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| O.O. | 18-03663-OO  18-00549-OO | | MISO No. | 1-17239688  1-16319318 | File No. | 240802 |
| **Name of Outage:** | | 230 kV Line R7B (Boundary Dam – Auburnton) ***and,***  230 kV Line P52E (Ralls Island – EB Campell) | | | | |
| **Effective Dates:** | | 2018-02-27 from 22:51 to 2018-03-01 at 12:00 CST  (2018-02-27 from 23:51 to 2018-03-01 at 13:00 EST) | | | | |
| **Standing Guide Reference:** | | MH-SPC Special Study (as per R. Arruda 2018-02-28) | | | | |

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| **System**  **Posturing** | B10T will be operated within the range of "Scheduled / SOL" 150 / 165 MW South and "Scheduled / SOL" 75 / 90 MW North.  **West Flow**  **“GRAPH” MAXIMUM of 900 MW** was studied for this outage for west flow conditions. Monitor Graph by using the “GRAPH LIMIT” calculation. **“GRAPH” MINIMUM of 0 MW**. Maximum **"PH" of 500 MW**. Use "ARC Constant" value of **575 MW**, for "GRAPH LIMIT" monitoring.  **East Flow**  **“GRAPH” MAXIMUM of 900 MW** was studied for this outage for east flow conditions. Monitor Graph by using the “GRAPH LIMIT” calculation. **“GRAPH” MINIMUM of 0 MW**. Maximum **"PH" of 500 MW**. Use "ARC Constant" value of **575 MW**, for "GRAPH LIMIT" monitoring.  Note: **“GRAPH”** = sum of **Grand Rapids** and Power to **Ponton and Herblet Lake**  (This acronym replaces previous “GRPTPH” which had the same parameter value )  Note: **“ARC”** = sum of **U91A and A4D “OUT**” at **Ashern** plus **MR11 “OUT”** at **Raven Lake** plus **C28R “IN”** at **Cornwallis**.  Note: **“PH”** - sum of Power to **Ponton and Herblet Lake** from lines P19W, J30P, W73H and W74H. (N.B: This acronym replaces previous “PTPH” which had the same parameter value). |
| **Description**  **of Work:** | R7B – SPC replacing nine compromised structures between Boundary Dam and Auburnton. MHEB to serve Auburnton load for duration of outage.  P52E – SPC/MHEB Line mtce. Insulation tests on Ralls P52E Line and Sync PTs. Teleprotection maintenance. |



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| **Load Serving** | For the outage to Boundary Dam to Auburnton section of R7B, the Auburnton load will be supplied by MH from Reston. SaskPower estimates the maximum Auburnton load will be approximately 70 MW during the outage. The area system load is sum of the loads at Auburnton, Reston, Souris, Virden West, Birtle, and Raven Lake. Studied area load is about 350 MW.  The load serving schedule will be between Manitoba Hydro (MHEB) and Saskatchewan Power Corporation (SPC) Control Areas. MHEM/North Point (NRPT) will make the arrangements for energy to serve the load as detailed in the Manitoba Hydro Transmission Tariff Business Practices.  **Immediately after the section of 230 kV line R7B (Boundary Dam to Auburnton) is removed from service:**   1. MHEB will record R7B flow at Reston Station immediately following the section of 230 kV Line R7B (Boundary Dam to Auburnton) being removed from service. 2. MHEB will scan inhibit R7B MW value in AGC and manually enter a zero value. 3. SPC will scan inhibit Boundary Dam R7B MW value in AGC and manually enter a zero value. 4. The Reston R7B flow recorded in step 1 will be used for partial hour calculation if 230 kV Line R7B was not removed from service exactly on the hour. The calculation is: R7B flow at Reston multiplied by number of minutes remaining to top of the next hour divided by 60. 5. SPC and MHEB control areas shall confirm the amount of energy supplied to the separated load for the first hour based upon the above calculation. SPC will adjust the dynamic etag energy profile with this value.   During the 230 kV Line R7B outage, MHEB will use the R7B digital metering to determine the MWhr value(s) and forward the information to SPC for after the fact billing and inadvertent calculations. SPC will enter these values into the dynamic eTag energy schedule for each hour.  **Immediately prior to the section of 230 kV Line R7B (Boundary Dam to Auburnton) being returned to service:**   1. MHEB will record R7B flow at Reston Station immediately prior to the section of 230 kV Line R7B (Boundary Dam to Auburnton) being returned to service. 2. The Reston R7B flow recorded in step 6 will be used for partial hour calculation if 230 kV Line R7B was not removed from service exactly on the hour. The calculation is: R7B flow at Reston multiplied by number of minutes into the current hour divided by 60. 3. SPC and MHEB control areas shall confirm the amount of energy supplied to the separated loads for the last hour based upon the above calculation. SPC will adjust the dynamic eTag energy profile with this value. 4. MHEB will return R7B signal to service in AGC.   SPC will return R7B signal to service in AGC. |

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| **Special Instructions to MHEB Operator:** | Open 66 kV Line 94 at Virden as per NOP. Open 230 kV Breaker R8 at Reston. This will result in loss of Auburnton load with C28R.  Adjust Brandon units to maintain Cornwallis voltage around 240-242 kV during the load serve of Auburnton for maximum voltage support and post contingency operation. Additional Brandon units may be brought online for reliability, and the voltage setpoint of the units may be adjusted to adjust Var loading on the units.   SPC minimum voltage at Auburnton is 207 kV (0.90pu) for steady state voltages and 196 kV (0.85pu) for post contingency (short term duration). Reston/Virden voltage alarming for normal minimum is 225 kV (as per NOP 1321-01). During this outage, voltage at Reston/Virden may be operated to 219 kV (0.95pu). Monitor post contingent voltage at Virden when operating below 225 kV, and ensure voltage at Cornwallis is closer to 241-242 kV.  Maximum studied Load Serve for Auburnton load is 70 MW. |

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| **Special Instructions** | **TOI Extensions** - This TOI may be extended until 23:59 by performing the following steps:   1. 1. Verify system conditions to confirm there are no additional tie line facilities outages, or new internal MH outages. 2. 2. Review RTCA to confirm there are no new contingencies. 3. 3. Contact MISO to confirm there are no new outages, if there are no new outages provide notice to MISO that MH is extending the TOI. 4. 4. Extend the outage in COLA. 5. 5. Update TLAP outage table.   6. Provide notice to affected balancing authorities. |

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| **Prepared By:** | D. Williams | **Date:** | **2018.02.28** |

Copies to:

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Operating Order File 240802

MHEB OASIS MISO – St. Paul

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