

TRANSCANADA  
KEYSTONEXL PIPELINE **REPORT UPDATE**

INTEGRATED SYSTEM EASTERN INTERCONNECTION TRANSMISSION IMPACTS



### Background

The final report dated May 15, 2009 was issued for public review and some changes have occurred due to stakeholder input. None of the changes result in substantive changes in the Final Report, however, details in some areas need to be defined, and locations of some of the Points of Interconnection were changed to better fit the needs of all stakeholders.

### Network Improvements: Rhame Substation

The requirements for capacitor additions at Rhame substation were inadvertently removed from the final report. Tables 5.5.2a and 5.7i should include an entry for a capacitor at Rhame 115 kV substation.

<b>Capacitors at Rhame substation on the 115 kV bus</b>				
<b>Location</b>	<b>Case 5 – Ultimate load</b>		<b>Case 2 – Initial load</b>	
	<b>v w/o cap on</b>	<b>Mvar for 3 % step</b>	<b>v w/o cap on</b>	<b>Mvar for 3 % step</b>
Rhame 115 bus	0.97189	26.2	0.98431	39.8

This update recommends that two 20 Mvar capacitors be installed on the Rhame 115 kV bus. Only one is needed for the initial KeystoneXL load, however, economy of scale and mobilization costs may dictate that both be installed at the same time.

### Network Improvements: Oahe Transformer

The final report recommended installation of additional transformer capacity at Oahe between the 115 and 230 kV buses. An opportunity to utilize a surplus transformer from another plant and parallel the existing unit at Oahe has presented itself, and Corps and Western are examining the option for its viability and to determine if the timing is such that it will work.

### Network Improvements: 230 kV line build into Witten area

The final report recommended installation of a 230 kV line from Fort Thompson or Lake Platte to Witten. Further discussion with stakeholders determined that a better alternative would be to modify the arrangement of the double circuit turning structure that enters Big Bend, and construct a double circuit line south about two miles to a proposed Lower Brule substation. A single circuit 230 kV line would continue from there to Witten.

### Pump Station 9 (PS9) Malta, MT (Western Interconnect)

The Final Report recommended a tap substation for this service. Further discussion with the maintenance office and the coop customer resulted in a request for ring bus operation. Planning determined that full substation operation is acceptable.

DVAR is recommended at the pump location because of the small capacitor step size for n-1 operation and because of the difficulty of regulating voltage at the end of a long line.

### Pump Station 10 (PS10) Fort Peck 115 kV bus

The Final Report recommended feeding PS10 from the Fort Peck 115 kV bus. This has not changed, however PS11 was also recommended to be fed from Fort Peck, and that has changed. The existing breaker arrangement calls for a double breaker arrangement.

DVAR is recommended at the pump location because of the difficulty of regulating voltage at the end of a long line.

### Pump Station 11 (PS11) South of Fort Peck on FP-DC 230 kV line

The Final Report recommended feeding PS11 from the Fort Peck 115 kV bus. KeystoneXL determined that the risk of running the 115 kV line across the Fish Wildlife and Parks land was

unacceptable high, and requested the interconnect about 11 miles from Fort Peck on the FP-DC 230 kV line. Planning determined that full substation operation is acceptable at this location.

DVAR is not recommended for this location.

**Pump Station 12 (PS12) Near Circle, MT**

The Final Report recommended feeding PS12 via a tap of the area between the 115kV bus and the customer coop transformers. Further discussion with maintenance, operations, and the cooperative resulted in a proposal to build a Main and Transfer bus and breaker arrangement for the Circle service. Planning determined that this substation arrangement is acceptable at this location.

DVAR is recommended at the pump location because of the small capacitor step size for n-1 operation, unless the customer can demonstrate that impacts to the IS can be kept within criteria.

**Pump Station 13 (PS13) O'Fallon substation**

No changes from the Final Report are recommended. DVAR is not recommended for this location.

**Pump Station 14 (PS14) MDU (Not IS Responsibility)**

This load is assumed to be served by MDU from the existing Baker 115 kV bus.

**Pump Station 15 (PS15) Bowman 230 kV Substation**

No changes from the Final Report are recommended.

DVAR is recommended at the pump location because of the difficulty of regulating voltage at the end of a long line.

**Pump Station 16 (PS16) Bison (John R Riedy) 230 kV substation**

The Final Report recommended feeding PS16 from Maurine 115 kV bus with an option to feed via a tap of the Newell-Maurine 115 kV line. Further discussion with stakeholders led to the proposal to feed the pump station via a 230/115 kV transformer at Bison substation. This is a tap on the high voltage side, and the proposed interconnection would not alter that condition.

DVAR is recommended at the pump location because of the difficulty of regulating voltage at the end of a long line.

**Pump Station 17 (PS17) Maurine 115 kV bus**

No changes from the Final Report are recommended. DVAR is not recommended for this location.

**Pump Station 18 (PS18) Philip 115 kV bus**

No changes from the Final Report are recommended. DVAR is not recommended for this location.

**Pump Station 19 (PS19) Midland 115 kV bus**

No changes from the Final Report are recommended.

DVAR is recommended at the pump location because of the small capacitor step size for n-1 operation, unless the customer can demonstrate that impacts to the IS can be kept within criteria.

**Pump Station 20 (PS20) Witten 115 kV bus**

No changes from the Final Report are recommended.

DVAR is recommended at the pump location for the initial loading of the pump station because of the small capacitor step size for n-1 operation, unless the customer can demonstrate that impacts to the IS can be kept within criteria. After construction of the 230 kV substation, the DVAR may not be required except under outage of the 230 kV line addition.

**Pump Station 21 (PS21) Gregory 115 kV bus**

The Final Report recommended feeding PS21 via a tap of the Fort Randall 115kV line or 115 kV bus with a cross trip of the pump station for loss of the 115 kV circuit east toward Fort Randall. Further discussion with maintenance, operations, and the cooperative resulted in a proposal to build a Main and Transfer bus and breaker arrangement. Breaker replacement was scheduled for this location in FY 2011, control building issues and relay replacements were budgeted as well further justifying using this as an opportunity to upgrade the substation. Planning determined that this substation arrangement is acceptable at this location.

DVAR is recommended at the pump location because of the small capacitor step size for n-1 operation, and because of the difficulty of regulating voltage at the end of a long line. The DVAR may be omitted if the customer can demonstrate that impacts to the IS can be kept within criteria. After construction of the 230 kV substation, the DVAR may not be required except under outage of the 230 kV line addition.