

MISO Investigation Report on the NERC TLR Level 5 Event
Manitoba Hydro
Flowgate 6002: MHEX_S Interface
April 28-May 1, 2011

Report submitted to NERC on: June 2, 2011

This report is submitted in accordance with the NERC Transmission Loading Relief (TLR) Investigation Procedure for the TLR events that occurred on Flowgate 6002 from April 28-May 1, 2011. This event resulted in curtailment of Firm transactions.

1. Description of purpose/cause of hold/curtailment:

The definition of flowgate 6002 is listed below.

Monitored Facilities: Dorsey-Roseau 500kV line
Glenboro-Rugby 230kV line
Richer-Roseau 230kV line
Letellier-Drayton 230kV line

2. Facility/Flow gate limitations and flow at the time the TLR was initiated:

Midwest ISO, along with Manitoba Hydro has developed a standing operating guide to provide guidance for operators to manage real time flow on the MHEX_S Interface.

On April 28, 2011, a TLR 5 was required to reduce the scheduled and real-time flows across flowgate 6002 due to the outage of the Dorsey-Forbes 500kV circuit along with multiple other outages cause by blizzard conditions in North Dakota. Interface FG 6002 must be operated to the scheduling limit = 475MW and the SOL = 650MW.

At 21:30 EST on April 28, MHEB informed MISO that they will be taking the Dorsey-Roseau-Forbes 500kV line out as scheduled. At 21:37 EST MISO issued a TLR-1 to prepare for this outage and to inform others of the potential need for TLR.

Starting at about 05:45 EST on April 30 a Blizzard encompassing most of North and South Dakota started tripping multiple facilities as listed in section 4 below. These forced outages had a collective affect on the MHEX_S Interface FG 6002. MHEB informed MISO that they would be required to reduce schedules and real-time flows to the conservative limits in the standing operating guide of 0MW scheduling limit and 150MW SOL.

At 05:57 EST on April 30, MISO re-issued the TLR-1 as a TLR-5A for across 06:10 EST on the MHEX_S flowgate 6002 to return the flows to within limits.

At 10:46 EST, MHEB released a temporary operating guide with new limits of 450MW scheduling and 625 SOL.

At 23:36 EST on April 30, MISO re-issued the TLR-5A to a TLR-1 for across 00:00 EST on May 1. Scheduled flows are within limits and TLR can be reduced accordingly.

At 00:32 EST on May 1, MISO re-issued the TLR-1 to a TLR-5A for across 01:00 EST on May 1. Schedules were again predicted to be above op-guide limit, TLR was issued to maintain scheduled flow limit.

At 03:35 EST on May 2, MHEB informed MISO that the outage of the Dorsey-Forbes 500kV line was complete. At 03:39 EST, MISO re-issued the TLR-5A to a TLR-1 across 04:00 EST.

At 04:15 EST, MHEB informed MISO that conditions were stable and the Dorsey-Forbes 500kV line was operating properly. At 04:18 MISO re-issued the TLR-1 to a TLR-0, ending the TLR-5 event.

As the NERC IDC showed insufficient non-firm schedule curtailments to relieve flows to the necessary levels, TLR-5 was issued for 23 issuances over the duration of this event.

3. TLR Level 5 issuance information, timing (EST), firm tag information obtained for flow gate #6002 April 28, 2011:

TLR LEVEL	TIME (EST)	Firm Transaction / Curtailment Information	NNL Reduction Requirement
1	4/28 22:00	No Firm Curtailments	None
5A	04/30 06:10	8 tags of (7-F and 7-FN) = 525 MW schedules curtailed to provide 525 MW relief	None
5A	07:00	8 tags of (7-F and 7-FN) = 525 MW schedules curtailed to provide 525 MW relief	None
5A	08:00	8 tags of (7-F and 7-FN) = 525 MW schedules curtailed to provide 525 MW relief	None
5A	09:00	8 tags of (7-F and 7-FN) = 525 MW schedules curtailed to provide 525 MW relief	None
5A	10:00	8 tags of (7-F and 7-FN) = 525 MW schedules curtailed to provide 525 MW relief	None
5A	11:00	8 tags of (7-F and 7-FN) = 525 MW schedules curtailed to provide 525 MW relief	None
5A	11:10	8 tags of (7-F and 7-FN) = 450 MW schedules curtailed to provide 450 MW relief	None
5A	12:00	8 tags of (7-F and 7-FN) = 76 MW schedules curtailed to provide 76 MW relief	None
5A	13:00	8 tags of (7-F and 7-FN) = 76 MW schedules curtailed to provide 76 MW relief	None
5A	14:00	8 tags of (7-F and 7-FN) = 76 MW schedules curtailed to provide 76 MW relief	None
5A	15:00	8 tags of (7-F and 7-FN) = 76 MW schedules curtailed to provide 76 MW relief	None
5A	16:00	8 tags of (7-F and 7-FN) = 74 MW schedules curtailed to provide 74 MW relief	None
5A	17:00	8 tags of (7-F and 7-FN) = 75 MW schedules curtailed to provide 75 MW relief	None
5A	18:00	8 tags of (7-F and 7-FN) = 75 MW schedules	None

		curtailed to provide 75 MW relief	
5A	19:00	8 tags of (7-F and 7-FN) = 75 MW schedules curtailed to provide 75 MW relief	None
5A	20:00	8 tags of (7-F and 7-FN) = 75 MW schedules curtailed to provide 75 MW relief	None
5A	21:00	8 tags of (7-F and 7-FN) = 75 MW schedules curtailed to provide 75 MW relief	None
5A	22:00	8 tags of (7-F and 7-FN) = 75 MW schedules curtailed to provide 75 MW relief	None
5A	23:00	8 tags of (7-F and 7-FN) = 75 MW schedules curtailed to provide 75 MW relief	None
1	5/1 00:00	No Firm Curtailments	None
5A	01:00	11 tags of (7-F and 7-FN) = 402 MW schedules curtailed to provide 402 MW relief	None
5A	02:00	10 tags of (7-F and 7-FN) = 389 MW schedules curtailed to provide 389 MW relief	None
5A	03:00	10 tags of (7-F and 7-FN) = 405 MW schedules curtailed to provide 405 MW relief	None
1	04:00	No Firm Curtailments	None
0	04:30	Terminated TLR	None

NNL Mitigation:

- There were no NNL obligations for this TLR 5.

4. Transmission and generation outage or changes from prediction that may have contributed:

Significant Transmission Outages:

Dorsey-Forbes 500kV
Coon Creek-Terminal 345kV
Sherburne County-Benton County 345kV
Prairie Shunt Caps
Roseau Series Cap 2
Berthold-Logan 115kV
Kenmare-Berthold 115kV
Kenmare-Stanley 115kV
Grenora-Plentywood 115kV
Mont-Williston 115kV
Neset-Tioga 115kV
Tioga-Stanley 115kV
Williston-Tioga 115kV
Colbertson-Williston 115kV
Fair-Williston 115kV
Poplar-Colbertson 115kV
Belfield-Rhame 230kV
Logan-Ieland Olds 230kV
Logan-Tioga 230kV

Neset-Tioga 230kV
Williston-Tioga 230kV
Boundary Dam-Tioga 230kV
Kennedy-Peeble 230kV

Significant Generator Outages:

JP Madgett	399
Coal Creek 1	575
Monticello	610
Sherburne County 3	934
Prairie Island 1	577
Coyote 1	450
MR Young 1	260
Lansing 4	266
Neal 4	380
Riverside	573
Antelope valley 1	477
Leland Olds 1	212
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System Condition Summary:

Conditions started as the scheduled outage of the Dorsey-Forbes 500kV line. They were deteriorated by multiple outages caused by blizzard conditions in North & South Dakota. At the same time, there was a large amount of critically located generation that was off-line. Other TLR-5 events were in progress during portions of this TLR-5 event.

5. Procedures implemented prior to hold/curtailment:

None – this event was caused by multiple forced outages.

6. Compare Complete Transaction Curtailment List with the Whole Transaction List as generated by the IDC, before and after curtailments:

Firm transactions impacting the flow gate by 5% or greater were partially curtailed and reloaded.

7. Known Transactions not in the IDC and actions taken:

There were no known transactions not in the IDC at the time this TLR was in effect that were impacting this flow gate.

8. RCIS or other system messages:

Information was provided to NERC Reliability Coordinators via the NERC IDC. The IDC automatically sends TLR Level information to the RCIS. Curtailment information was communicated to the MISO control areas via the MISO MCS and ICCS messaging systems.

9. State estimator snapshots and security analysis including contingency analysis or stability analysis along with any other recorded data indicating the need for TLR:

None – this event was caused by multiple forced outages.

10. ATC Limitations before, during, and after the event:

None – this event was caused by multiple forced outages.

11. Description of actions taken to avoid future hold/curtailments:

None – this event was caused by multiple forced outages

12. Re-dispatch actions taken:

None – this event was caused by multiple forced outages

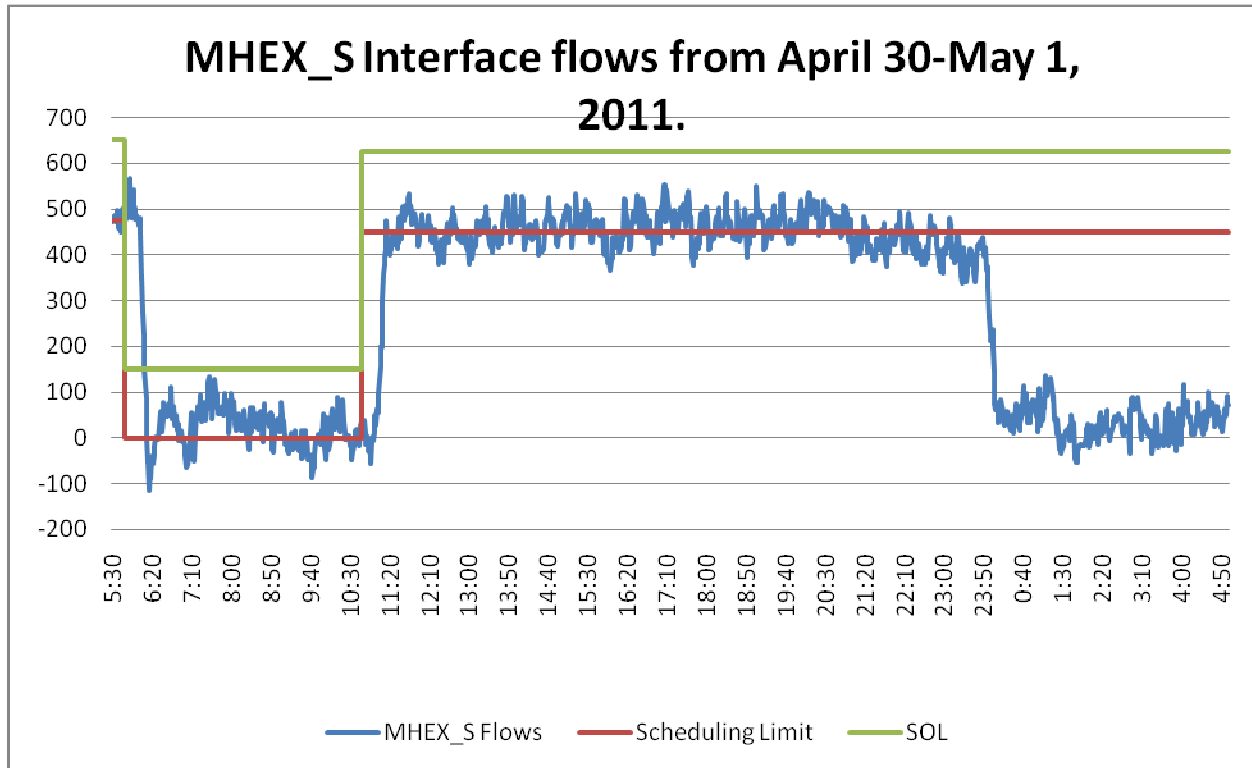
13. If Firm transaction curtailments took place, description of Transactional Contribution Factor calculation and results as well as how necessary relief was obtained through network service and native load contributions:

Firm schedules were curtailed as detailed in section 3 above.

14. Other options considered before/during to avoid hold/curtailment:

None – this issue is covered by the Temporary & Standing op-guides.

15. The following chart identifies the flowgate loading for the TLR level 5 event:



16. Lessons Learned

The MHEB and MISO Operators reacted appropriately to the scheduled outage of the Dorsey-Forbes 500kV outage and to the reduced limits on the MHEX_S Interface FG 6002 during multiple forced transmission outage conditions.

MHEB and MISO will continue to work closely to ensure the Interface limits are respected.