CRITICAL ENERGY INFRASTRUCTURE INFORMATION NOTICE

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Facilities Study
for
Montezuma Substation
Add One 345 kV, 100 MVAR Capacitor

Related to MISO Affected System Study Results
for
SPP DISIS 2017-001 Study

Submitted by
MidAmerican Energy Company

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1.1 Project Summary

MidAmerican Energy Company ("MidAmerican" or "Transmission Owner") was retained by MISO ("Transmission Provider") to perform a facilities study for the upgrades necessary to add one 345 kV, 100 MVAR capacitor at Montezuma Substation as a result of the MISO Affected System Study for SPP DISIS 2017-001. Montezuma Substation is operated by Transmission Owner and jointly owned with ITC Midwest with undivided ownership interests as tenants in common. Transmission Owner would complete the upgrades as operator of the substation. The following table summarizes the estimated cost and estimated project duration for Transmission Owner's upgrade. These Transmission Owner facilities were identified as Network Upgrades.

Updates to this facilities study may be necessary to reflect 1) effects of the required upgrades identified in restudies of the MISO Affected System Study for SPP DISIS 2017-001 steady state and stability studies, 2) changes in information from the Interconnection Customers, 3) updates or restudies made to previously completed DPP studies or DISIS studies and/or 4) results of any Optional Studies being performed for the Interconnection Customers. The following table summarizes the estimated costs of the Network Upgrade.

Table 1-1. Cost Estimate of Network Upgrades

Upgrade Classification	Description of Upgrade	Cost Estimate ($)*
Non-Stand Alone Network Upgrade	Montezuma Substation Add One 345 kV, 100 MVAR Capacitor	$6,000,000
	Total	$6,000,000

* Estimated cost includes AFUDC and is in 2022 U.S. dollars +/-20% and does not include the effects of inflation or escalation to future years. Tax gross-up does not apply based on present IRS rules. Transmission Owner plans to elect self-funding.

1.2 Election to Transmission Owner self-fund of Network Upgrades

Transmission Owner plans to self-fund these Network Upgrades described in this facilities study. As a result, the Interconnection Customers would provide suitable financial security such as a parent guaranty, letter of credit or surety bond as part of the MPFCA. Later, the Interconnection Customers and Transmission Owner would enter into a Facilities Services Agreement ("FSA") or a Multi-Party FSA ("MPFSA") covering the payments for the Transmission Owner's share of the Network Upgrades. Interconnection Customers would also enter similar agreements with ITC Midwest for their share of the Network Upgrades.

2 Transmission Owner Interconnection Facilities

Not Applicable

3 Stand Alone Network Upgrades

None

4 Non-Stand Alone Network Upgrades

Network Upgrades to be installed by Transmission Owner

4.1 Montezuma Substation Add One 345 kV, 100 MVAR Capacitor

4.1.1 Overview

The MISO Affected System Study for SPP DISIS 2017-001 study showed the need for capacitive VAR support at Montezuma Substation to increase voltages in the area to mitigate the impacts of the Interconnection Customers on the system. The Montezuma Substation was reviewed to determine the potential placement of one 345 kV, 100 MVAR capacitor including the expansion needed to accommodate the capacitor. If a MISO Affected System Study for SPP DISIS 2017-001 restudy required a different amount of capacitance at Montezuma Substation, then a revised or new facilities study would be required.

The review did not include a capacitor bank switching analysis or a harmonic frequency scan analysis. Such analyses will be completed as part of the design process should this project proceed.

The substation is operated by Transmission Owner and jointly owned with ITC Midwest with undivided ownership interests as tenants in common. Transmission Owner owns 52% and ITC Midwest owns 48%. The upgrades would be jointly owned by the existing owners, as tenants in common, consistent with the existing agreements that govern the Montezuma Substation and be operated by Transmission Owner. Transmission Owner would work as agent for ITC Midwest in constructing the new facilities. Prior to the Transmission Owner substation project being closed to charges, ITC Midwest will likely pay Transmission Owner for 48% of the Network Upgrade charges related to ITC Midwest's ownership share.

The scope of the substation work assumed in the estimated cost and schedule for the 345 kV capacitor installation at Montezuma Substation includes one 345 kV, 100 MVAR capacitor, switching breaker, disconnect switches, control and relaying, steel support structures and expanding the yard.

The substation upgrades are estimated to cost $6,000,000 in year 2022 U.S. dollars +/- 20% and does not include the effects of inflation or escalation to future years and are described below and shown in preliminary drawing in Exhibits A4.

4.1.2 Assumptions

- It is assumed outages to complete the Network Upgrades will be granted when requested to meet project schedule.
- It is assumed based on the present tax laws in effect at the time of this study that tax gross-up would not apply and is not included in the cost estimates.
- It is assumed labor resources and equipment will be available at reasonable costs. For example, low unemployment rates and significant amounts of transmission and

substation project work related to new wind and solar farm interconnections requesting to be eligible for the Federal Production Tax Credit ("PTC"), the Infrastructure Investment and Jobs Act ("IIJA") and other initiatives may drive costs significantly higher and affect schedule.

- It is assumed that timely receipt of financial security will be provided by all the Interconnection Customers.
- It is assumed that the capacitor bank switching analysis and harmonic frequency scan analysis that will be completed as part of the design process will not result in significant changes to the project scope.
- The results of recent DPP studies and Affected System Studies have required numerous capacitor banks in eastern Iowa to improve system voltage, it is assumed that these installations will not have negative interactions with each other.
- The capacitor addition requires an expansion of the substation yard and acquisition of additional land to the west or to the south of the substation. For the purposes of the cost estimate, it is assumed this land can be obtained. If additional land is also needed to meet governmental setback or other requirements, it is assumed additional land can be purchased. No land costs are included in the estimate, but it is assumed it can be obtained at a reasonable cost. This is a preliminary design that is subject to change during detailed design stage should the Interconnection Customers proceed further.

4.1.3 Structure and Foundation

Yard Development

- Grading and expansion of yard
- Installation of additional station ground grid system
- Installation of additional substation yard rock surfacing
- Installation of additional below grade control conduit and manhole system
- Modification and installation of high security fence

Steel Structures

- Support structures for 345 kV switching breaker, manual breaker 345 kV disconnect switch, CCVT, shield masts, 345 kV bus work
- Drilled pier foundations will be used for all equipment support structures as design permits

4.1.4 Major Items

345 kV Capacitor Bank

- One (1) 345 kV, nominal 100 MVAR capacitor
- Capacitor will have an inrush/outrush reactor sized as per IEEE Standard C37.06
- Includes installing foundations, support structures, arresters

345 kV Gas Circuit Breakers

- One (1) 345 kV, SF6 gas circuit breakers rated 3000 A, 50 kA interrupting capability, with synchronous closing
- Includes installing foundations, control conduit to the circuit breaker, jumpers to the associated disconnect switch and control cable to the control building

345 kV Disconnect Switches

- One (1) disconnect switch rated 345 kV, 3000 A continuous, 100 kA momentary, 1300 kV BIL is required to allow isolation of the capacitor
- Includes installing foundations and support structures

345 kV Rigid Aluminum Bus

- The main bus additions will be aluminum rigid tubular bus

4.1.5 SCADA and Communications

- Updates to RTU and SCADA for capacitor and breaker addition

4.1.6 Protection and Control

345 kV Relay/Control/Metering Panels

- One (1) protection panel for capacitor bank, SEL-487V or equivalent
- Includes installing the panels in the control building, connection of control cable wiring, checkout and commissioning of the associated systems
- Includes modification to other protection panels

4.1.7 Price

The cost estimate for Network Upgrades is $6,000,000 in year 2022 U.S. dollars +/-20% and does not include the effects of inflation or escalation to future years.

5 System Protection Facilities constructed by Transmission Owner

None

6 Distribution Upgrades

None

7 Exhibits

7.1 A1 - Interconnection Customer One Line and Site Map

A1-1 One-line Diagram for IC Project

A1-2 Site Map for IC Project

Not Applicable

7.2 A2 - Transmission Owner One Line

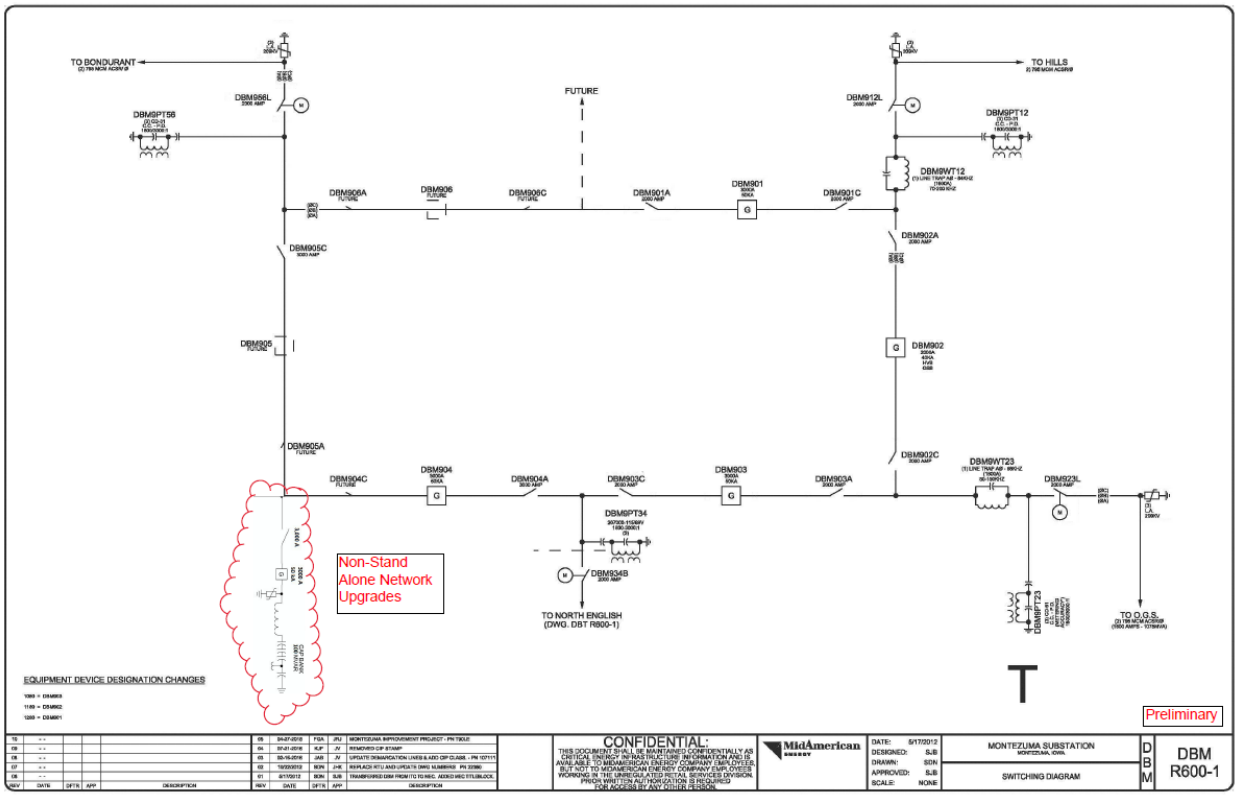
Not Applicable

7.3 A3 - Site Plans or General Arrangement Drawing

Not Applicable

7.4 A4 – Network Upgrade Plan and Profile

Montezuma Substation: Expansion to Add One 345 kV, 100 MVAR Capacitor



7.5 A5 - Facilities to be Constructed by Transmission Owner

Upgrade Classification	Description of Upgrade	Cost Estimate ($)*
Non-Stand Alone Network Upgrade	Montezuma Substation Add One 345 kV, 100 MVAR Capacitor	$6,000,000
	Total	$6,000,000

* Estimated cost includes AFUDC and is in 2022 U.S. dollars +/-20% and does not include the effects of inflation or escalation to future years. Tax gross-up does not apply based on present IRS rules. Transmission Owner plans to elect self-funding.

7.6 A6 - Detailed Cost of Facilities to be Constructed by Transmission Owner

Table A6-1 Construct Transmission Owner Interconnection Facilities

Not Applicable

Table A6-2 Construct Stand Alone Network Upgrade
Not Applicable

Table A6-3 Construct Non-Stand Alone Network Upgrade

Montezuma Substation Add One 345 kV, 100 MVAR Capacitor Network Upgrade Estimate

Description	Cost Estimate ($)*
Stores (arresters, insulators, conductor, etc)	$125,000
Substation Steel, Bus, Connectors	$175,000
Capacitors	$500,000
Disconnect Switches	$30,000
Circuit Breakers	$350,000
Instrument Transformers	$50,000
Control & Metering	$125,000
Civil (foundations, raceways, grounding, yard)	$1,200,000
Consultant Design Labor & Project Management	$250,000
Contractor Labor & Commissioning	$1,800,000
Company Labor	$130,000
Transportation	$5,000
Miscellaneous	$500,000
General & Administrative	$530,000
AFUDC	$230,000
Total Substation Network Upgrades w/ AFUDC	**$6,000,000**

* Estimated cost includes AFUDC and is in 2022 U.S. dollars +/-20% and does not include the effects of inflation or escalation to future years. Tax gross-up does not apply based on present IRS rules. Transmission Owner plans to elect self-funding.

Schedule is dependent on outage availability, labor availability, equipment lead times and milestones in the Multi-Party Facilities Construction Agreement ("MPFCA") including receipt of acceptable financial security and what time of year the MPFCA is signed because of the effect on the available construction seasons.

See Section 4.1.2 Assumptions for more information.

7.7 A7 - Facilities to be Constructed by Interconnection Customer

None

7.8 A8 - Detailed Cost of Transmission Owner Facilities to be Constructed by Interconnection Customer

Not applicable

7.9 A9 - Facilities Subject to MISO Attachment FF

Upgrade Classification	Description of Upgrade	Cost Estimate ($)*
Non-Stand Alone Network Upgrade	Montezuma Substation Add One 345 kV, 100 MVAR Capacitor	$6,000,000
	Total	$6,000,000

* Estimated cost includes AFUDC and is in 2022 U.S. dollars +/-20% and does not include the effects of inflation or escalation to future years. Tax gross-up does not apply based on present IRS rules. Transmission Owner plans to elect self-funding.

For Network Upgrades at 345 kV, ten percent (10%) of the total costs identified as Network Upgrades are eligible for reimbursement according to the existing provisions in Attachment FF of the MISO Open Access Transmission, Energy and Operating Reserve Markets Tariff. The cost estimate is the 100% cost estimate.

Since the Transmission Owner and ITC Midwest plan to elect self-funding, the Network Upgrade costs included in the FSAs or MPFSAs would reflect the ten percent (10%) reimbursement being effectively paid to the Interconnection Customer, subject to the terms of the FSAs or MPFSAs. Interconnection Customers would enter into separate FSAs or MPFSAs with Transmission Owner and ITC Midwest for their share of the Network Upgrades.

7.10 A10 - Contingent Facilities

MISO will provide this exhibit.

7.11 A11 - Interconnection Customer Milestones

Not Applicable

7.12 A12 - Construction and Coordination Schedules

Transmission Owner estimates that construction of the Network Upgrades described in this report can be completed approximately 30-36 months after the Interconnection Customers meet financial security requirements in the executed MPFCA. The proposed schedule is dependent on the time of year the MPFCA is executed as it affects the construction seasons available, timely receipt of all approvals associated with constructing the Transmission Owner Network Upgrades, higher queued projects, outage availability, equipment lead-time and labor resource availability. As previously mentioned, the availability of labor resources at reasonable costs is a concern as well as outage availability given the amount of work expected in Iowa and MISO West footprint. It is anticipated that outages will be restricted during the mid-May to mid-September period. No additional right-of-way is expected for this project. However, the project requires an expansion of the substation yard and acquisition of additional land to the west or to the south of the substation. It is assumed this land can be obtained timely and at a reasonable cost. Long lead-time items include substation steel structures, circuit breaker/capacitor switching device.

1. Begin preparing preliminary engineering, procurement and construction ("EPC") documents
2. Order or reserve certain long lead equipment
3. Finalize EPC bid documents and issue project for bids
4. Review proposals and award bid
5. Commence capacitor switching study
6. Review and submit all necessary permits for the project
7. Coordinate outages, material and resource availability
8. Begin construction
9. Complete project work

7.13 A13 - Permits, Licenses, Regulatory Approvals and Authorization

It is not expected that any required approvals will delay completion of this upgrade. However, the project requires an expansion of the substation yard and acquisition of additional land to the west or to the south of the substation. It is assumed this land can be obtained timely.

Typical permits, licenses and approvals required to construct the Transmission Owner facilities may include, but are not limited to:

- Landowner easements – No additional easements assumed
- Local Building/Construction permit for substation
- County Engineer Approval – 1 to 2 months
- Local City Government Approval
- Iowa Department of Transportation
- Iowa Department of Natural Resources – 3 to 6 months
- Iowa Historical Society Review and Application – 1 to 2 months
- US Corps of Engineers Approval
- US Fish and Wildlife Approval
- Foreign Utility Conflicts Approval
- FAA Approval
- Iowa Utilities Board (Assumed not to be required.)

7.14 A14 - Interconnection and Operating Guidelines

Not Applicable