences between sum of individual category amounts and Total are due to rounding.		

As discussed in the previous section, these costs are related to both investments necessary to resume vaporization at each of the plants, to resume liquefaction at Wescott, and for the additional safety and reliability

investments identified, as noted above. To further detail the scope of work to be completed in 2021 versus the additional projects that will be completed after the plants return to service, I provide the Gas Plant Remediation Program – Project Scope Validation document as Exhibit___(MPP-1), Schedule 2 attached to my testimony.

B. Wescott Capital Investments

Q. WHAT ARE THE INDIVIDUAL CAPITAL INVESTMENTS AT THE WESCOTT PLANT THAT YOU SUPPORT IN YOUR TESTIMONY?

A. Table 2 below shows the individual projects at the Wescott peaking plant that I support in my testimony.

Table 2

Wescott Peaking Plant Projects - Capital Additions

State of Minnesota ($ millions)

Wescott Peaking Plant Projects Capital Additions	2021 Forecast	2022 Test Year
Necessary for Vaporization		
Thermal Relief Upgrades	$4.2	–
Variable Frequency Drive Installation	$1.3	–
Valve Replacement	$0.1	–
Necessary for Liquefaction		
Cold Box Thermocouple Replacement	–	$1.3
Compressor Controls (GT101/C101)	–	$1.0
Adsorber Sieve Changeout	–	$1.0
Compressor Overhaul (C101)	–	$0.6
Turbine Overhaul (GT101)	–	$0.4
Replace Boil Off Compressor (C107)	–	$0.3
Safety and Reliability Projects		
Fire Protection Upgrades	–	$0.5
Integrity Assessments	–	$0.4
Wescott Total	**$5.7**	**$5.4**
Any differences between sum of individual category amounts and Total are due to rounding.		

Q. PLEASE DESCRIBE THE COMPANY'S ASSESSMENT OF THE MOST URGENT PLANT NEEDS, VERSUS THOSE THAT WERE BENEFICIAL TO COMPLETE WHILE THE PLANTS WERE OFFLINE.

The most urgent plant needs are the upgrades that ensure the safe and reliable vaporization for the 2021-2022 heating season and liquefaction in Spring of 2022. The additional safety and reliability projects have been identified as prudent investment at the plant, and a portion of that work will be completed in 2022 as shown in Table 2. Part of that work, however, is being completed in 2021 under the Campos EPC contract and is included in the vaporization costs shown in Table 1.

Q. HOW DID THE COMPANY DEVELOP ITS BUDGET FOR THESE INVESTMENTS?

A. The process for budget development of the work orders and related costs were developed by the Company engineers with support from contracted engineering firms and suppliers. These estimates were developed using parametric models based on the costs of similar equipment and upgrades performed by technical experts. Direct costs for engineering, materials, and construction were solicited directly from vendors specializing in this work.

1. Projects Necessary for Vaporization

Q. CAN YOU PROVIDE A HIGH-LEVEL DESCRIPTION OF THE WESCOTT PLANT VAPORIZATION PROCESS AND EQUIPMENT?

A. Yes. During the vaporization process, a single pump will pump LNG from the storage tank to the vaporizers where it will be heated via a water ethylene glycol (WEG) system returning to the gas phase. From here it is injected into the pipeline system for distribution. The system is designed to operate up to specific design pressure parameters. If that pressure is exceeded, there are

sensors, safety systems, relief valves, and other equipment to ensure the pressure remains within design parameters. In some cases, the sensors will trip the system to ensure overpressure situation does not occur. Overpressure protection is a critical component to a safe operating system. If an unplanned mechanical failure occurs, overpressure protection prevents additional downstream components from exceeding their design capability.

Q. PLEASE DESCRIBE AT A HIGH LEVEL THE OVERALL WORK THAT IS NECESSARY TO RETURN THE PLANT TO SERVICE AND BEGIN VAPORIZING.

A. The vaporization work at Wescott primarily involves upgrading or installing equipment necessary to ensure protection against overpressure events. This includes installation of valves, additional piping, variable frequency drives (VFDs), and electrical breaker equipment. This work is being done at various nodes of the system, including from the LNG storage tank to the vaporizers, and for the WEG heating system component of the vaporization systems. This project also requires construction of buildings necessary to house the new equipment and installation of a new cold storage tank. I discuss project details further below.

Q. WHAT IS THE THERMAL RELIEF UPGRADES PROJECT?

A. Overpressure protection is a critical component to a safe operating system. If an unplanned mechanical failure occurs, overpressure protection prevents additional downstream components from exceeding their design capability. Related to overpressure protection from the LNG tank to the vaporizers, the original overpressure protection at Wescott consisted of process relief valves that would discharge LNG into the pump suction recycling flow until the pump breaker could be shut off. This created the potential for flashing and

vapor expansion that could lead to pressure exceedances in other parts of the system. First, the thermal relief upgrades will consist of installing an upstream feeder breaker that will decouple power to the VFDs that will be installed to run the pumps, which will trip off the pumps. This solution will eliminate the need for the mechanical recycling process previously in place. The new VFDs to be installed are described separately below. Additionally, the discharge points of relief valves will be directed via new piping to a common header that will lead to a storage tank (knockout drum) in a remote location where the liquid can be safely and efficiently handled.

Q. WHAT WORK IS INVOLVED?

A. The thermal relief upgrade project involves installation of equipment that trips the upstream feeder breaker, which will segregate and decouple power from the breaker to the VFDs, tripping off the pumps. This solution avoids additional mechanical work, mitigates hazards, and requires running two wires approximately 200 feet to the feeder breaker and minor modifications to the control system software. This project also includes manifolding of all relief valve discharge points to a remote knockout drum. This involves construction of pilings and related piping work to carry the excess liquid to a safe location and into the knockout drum. The level of liquid in the knockout drum will be remotely monitored by the new SCADA DeltaV system, so that operators can see the tank level from the control room. Also included under the thermal relief upgrade project are costs related to firewater testing, fire and gas detection system modifications, as well as decommissioning preparation and procedures that are related to work that will be completed in 2022. These projects are being implemented in 2021 to provide efficiencies related to the overall multi-year remediation work.

Q. WHAT ARE THE WESCOTT FIRE PROTECTION UPGRADES THAT WILL BE COMPLETED IN 2022?

A. Fire protection upgrades at Wescott in 2022 will include any remaining water system and fire suppression system repairs that are not required for vaporization.

Q. WHAT ARE THE ADDITIONAL INTEGRITY ASSESSMENTS THAT THE COMPANY WILL COMPLETE AT WESCOTT IN 2022?

A. The Company will conduct additional integrity assessments at Wescott in 2022 according to the schedule developed in working with MNOPS as described above. During these assessments, the Company will conduct a risk-based review of all components in a piping segment. This work includes insulation removal, visual and non-destructive testing (NDT), inspection of piping in potential high-risk areas, development of report, findings, and conclusions, and the replacement of insulation.

Q. WHAT IS THE VARIABLE FREQUENCY DRIVE INSTALLATION PROJECT?

A. To prevent over-pressurization of the Wescott vaporization system feed pumps, the Company is installing two variable frequency drives. The VFDs will prevent the pumps from quickly ramping up to the point of over-pressuring the vaporization system and the discharge piping.

Q. WHAT WORK IS INVOLVED?

A. The VFDs are a critical component of the overpressure protection system and must be housed in a weather-proof building. Buildings on concrete pads are being constructed to house the two new VFDs, and placement of the VFDs will occur prior to the roof on the buildings being installed. Electrical wiring

to the VFDs is required, and testing to validate the functionality and safety of the VFDs will be part of the work involved.

Q. WHAT IS THE VALVE REPLACEMENT PROJECT?

A. The valve replacement project includes replacement of seven manual valves to improve isolation of different parts of the system and eliminate outdated and potentially leaking valves. The project also includes replacing two control valves and actuators (i.e. automated turning mechanisms) for two vaporizer water ethylene glycol (WEG) temperature control valves. These four valves will have new position indicators to provide additional information to the new control system so operators can see the valve positions remotely, enhancing safety and reliability. This will increase reliability and replace outdated equipment that is at the end of its useful life. All of these manual valves will be replaced with flanged ball valves to improve safety and increase reliability.

Q. WHAT WORK IS INVOLVED?

A. The existing 6-inch valve on the inlet of the LNG vaporizers will be replaced with 3-inch control valves to improve the control of flow through the vaporizers. Two valves will have the actuators (i.e. automated turning mechanism) replaced, and another valve will be replaced with a quarter-turn actuated ball valve. The work related to the valve replacements included the engineering design to find suitable flanged replacements for the manual valves and the installation of these valves.

Q. WHY ARE THESE PROJECTS NEEDED?

A. Each of the projects discussed above will prevent over pressurization and are being installed before Wescott vaporization system is placed in service during

the 2021-2022 heating season. In addition to limiting the vaporizer pumps speed, the proposed valve changes, piping modifications, and cold drain storage vessel will maximize the safety of the public and environment by preventing over-pressuring events that could cause the unintentional release of product or, in catastrophe cases, fire, explosion, and personnel injuries and by providing a storage and dissipation location for relieved LNG away from the ground, equipment, and personnel.

Q. HOW DID THE COMPANY PLAN FOR THIS WORK AT WESCOTT TO ENSURE IT IS SUCCESSFUL AND COMPLETED AT REASONABLE COSTS?

A. Engaging Campos under an EPC contract to complete the vaporization projects provided significant efficiencies, especially related to the scope of work and managing long lead times for procurement of specific equipment. To ensure prudency of expenses, the existing thermal relief valves will be reused within the modified thermal relief piping, and inlet and outlet isolation ball valves added. The project will make use of existing pipe supports to complete the valve replacements. If the body length of a valve does not allow for the reuse of a pipe support, the existing support will be demolished and repositioned to properly support piping around the new valve. The work is being done by contractors who are already contracted to perform work for Xcel Energy under competitively-bid MSAs. As also noted earlier, there are frequent project management review meetings to monitor and address any scope, schedule, or cost changes during the life of the project.

2. Projects Necessary for Liquefaction

Q. CAN YOU PROVIDE A HIGH-LEVEL DESCRIPTION OF THE WESCOTT PLANT LIQUEFACTION PROCESS?

A. Yes. At a high level, natural gas enters the plant from the distribution system, and impurities are removed from the gas. The gas then goes to the cold box, a series of heat exchangers which is central to the liquefaction process. There are various turbines and compressors that support the liquefaction process. The liquefied natural gas is then sent to the LNG tanks to be stored until needed during the heating season.

Q. PLEASE DESCRIBE AT A HIGH LEVEL THE OVERALL WORK THAT IS NECESSARY TO RESUME THE LIQUEFACTION PROCESS.

A. The liquefaction work at Wescott primarily involves upgrades or installation of equipment identified during the plant reviews related to control system compatibility with the new SCADA DeltaV software upgrade, upgrading or installing equipment necessary to ensure protection against overpressure events and to increase the effectiveness of the fire suppression systems.

Q. WHAT IS THE COLD BOX THERMOCOUPLE REPLACEMENT PROJECT?

A. The cold box is a series of heat exchangers central to the LNG process. These heat exchangers cool and liquefy the natural gas through heat transfer with a mixed refrigerant stream. The cold box was replaced in 2020 because the existing legacy infrastructure was cracked and obsolete and is needed for liquefaction. Ms. Zich describes the 2020 cold box replacement project in her Direct Testimony. During the recent review of plant operations, the cold box related thermocouples were identified as needing replacement to provide additional temperature accuracy. The thermocouples are now being replaced to ensure accurate temperature measurement and to synchronize with the new software being installed as part of the SCADA upgrade project.

Q. WHAT IS THE COMPRESSOR CONTROLS (GT101/C101) PROJECT?

A. A new control system and additional controls are needed to control turbine GT101 and compressor C101 to align with plant operations and modernize the controls (from analog to digital) to be compatible with the new SCADA DeltaV software upgrade. This work will involve installation of a new control system and programming for GT101 turbine and C101 compressor. The new modern control system will provide insight via digital readout to the plant operators when they are using the compressor during the liquefaction process.

Q. WHAT IS THE ADSORBER SIEVE CHANGEOUT PROJECT?

A. The adsorber removes the impurities from the natural gas prior to liquefaction as described above. Adsorbers remove impurities from natural gas much like charcoal filters remove impurities from water. There are three adsorbers at the plant, and when they or the associated valves fail, they trigger a process shut down; thus upgrades are needed to maintain reliability. The adsorber beds (i.e., the filter materials) are at the end of their useful lives and will be replaced. The switching valves were identified as nearing end of their useful lives, and new switching valves will be installed.

Q. WHAT IS THE COMPRESSOR OVERHAUL (C101) PROJECT?

A. Compressor C101 was due for a ten-year overhaul and needed maintenance and repairs to support liquefaction operations. The C101 is due for an overhaul based on cumulative operational hours and issues identified. This work involves a complete overhaul of the compressor, and replacement of parts are required to ensure reliability of the compressor.

Q. WHAT IS THE TURBINE OVERHAUL (GT101) PROJECT?

A. The mixed refrigerant liquefier (GT101) turbine was due for a ten-year overhaul and needed updates to specific internal materials to maintain reliable operation. The recent review and routine inspection of the turbine showed that there were repair items required and that replacements were needed. The overhaul of the gas turbine requires replacement of soft goods and involves vendor support from Siemens, the original equipment manufacturer.

Q. WHAT IS THE REPLACE BOIL OFF COMPRESSOR (C107) PROJECT?

A. The C107 compressor was reviewed and necessary repairs were identified. This compressor is necessary for plant liquefaction operations. Due to the age of the current equipment, replacement parts are unavailable, so the compressor will be replaced with a new compressor to bring the boil off gas system back to full capacity. The work involved includes acquisition and installation of a new boil off compressor. The new compressor will be installed on the existing concrete pad, with new wiring and piping to the new unit.

3. Wescott Summary

Q. HOW IS THE WORK AT THE WESCOTT FACILITY PROGRESSING?

A. The project is currently moving per schedule at Wescott via detailed engineering work to ensure material items like thermal relief piping and construction worker availability are not barriers to success. Procurement and identification of long lead time materials was a priority to ensure success and timing of construction.

C. Sibley Capital Investments

Q. CAN YOU PROVIDE A HIGH-LEVEL DESCRIPTION OF THE VAPORIZATION PROCESS AND EQUIPMENT AT THE SIBLEY PLANT?

A. Yes. Propane is delivered to the plant in its liquid state via truck, where it is stored in tanks until needed. When the plant is dispatched, the propane is vaporized, mixed with air, and injected into the gas into the distribution system, where it is blended with natural gas and ultimately delivered to customers. The primary plant components include propane storage tanks; three buildings that separately house the boiler, compressor, and vaporizer equipment; all associated piping, electrical equipment, and safety systems; and a trucking area for delivery of the liquid propane.

Q. PLEASE DESCRIBE AT A HIGH LEVEL THE OVERALL WORK RELATED TO VAPORIZATION AT THE SIBLEY PLANT.

A. The vaporization work at the Sibley plant is primarily related to replacement of equipment that is near the end of its life expectancy. This includes installation of a new vaporizer, super heater, pre-heater, mixing system, and all associated piping and valving within the existing vaporizer building. Also included is the replacement of boiler feedwater pumps and installation of new wiring. The Company will also make modifications to the electronic controls systems for the equipment and will make improvements to safety systems, such as installation of additional gas detection equipment and upgraded fire extinguishers.

Q. IS A PORTION OF THE WORK DESCRIBED ABOVE TO BE COMPLETED AFTER THE PLANT RETURNS TO SERVICE?

A. Yes. As discussed earlier, the Company identified projects that were critical for the plants to resume vaporization during the 2021-2022 heating season (Phase 1), and those that are necessary but may be completed after the plants return to service (Phase 2). Discussion in my testimony primarily focuses on the portion of the work that will be completed in 2021 (Phase 1), but some of the work is to be completed in 2022. The 2022 work at Sibley will include upgrading the piping and valves at the tank bank (i.e., propane storage area). After heating season, the tank inventory will be drawn down based on usage, so it will be safer, and the remaining propane will be more easily handled and removed so that additional piping and valve work can commence. The other upgrades in 2022 are the boiler systems and plant air systems.

Q. WHAT ARE THE CAPITAL INVESTMENTS AT THE SIBLEY PEAKING PLANT FOR 2021 AND 2022 THAT YOU SUPPORT IN YOUR TESTIMONY?

A. Table 3 below shows the total project capital additions for the Minnesota jurisdiction at the Sibley peaking plant that I support in my testimony. As shown, a portion of the "vaporization" work is necessary but not critical to resume vaporization during the 2021-2022 heating season, and thus it is scheduled to be completed in 2022.

Table 3

Sibley Peaking Plant Projects - Capital Additions

State of Minnesota ($ millions)

Sibley Peaking Plant Projects Capital Additions	2021 Forecast	2022 Test Year
Vaporization Total	$12.6	$6.8
Sibley Resurfacing Project	$0.0	$0.2
Total	**$12.6**	**$7.0**

Q. HOW WERE BUDGETS FOR THESE PROJECTS DEVELOPED?

A. The capital expenditure budgets for the Sibley projects were based on the detailed engineering analyses and assessments described above. The Company, in conjunction with Campos, developed comprehensive cost estimates for the investments and work in the field. The Company's capital expenditure budgets were then informed by the costs for the Phase 1 work included in the Campos EPC contract, as well as the Company's costs related to overall project management and monitoring related to such tasks as scheduling management and coordination, ongoing risk monitoring, and continuous variance reporting with respect to scope, schedule, and cost performance. The process for budget development of the work orders and related costs were developed by the Company engineers with support from contracted engineering firms and suppliers. These estimates were developed using parametric models based on the costs of similar equipment and upgrades performed by technical experts. Direct costs for engineering, materials, and construction were solicited directly from vendors specializing in this work.

Q. PLEASE DESCRIBE THE COMPANY'S ASSESSMENT OF THE MOST URGENT PLANT NEEDS, I.E., THOSE NECESSARY TO ENSURE VAPORIZATION DURING THE 2021-2022 HEATING SEASON.

A. The assessment of the most urgent project to be completed at Sibley was based on the plant investigations and reviews discussed earlier in my testimony. Based on that information, the Company identified projects that would need to be completed during 2021 to return the plant to service during the 2021-2022 heating season. These projects were identified in the following categories in April 2021 after completion of the initial plant assessments:

- Control systems overhaul,
- Valve integrity and replacement,
- Vaporizer system and building,
- Truck loading systems,
- Relief system modifications,
- Life safety systems.

Subsequently, based on information from the additional investigations and plant reviews, as describe earlier in my testimony and by Ms. Zich, the Company modified its project plans and finalized the Phase 1 scope to include the projects listed below. The following projects are all to be completed in 2021 under the Campos EPC contract:

- Vaporizer System Upgrades – to include: demolition of existing equipment, replacement of vaporizers, super heater, and pretreament and all associated piping or valving along with the building;
- Install new pad gas compressors;
- Install a new pipe rack / bridge from the Propane Pump Area to the Vaporizer Building;
- Install new actuators to the Sales gas and Fuel gas valves;
- Install new air receiver and associated piping.

Q. ARE THERE OTHER PROJECTS TO BE COMPLETED UNDER THE SCOPE OF THE CAMPOS EPC CONTRACT IN 2021?

A. Yes. Similar to the Phase 1 work at Wescott, Campos will also be implementing a portion of the fire protection upgrades and pipe integrity assessments at Sibley in 2021.

Q. PLEASE IDENTIFY IN MORE DETAIL EACH OF THE CAPITAL INVESTMENTS PLANNED FOR THE SIBLEY FACILITY IN 2021.

A. The projects to be completed at Sibley in 2021 include the following:

- Vaporizer System Upgrades include demolition of existing equipment, piping, and instrumentation in the vaporizer building, replacement of the propane vaporizers, super heaters, pretreament equipment, new mixing skid and all associated piping, electrical and valving along with the building being reskinned and reroofed. Installation of new piping as required for connecting the new Propane Preheaters, Vaporizers and Superheaters will accompany the work. Re-skinning and roofing of the Vaporizer Building is required after the equipment is lifted into the building by crane. Replacement of the original propane air mixing system with a skidded system will improve the ability to maintain the equipment, enhance the accuracy of the blending of propane to air digitally, and reduce the risk of leaks due to vibration.
- Installation and locating of the new pad gas compressors with related piping. Relocation and installation of the Pad Gas Compressors and re-piping of the Pad Gas Compressor System is also included in the 2021 scope of work, because the prior location and legacy piping was inefficient as due to the hydraulic losses from having to move gas across the site and back. Installation of a new modern Plant Air cooling system is also being installed, because the legacy early 1958 system has reached the end of its useful life.
- Install a new pipe rack / bridge from the Propane Pump Area to the Vaporizer Building and related piping. Installation of new piping to and from the Propane Pump Area to the vaporizer building and

replacement of the Propane Vaporizers and Superheaters. To install the new equipment, demolition of all old piping, equipment, and instrumentation within the existing vaporizer building is required. The roof will be removed to facilitate the installation.

- Install new actuators to the Sales gas and Fuel gas valves.
- Installation and piping of the new air receiver and associated equipmment.
- As discussed above, plant-wide updates to the life safety systems will be completed to allow for vaporization to resume during the 2021-2022 heating season. A portion of the pipe integrity assessments will also be completed while the plant is offline.

Q. WHAT PROJECTS ARE PLANNED TO BE COMPLETED AT THE SIBLEY FACILITY IN 2022?

A. The projects planned for completion during 2022 include projects associated with the vaporization equipment that are not critical to resume vaporization during the 2021-2022 heating season, including installation of cable tray from the Vaporizer building area to Tank Bank as well as new piping to/from the Tank Bank to the Propane Pump Area and the related electrical upgrades. Projects in 2022 also include additional fire protection upgrades and pipe integrity assessment work as also discussed above. Additionally, a truck area resurfacing project will also be completed.

Q. HOW IS THE WORK AT THE SIBLEY FACILITY PROGRESSING?

A. Sibley upgrades are progressing with construction underway; demolition is complete and purging, and sectionalizing of the plant is complete, with

installation of the vaporizer heaters and pretreatment equipment on target for both schedule and budget.

D. Maplewood Capital Investments

Q. CAN YOU PROVIDE A HIGH-LEVEL DESCRIPTION OF THE VAPORIZATION PROCESS AND EQUIPMENT AT THE MAPLEWOOD PLANT?

A. Yes. Consistent with the process and equipment at the Sibley plant, propane is delivered to the plant in its liquid state via truck, where it is stored in tanks until needed. When the plant is dispatched, the propane is vaporized, mixed with air, and injected into the gas distribution system, where it is blended with natural gas and ultimately delivered to customers. The primary plant components include propane storage tanks; three buildings that separately house the boiler, compressor, and vaporizer equipment; all associated piping, electrical equipment, and safety systems; and a trucking area for delivery of the liquid propane.

Q. PLEASE DESCRIBE AT A HIGH LEVEL THE OVERALL WORK RELATED TO VAPORIZATION.

A. The work at the Maplewood plant is very similar or the same as the work at Sibley; however, below I discuss specific work at Maplewood in this section of my testimony to provide a complete picture of the work at each plant.

The vaporization work at the Maplewood plant is primarily related to replacement of equipment that is past the end of its life expectancy. The systems to be upgraded are the vaporizer system, pad gas, plant air, and boiler systems. This includes installation of a new vaporizer, super heater, pre-heater, mixing system, and all associated piping and valving within the existing

vaporizer building. Also included is new piping from the pumps to the vaporizer building, modifications to the plant air piping, and installation of plant air dryer with new steam piping boiler feedwater pumps and new instrumentation and wiring. The Company will also make modifications to the electronic controls systems for the equipment and will make improvements to safety systems, such as installation of additional gas detection equipment and upgraded fire extinguishers.

Q. IS A PORTION OF THE WORK DESCRIBED ABOVE TO BE COMPLETED AFTER THE PLANT RETURNS TO SERVICE?

A. Yes. As discussed earlier, the Company identified projects that were critical for the plants to resume vaporization during the 2021-2022 heating season (Phase 1), and those that are necessary but may be completed after the plants return to service (Phase 2). A portion of the work described above will be completed in 2021, with some of the work to be completed in 2022. The other upgrades in 2022, the truck loading systems, the boiler systems, and the plant air systems.

Q. WHAT ARE THE CAPITAL INVESTMENTS AT THE MAPLEWOOD PEAKING PLANT FOR 2021 AND 2022 THAT YOU SUPPORT IN YOUR TESTIMONY?

A. Table 4 below shows the total project costs at the Maplewood peaking plant that I support in my testimony. As shown, a portion of the "vaporization" work is necessary but not critical to resume vaporization during the 2021-2022 heating season, and thus it is scheduled to be completed in 2022.

Table 4

Maplewood Peaking Plant Projects - Capital Additions

State of Minnesota ($ millions)

Maplewood Peaking Plant Projects Capital Additions	2021 Forecast	2022 Test Year
Maplewood Vaporization Projects Total	$12.2	$5.5
Truck Unloading Station	$0.5	$0.0
Total	**$12.6**	**$5.5**

Q. HOW WERE BUDGETS FOR THESE PROJECTS DEVELOPED?

A. The capital expenditure budgets for the Maplewood projects were based on the detailed engineering analyses and assessments described above. The Company, in conjunction with Campos, developed comprehensive cost estimates for the investments and work in the field. The Company's capital expenditure budgets were then informed by the costs for the Phase 1 work included in the Campos EPC contract, as well as the Company's costs related to overall project management and monitoring related to such tasks as scheduling management and coordination, ongoing risk monitoring, and continuous variance reporting with respect to scope, schedule, and cost performance. The process for budget development of the work orders and related costs were developed by the Company engineers with support from contracted engineering firms and suppliers. These estimates were developed using parametric models based on the costs of similar equipment and upgrades performed by technical experts. Direct costs for engineering, materials, and construction were solicited directly from vendors specializing in this work.

Q. PLEASE DESCRIBE THE COMPANY'S ASSESSMENT OF THE MOST URGENT PLANT NEEDS, I.E., THOSE NECESSARY TO ENSURE VAPORIZATION DURING THE 2021-2022 HEATING SEASON.

A. The assessment of the most urgent projects to be completed at Maplewood was based on the plant investigations and reviews discussed earlier in my testimony. Based on that information, the Company identified what would need to be completed during 2021 to return the plant to service during the 2021-2022 heating season. These projects were identified in the following categories in April 2021 after completion of the initial plant assessments:

- Control systems overhaul,
- Valve integrity and replacement,
- Vaporizer system and building,
- Truck loading systems,
- Relief system modifications,
- Life safety systems.

Subsequently, based on information from the additional investigations and plant reviews, as describe earlier in my testimony and by Ms. Zich, the Company modified its project plans and finalized the Phase 1 scope to include the projects listed below. The following projects are all to be completed in 2021 under the Campos EPC contract:

- Vaporizer System Upgrades include demolition of existing equipment, replacement of vaporizers, super heater, and pretreatment equipment and all associated piping, electrical and valving along with the building;
- Install new vaporizer mixing skid;
- Install new pad gas compressors;

- Install a new pipe rack / bridge from the Propane Pump Area to the Vaporizer Building;
- Install new piping at the Propane Pumps;
- Install new actuators to the Sales gas and Fuel gas valves;
- Install new air dryer and associated piping;
- Install a new process air cooling system and associated piping.

Q. ARE THERE OTHER PROJECTS TO BE COMPLETED UNDER THE SCOPE OF THE CAMPOS EPC CONTRACT IN 2021?

A. Yes. Like the Phase 1 work at Wescott and Sibley, Campos will also be implementing a portion of the fire protection upgrades and pipe integrity assessments at Sibley in 2021.

Q. PLEASE IDENTIFY IN MORE DETAIL EACH OF THE CAPITAL INVESTMENTS PLANNED FOR THE MAPLEWOOD FACILITY IN 2021.

A. The projects to be completed at Maplewood in 2021 are largely the same as the projects to be completed at Sibley and are described in detail above. An additional project to be completed at the Maplewood plant is installation of a new process air cooling system and associated piping.

Q. WHAT PROJECTS ARE PLANNED TO BE COMPLETED AT THE MAPLEWOOD FACILITY IN 2022?

A. As at Sibley, the projects planned for completion at Maplewood during 2022 include projects associated with the vaporization equipment that are not critical to resume vaporization during the 2021-2022 heating season, including installation of cable tray from the Vaporizer building area to Tank Bank as

well as new piping to/from the Tank Bank to the Propane Pump Area and the related electrical upgrades. Projects in 2022 also include additional fire protection upgrades and pipe integrity assessment work as also discussed above. Additionally, the truck unloading station will also be completed in 2022.

Installation of new piping to and from the Tank Bank to the Propane Pump Area will be completed in 2022 to ensure reliability of the piping and connections. Installation of a new Plant Air dryer system and installation of a cable tray from the Vaporizer building area to the Tank Banks are also planned for 2022. The 2022 work at Maplewood that involves upgrading piping and valves at the Tank Bank (i.e. propane storage area) will occur after heating season because the propane inventory in the tanks will be drawn down based on usage. The lesser amount of remaining propane will be more easily handled and removed so piping and valve work can commence.

Q. HOW IS THE WORK AT THE MAPLEWOOD FACILITY PROGRESSING?

A. Isolation of the plant piping and demolition is complete. Structure of the building during demolition revealed more corrosion than anticipated, so structural engineering was performed to reinforce the building for safety. Foundations are being installed and pipe fabrication is underway. Preheaters and Superheater delivery is scheduled for first week of October 2022. SCADA Delta V work is on track with many items complete. The project is currently on schedule and on budget.

E. Gas Plant Operating System Replacement (DeltaV Project)

Q. WHAT IS THE DELTAV PROJECT AND WHY IS IT NEEDED?

A. The DeltaV project will replace the existing Citect gas plant operations system software at the Westcott, Sibley, and Maplewood plants. The existing operating system at the gas plants was installed in 2012 and is outdated and must be replaced. Working in conjunction with plant personnel, the project is being implemented by Business Systems, and project costs are included in the Business Systems budgets. Below, I describe the need for and the benefits of the project and summarize the work involved. The DeltaV project will be placed in service in 2021, and capital additions are $4.1 million on a Total Company NSPM basis.

Q. CAN YOU SUMMARIZE THE WORK THAT IS BEING UNDERTAKEN TO IMPLEMENT THE DELTAV PROJECT?

A. Yes. Implementation of the new control system at the plants includes the following:

- DeltaV software implementation, including integration with existing plant and corporate networks and systems, and customization of software to the specific equipment at each of the plants;
- hardware installation including new cabinets, electronic equipment, and switches as well as new wiring from cabinets to instrumentation throughout the plants;
- testing of all systems and operations; and
- training for all plant operators.

Q. WHAT ARE THE BENEFITS OF IMPLEMENTING THE DELTAV PROJECT?

A. In addition to simply addressing the need to replace the outdated current plant operating system, implementation of DeltaV provides significant benefits. The new Delta V operating system will ensure the reliability of plant operations to liquefy and vaporize natural gas and will improve the digital accuracy of process monitoring of temperature, pressure, and flow through the systems at each of the plants. In addition, bringing the system support under Xcel Energy's Business Systems area ensures automated integration with Xcel Energy corporate IT policies, cyber security, and IT support structures.

Q. PLEASE DESCRIBE THE WORK BEING COMPLETED AT WESCOTT FOR THE DELTAV PROJECT.

A. At Wescott, the SCADA DeltaV work is extensive. The project includes significant rewiring and installation of new switches to replace all the existing Citect Modicon PLC's with DeltaV Charms and to connect with the corporate network and the plant process network. Fiber Optic Cable replacement is required throughout the plant to facilitate effectiveness of the new system. Building out a new MDF room, install wiring racks, new HVAC, security equipment, ethernet switches and new DeltaV Controller are all required. In the compressor building and in the adsorber building, we will install a DeltaV Charms panel and connect it to power and the network. In the Wescott control room, the project requires installation of a new charms stick, new network cables and network drops in the new DeltaV Charms panels. Additional work includes decommissioning all obsolete back panels and installing new Charms panels and rewiring to all PLCs, control valves, tanks and workstations.

Q. WHAT IS THE WORK BEING COMPLETED AT SIBLEY FOR THE DELTAV PROJECT?

A. The work at Sibley for the SCADA DeltaV project includes installation of new switches and router to communicate with the corporate network, and build-out of the new MDF room in the boiler building. In addition, we will install DeltaV ethernet switches and the MQ Controller in the rack and connect to power and network. Also, we will run network cables to new network drops in the plant and install an Operator workstation in the Control Room with a new enclosure for button and display on the other side of the wall from where it is located. No rewiring of I/O is needed at Sibley such as what was necessary at Wescott, because the physical control system hardware is in good condition at Sibley.

Q. WHAT WORK IS BEING DONE AT MAPLEWOOD FOR THE DELTA V PROJECT?

A. The work at Maplewood for the DeltaV project includes installation of new switches and new router to communicate with the corporate network, and build out of the new MDF room, as the old office room in Boiler Building was not temperature nor humidity controlled properly. Also included is installation of a new DeltaV Controller Cabinet and ethernet switches and connection to power source and network connectivity, installation of the DeltaV MQ Controller and running network cables to new network drops in the plant, and finally, installation of the Operator Workstation in the Control Room. No re-wiring of the I/O as was necessary at Wescott is required, because the physical control system hardware is in good condition at Maplewood.

Q. PLEASE SUMMARIZE HOW THESE PROJECTS WILL BENEFIT THE PLANTS AND NSPM CUSTOMERS OVERALL.

A. The SCADA Delta V projects will implement digital operating systems that will improve the reliability of the gas peaking plants by enhancing system monitoring and management, reducing risk, and benefiting from the Company's additional Information Technology policies and structures. Overall, these investments will improve plant reliability and efficiency, enhancing their service to customers.

IV. CONCLUSION

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. In my testimony, I describe certain capital investments required to ensure safe and reliable gas service is delivered by Xcel Energy's peaking plants in Minnesota. The Company has focused its efforts on the most urgent plant needs to complete projects to ensure the safe and reliable vaporization during the 2021-2022 heating season. The investments being made at the plants are prudent and reasonable. Engineering analysis as described above led to identification of and planning for the required investments, construction efficiencies, and safety enhancements. Together, these investments are intended to assure the plants are available to safely vaporize if and when called upon during the 2021-2022 heating season. For these reasons the costs for the gas plant remediation projects are appropriate for recovery in this rate case.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.

Statement of Qualifications

Mary P. Palkovich
Program Executive, Gas

Ms. Palkovich received a Bachelor of Science in Mathematics and Computer Science from the University of Missouri (Kansas City) and an Associate of Science in Civil Engineering Technology from Michigan Technological University.

Ms. Palkovich was hired by Panhandle Eastern Pipeline Company in 1982 as an Engineering Technician performing field inspections of gas transmission lines and gas compressor stations and progressed to Senior Technician responsible for engineering studies of compressor additions and FERC applications for capital investments and annual certifications.

In 1989, Ms. Palkovich accepted a position with CenterPoint Energy as a staff engineer performing gas distribution and transmission designs, including gas storage field well designs. Ms. Palkovich was promoted to Manager, Gas Supply in 1994 and in this position, she purchased capacity on the interstate pipelines and negotiated with interstate pipelines when they applied for FERC approval to increase rates.

From 1998 and through 2012 Ms. Palkovich was promoted from Director of Engineering to Vice President over all gas engineering at CenterPoint Energy in the six states where they operated. In this position, Ms. Palkovich had responsibility for Gas Control, Underground Storage, Engineering Design, Environmental Compliance, Safety and the technical portion of operations such as cathodic protection, leak detection and measurement of transmission facilities.

In 2012, Ms. Palkovich joined Consumers Energy (A CMS Energy Company) as an Executive Director over Gas Engineering. In this position, Ms. Palkovich's responsibilities included compression, underground storage, distribution and transmission design, and all capital budget for gas assets. Ms. Palkovich also acted as incident commander for several significant Consumers Energy gas events. She led efforts that improved compliance with federal and state gas code while increasing productivity in all areas of her responsibility. In addition, Ms. Palkovich oversaw the revisions to the gas operations manual process.

In 2013, Ms. Palkovich was promoted to Vice President of Energy Delivery, which included both Gas and Electric Engineering. In this position, she had responsibility for engineering of the gas and electric distribution and transmission assets. In 2018 Consumers reorganized to align gas supply and gas control into gas engineering and aligned electric supply activities into electric engineering. Ms. Palkovich was appointed to the gas engineering and supply Vice President position. From 2018 to 2021, Ms. Palkovich was a loaned executive to the American Gas Association where she performed peer reviews of investor-owned utilities across the United States and represented the gas industry at the API 1173 working group to further gas industry advancement of pipeline safety management systems. In January of 2019, Ms. Palkovich was appointed by the Secretary of the U.S. Department of Transportation to the Gas Pipeline Advisory Committee or GPAC, where federal regulators and industry representatives translated legislation into federal code regulations.

Gas Plant Remediation Program

Project Name:	Gas Plant Remediation Program
Project Phase:	Remediation
Department:	NSP Gas Plants
Project Sponsor:	Luke Litteken
Project Lead:	Mary Palkovich

1 Contents

2 Executive Summary

The purpose of this Scope Validation document is to define the project scope and obtain stakeholder approvals for the scope. Therefore, this is a scoping document and not a schedule or cost document.

The program spans upgrades and changes at three gas plants in Minnesota. The primary site is the Wescott Liquid Natural Gas (LNG) plant located in Inver Grove Heights, MN. The secondary sites are the Maplewood Liquid Propane Gas (LPG) plant located in Maplewood, MN and the Sibley LPG plant located in Mendota Heights, MN.

This program is primarily focused on enabling safe, reliable, and sustainable vaporization activities at the three gas plants but also supports cultural and process changes in how the plants are operated.

3 Scope Statement

3.1 Background

The Gas Plant Remediation Program overall scope is set by this document and aligns with design packages and regulatory requirements. The scope was developed largely based on four sources of information:

1. Xcel Energy HAZOP and LOPA analyses.
2. Internal audits of plant processes and training.
3. Approved Xcel documents (drawings, vendor manuals, etc.).
4. Legal notices from the MN Office of Pipeline Safety.

3.2 Base Scope:

The base scope are items included in the scope. Additional scope items were considered during the development and scope evaluation, but determined not to be included in the program. See section 4 for scope exclusions.

1. **Trained and Qualified Personnel**
    a. Normal/Abnormal/Emergency Plant Operations Training (Xcel Energy Tech Training) – All plant personnel will be trained how to operate and maintain the gas plants under normal, abnormal, and emergency operating conditions. Personnel will utilize the operating and emergency procedures during the training. Knowledge will be validated through the use of a written evaluation.
    b. Plant Modifications and Procedures Training (Xcel Energy Tech Training) – All plant personnel will be trained on the changes to the facilities that affect their operation. This includes physical changes to plant equipment as well as computer operating systems. Knowledge will be validated through the use of a written evaluation.

c. CPR/First Aid/AED Training (Xcel Energy Tech Training) – Plant personnel will be trained in basic first aid topics to ensure remedial actions can be taken in the event of injury.
d. Plant Operations Drills (Xcel Energy Tech Training) – Training will be provided on the proper response of plant personnel to abnormal and emergency conditions. This training will include use of the procedures in the field to ensure clarity in roles/responsibilities and appropriate actions for the given conditions. Skill to respond to these events will be validated through the performance of a plant drill.
e. 4160kV Safety Training (Xcel Energy Tech Training) – Select personnel will be trained to operate breakers on site at Wescott in order to enable future isolation and other procedures.
f. Work Manager Usage Training (Xcel Energy Gas Business Ops) – Plant personnel will be instructed on and provided resources to track and manage work through SAP and Work Manager.
g. Maintenance Plan Management Training (Xcel Energy Gas Business Ops) – Plant scheduler will be instructed on the purpose for various SAP and Work Manager functions to include tracking equipment compliance, reporting on equipment status, and planning future work.
h. Audit/Sustainability Plan (Xcel Energy Tech Training) – refresher training will be provided for the gas plants as defined in the LNG/Propane Plant Training Program Description to ensure knowledge and skills for plant operation and maintenance are maintained. Training will be planned, tracked, and documented through Xcel's Learning Management System (LMS).

2. **Valued and Robust Procedures**
   a. Operations Manuals (Xcel Energy Gas Standards) – LNG and LPG manuals will be reviewed and updated for normal and abnormal operations of the plants with requisite processes and procedures.
   b. Maintenance Manuals (Xcel Energy Gas Standards) – LNG and LPG manuals will be reviewed and updated for maintenance of equipment throughout the plants with requisite processes and procedures.
   c. Emergency Manuals (Xcel Energy Gas Standards) – LNG and LPG manuals will be reviewed and updated for emergency situations with requisite processes and procedures.
   d. Audit/Sustainability Plan (Xcel Energy Gas Standards) – Manuals will be periodically updated by following the Pipeline Compliance and Standards Process for Reviewing Manuals for LNG and LPG manuals (operations, maintenance, and emergency). Recurring tasks have been created in Xcel Energy eGSR Archer software to ensure manuals are routinely reviewed and updated. Updates to procedures will follow the Gas Management of Change process, as appliable.
3. **Reliable Equipment**
   a. **Wescott LNG Plant**

i. Fire System Upgrades (Campos EPC) – The fire system will include the following changes: Siting and Vapor Dispersion Study, Fire Pump/feedwater Upgrades, Additional Gas Detection, Vaporizer and boiler building gas detection upgrades, and Additional ESD Locations and Testing.
ii. Variable Frequency Drive (VFD) Installation (Campos EPC) – VFDs installed t oreduce maximum output pressure from pumps and reduce risk of pump overpressure.
iii. Process Relief System Installation (Campos EPC) – Provides a flow path in accordance with best engineering practices to protect piping and provide recirculation.
iv. Thermal Relief System Installation (Campos EPC) – Adds temperature or flow elements tied to alarms so plant personnel have visibility into reliving conditions via control room.

b. **Maplewood LPG Plant**
   i. Vaporizer System Upgrades (Campos EPC) – To include: demolition of existing equipment, replacement of vaporizers, super heater, and pretreament and all associated piping or valving along with the building.
   ii. Install new vaporizer mixing skid (Campos EPC)
   iii. Install new pad gas compressors (Campos EPC)
   iv. Install a new pipe rack / bridge from the Propane Pump Area to the Vaporizer Building (Campos EPC)
   v. Install new piping at the Propane Pumps (Campos EPC)
   vi. Install new actuators to the Sales gas and Fuel gas valves (Campos EPC)
   vii. Install new air dryer and associated piping (Campos EPC)
   viii. Install a new process air cooling system and associated piping (Campos EPC)

c. **Sibley LPG Plant**
   i. Vaporizer System Upgrades (Campos EPC) – To include: demolition of existing equipment, replacement of vaporizers, super heater, and pretreament and all associated piping or valving along with the building.
   ii. Install new pad gas compressors(Campos EPC)
   iii. Install a new pipe rack / bridge from the Propane Pump Area to the Vaporizer Building(Campos EPC)
   iv. Install new actuators to the Sales gas and Fuel gas valves(Campos EPC)
   v. Install new air receiver and associated piping(Campos EPC)

d. **Gas Plant Operating System Replacement (DeltaV)**
   i. Basic User Training (Xcel Energy Business Systems) – Train plant operators on basic functions of the DeltaV software system including how to open, utilize and change user interface, and update the system.
   ii. Wescott Wiring (Xcel Energy Business Systems) – New wiring between cabinets and instrumentation throughout the plant.

iii. Wescott Cabinets/PLCs (Xcel Energy Business Systems) – Replacement cabinets and electronic equipment to support the DeltaV systems.
iv. Wescott Charms Building (Xcel Energy Business Systems) – Install a new building to support nearby cabinets and instrumentation.
v. Wescott Code Development (Xcel Energy Business Systems) – Customize DeltaV code with input from plant personnel to adequately model and control the Wescott plant.
vi. Wescott Code Installation (Xcel Energy Business Systems) – Deploy custom code to Wescott and demonstrate adequate control of the system.
vii. Sibley/Maplewood Code Development (Xcel Energy Business Systems) – Customize DeltaV code with input from plant personnel to adequately model and control the Sibley and Maplewood plants.
viii. Sibley Code Installation (Xcel Energy Business Systems) – Deploy custom code to Sibley and demonstrate adequate control of the system.
ix. Maplewood Code Installation (Xcel Energy Business Systems) – Deploy custom code to Maplewood and demonstrate adequate control of the system.

4. **Effective Work Control**
   a. Update/create equipment records for existing equipment (Xcel Energy Gas Business Ops) – Review all existing equipment at the MN gas plants and ensure adequately represented in Xcel's enterprise asset management system (SAP).
   b. Define required maintenance plans (Xcel Energy Gas Business Ops) – Review regulatory requirements and manufacturer recommendations to determine mainteance plans and task lists for all plant equipment.
   c. Create maintenance plans (Xcel Energy Gas Business Ops) – Develop maintenance plans by object type per definition above and create in SAP.
   d. Activate maintenance plans (Xcel Energy Gas Business Ops) – Assign maintenance plans to individual pieces of equipment and functional locations to automatically run and create necessary SAP work orders.
   e. Add equipment records for new equipment (Xcel Energy Gas Business Ops) – Create new equipment records for all equipment modified or added throughout this program.
   f. Create maintenance plans for new equipment (Xcel Energy Gas Business Ops) – Create and activate maintenance plans for all equipment modified or added throughout this program.

4 Scope Exclusions

The following scope was considered based on inputs, but was ultimately excluded.

1. Wescott
   a. Boiler Building Ventilation – Installation of louvers moved to future phase as risk can mitigated through simpler means (open of large doors during operation).

b. Liquefaction Upgrades – Any changes to the liquefaction system to include process and thermal relief changes and HAZOP items moved to future phases.
c. TL202 and TL201 Traps – Pushed to future phase (2022) as inspection is not required until 2023 (confirmed with Xcel integrity management).
d. Tank 1 Mitigation – Operational risk to program but scope of remediation for Tank 1 is outside the vaporization scope.

2. Sibley

a. Truck Loading/Unloading System
b. Yard Piping to Remaining tanks
c. Boiler upgrades
d. Plant air compressor upgrades
e. Plant road upgrades
f. Electrical upgrades
g. Ground grid replacement
h. Steam instrumentation updates
i. Redundant instrument air compressor
j. Bank 6 redundant pump
k. Tank updates
l. Replacement of control wiring and PLCs

3. Maplewood

a. Yard Piping to Remaining tanks
b. Boiler upgrades
c. Plant air compressor upgrades
d. Plant road upgrades
e. Plant air building piping and conduit support upgrades
f. Additional electrical upgrades
g. Ground grid replacement
h. Steam instrumentation updates
i. Redundant instrument air compressor
j. Bank 6 redundant pump
k. Tank updates
l. Replacement of control wiring and PLCs

5 Attachments

1. Wescott P&IDs (Wescott_PID_Rev_0_5-21-21_Part 1.pdf, Wescott_PID_Rev_0_5-21-21_Part 2.pdf, Wescott_PID_Rev_0_5-21-21_Part 3.pdf)
2. Maplewood P&ID (Maplewood P&ID Rev 0.pdf)
3. Sibley P&ID (Sibley_P&IDs_Combined_083021.pdf)

6 Project Scope Statement Report Approvals

Prepared By:	Approved via email	27-Sep-2021
	Kyle Lundequam, Project Manager	**Date:**
Approved By:	Approved via email	27-Sep-2021
	Steve Yehle, Project Sponsor	**Date:**
	Approved via email	27-Sep-2021
	Mary Palkovich, Project Lead	**Date:**
	Approved via email	29-Sep-2021
	Steve Martz, Sr. Director, Gas Engineering	**Date:**
	Approved via email	27-Sep-2021
	Kevin Joyce, Director, Gas Programs	**Date:**
	Approved via email	4-Oct-2021
	Luke Litteken, SVP, Gas	**Date:**