

South Dakota Infrastructure Rider 2016 Project List and Descriptions

Existing Rider Projects

The following projects were approved for recovery by the Commission in the Company's Infrastructure Rider in Docket No. EL14-058, and there have been no substantive changes to the projects' scopes since their approval in that docket:

Monticello LCM/EPU (w/o 10245258)
Border Winds (w/o 11551351)
Pleasant Valley Wind (w/o 11869600)
Prairie Island Casks (#39-47) (w/o 11101522)
Prairie Island ISFSI Relicensing (w/o 10798851)
PI Unit 2 Electric Generator Replacement (w/o 11808202)
PI Unit 2 GSU Transformer Replacement (w/o 11808219)
Sherco Unit 1 Couton Bottom Replacement (w/o 10924185)
MNGP EDG Tornado Missile Protection (w/o 11946062)
MNGP Fukushima Modifications (w/o 11503439)
PI LR Ph II-U2 MRP-227A Implementation (w/o 11812440)
PI U2 HDTP Speed Control Upgrade (w/o 11230621)
BDS-C Install Package Boiler (w/o 11345791)
SHC3C Motor Control Sys PL (w/o 11487734)
Midtown 115kV line (w/os 11219377 and 11627836)
NSM0953 Galloping Mitigati (w/o 11892875)
GIST-III Computer Software (w/o 11465739)
Hiawatha Dam Interconnect Substation (w/o 11083245)
Scott County 345 kV Expansion, Substation (w/o 11806389)
BS-Fcst-BD-SW-CM-M (w/o 11218029)
PI-Repl Instrument Air Compressor (w/o 10799550)
PI-NFPA 805 Fire Model (w/o 11044898)

Settlement Agreement Exhibit C Projects

The following projects were among those identified on Exhibit C to the Settlement Agreement approved by the Commission in Docket No. EL14-058. Exhibit C provided the list of specific capital projects for which potential Rider cost recovery may be requested in future Infrastructure Rider filings:

Prairie 3rd 230/115 kV tra (w/o 11491534)

The project involves installing a third 230-115 kV 336 MVA transformer and the relocation of an existing transformer at the existing Prairie Substation near Grand Forks, North Dakota. This additional transformer is needed to avoid severe low voltages on the 115 kV system and severe thermal overloads on the 69 kV system in the Grand Forks area during the loss of the two existing 230/115 kV transformers at the Prairie Substation as required by NERC's TPL-003 standard. The Company conducted the Grand Forks Load Serving Study to evaluate two options to prevent the voltage problems in the Grand Forks area. The other option was to increase the transformer capacity at Western Area Power Administration's Grand Forks substation and rebuild the 69 kV transmission line between the Prairie Substation and Gateway substations. The addition of a third transformer at the Prairie Substation was determined to be more cost-effective and long-term solution.

PI Emerg Resp Equipment FLEX (w/o 11634222)

The purpose of this project is to purchase and implement emergency response equipment for use in a beyond design-basis event/accident at the Prairie Island Nuclear Plant. This project will modify plant as specified in order to implement and use emergency response equipment including installation of connection points for response equipment in plug-and-play deployment of equipment during an event. The project will enable the site to meet the requirement by the NRC, as outlined in 50.54(f) letters and orders issued in March of 2012, which will ensure that Nuclear Generating Stations will have portable equipment (FLEX) that will be stored in diverse locations and capable of being used to assist in mitigating beyond design basis events.

The additional portable equipment will enable three key safety functions to be achieved in the absence of AC power and ultimate heat transfer capability using permanently installed safety related systems: core cooling; spent fueling cooling; containment integrity.

PI U1 HDTP Speed Control U (w/o 11101124)

This project is to upgrade the obsolete Heater Drain Tank Pump (HDTP) Speed Control system on Prairie Island Unit 1 with a reliable variable frequency drive (VFD)

system and redundant level control loops. Completion of this project will eliminate the maintenance burden associated with the speed control system and prevents reactivity events due to heater drain tank pump failures. This project will be implemented in the fall of 2016 to resolve this long-standing issue and maintain the site's "zero tolerance policy" with regards to reactivity events.

The existing Regutron II HD pump control system, cabling, motors, and level transmitter for Unit 1 will be removed and a new VFD based control system for the HD pumps will be installed. As part of this project we will also install: inverter rated motors and direct drive pump couplings; new control cable and armored power cabling; and, two trains of Heater Drain Tank level transmitters. When complete this project provides redundant level control and eliminates single point vulnerabilities with the current control system.

SHC2C U2 Turbine EHC Ctrl's (w/o 11488127)

This project will replace the current GE Mark 1 Electrohydraulic Control Systems with a new digital turbine control system. Additionally the current mechanical overspeed trip systems will be replaced with a triple redundant electronic overspeed trip system and as well as replace critical aging field devices and cables with new equipment. The turbine control replacement projects for all 3 Sherco Units should be done in one package in order to reduce costs and to ensure that the exact same turbine control system is used on all 3 Sherco units.

Dynamic EMS Environment Phase (w/o 10818773)

This project is to replace the current Energy Management System (EMS) SCADA system which was implemented 15 years ago and is well past its useful life. EMS is a critical cyber asset that is used for the monitoring and management of the Bulk Electric System by Xcel Energy's Transmission and Distribution Operations function. The EMS interfaces with field devices that collect information about the health of the bulk electric system. Real time two-way communications provides Transmission and Distribution Operations the ability to remotely control the flow of electricity during outage and maintenance periods. This is a key project to allow compliance with NERC critical infrastructure protection requirements.

MNGP Security Physical Upgrade (w/o 12076265)

The purpose is to design and install upgrades to the Monticello Nuclear Plant physical security features. These upgrades are required as a result of installation of the bin wall and the reevaluation of the waterborne Design Basis Threat (DBT), both of which have resulted in required compensatory posts and actions.

The study phase determined the appropriate design/equipment relative to: (1) the recent (2013) blast analysis; (2) the Design Basis Threat (DBT), including changes required as a result of the navigable waterways issue; (4) security tabletop analysis; and (5) security's line-of-sight and protective strategy needs. The study conclusions will be incorporated in a detailed design and implementation project as described below. The design phase included design for: (1) Blast and Bullet Resistant Enclosure equipment and locations (buried and/or overhead lines and utilities); (2) structural hardening of some existing defensive positions; and, (3) addition of features that will increase adversary engagement time. An engineering change was prepared that provided the design for installation of the above equipment, and routing of all required utilities (power, fiber optic cable and communications). The implementation phase deliverable includes: (1) Installation of four elevated Blast and Bullet Resistant Enclosures, along with power, HVAC, specified security systems, and phone lines; (2) installation of delay fencing and upgrades to existing structures; and (3) removal of temporary security structures associated with current compensatory measures.

Work and Asset Ph 1 SW MN (w/o 11491932)

This project involves the replacement of our existing work and asset management systems, Maximo and Passport. Maximo is used to manage all work related to our Energy Supply business area and the Passport system manages all work related to our Transmission, Distribution and Nuclear areas. As part of the replacement of these systems, we will be redesigning work management and scheduling processes. The project will improve our ability to more directly, efficiently and effectively manage our system assets, allow us to optimize labor management and enhance sourcing and supply chain efficiencies. We will also be unifying and standardizing processes across the Company as we consolidate multiple systems into one, which will help recover quickly from unplanned outages, secure materials and dispatch labor in a more cost effective manner, and deliver corporate efficiencies. Additionally, with the implementation of this system, we will be able to provide enhanced analytics.

PI Sfgds CL Pump Redesign (w/o 12075477)

The Safeguards Cooling Water Pump Replacement project was initiated for three primary reasons: 1) the site's spare Cooling Water pump is currently offsite and not in a condition to be reinstalled due to its material condition and 2) the 12 Diesel Driven Cooling Water Pump (DDCLP) is subject to an Operable but Non-Conforming condition for missing required Non-Destructive Examination reports, and 3) there are several operation and maintenance burdens associated with the forced bearing cooling system for the existing cooling water pumps.

This Project includes the procurement of one New and one Refurbished vertical safeguards cooling water pump. Either the New or Refurbished pump will be installed in place of Company's existing 12 DDCLP. Either the New or Refurbished pump will be placed in the Company's warehouse as a spare. The existing 12 DDCLP will be removed and placed in the Company's warehouse. The design of the new and refurbished pumps will be upgraded from the existing close-lined-shaft to an open-line-shaft. The open-line-shaft pump design will preclude the need for bearing cooling that is currently provided by the well-water system.

Galloping Mitigation (w/o 11892875, 12051340, 12077207)

Conductor galloping is the high-amplitude, low-frequency oscillation of overhead conductor caused by wind and ice loading. Galloping can cause outages and significant damage to the conductor, structures and related components. This project involves the Split-Rock – Lakefield Junction 345kV line which has been analyzed with solutions determined to be a mixed approach consisting of: 1) reconductoring the most gallop-prone segments of the line with twisted pair conductor that is a proven effective method for limiting conductor galloping; and 2) installation of anti-galloping devices to existing conductor where galloping has been less frequent and of lower severity.

The existing Galloping Mitigation project (work order 11892875) included in the 2015 Infrastructure Rider has now been further split, such that the complete project involves a total of three work orders: 11892875, 12051340, and 12077207.

Proposed New Projects

The Company seeks eligibility determination for the following projects:

HBC7C U7 HGP/Combustion Inspec (w/o 10785655)

Hot gas path outage for High Bridge Unit 7. Included in this capital project is the labor and rental equipment needed to perform a HGP. A HGP path outages includes everything done during a Combustion Inspection plus replacement of turbine section components. The costs of this project are according to the Parts Exchange Agreement between Xcel Energy and MPSA (Mitsubishi). for both materials and labor. Additions to the project include Row 4 blade root springs to decrease wear while on turning gear, new combustor tophats without steam injection which will decrease overhaul durations by approximately two 12-hour shifts, and air leakage improvements which will optimize component cooling and increase overall efficiency and stability.

SHC1C U1 DCS Controls Repl PH (w/o 11350867)

This project is to replace the Unit 1 Distributed Control System (DCS) Distributed Processing Units (DPU) controllers and token ring network. Also replaces Input/Output points for the visual annunciator system and sootblowing system. This is Phase 2 of a multi-phase replacement approach and will replace 73 DPUs and logic that were originally installed in 1996 and 1997. The I/O points for the visual annunciator replace original equipment from 1976; the I/O points for the sootblowing control system were originally installed in 1990.

Unit 1 DCS was replaced in 1996, however the DPUs are at end-of-life and are only available in used condition sporadically from the manufacturer. Parts to service these systems cannot be acquired. The system networks are also at capacity, creating long latency for response to operators and preventing any additional data from being added to the system. Current DPU's and Token Ring network are unable to meet our DCS security policy requirements or potential CIP requirements. This upgrade is required for the control of any future turbine or environmental control projects. If this project is not done, Unit would experience increasing Unit trips resulting in potential Unit damage and increased maintenance costs.

MNGP Rplc IMUX Front End Proce (w/o 11366818)

This project replaces the existing N-1000 boards and the field PC (also known as Front End Processor/FEP unit) with Mercury Security alarm and access control boards in each of eight IMUXes (2, 4, 5, 6, 7, 8, 9, and 10).

An inverse multiplexer (IMUX) is a device performing the opposite function of a multiplexer (MUX). Instead of allowing one or more low-speed analog or digital input

signals (or data streams) to be selected, combined and transmitted at a higher speed on a single shared medium or within a single shared device, i.e. multiplexing, an inverse multiplexer breaks the combined and related higher speed analog or digital signals into several concurrent lower-speed related signals or data streams. Thus, using multiple slower lines, the data stream can be more evenly distributed across all lines.

GIST-II Computer SoftwareNSPM (w/o 11434783)

The purpose of this project is to create a new durable electronic asset of data, documentation, and connectivity models for Xcel Energy's substations. The electronic data consists of new substation smart one-lines containing substation equipment information, ratings, and electrical connectivity modeling and also substation system protection asset information. The data contained in the smart one-lines is leveraged in a one-stop geo-spatial, searchable portal to provide quick and centralized access to substation data such as one-lines, asset information, equipment ratings, and manufacturer drawings. The primary work performed for this project consists of the creation of substation smart one-line diagrams using intelligent CAD templates that mine equipment attributes and populate a centralized Common Information Model (CIM). Once the smart one-lines are complete, automated algorithms use information stored in the CIM to calculate substation equipment and facility ratings in a consistent and auditable manner. A new Geographic Information System (GIS) viewer leverages the smart one-lines to give end users a single point of entry for access to substation equipment information originating in a variety of data sources, such as CAD, Passport, the Data Warehouse, Smallworld, and ProjectWise.

MNGP Cyber Security 08-09 (w/o 11468481)

This project addresses cyber security at our Monticello nuclear plant. Nuclear's Cyber Security requirements are codified in Federal regulations 10 CFR 73.54 and are designed to provide high assurance that digital computer, communication systems and networks are adequately protected against cyber-attacks up to and including the design basis threat established by regulations. The Federal requirements and our plan are intended to protect our nuclear plants against radiological sabotage due to cyber security events. Compliance with the requirements is mandatory to continue operation under the license in good standing.

The regulations specifically require operating licensees implement a cyber security plan (CSP) that satisfies the requirements of the regulations in accordance with an NRC-approved cyber security plan implementation schedule. NRC approvals are required for Cyber Security program implementation. Our compliance plan was submitted to the NRC as a license amendment and has been approved, with amendments, to fully implement the program by December 31, 2016.

Purch EMS DEMS Ph2 HW MN (w/o 11584375)

The project is the 2nd phase of an effort to replace the Energy Management System (EMS), a critical technology that is used for the monitoring and management of the Bulk Electric System by our transmission and distribution systems. The EMS interfaces with field devices that collect information about the health of the bulk electric system. This real-time, two-way communication provide Transmission and Distribution Operations the ability to remotely control the flow of electricity during outage and maintenance periods which is a key driver in our ability to maintain efficient and reliable service to our customers.

This project is driven by the need to 1) improve reliability of the current antiquated system and 2) meet critical infrastructure protection (NERC CIP) requirements. The current system, Siemens Spectrum EMS, was implemented 15 years ago and is well past its useful life. Industry best practice is to keep software systems current through regular upgrades with the vendor. Xcel Energy utilized software customizations to keep the Siemens system current for some time, but it has become too expensive to maintain and hard to support, and evolving regulatory requirements warranted a full upgrade or replacement.

PI Fan Coil Unit Face Repl (w/o 11812451)

This project is to replace cooling water supply and return headers to containment fan coils in Unit 2. Supply and return piping to the Fan Coils are currently 40 years old. The containment cooling coils function to remove heat generated in containment during normal operations and reduce pressure during a postulated design basis steam line break. By NRC issued license, the coils are required to be leak-tight both in the coil and the piping supply/return attached to the coils.

Recently the coils in unit 2 have experienced leaks which requires the station to enter an “LCO” (limiting condition of operation), which allows a short period of time to eliminate the leak or requires shutting down the unit. The piping has also experienced leakage at flanged joints, which has also required immediate repair or isolation followed by repair.

As the coils and piping have met their normal service life, replacement during the fall of 2015 (unit 2 refueling outage) has been scheduled based on life-cycle management. Replacement will ensure at least 10 years of reliable, leak free service and will improve station reliability.

The project includes removal of the old fan coil headers and replace with new piping. The project also includes removal, disposal and installation.

PI NFPA 805 -08 Fire Detection (w/o 11825933)

Nuclear's fire protection requirements are codified in Federal regulations 10 CFR 50, Appendix R (referred to as Appendix R). New requirements were established by the National Fire Protection Association (NFPA) under their Standard No. 805, and operators were given the option of continuing compliance under Appendix R, or implementing the NFPA 805 standards. Monticello proceeded with Appendix R requirements as best for its site, and Prairie Island elected NFPA 805 requirements as more appropriate fire risk mitigation for its site. The NFPA 805 project allows Prairie Island to transition from its current Appendix R program into the new risk-informed, performance-based NFPA 805 program through the use of NRC License Amendment Requests (LAR). Implementation of all approved LAR projects is a condition of maintaining an operating license in good standing. The NFPA 805 project scope at Prairie Island includes performance of 32 plant modifications to implement fire protection elements, which will be completed in stages through 2018.

The benefit of the NFPA 805 Project is to reduce the risks of reactor core damage frequency and large early radiation release, and to ensure the safe shutdown of the Prairie Island plant, in the event of a fire.

MNGP EDG Fuel Oil Train Separation (w/o 11926489)

A Design Study was conducted in 2014 that identified various options for revised Fuel Oil System configurations to meet design basis documents and recommended that which was the most viable. The modified system includes two independent and redundant trains of fuel oil supply from the Fuel Oil Storage Tank T-44 to each of the EDG Day Tanks, T-45A and T-45B. The two existing diesel oil pumps in the Diesel Oil Pump House were replaced with new pumps and comprised the Division 1 train; two new pumps were added to the #12 EDG Day Tank Room for the Division 2 train. In addition, a second return line to T-44 was added, providing for one return line from each EDG Day Tank.

Two interim mods were included into the scope of this project. EC 22600 provided for a physically separate path for a safety related power source to Diesel Oil Transfer Pump P-77. EC 22104 provided a new pump and motor with a safety related pedigree to replace the previously non-safety related pump P-77.

The scope of installation included mechanical (pumps, piping, instrumentation) and electrical (conduit, cable, grounding) components. Testing, start-up and turnover activities took place during RFO27.

2015 work included the installation of two additional diesel oil pumps, replacement of two existing pumps, installation of a new fuel oil return line from EDG Day Tank #12 T-45B to the Fuel Oil Storage Tank T-44, new instrumentation and controls for both Divisions of the fuel oil supply system, new electrical (conduit and cable) for the new diesel oil pumps, pre-operational testing and turnover of the new fuel oil Divisions.

PI FLEX Storage Building (w/o 12035378)

This modification will satisfy Nuclear Regulatory Commission Order EA-12-049 and related Information Requests and allow the plant to continue operation after the Fall 2015 refuel outage. NRC Order EA-12-049 requires the on-site storage of response equipment to be in a robust building designed and constructed to exacting engineering specifications. Failure to implement the order will result in the NRC not allowing the plant to start up after the scheduled 2015 refuel outage.

CRT0C Courtenay Wind Farm Construct (w/o 12173639)

The Courtenay Wind project is a 200 MW wind resource being built in Stutsman County, in southeast North Dakota, consisting of 100 Vestas 2.0 MW wind turbine generators and associated infrastructure. This project was selected as a result of our February 2013 competitive bidding process for additional wind resources. Project is construction began in September 2015 and is expected to be completed and in-service in December 2016 in order to be eligible for federal production tax credits before the scheduled PTC expiration date.

RIV9C-U9 HGP Inspection No 1 (w/o 11215945)

This project is for the Riverside Unit 9 Hot Gas Path (HGP) inspection and repairs. The combustion turbine Original Equipment Manufacturer (OEM) recommends performance of an HGP at 24,000 equipment operating hours or 900 factored starts (whichever comes first). During a HGP, the existing parts will be removed from the turbine and parts provided by our vendor under the combustion turbine parts program will be installed.

Delaying this Hot Gas Path inspection beyond the OEM recommended maintenance interval would involve great risk. As these components age, they may undergo thermal mechanical fatigue, cracking, abnormal wear, foreign object damage, cooling hole damage or plugging, or other issues inherent with the high temperature operating

conditions they experience. These issues could result in unit trips, extended forced outages, and possibly major equipment damage. Consequently, to keep Riverside in good working order we are undertaking the OEM recommended work on the OEM's recommended schedule.

Red Wing – Wabasha Rebuild (w/o 11776427-760)

The purpose of this project is to maintain system reliability by rebuilding 5.0 miles of single circuit 69 kV transmission line terminating at Wabasha Substation. In addition, the wood structures in this line section are at the end of life. The existing pole structures, which are primarily H-frame wood poles, will be removed and replaced by a combination of custom steel poles, Light Duty steel poles and H-Frame wood poles. New steel wire will be used as phase conductor and shield wire on the rebuild line. The Transmission Maintenance and Reliability Group has developed a prioritized refurbishment work plan, based on patrol inspection reports.