



TPL-007-2

Transmission System Planned Performance for Geomagnetic Disturbance Events

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Transmission Planning
RSCS Meeting
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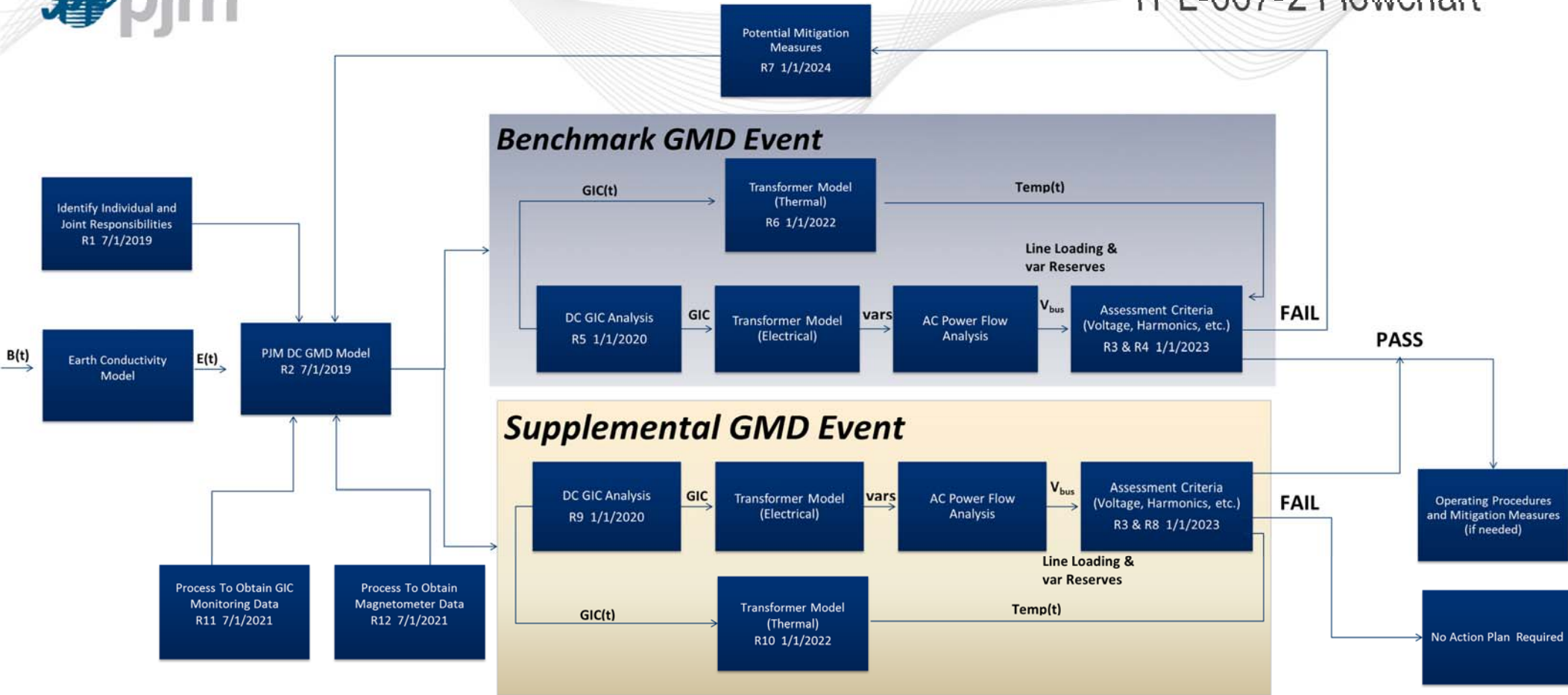
- Effective Date of TPL-007-2 Standard is 7/1/2019
 - Purpose:
 - Establish requirements for Transmission system planned performance during geomagnetic disturbance (GMD) events
 - Applicable to:
 - Planning Coordinator
 - Transmission Planner
 - Transmission Owner
 - Generator Owner
 - Facilities:
 - Facilities that include power transformer(s) with a high side, wye-grounded winding with terminal voltage greater than 200 kV



TPL-007-2: Action Required until 01/01/2020

Action Required	Deadline	Who May Be Affected
Submit GMD data to PJM via Gen Model Tool	04/15/2019-06/14/2019	Generator Owners (GOs)
Send GMD data request to TOs	05/23/2019	PJM
Submit GMD data to PJM via NERC.Transmission.Planner@pjm.com	07/18/2019	Transmission Owners (TOs)
Run DC GIC Analysis during Benchmark and Supplemental GMD Events	01/01/2020	PJM
Provide GIC flows to impacted TOs and GOs	01/01/2020	PJM





- **PJM identified individual and joint responsibilities according to TPL-007-1 R1**
 - PC Meeting on 3/9/2017
 - Joint SOS Meeting on 4/5/2017
 - RSCS Meeting on 5/18/2017
- **PJM collected GMD data according to TPL-007-1 R2**
 - 2016 Series RTEP (2021 5-year) Summer Case
 - Transmission Owners submitted GMD data to NERC.Transmission.Planner@pjm.com on 5/10/2017 – 10/1/2017
 - Generator Owners submitted GMD data through Gen Model tool in Planning Center on 7/6/2017 – 10/1/2017
- **PJM completed DC GIC analysis according to TPL-007-1 R5**
 - PJM provided GIC flows to impacted TOs and GOs on 12/28/2018

- **R1: PJM will identify individual and joint responsibilities (7/1/2019)**
 - Maintain System models & GIC System models
 - Perform studies needed to complete Benchmark and Supplemental GMD Vulnerability Assessments
 - Implement processes to obtain GMD measurement data
 - Need the assistance of 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 (7/1/2019)
 - 2018 Series RTEP (2023 5-year) Summer Case
 - Transmission Owners will submit new or updated GMD data to NERC.Transmission.Planner@pjm.com on 5/23/2019 – 7/18/2019
 - Generator Owners will submit new or updated GMD data through Gen Model tool in Planning Center on 4/15/2019 – 6/14/2019

- **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)
 - Harmonics
 - PJM will be issuing a data request of devices such as capacitor banks, SVC, STATCOM, HVDC, etc., that will be affected by harmonics during GMD events through Relay Subcommittee.



- **R5 & R9: PJM will provide GIC flows to impacted TOs/GOs(1/1/2020)**
 - Provide GIC flows to TOs/GOs which will meet the applicable thresholds of an effective GIC value per phase during GMD events
 - 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 (1/1/2024)**
 - If PJM concludes through the benchmark GMD Vulnerability Assessment conducted in Requirement R4 that 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 & R12: 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.



- Revision History
 - V1 - 4/12/2019 – Original Version Posted to PJM.com