

PREP WORK

Subgroup members review agenda and provide the following to staff by 6/4/18:

- 1) Propose edits to the Regulated Utilities' TIIR Draft Proposal (Sections 5-7, p. 21-23) and/or flag topics for discussion. Send as red-lines/track changes to the 4-11-18 draft of Regulated Utilities' TIIR proposal (attached).**
 - a. Voltage regulation and control methods using reactive power control; Section 5
 - b. Voltage and Active Power Control; Section 5C
 - c. Voltage and Frequency Ride-Through as a response to Abnormal Conditions (Section 6)
 - d. Protection requirements as a Response to Faults (Section 7)
- 2) Review and be prepared to reference IEEE 1547-2018 (Clauses 4.8, 5.1-5.4, 6.1.-6.4)**
 - a. Voltage regulation by Reactive Power Control; Clauses 5.1 – 5.3
 - b. Voltage and Active Power Control; Clause 5.4
 - c. Voltage Ride-Through as a response to Abnormal Conditions; Clauses 6.1 - 6.4
 - d. Protection requirements (Clauses 4.8 and 6.1-6.4)
- 3) Please provide examples of the following if possible.**
 - a. Controlling voltage by reactive power control using constant power factor mode
 - b. Operations leveraging default settings for normal operating performance in Table 8 of IEEE 1547-2018 (page 39)
 - i. Please share any lessons learned.
 - c. Making updates to voltage and reactive power control settings
 - i. How long did it take?
 - ii. What type of DER was involved?
 - iii. Where there any cost implications?
 - d. Making updates to voltage and active power control setting
 - i. How long did it take?
 - ii. What type of DER was involved?
 - iii. Where there any cost implications?

See end of Draft Agenda for more details regarding TIIR and 1547-2018 references. Please copy michelle.rosier@state.mn.us and pam.johnson@state.mn.us on your prep work responses.

Technical Subgroup Meeting 3 DRAFT AGENDA

Friday, June 8th

9:30am – 12:30pm

WebEx: <https://global.gotomeeting.com/join/432598661>

Time	Topic
9:30 – 9:45	Welcome, Introductions, Overview of Agenda, Expectations
9:45 – 9:50	Recap and highlights of some of the new suggestions re: Section 4; Performance Categories
9:50 – 9:55	IREC Presentation on Regulation Functions and Consumer Protections
9:55 – 10:35	Voltage Regulation via Reactive Power Control: Normal Conditions
10:35 – 11:20	Voltage and Active (Real) Power Control
11:20 – 11:55	Voltage Ride-Through as a response to Abnormal Conditions
11:55 – 12:20	Protection Requirements as a Response to Faults
12:20 – 12:30	Meeting Evaluation & Next Steps

Phase II Technical Subgroup Roster:

Jeff Schoenecker/Craig Turner, Dakota Electric	Robert Jagusch, MMUA	Patrick Dalton/John Harlander/Alan Urban, Xcel Energy
Lise Trudeau, Dept of Commerce	Kevin McLean/Jenna Warmuth, MN Power	Natalie McIntire/TBD, Wind on the Wires
Mike McCarty/Katie Bell, EFCA	Kristi Robinson, MREA	John Dunlop/Chris Jarosch, MNSEIA
Brian Lydic/Sky Stanfield/Laura Hannah – Joint Movants	Dean Pawlowski, Otter Tail Power	Commissioner Matt Schuerger; Michelle Rosier; Cezar Panait
Tam Kemabonta/Professor Mahmoud Kabalan, St. Thomas Affiliation		Technical Assistance*: Michael Coddington and Michael Ingram, National Renewable Energy Laboratory Tom Key, Jens Boemer, Nadav Enbar; Electric Power Research Institute Pam Johnson, DOE Solar Energy Innovator Fellow

*Technical assistance is not a participant or party to the docket and does not advocate for specific outcomes in the proceeding. The role of technical assistance is to support Commission staff in the process for these proceedings, and to provide an objective source of information or data, as requested, by Commission staff to understand areas of disagreement amongst participants.

Draft Meeting Topics Proposal:

<u>Date</u>	<u>Topic</u>
3/23/18	Meeting 1 Scope/Overview** (Walk-through with explanations: Red-lined TIIR; List of topics in scope of TSMs; Definitions
4/13/18	Meeting 2 Performance Categories**; Response to abnormal conditions; MISO Bulk Power System
6/1/18	Full DGWG Meeting Technical Subgroup update; Phase I Update/Next Steps
6/8/18	Meeting 3 Reactive Power and Voltage/Power Control Performance**; Protection Requirements
7/20/18	Meeting 4 Energy Storage**; Non-Export and Inadvertent Export**; Capacity
8/3/18	<i>July 20 topics continued</i>
8/10/18	Meeting 5 Interoperability** (Monitor and Control Criteria); Metering**; cyber security
9/14/18	Meeting 6 Test and Verification**; Witness Test Protocol
10/19/18	Meeting 7 References; Definitions*; 1-line diagram requirements; Agreements*, Frequency Response and Ride-Through
11/9/18	Full DGWG Meeting 2

References to 6/8/18 Topics in Draft from Regulated Utilities of TIIR or IEEE 1547-2018

Reactive Power is discussed or has assumptions about how it is treated in the following places, i.e. not merely mentioned or defined (Focus is TIIR draft Section 5)

- Draft TIIR
 - Page 20-21 in the discussion of Category A and B assignment (IEEE citing)
 - Page 21-24 in Reactive Power Capability and Voltage/Power Control Performance (Section 5)
 -
- IEEE 1547-2018
 - Clause 5.1
 - Clause 5.2, Reactive Power Capability of the DER
 - Clause 5.3.1, Voltage and Reactive Power Control

Protection Requirements are discussed in the following places, i.e. not merely mentioned or defined (Focus is TIIR draft Section 7)

- Draft TIIR
 - Pages 25-26 in Protection Requirements (Section 7)
 - See figure on Page 37 in Annex B; Clarification on RPA, PoCC, PoC, and Supplemental DER Devices for relevant physical drawing with regards to relative locations, as it is relevant to protection requirements.
 - Other places protection requirements come up, but we propose not focusing on during June 8 meeting
 - Page 31 in Energy Storage Load Aspects (Section 10, Subsection C)
 - Pages 32-33 in Non-Exporting and Inadvertent Export Functional Definition and Requirements and Testability (Section 11, Subsections B and C)
- IEEE 1547-2018
 - 4.8 Isolation Device
 - Are there other parts of Clause 4 specifically in reference to Protection Requirements?
 - Page 35 in Protection from EMI in 4.11.1 (possibly not of enough relevance to cite)
 - Annex E
 - Clause 6.1; Introduction
 - Clause 6.2, Area EPS faults and open phase conditions
 - Clause 6.3; Area EPS reclosing coordination
 - Clause 6.4; Voltage
 - Other places protection requirements come up, but we propose not focusing on during June 8 meeting
 - Clause 6.5 Frequency

Abnormal conditions are discussed or has assumptions about how it is treated in the following places

- Draft TIIR
 - Page 25 in Response to Abnormal Conditions (Section 6)
- IEEE 1547-2018; 6.1 through 6.4, with focus on the following two sections
 - Clause 6.1, Introduction
 - Clause 6.4, Voltage (Note: this is a long section)