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**Subject: Process to Obtain Geomagnetic Disturbance (GMD) Measurement Data in accordance with NERC Standard TPL-007-4**

Summary: This technical bulletin provides details on the process for obtaining Geomagnetic Induced Current (GIC) Monitoring Data (R12) and Geomagnetic Field Data (R13) in accordance with NERC Standard TPL-007-4 - Transmission System Planned Performance for Geomagnetic Disturbances (GMD). This technical bulletin will ultimately be incorporated into a Manual or other ISO Procedure.

**Details:**

NERC Standard TPL-007-4, entitled “Transmission System Planned Performance for Geomagnetic Disturbance Events” requirements R12 and R13 state the following:

*“R12. Each responsible entity, as determined in Requirement R1, shall implement a process to obtain GIC monitor data from at least one GIC monitor located in the Planning Coordinator’s planning area or other part of the system included in the Planning Coordinator’s GIC System model.*

*M12. Each responsible entity, as determined in Requirement R1, shall have evidence such as electronic or hard copies of its GIC monitor location(s) and documentation of its process to obtain GIC monitor data in accordance with Requirement R12.*

*R13. Each responsible entity, as determined in Requirement R1, shall implement a process to obtain geomagnetic field data for its Planning Coordinator’s planning area.*

*M13. Each responsible entity, as determined in Requirement R1, shall have evidence such as electronic or hard copies of its process to obtain geomagnetic field data for its Planning Coordinator’s planning area in accordance with Requirement R13 [1].”*

The purpose of R12 and R13 is to enable model validation and situational awareness to inform the GMD Vulnerability Assessment [2]. The geomagnetic field data collected in accordance with R13 will allow for the simulation of an actual GMD event from which GIC flows can be calculated. The calculated GIC flows can then be compared to the GIC monitor data collected in accordance with R12 to gauge the accuracy of the GIC model used for the GMD Vulnerability Assessment.

**Process to Obtain GIC Monitor Data**

Each Transmission Owner (TO) in NYCA that owns at least one applicable transformer as defined in TPL-007 shall obtain data from at least one GIC monitor attached to the neutral of an applicable transformer. The GIC monitor data shall be provided to the NYISO via the Inter-Control Center Communications Protocol (ICCP)<sup>1</sup>. The NYISO will provide written requests for additional information necessary for making the GIC monitor data useful for model validation, such as geographic location information, transformer connection type, and sampling rate, as needed [3].

**GIC Monitor Requirements**

The GIC monitor must meet the following requirements:

- The GIC monitor shall be connected to the neutral of a 200 kV or above high-side, wye-grounded power transformer [1] and measure the dc current flowing through the neutral [2].

<sup>1</sup>The Object IDs (OIDs) and the associated description such as station name, kV level and equipment name (line/transformer) for the applicable GIC monitor data for the ICCP shall be sent to the NYISO Data Coordinator Mailbox at the following email address: [Data\\_Coordinator@nyiso.com](mailto:Data_Coordinator@nyiso.com). The TOs should submit to the NYISO new OIDs at least four weeks prior to the deployment date for the GIC monitor data.

- Of the data provided by the TOs, at least one data set shall be from a GIC monitor with a data range of at least +/- 500 Amps [4].
  - It is acceptable to modify the GIC monitor configuration, as applicable, to allow for a more narrow data range to improve reporting accuracy through SCADA/ICCP if the modified data range is adequate to measure expected GICs based on historical data or results from NYISO GIC flow assessments.
- Of the data provided by the TOs, at least one data set shall be from a GIC monitor that samples continuously at a rate of between one sample per 10 seconds and one sample per second [6]. Sample rates up to one sample per minute are acceptable for other GIC monitors if required by equipment limitations [6].

### GIC Data Requirements

The time sampled GIC monitor data shall be provided to the NYISO via the ICCP and stored using the PI DataLink Historian software. The GIC data collected by the GIC monitor must meet the following requirements:

- The GIC values shall be reported to at least the nearest tenth of an Amp [5].
- The GIC values shall include a positive sign to denote flow from ground into the transformer neutral and a negative sign to denote flow from the transformer neutral to ground [5].
- The GIC data should not be compressed for storage in PI DataLink Historian, i.e., the data should be stored continuously as it is collected [7].

### Process to Obtain Geomagnetic Field Data

At least once per calendar year, the NYISO will collect and store geomagnetic field data from United States Geological Survey/Natural Resources Canada geomagnetic observatories and/or installed magnetometers in or near the planning area. Geomagnetic field data will be collected for time periods when the Kp index is greater than or equal to 7. The data shall be collected such that sufficient post-solar storm behavior can be observed. The collected geomagnetic field data will be retained for at least five years. [5]

### References:

1. TPL-007-4 – Transmission System Planned Performance for Geomagnetic Disturbance Events (DRAFT):  
[https://www.nerc.com/pa/Stand/Project201901ModificationstoTPL0073/Project%202019-01%20Final%20Draft%20of%20TPL-007-4\\_clean.pdf](https://www.nerc.com/pa/Stand/Project201901ModificationstoTPL0073/Project%202019-01%20Final%20Draft%20of%20TPL-007-4_clean.pdf)
2. Technical Rationale and Justification for Reliability Standard TPL-007-4 (DRAFT):  
[https://www.nerc.com/pa/Stand/Project201901ModificationstoTPL0073/Draft%20Tech%20Rationale\\_TPL-007-4\\_final%20ballot\\_OR.pdf](https://www.nerc.com/pa/Stand/Project201901ModificationstoTPL0073/Draft%20Tech%20Rationale_TPL-007-4_final%20ballot_OR.pdf)
3. TPL-007-3 Supplemental Material- Guidelines and Technical Basis:  
[https://www.nerc.com/\\_layouts/15/PrintStandard.aspx?standardnumber=TPL-007-3&title=Transmission%20System%20Planned%20Performance%20for%20Geomagnetic%20Disturbance%20Events&jurisdiction=United%20States](https://www.nerc.com/_layouts/15/PrintStandard.aspx?standardnumber=TPL-007-3&title=Transmission%20System%20Planned%20Performance%20for%20Geomagnetic%20Disturbance%20Events&jurisdiction=United%20States)
4. 2012 Special Reliability Assessment Interim Report: Effects of Geomagnetic Disturbances on the Bulk-Power System:  
<https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/2012GMD.pdf>
5. Geomagnetic Disturbance Data- Rules of Procedure Section 1600 Data Request in Response to FERC Order No. 830:  
[https://www.nerc.com/comm/PC/Geomagnetic%20Disturbance%20Task%20Force%20GMDTF%202013/GMD\\_data\\_request\\_June\\_2018.pdf](https://www.nerc.com/comm/PC/Geomagnetic%20Disturbance%20Task%20Force%20GMDTF%202013/GMD_data_request_June_2018.pdf)
6. GMD System Data Reporting Instructions:  
[https://www.nerc.com/pa/RAPA/GMD/RefDocs/GMD\\_Data\\_Reporting\\_Instruction.pdf](https://www.nerc.com/pa/RAPA/GMD/RefDocs/GMD_Data_Reporting_Instruction.pdf)

**This Technical Bulletin is expected to be incorporated into a NYISO Manual or other ISO Procedure.**