



Phase II Technical Subgroup Meeting #10  
August 9, 2019  
(Docket No. 16-521)

# Agenda

Time	Topic
2:00-2:10	Welcome, Introductions, Overview of Agenda, Expectations, Recap
2:10 – 2:20	MISO Regional Guidance Update
2:20 – 2:50	Final Update on the DRAFT TIIR
2:50 – 3:20	Utility Technical Specification Manuals/Table of Contents
3:20 – 3:25	Upcoming Schedule/Next Steps in Phase II
3:25 – 4:00	Questions/Feedback – We may end early.

# Commission Order

January 24, 2017

- The Commission hereby delegates authority to the Executive Secretary to issue Notice(s), set schedules, and designate comment periods for the scope outlined in paragraphs 2 – 3 below. The Executive Secretary will, in cooperation with the Department of Commerce, convene a work group of appropriate size and composition, and may select a facilitator, to develop the record more fully.
- The Commission will transition the Minnesota Interconnection Process to one based on the FERC SGIP and SGIA. The Executive Secretary will set schedules and take comments. It is anticipated that the Commission will consider the record and comments within 18 months of this order, to replace Attachments 1, 3, 4, and 5 to its 2004 Interconnection Standards in this Docket. The Executive Secretary will use the Joint Movants' May 12, 2016 filing, generally, as the starting point for comments.
- **In the longer-term (nine to twenty-two months), the Executive Secretary will set schedules and take comments on updating the Minnesota interconnection technical standards. It is anticipated that the Commission will consider the record and comments within 24 months of this Order, to replace Attachment 2 to the Commission's 2004 Interconnection Standards. This stage of work would incorporate newly revised national technical standards, and other issues identified as areas in need of updating.**
- The Commission hereby designates Commissioner Matthew Schuerger as lead commissioner pursuant to Minn. Stat. § 216A.03, Subd. 9, with authority to help develop the record necessary for resolution of the issues, and to develop recommendations to the Commission in this docket.

# Phase II Meetings: Topics and Timeline

<b>March 23</b>	Scope/Overview; Inventory of Definitions to Discuss
<b>April 13</b>	Performance Categories in Normal & Abnormal Conditions; MISO Bulk Power System
<b>June 8</b>	Reactive Power and Voltage/Power Control Performance; Protection Requirements
<b>July 20</b>	Energy Storage; Non-export; Inadvertent export; Limited export, Capacity
<b>Aug 3</b>	<i>July 20 topics continued</i>
<b>Aug 24</b>	Interoperability (Monitor and Control Criteria); Metering; Cyber security
<b>Sept 14</b>	Test and Verification; Protocol to witness Testing
<b>Sept 21</b>	In-Person TSG: Power Quality; Follow up items; TIIR edits discussion
<b>Oct 19</b>	References; Definitions; 1-line diagram requirements; Agreements, Frequency Ride-Through
<b>Nov 9</b>	Full DGWG Meeting # 7
<b>May 31 '19</b>	MISO Regional Guidance, 2 <sup>nd</sup> Draft TIIR from Writing Subgroup, Open Phase (Anti-Islanding) Testing and Grounding Bank Requirements; MN DIP/DIA & TIIR as “living documents”
<b>Aug. 9 '19</b>	MISO Regional Guidance, Utility TSMs, Final Draft TIIR from Writing Subgroup

- TSG has met 11 times over the past 10 months to discuss Minnesota statewide technical interconnection and interoperability requirements for DERs.
- In Sept. 2018, TSG met in person to reconcile and prioritize feedback from first 7 TSG meetings. Writing Subgroup provided 3 draft TIIRs based on TSG feedback. TSG has responded with 3 rounds of feedback.
- Last meeting identified two primary outstanding issues: Utility Technical Specification Manuals and Implementation of TIIR in interim of IEEE 1547-2018 roll out. Writing Subgroup added language to TIIR and sought TSG feedback in June.

# Goals for TSG #10

- Final check in on Draft TIIR as TSG prior to Commission issuing a notice of comment on the draft.
- Build shared understanding of
  - MISO Regional Guidance on IEEE 1547-2018 Implementation
  - Utility Technical Specification Manual Scope and Content
  - Phase II Timing and Next Steps

# MISO Regional Guidance on IEEE 1547-2018

# MISO July 1 Update

- The draft guideline can be found on: <https://www.misoenergy.org/planning/generator-interconnection/ieee-1547/> (look for 6th Straw Proposal in the presentation)
- MISO is currently working with the broader industry to request an amendment to IEEE Std 1547-2018. IEEE 1547 drafting team is discussing with IEEE Standards Association (IEEE SA) and its committees the possibility of an amendment to the voltage ride through requirement to enable easier implementation in MISO, PJM, and ISO NE (maybe others in the future)\*. MISO expects the IEEE SA to make a decision by September regarding whether to initiate the amendment process.
- The schedule of MISO guideline document is now intentionally delayed to September to better align with the potential IEEE 1547 amendment.
- MISO will provide more information in August regarding the IEEE 1547 amendment effort. MISO encourages your engagement in the balloting process if the IEEE SA decide to initiate the amendment process.



# Writing Subgroup's Final Draft of TIIR

# Jul 3<sup>rd</sup> Draft TIIR – Summary of Changes

- Writing Subgroup: Kristi Robinson (MREA), Craig Turner (DEA), Brian Lydic (IREC), Allen Gleckner (FE), Alan Urban (Xcel)
- Feedback received from Otter Tail Power and MNSEIA.
- Primary edits address: 1) TSM scope/purpose and 2) transition period to TIIR while IEEE 1547-2018 implementation in progress.
- Minor edits clarify definitions and make clear multiple RTOs serve Minnesota.
- Writing Subgroup provided responses on edits/comments not incorporated.

# Jul 3<sup>rd</sup> Draft TIIR – Summary of Changes

Page	Edit	Group Comment
5	<p>The Area EPS Operator’s TSM documents are to be designed to provide utility specific details aligned with the TIIR requirements. The Area EPS Operators’ TSM document shall be limited to detailing requirements which are in support of the requirements contained within the TIIR and MN DIP. Additional requirements not contemplated by the TIIR may be mutually agreed upon between the Parties.</p>	<p>Additional language to address the transition to the TIIR from the existing Technical Requirements.</p>
6	<p><b>1.6 Transition Period</b></p> <p>All requirements of the TIIR are immediately applicable unless requiring equipment that conforms with IEEE 1547-2018 advanced functionalities.</p> <p>Area EPS Operators cannot require the use of certified equipment that meets the requirements of IEEE 1547-2018 until such time the equipment is readily available. At such time certified equipment first becomes available, the Area EPS Operator and DER Owner may mutually agree to utilize the certified equipment and functionalities in conformance with the requirements of IEEE 1547-2018. At such time when certified equipment is readily available(7), the entire TIIR shall be applicable.</p> <p>(7) Refer to UL 1741 CRD for timeline of readily available certified equipment that meets the requirements of IEEE 1547-2018.</p>	<p>Additional language to address the transition to the TIIR from the existing Technical Requirements.</p>

# Jul 3<sup>rd</sup> Draft TIIR – Summary of Changes

Page	Minor Edits	Group Comment
15	NOTE – This definition is based on the IEEE 1547 regional reliability coordinator definition. In Minnesota, <b>i.e.</b> the Midcontinent Independent System Operator (MISO) and Southwest Power Pool (SPP), perform this function based on territory .	<b>Otter Tail Power:</b> Minor edit to definition. <b>Group:</b> Accepted edit.
16	<del>state of Minnesota DER</del> <b>Technical standards Requirements.</b>	Align with MN DIP terminology. <b>Group:</b> Accepted edit.
19	Until a decision is made by the Regional Transmission Operator <b>within that region</b> , all synchronous machine DER shall be assigned Category I and all inverter-based DER shall be assigned Category II.	<b>Otter Tail Power:</b> Minor additional wording to recognize the multiple RTOs in MN <b>Group:</b> Accepted edits.

# Jul 3<sup>rd</sup> Draft TIIR – Summary of Unincorporated Feedback

Page	MNSEIA	Group Comment
20	Provided written comments concerned about the Area EPS Operators “controlling” versus “confirming” of DER control settings. No specific language was provided for review.	The ability to request future control settings is necessitated by the need to adjust performance as DER growth grows or to address distribution system changes. The Interconnection Agreement could have terms that limit the control requests. Timeframe on requested changes are to be aligned with the priority of the request by the Area EPS Operator. (i.e. 3 months allowed for a setting change to occur if not time-sensitive settings change.) It is recognized that the Area EPS Operator should limit the frequency of setting changes.
21	Provided comments regarding the installation to have a constant power factor mode that is enabled with a .98 PF.	Any DER that meets IEEE 1547-2018 shall meet the constant power factor requirement. This requirement is for the DER only, disregarding the load connected at the RPA.
25	“At the DER’s election, proof that the DER will not result in an open phase condition occurring directly at the RPA and that the DER will not result in unintentional islands, and the monitoring of both therein, shall be possible through real world testing, diagrams, digital models, or other theoretical models that will confidentially illustrated the DER’s abilities to adhere to IEEE 1547 and the TIIR.”	It was discussed the concept of “paper” reviews of the open phase functional test. At this time IEEE 1547-2018 requires this actual functional test and the Group feels the actual test shall remain. The proposed edits were not accepted.  MNSEIA’s concern about open-phase testing appears to be more of an implementation issue on how the open phase testing is performed safely
29	Comment was made that storage that does not export to the distribution system should be eliminated from review	Storage that does not export to the distribution system not having to be reviewed is more of an Interconnection Process issue, and is out of scope for the TIIR. Section 11 does discuss the configuration of non-export

# Jul 3<sup>rd</sup> Draft TIIR – Summary of Unincorporated Feedback

Page	MNSEIA	Group Comment
32	Comment was provided requiring test result of UL1741 was redundant and an overreach	This functionality is not part of every UL 1741 certified system. Power control limiting and power control systems are additional equipment that interact with a DER unit and would have their own testing requirements
35	Comment on the practicality of testing impedance.	There is no specific test for impedance. It appears with MNSEIA's comments that source impedance is confused with physical equipment impedance. This is a requirement of IEEE 1547-2018 and should not be eliminated. IEEE 1547 11.3.2 see footnote in that section.
37	Updates to firmware and software occur frequently and could be a burden on the DER Operator to notify the Area EPS Operator.	This is a concern of burden for both the Area EPS Operator and the DER Operator, however both software and firmware changes can drastically change the way the DER operates. Until further guidance is provided by IEEE, it is unrealistic for the TIIR to narrow down the types of software/firmware changes that should be reported to the Area EPS Operator. (IEEE 1547.2 workgroup may address this concern in the future)
Page	Otter Tail Power	Group Comment
30	<p><b>“xi. Abnormal system configuration that may limit the output of the generator”</b></p> <p>OTP has used this provision to allow a generator to come on-line prior to all upgrades being completed in the MISO world.</p>	<p>The Group believed that item ii in the list states that same concept as the OTP proposed language. The Group did not accept the edit.</p> <p><i>ii. Documenting at the time of application the charge/discharge profile(s) or use case(s) intended to be utilized by the ESS owner. This information may be collected through an Area EPS Operator specific document or the Area EPS Operator's online application portal</i></p>



# Utility Technical Specification Manuals

# Jun 2019 DRAFT – Utility TSM Outline

1	Introduction	
2	Performance Category Assignment	Normal performance category, Assignment of abnormal performance category
3	Reactive Power Capability and Voltage/Power Control Performance	Voltage and reactive power control, Voltage and active power control
4	Response to Abnormal Conditions	Voltage ride-through and tripping, Frequency ride-through and tripping
5	Protection Requirements	AC disconnect, Protection
6	Signage and Labeling	Residential roof top, Residential ground mount, Large scale
7	Metering Requirements	Meter socket placement and type, Location and access of metering
8	Interoperability	Local DER communication interface, Cyber security
9	Energy Storage	Considerations not covered by industry standards
10	Test and Verification Requirements	Procedure, Documentation, Failure protocol, Testing procedure
11	Power Quality	Operations on start-up and shutdown, Resolving power quality issues found after interconnection, Normal operating bounds of expected power quality.
12	Modifications to Existing DER system	Process for notification of ESS Control Modes
13	Required Documentation	Information required on one-line diagram, Site diagram, Nameplate capacity documentation



# Phase II Next Steps

<b>Aug. 2019</b>	Notice of Comment on Draft TIIR Issued
<b>Sept. 24, 2019</b>	Initial Comment Deadline on Draft TIIR
<b>Oct. 11, 2019</b>	Reply Comment Deadline on Draft TIIR
<b>Nov. 2019</b>	Agenda Meeting on Draft TIIR
<b>~1Q 2020</b>	Order on Phase II Issued

Thank You!