

Meeting Minutes

Buffalo Ridge Incremental Generation Outlet Transmission Study Study Group Meeting

January 14, 2005
10:30 am
at Missouri River Energy Services offices
Sioux Falls, SD

Attendees:

<u>In person</u>	<u>Via telephone</u>
R Gonzalez Excel Engineering (for Xcel Energy)	J Standing Xcel Energy
J Weber Missouri River Energy Services	Matt Schuerger Wind on the Wires (Consultant)
B Zavesky Missouri River Energy Services	M Bettman SD Public Utilities Commission
R Dahl Missouri River Energy Services	P Rasmussen Xcel Energy
B Roos Marshall Municipal Utilities	Jeremy Severson Basin Electric Power Coop
K Booze East River Electric Power Coop	M Steckelberg Great River Energy
W Haidle Montana-Dakotas Utilities	D Schiro Xcel Energy (Energy Markets)
W Raihala Xcel Energy (Energy Markets)	J Dunlop American Wind Energy Assoc.
J Lein ND Public Service Commission	
J Weiers Otter Tail Power	

Hand-outs: (all except 5 & 6 were previously distributed via 1-12-05 e-mail)

1. Agenda
2. Set of 4 graphs of "Installed Cost as function of Outlet"
3. Set of maps for the transmission Options
4. Revised Tabulation of MW losses
5. Reactive requirements tabulation
6. Installed Cost Estimates ("Base Plan" Costs) for the transmission Options (2 pages)

Following the introductions, the meeting progressed per the Agenda outline; this numbering is used in the following sections.

1. Review of Study Purpose/Scope/Goals

R Gonzalez gave a review of the study goals, and the purpose of this particular Study Group meeting. The principal goals of the Study are to

- Determine how much additional Buffalo Ridge area generation outlet may be achievable with modest-scale transmission upgrades or additions (presumably primarily 115 kV). Ideally, a plan for securing an increment of at least 200 -300 MW would result.
- Address Yankee "stability" limitations identified in the MISO Buffalo Ridge "Group II" interconnection studies
- Identify Preferred Plan(s) of transmission improvements for addressing the above goals.

Marshall load serving considerations are also intended to be taken into account during the evaluation of the generation outlet options.

This Study Group meeting was for the purpose of

- reviewing the technical analysis performed to date;
- identifying a “Preferred Plan”;
- discussing “next steps” required for study report development and review.

2. Review of Transmission Options under evaluation

R Gonzalez described the five transmission Options which survived the “second cut” at the last meeting, and the new “combination options” whose performance is now to be reviewed:

Option 9	“Reconductors”
Option 1A	2 nd Nobles Co-Fenton 115 & 2 nd Nobles Co 345/115 tx
Option 3	Lake Yankton-marshall 115 kV
Option 6	Yankee-White 115 kV #2 & White-Toronto 115 kV
Option 31A	Opt 3 + Opt 1A
Option 61A	Opt 6 + Opt 1A
Option 71A	Opt 7 + Opt 1A
Option 31A6	Opt 3 + Opt 1A + Opt 6

It was explained that although Option 7 had been dropped last time, the “71A” combination was of some interest for comparison purposes and was therefore added to the “combinations” to be reviewed.

3. Presentation of Reactive Requirements Summary

Reference was made to a handout listing the Options’ reactive requirements. This tabulation shows, at the 925 and 1225 MW Buffalo Ridge area generation levels, the amounts of reactive injection required to maintain post-contingent bus voltages at Pipestone 115 kV and Panther 230 kV at .95 pu. It was noted that this document was not among the items transmitted in the 1-12-05 e-mail to the Study Group, but would be forwarded soon.

The only significant reactive requirement difference noted among the Options was that Option 9 requires some reactive supply at Pipestone; otherwise the differences noted were relatively small; all options require some capacitor additions at Panther and Lk Yankton vicinities. Accordingly, the only “reactive requirements” cost adjustment made to the TLTG cost summary graphs was the addition of capacitors at Pipestone for Option 9.

4. TLTG Results

Introducing a revised set of installed cost vs. MW graphs, it was explained the changes since the last version were

- addition of the "combination" options
- addition of capacitor costs to address reactive requirements differences
- update of Option 6 curve from re-run of TLTG simulation due to correction of powerflow model line impedance error

The first graph, of installed cost only, shows that Option 9 (reconductors) is the least-cost option up to a total SW Minnesota Buffalo Ridge generation level of approximately 1240 MW, beyond which level Option 1 is then consistently the least-cost option.

It was pointed out that on any of these graphs, beyond approximately 1400 MW the relevance of the TLTG results is limited, as the power system linear analysis technique imbedded in the TLTG computational method is inherently limited to identification of only the line and transformer thermal limits; there is no assurance that dynamic stability or voltage stability performance is satisfactory, or that operation at such points is possible. Consequently, the extreme right-hand portions of the graphs are mainly helpful in comparing Options' trends in cost per MW of thermal capability.

The second graph includes effect of losses, evaluated per the method discussed at the last meeting, consistent with the previous (2001) SW MN/SE SD transmission study. This graph shows that Option 1A becomes the least-cost option at approximately 940 MW, and remains so to approximately 1490 MW.

The third graph shows the effect of applying a \$6 million "Yankee Fix" charge to those Options that do not provide a new Yankee outlet line, as required to support Yankee generation levels of over approximately 250 -300 MW. In this scenario, Option 1A is the least-cost option over the range 940 - 1290 MW. Between 1290 and 1440 MW, there are repeated crossovers between Options 1A and 6. Beyond 1440 MW, Option 31A6 is generally the least-cost option.

The fourth Graph shows the effect of applying a \$6 million "Yankee Fix" charge and/or a \$6.9 million "Marshall Fix" charge, as necessary, to those Options that do not provide a new Yankee outlet line, or a new line to the Marshall load center. The \$6.9 million figure was described as being based upon the estimated cost of a Lk Yankton-Marshall 115 kV development, as embodied in Option 3.

It was observed that this Graph shows that Option 3 is generally least-cost up to approximately 980 MW, and then Option 31A is consistently least-cost to approximately 1175 MW. Beyond 1175 MW, Option 31A6 is generally the least-cost option; beyond 1400 MW, it always is, by a considerable margin.

It was noted that within the range 1250 to 1350, there are multiple cross-overs among the costs of options 1A,31A,31A6, and 61. Beyond 1400 MW, Option 31A6 becomes the least-cost by a considerable margin.

The most significant findings from the review of TLTG results were

- At all outlet levels beyond 980 MW, the Option 1A facilities are part of the least-cost option;
- Option 31A (which adds the Lk Yankton-Marshall 115 kV to the 1A facilities) appears to be slightly more economical than 1A, and is the least-cost option, from 980 up to approximately 1175 MW;
- Option 31A6 (which adds the Yankee-White #2 and White-Toronto 115 kV circuits to the 31A facilities) appears to be economically beneficial beyond the 1175 MW level.

There was some discussion of intangible factors not represented on the cost vs. MW graphs:

- The Yankee fix requires either another outlet line from Yankee (as in Option 6 or the combination options that include the Option 6 facilities), or possibly an SVC at Buffalo Ridge Sub. All else being equal, a new line would be a fundamentally more robust solution than a SVC addition. Also, a line could contribute toward future outlet capacity increases, whereas an SVC is unable to address thermal limitations.
- Option 6 and related “combinations” provide another 115 kV source to the OTP Toronto 115/41 kV Sub, which is presently radially supplied. This “looping” of Toronto for Buffalo Ridge outlet purposes would provide some incidental load serving reliability benefit.
- Construction outages would be most extensive for Option 9, which relies on many reconductors.
- Cost uncertainty is probably largest for Option 9 because most of the line capacity increases were presumed to be achieved via reconductoring. Xcel Energy’s recent experience has been that some of the older lines cannot be reconducted and must instead be rebuilt, at considerably higher cost.
- Option 31A provides a new 115 kV line to Marshall, which helps address Marshall load-serving reliability concerns.

5. Selection of Preferred Plan

It was agreed that Option 31A is the basic Preferred Plan.

It was further agreed that it may be desirable to also add the “Option 6” Yankee-White-Toronto 115 kV facilities; this would result in implementation of Option 31A6. Addition of the Option 6 facilities improves performance at moderate outlet levels (up to 1400 MW) and is definitely advantageous if higher outlet levels are sought. Since 31A and 31A6 are compatible options, there is no need to select one versus the other at this time.

6. Discussion of next steps

The following items were identified as needed to complete the technical analysis:

- [Carry-over from previous meeting]: Perform “constrained interface” analysis; are there any significant differences among Options as to degree of incremental loading impressed upon the defined MAPP and MISO constrained interfaces (“flowgates)?
- [Carry-over from last meeting]: Perform Anson Generation sensitivity analysis to reflect impact of Year 170 MW unit addition.

It is expected that the above items will not materially affect the Options’ performance ranking.

R Gonzalez stated that the next step will be for Xcel Energy to develop a study report, a draft of which would be expected to be available for Study Group review within the next month.

The Study Group requested that an in-person meeting be scheduled for review of this draft; Sioux Falls (MRES) is the preferred meeting location. Xcel Energy will check with Ed Weber on the feasibility of coordination of this meeting date and location with the next MB SPG meeting.

Prepared by:

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