

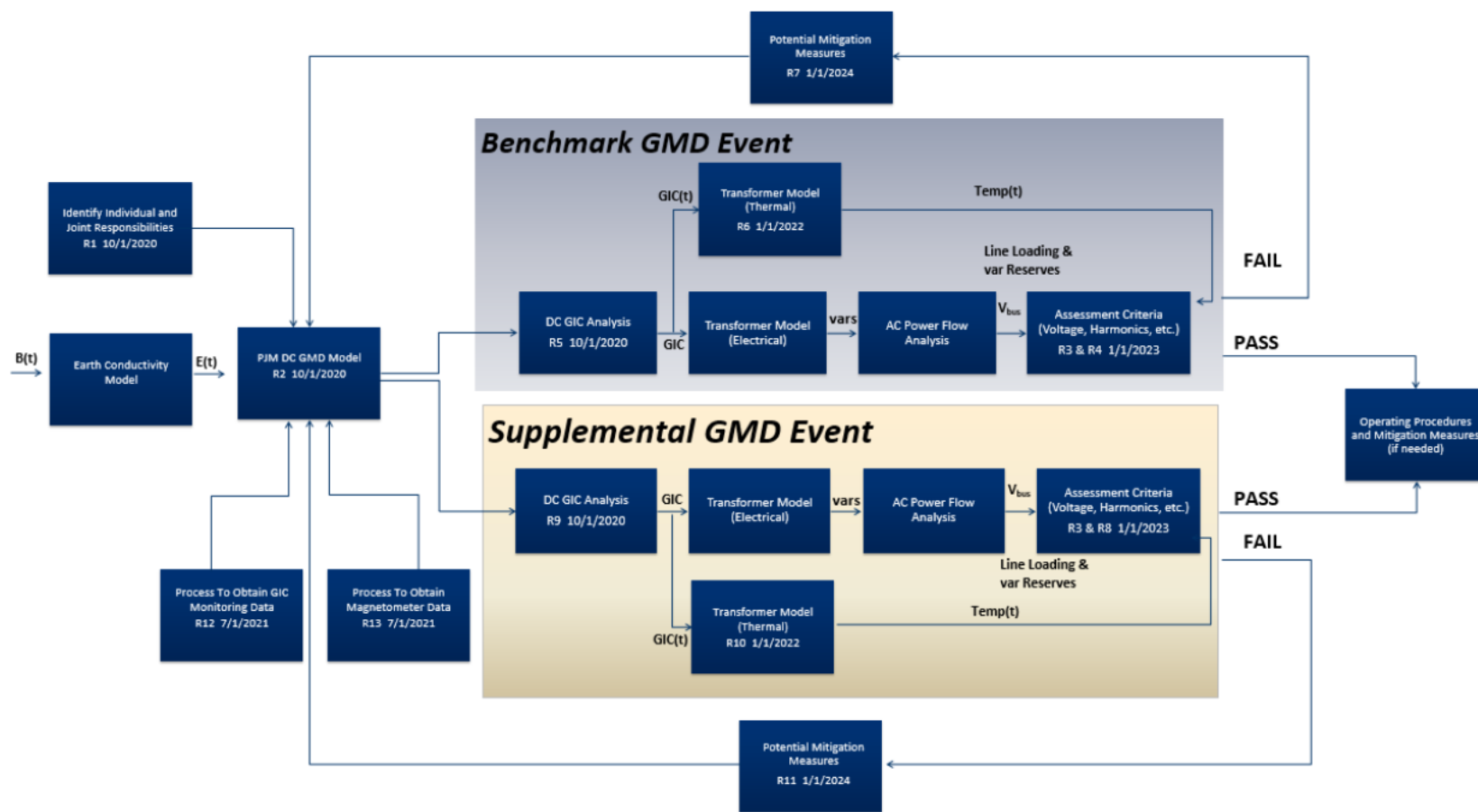


TPL-007-4

Transmission System Planned Performance for Geomagnetic Disturbance Events

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Reliability Standards & Compliance Subcommittee
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- **Effective Date of TPL-007-4 Standard is 10/1/2020**
 - Purpose:
 - Establish requirements for Transmission system planned performance during geomagnetic disturbance (GMD) events
 - Applicable to:
 - Planning Coordinator
 - Transmission Planner
 - Transmission Owner
 - Generator Owner
 - Facilities:
 - Facilities that include power transformer(s) with a high side, wye-grounded winding with terminal voltage greater than 200 kV





- **R1: PJM will identify individual and joint responsibilities (10/1/2020)**
 - PJM, as the Planning Coordinator and Transmission Planner is responsible for:
 - Maintaining System models & GIC System models
 - Performing studies needed to complete Benchmark and Supplemental GMD Vulnerability Assessments
 - Implementing processes to obtain GMD measurement data
 - Working with member TOs and GOs to collect new or updated GMD data of applicable facilities within PJM's footprint



- **R2: PJM will maintain System models and GIC System models (10/1/2020)**
 - 2018 Series RTEP (2023 5-year) Summer Case
 - No modeling updates or changes going from TPL-007-3 to TPL-007-4
 - Transmission Owner data submitted last year for TPL-007-3 will be used for TPL-007-4.
 - Generator Owner data submitted last year for TPL-007-3 will be used for TPL-007-4.



- **R3: PJM will develop criteria for System steady state performance (1/1/2023)**
 - Voltage Criteria
 - Develop acceptable System steady state voltage performance for its System during benchmark and supplemental GMD events
 - Future discussion with Transmission Owners Planning Working Group (TOPWG)



- **R5 & R9: PJM will re-issue same GIC flows to impacted TOs/GOs(10/1/2020)**
 - PJM will re-issue same GIC flow results from TPL-007-3 for TPL-007-4
 - The same GMD model is being used for TPL-007-4 compliance
 - 75 Amps or greater per phase during benchmark GMD event
 - 85 Amps or greater per phase during supplemental GMD event
- **R6 & R10: TOs and GOs will conduct thermal impact assessment (1/1/2022)**
 - Be based on the effective GIC flows provided by PJM in R5 & R9
 - Be performed and provided to PJM within 24 calendar months of receiving GIC flows specified in R5 & R9
- **R4 & R8: PJM will perform GMD Vulnerability Assessments (1/1/2023)**
 - System On-Peak: Summer 5 year case 2023
 - System Off-Peak: Light Load/Winter 5 year case 2023

- **R7: Develop a Corrective Action Plan - Benchmark(1/1/2024)**
 - If PJM concludes through the benchmark GMD Vulnerability Assessment conducted in Requirement R4 that the PJM System does not meet the performance requirements for the steady state planning benchmark GMD event, then PJM will develop a Corrective Action Plan (CAP) addressing how the performance requirements will be met.
- **R11: Develop a Corrective Action Plan – Supplemental (1/1/2024)**
 - If PJM concludes through the supplemental GMD Vulnerability Assessment conducted in Requirement R8 that the PJM System does not meet the performance requirements for the steady state planning supplemental GMD event, then PJM will develop a Corrective Action Plan (CAP) addressing how the performance requirements will be met.



- **R12 & R13: PJM will develop processes to obtain GIC monitor data and geomagnetic field data (7/1/2021)**
 - Obtain GIC monitor data
 - There are about 20 substations that have GIC monitors within PJM footprint.
 - Obtain geomagnetic field data
 - US GS (Geological Survey) Observatory located in Fredericksburg, VA.

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**TPL-007-4: Transmission System
Planned Performance for Geomagnetic
Disturbance Events**



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Revision History

- Revision History
 - V1 - 9/1/2020 – Original Version