

**Northern States Power Company/Northern States Power Company
(Wisconsin)**

**Meeting Notice
In Compliance with 18 C.F.R. Part 358.5(a)(2)**

The Transmission Provider must ensure that any employee of its Marketing or Energy Affiliates is prohibited from obtaining information about the Transmission Provider's transmission system (including, but not limited to, information about available transmission capability, price, curtailments, storage, ancillary services, balancing, maintenance activity, capacity expansion plans or similar information) through access to information not posted on the OASIS or Internet website or that is not otherwise also available to the general public without restriction.

To: SW MN -Twin Cities EHV Study Group

Re: SW MN Twin Cities EHV Study to be discussed at MRES Offices located at 3724 West Avera Drive, Sioux Falls, SD on Tuesday, September 27, 2005 1:00 pm - 3:30 pm Central Time

For those participating via telephone: 303-571-7777 or 800-805-8686 Conf ID: 33

AGENDA

1. Introductions, Review Study Purpose/Scope/Goals
 - Relationship to CapX 2020 vision plan & MISO Exploratory Studies' results
 - Buffalo Ridge generation outlet
 - Coordination with Big Stone II development
2. Review Study Schedule
3. Review Study Assumptions
4. Review Revised Base Transmission Plan
(no Lk Marion-Black Dog 345 kV or Lyon Co-Lk Yankton 345 kV)
5. Hand-out of revised powerflow maps
(System intact & relevant contingencies)
6. TLTG summaries (revised Base Plan and new "System Alternative")
7. Installed Cost graphs
8. Losses
(single vs double circuit & effect of series compensation)
9. Constrained Interface Analysis
(single vs double circuit & effect of series compensation)
10. Preliminary Stability Results

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11. Discussion of next steps

12. Next Study Group Meeting: Thurs Oct 6, 2005 at OTP offices, Fergus Falls, MN

Documents in the Meeting Material file for this meeting are:

20050927-SWMNTC-EVH-Study-Meeting-NSP-doc1-LossesGraph1.pdf

20050927-SWMNTC-EVH-Study-Meeting-NSP-doc2-dfcalc-parse.pdf

20050927-SWMNTC-EVH-Study-Meeting-NSP-doc2a-dfcalc-parse.pdf

20050927-SWMNTC-EVH-Study-Meeting-NSP-doc3-NealLouisaSummary.pdf

20050927-SWMNTC-EVH-Study-Meeting-NSP-doc4-TLTG-OPK-091205.pdf

20050927-SWMNTC-EVH-Study-Meeting-NSP-doc5-Off-Ridge-Sensitivity.pdf

20050927-SWMNTC-EVH-Study-Meeting-NSP-doc6-TLTG-OPK-091905diff-LYCFRA-gen.pdf

20050927-SWMNTC-EVH-Study-Meeting-NSP-doc7-CompBasePlan-SysAlt2.pdf

20050927-SWMNTC-EVH-Study-Meeting-NSP-doc8-TLTG-092205-Summary.pdf

20050927-SWMNTC-EVH-Study-Meeting-NSP-doc9a-Map-BP-1200MW.pdf

20050927-SWMNTC-EVH-Study-Meeting-NSP- doc9b-Map-BP-2000MW.pdf

20050927-SWMNTC-EVH-Study-Meeting-NSP-doc9c- Map-SysAlt-1200MW.pdf

20050927-SWMNTC-EVH-Study-Meeting-NSP- doc9c- Map-SysAlt-2000MW.pdf

Comments on the documents in the Meeting Material file are as follows.

1. Revised TLTG summary sheets (revised to reflect removal of Lyon Co-Lk Yankton 345 kV from the "Base Plan", and to correct a few other powerflow model and TLTG quirks we've found).

The spreadsheet has tabs for the four previous scenarios (1. "Existing System" 2. "Base Plan" 3. "Add Lyon Co-Franklin 115 kV" 4. "Add Fargo-Benton Co 345 kV") and now the "System Alternative" which evaluates the option of building a 345 kV along (not in place of) the Minn Valley-Blue Lk 230 kV, plus an extension down to Lyon Co at 345 kV, plus a 115 kV from Lyon Co to Brookings Co. We haven't completed the analysis of what additional facilities may be required to make it work in a fully satisfactory manner, especially w/r to the Blue Lake termination.

The Options also have revised costs tabulated. Be careful in interpreting the three "cost" graphs, as they are terribly deceptive in their present draft form, because the 345 kV options have only the cost of the incremental improvements shown, and also

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because the "Existing System" cost curve (which is equivalent to what we previously called the "reconductor" option) represents an option that isn't really feasible due to extremely high losses (which aren't accounted for yet) and because it is known that the dynamic stability and voltage stability won't work for this hypothetical option. We'll go over these carefully at the meeting.

2. Losses (examine the effect of adding series compensation or a second circuit to the Lyon Co-Franklin-Helena section of the Base Plan's 345 kV line)

There are two losses graphs provided: one calculated from casework with NDEX at 2080 MW (maximum possible), and one calculated from casework with NDEX at 1000 MW (a more moderate loading). Considering these graphs and the underlying tables, several observations can be made:

- a) the effect of High vs. Moderate NDEX is to drive total system losses up approximately 200 MW.
- b) with Moderate NDEX, the incremental losses associated with Buffalo Ridge-->Twin Cities/Milwaukee deliveries (with Base Plan facilities) is approximately 22%, calculated across the 1600-2000 MW delivery increment. Addition of a second circuit (on Lyon Co-Franklin-Helena) reduces the losses by 40-50 MW over this increment, reducing the corresponding loss percentage from 22% to 20%.
- c) adding series compensation (to the single circuit) reduces losses 15 -30 MW over the 1600-2000 MW delivery increment depending on amount of compensation applied (40-70%). At the 60 or 70% compensation level, the incremental losses are reduced to 21%.
- d) adding a second circuit and series compensation (70%) to both circuits lowers the incremental losses to 18%.
- e) these incremental losses are higher than those seen in the "Incremental" ("BRIGO") study for the test 345 kV line addition (17.6%) because the present study is modeling 20% of the power delivery to eastern Wisconsin, whereas the BRIGO study had 100% delivered to the Twin Cities (Sherco).
- f) the large loss reduction achieved with the second circuit suggests that examination of larger conductor sizes would also yield significant loss reductions. All present casework has the 345 kV circuits equipped with 2 x 954 kcm ACSS per phase.

3. Constrained interface analysis (look at effect of Base Plan facilities on interfaces of interest, for either Buffalo Ridge-->Twin Cities deliveries, or for West Iowa-->East Iowa transfers)

The "dfcalc" file shows that addition of series compensation, or a second circuit, is very effective at reducing inadvertent flows, both to the south of the Ridge (through Omaha area, as captured by Ft Cal S and Cooper S) and to the north (as measured on Riel-Dorsey 500 kV). The effect on Ft Cal S is relatively small, but beneficial in either case: reduction from 4.5% to as low as 4.2%. Interestingly, addition of both a second circuit *and* series comp is not any more effective.

The North 500 kV line (it is Riel-Roseau Co in these future-year cases) distribution factor is reduced from the 8% seen in the previous (BRIGO) study to the range 4.6% (no second circuit or series compensation) to 3.7% (second circuit and series compensation). This is good.

To investigate a concern expressed by our Iowa comrades, an analysis was performed looking at how much of any west-->east transfer scheduled across Iowa flows northward

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to the Twin Cities and then out across the MWSI interface. The "Neal-LouisaSummary" file shows that (as expected/feared) the addition of the "Base Plan" 345 kV facilities does encourage increased loading of MWSI by providing a parallel path for Iowa west-->east transfers: the distribution factor on MWSI for such transfers increases from today's 12.5% to 14.8%. This will likely make for an interesting discussion at our next meeting.

Richard Gonzalez