NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Consideration of FERC Order No. 901 Directives

Milestone 3: Project 2022-02 Uniform Modeling Framework for IBR
August 2025

On October 23, 2023, FERC issued a Final Rule, Order No. 901, directing the North American Electric Reliability Corporation (NERC) to develop new or modified Reliability Standards that address aggregation of data, parameters, and estimation methods to provide the Transmission Planner (TP) and Transmission Operator (TOP) with the estimate values, explanation for limitations on data availability, and the method used for all estimations. This project has a FERC regulatory deadline of November 4, 2025. Below provides the directives from FERC Order 901 along with the drafting team's (DT's) consideration of the directives.

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
P7. "… Second, by November 4, 2025, NERC must submit new or modified Reliability Standards addressing the interrelated directives concerning: (1) data sharing for registered IBRs, unregistered IBRs, and IBR-DERs in the aggregate…"	IRO-010 MOD-032 TOP-003	A timeline has been drafted to meet the regulatory deadline of November 4, 2025. Completed tasks listed below. • An industry workshop completed January 14-17, 2025. (outreach) • Many virtual DT meetings completed weekly from January – March 2025. (publicly posted) • In-person DT completed February 11-13, 2025. (publicly posted) • Industry Webinar March 6, 2025. (publicly posted) • DT outreach with trade groups and entities March 3-14, 2025 • Industry comment and ballot period April 17-May 16, 2025. (publicly posted)

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
		• A second industry workshop completed June 3-5, 2025. (publicly posted) • Many virtual meetings were completed weekly from May 19-July 23, 2025. • Industry outreach with trade groups and entities July 3-23, 2025. • Industry comment and ballot period August 8-September 10, 2025.
P76. "Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal and direct NERC to develop new or modified Reliability Standards that require registered IBR generator owners and operators to provide IBR-specific modeling data and parameters (e.g., steady-state, dynamic, and short circuit modeling information, and control settings for momentary cessation and ramp rates) that accurately represent the registered IBRs to their planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities that are responsible for planning and operating the Bulk-Power System. As several commenters indicate, ensuring the sharing of appropriate IBR modeling data is critical to create and maintain the models used in reliability studies, and in turn to ensure that Bulk-Power System transmission planners or operators are able to plan for, operate, and reliably integrate IBRs onto the Bulk-Power System."	IRO-010 MOD-032 TOP-003	**Theme:** Inverter-Based Resource (IBR) /Generator Owner to provide specific modeling data. IRO-010 and TOP-003: • While TOP-003 and IRO-010 allow any data to be requested, the DT felt it was important to add "IBR-specific data and parameters" specifically to IRO-010-6 Requirements R1, subpart 1.1 and TOP-003-8 Requirement R1, subpart 1.1 and Requirement R2, subpart 2.1 to ensure it is clear what data may be specifically requested to address FERC Order No. 901. In addition, IBR encompasses IBR-DER, and this information could be requested. • The DT considered adding a new subpart at the end of Requirement R1 (e.g., Part 1.6), but after reviewing requirement language, the DT determined the data and information lists within the existing subparts were the appropriate place to capture IBR-specific modeling data and parameters.

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
		MOD-032: • Generator Owner and Generator Operator – The DT decided to maintain applicability for just the Generator Owner and did not add Generator Operator as a functional entity to the applicability section. If data is needed from the Generator Operator, then the Generator Owner can reach out to the Generator Operator for necessary data via contractual obligations, etc. The DT does not find it necessary to require two applicable entities when one oversees the other. • The DT modified Attachment 1 to include generation and storage units, removed photovoltaic system (covered within IBR) and added Inverter-Based Resources. The wind turbine was updated for clarity that it is for Type 1 and Type 2, which is not included in the IBR definition.
P77. "With regard to AEU and ACP/SEIA's comments that the Commission direct NERC to specify data sharing requirements from transmission owners to generator owners and operators, we believe that this request may already be addressed through each transmission planner's existing processes. For example, the New York Independent System Operator (NYISO) and CAISO both have processes for obtaining such data after demonstrating a need for the specific information requested and that the required information protection and non-disclosure agreements are signed. Nevertheless, to support accurate modeling and performance, we direct NERC to consider during its standards development process AEU and ACP/SEIA's	MOD-032	**Theme:** Information going from Transmission Owner to Generator Owner/Generator Operator (consider): MOD-032 • There is no specific requirement within MOD-032 that requires Transmission Owners to share data with the Generator Owners and Generator Operators (and such a requirement would not be aligned with the purpose of MOD-032). However, Transmission Planners and Planning coordinators have a framework where requests for data can be sent for inclusion for the Interconnection-wide models. At this time, the DT does not see a need for a requirement to be drafted requiring Transmission Owners to provide data to Generator Owners and Generator Operators. The DT believes this is most appropriately addressed

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
suggested data sharing requirements when developing the framework, criteria, and necessary data exchange requirements to meet the registered IBR data sharing directive." **P74.** "AEU and ACP/SEIA ask that, in addition to data provision requirements for generator owners and operators, the Commission direct NERC to specify data sharing requirements from transmission owners to generator owners. For example, AEU explains that generator owners and operators also require data from transmission owners to support accurate modeling and performance, e.g., short circuit data, grid data for offshore wind, information on other power electronic devices around the IBR plant, and voltage harmonics. AEU adds that putting requirements on transmission owners would be consistent with revisions being developed for NERC's Modeling, Data, and Analysis (MOD) Reliability Standards."		through processes that exist outside of the MOD-032 Reliability Standard and concurs with the suggestion in P77 that these processes are already in place.
P78. "Commenters raised general concerns that mandating specific modeling and data submissions would reduce the flexibility and discretion of transmission planners and operators to identify the information they need. We find that, given the need for IBRs to operate in a predictable and reliable manner to ensure the reliable operation of the Bulk-Power System, it is necessary to establish uniform, minimum categories or types of data that must be provided so that Bulk-Power System planners and operators can predict the behavior of all IBRs. As discussed in more	MOD-032 TOP-003 IRO-010	**Theme:** Individual use of approved IBR models. (Uniform modeling framework) **Applicability:** Transmission Planner and Transmission Operator • Modifications made to MOD-032, including incorporation of an ERO Unacceptable Models list, establish an improved uniform modeling framework. IBR has been included in Attachment 1 of MOD-032 under steady state (item 3), dynamics (item 7), and short circuit specifying the minimum types of IBR data and capabilities that need to be collected as required per FERC Order No. 901.

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
detail in section IV.C of this final rule, we are also directing NERC to develop new or modified Reliability Standards that require the use of approved industry IBR models that accurately reflect the behavior of all IBRs during steady state, short-circuit, and dynamic conditions."		• Explicit reference to IBR data was added to the TOP-003 and IRO-010 standards along with provisions to ensure that models submitted under these standards are consistent with the models submitted under the framework established in MOD-032.
P86. "As a general matter, we agree with ACP/SEIA regarding the need to balance the burden to generator owners of collecting and providing data collected by disturbance monitoring equipment with the benefit of that data to reliability. Thus, in developing the directed data collection requirements, we direct NERC to consider the burdens of generators collecting and providing data, while assuring that Bulk-Power System operators and planners have the data they need for accurate disturbance monitoring and analysis. Likewise, regarding CAISO's request that the Commission direct NERC to consider requiring registered IBRs to provide additional data, we agree that such data collections may be warranted, and direct **NERC to consider through its standards development process whether additional IBR data points (e.g., telemetry collections or other automated platform integrations) are needed to further enhance real-time visibility of Bulk-Power System operations."**	TOP-003 IRO-010	**Theme:** Disturbance and monitoring (Consider) (real-time operations) **Applicability:** Generator Owner TOP-003/IRO-010 • TOP-003 and IRO-010 Reliability Standards are already structured in an open way so that any type of data needed can be requested at any time. In addition, transmission of information from the plant level is generally dealt with via interconnection agreements and does not rise to the level of a requirement being needed at this time. Lastly, PRC-028 PMU devices must be installed for every IBR installation. These additional monitoring devices will allow additional data requests related to those devices, if the applicable entities find that useful. Because of the two items above (the open method for data requests and the PRC-028 PMU devices), the standard balances the needs for the Transmission Operator to gather the data deemed necessary for reliability without uniform burden on all generating facilities.
P102. "Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal, with modification. Specifically, as proposed in the NOPR, we direct NERC to submit to the Commission for approval one or more new or modified Reliability Standards that require: (1)	MOD-032 IRO-010 TOP-003	**Theme:** 1) Transmission Owner directed to provide data for unregistered IBR and 2) Distribution Provider directed to provide data for IBR-DER **Applicability:** Transmission Owner and Distribution Provider

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
transmission owners to provide to Bulk-Power System planners and operators modeling data and parameters for unregistered IBRs in their transmission owner areas that, individually or in the aggregate, materially affect the reliable operation of the Bulk-Power System and (2) distribution providers to provide to Bulk-Power System planners and operators modeling data and parameters for IBR-DERs in the aggregate in their distribution provider areas where the IBR-DERs in the aggregate materially affect the reliable operation of the Bulk-Power System."		• The DT focused on the MOD-032 standard to address this directive from FERC. The DT added IBRs (including unregistered-IBRs) and DER (including IBR-DER) to Attachment 1 of the MOD-032 standard. In response to comments seeking more precision, the MOD-032 standard uses the phrase "an IBR that is not a DER and does not meet the criteria that would require the owner to register with NERC for mandatory Reliability Standards compliance purposes" to refer to the IBR resources encompassed by the term "unregistered IBR" in Order No. 901. • While the DT agrees that the Transmission Owner would be the typical entity for providing unregistered IBR data and the Distribution Provider would be the typical entity to provide DER data (as noted in Attachment 1 of MOD-032), the DT modified the Requirement language in response to comments to allow the Planning Coordinator and each of its Transmission Planners to identify the most appropriate entity to provide the data listed in Attachment 1 of MOD-032-2. Determination if an unregistered IBR or aggregate IBR-DER would "materially affect" the Bulk-Power System, requires engineering judgment and is not something that would be appropriate to precisely specify in a reliability standard. Thus, Attachment 1 footnote 7 was added to explicitly allow Transmission Planners and Planning Coordinators to specify DER thresholds that may be appropriate when considering impact to their local areas. • The DT made changes to the IRO-010 and TOP-003 standards to include IBRs specifically (see R1 of each standard), and to add references back to the MOD-032 standard. The DT determined that the IRO-010 and TOP-003 standards already included language in place to address IBR impacts.

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
P104. "Recognizing that there may be instances in which transmission owners are unable to gather adequate unregistered IBR modeling data and parameters to create and maintain unregistered IBR models in their transmission owner areas, we modify the NOPR proposal and direct NERC to develop new or modified Reliability Standards that require each transmission owner, if unable to gather accurate unregistered IBR data or unable to gather unregistered IBR data at all, to provide instead to the Bulk-Power System planners and operators in their areas: (1) an estimate of the unregistered IBR modeling data and parameters, (2) an explanation of the limitations of the availability of data, (3) an explanation of the limitations of any data provided by unregistered IBRs, and (4) the method used for estimation. We believe that this directive appropriately balances commenters' concerns about data accessibility and burden with the established need for transmission owners to provide unregistered IBR modeling data and parameters to Bulk-Power System planners and operators in their transmission owner area. We recognize that estimated modeling data and parameters are approximations of actual modeling data and parameters. We further acknowledge that there is some degree of error in estimated modeling data and parameters. However, on balance we believe that requiring such estimates with explanation of any limitations is an improvement from not having any data at all; and that even estimates will increase the overall adequacy of models and improve	MOD-032 IRO-010 TOP-003	**Theme 1:** 1) Estimation, if not able to get data from unregistered IBRs, 2) an explanation of the limitations of the availability of data, 3) explanation of the limitations of any data provided by unregistered IBRs, and 4) method for estimation. (directive) **Theme 2:** Implement a process or mechanism by which Transmission Owners would receive modeling data and parameters. (consider) **Applicability:** TO • The DT added Requirement R2, Part 2.1 allowing the functional entity to use the method of estimation should it find itself in a place unable to gather unregistered IBR data or DER data. However, it must include an explanation of the limitations of the data provided for unregistered IBRs or DERs (limitations on the availability and of the data provided) and the method used for estimation. • In addition, the DT added an explanation of the resources that are intended to be captured. In proposed MOD-032, "unregistered IBR" are described as IBRs that are not Distributed Energy Resources, as the DT proposes to define that term, and that would not meet the criteria in the NERC Rules of Procedure to register the owner of the IBR for the Generator Owner functional entity registration (as owning either category 1 or category 2 assets). As suggested by commenters, the DT has removed the phrase "Bulk-Power System" from this description to remove any potential for ambiguity in application. • While previous drafts of the MOD-032 standard used the shorthand phrase "unregistered IBR" to establish consistency with FERC Order No. 901, with the more fulsome description of

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
the reliability of the Bulk-Power System. To support this data collection, we further direct **NERC to consider commenters suggestions to implement a process or mechanism by which transmission owners would receive modeling data and parameters."**		those resources in the footnote, the DT moved this description to the requirement text (in lieu of the phrase "unregistered IBR") in response to comments. • It is important to note that Order No. 901 predated the changes NERC made to the Rules of Procedure to ensure that the owners and operators of such IBR resources would be registered with NERC for mandatory compliance purposes. NERC does not register IBRs as resources, but rather the owners of such resources based on the registry criteria for Generator Owner and Generator Operator. There are two categories of each: owners and operators of BES Facilities (category 1 GOs/GOPs); and owners and operators of non-BES inverter based generating resources that either have or contribute to an aggregate nameplate capacity of greater than or equal to 20 MVA, connected through a system designed primarily for delivering such capacity to a common point of connection at a voltage greater than or equal to 60 kV (category 2 GOs/GOPs). In Order No. 901 parlance, ownership or operation of IBR resources meeting these criteria would require owner/operator registration and therefore would be considered "registered IBRs". In Order No. 901 parlance, ownership or operation of IBR resources that do not meet these criteria but are connected to a transmission system (i.e., are not Distributed Energy Resources) would not require owner/operator registration and therefore would be considered "unregistered IBR." • The DT discussed implementing a process or mechanism by which Transmission Owners would receive modeling data and parameters in depth. It was determined that if a TO is unable to gather data for unregistered IBRs and DERs, it is better to not

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
		mandate a specific process for how Transmission Owners acquire or estimate data. Obtaining data for unregistered IBRs should not pose a significant challenge because such facilities are likely directly connected to a TO system and provision of necessary data should be specified in interconnection agreements or other contracts. Obtaining data for DERs would be more challenging as these facilities are connected to the TO system through a separate unregistered DP. In such cases, it is prudent to allow various estimation methods to be used. • The IRO-010 and TOP-003 Reliability Standards are drafted in a way that is open-ended and allows the respective applicable entities to request data needed. However, project 2022-02 DT added "Inverter-based Resource (IBR) specific data and parameters" to ensure it is clear that entities can request data when needed for operations assessments. To the extent modeling is needed, it should be consistent with modeling data provided under MOD-032 modeling framework. Therefore, the DT made changes to the IRO-010 and TOP-003 standards to require that model submissions for operations purposes under IRO-010 and TOP-003 are consistent with the model submissions for planning purposes under MOD-032, as applicable.
P105. "We also recognize that there may be instances where distribution providers are similarly unable to gather adequate modeling data and parameters from IBR-DERs. Accordingly, to account for instances in which distribution providers are unable to gather adequate modeling data and parameters of IBR-DERs to create and maintain IBR-DER models, we modify the NOPR proposal and direct NERC to develop new or	MOD-032 IRO-010 TOP-003	**Theme 1:** 1) an estimate of the modeling data and parameters of IBR-DERs in the aggregate, (2) an explanation of the limitations of the availability of data, (3) an explanation of the limitations of the data provided by IBR-DERs, and (4) the method used for estimation. (Directive) **Theme 2:** Consider commenters' suggestions to implement a process or mechanism by which distribution providers would receive modeling data and parameters. (Consider)

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
modified Reliability Standards that require that each distribution provider, if unable to gather accurate IBR-DERs data in the aggregate or unable to gather IBR-DERs data in the aggregate at all, provide instead to the Bulk-Power System planners and operators in their areas: (1) an estimate of the modeling data and parameters of IBR-DERs in the aggregate, (2) an explanation of the limitations of the availability of data, (3) an explanation of the limitations of the data provided by IBR-DERs, and (4) the method used for estimation. In support of above, we further direct NERC to consider commenters' suggestions to implement a process or mechanism by which distribution providers would receive modeling data and parameters."		**Applicability:** Distribution Provider The DT added a new Requirement R2, Part 2.1 that if the responsible entity is unable to gather unregistered IBR data (*see description above*) or DER data and provide it to the Transmission Planner and Planning Coordinator, as specified in the data requirements and reporting procedures developed under Requirement R1, the responsible entity shall provide an estimate of the modeling data and parameters and include an explanation of the limitations of the data provided for unregistered IBRs or DERs (limitations on the availability and of the data provided) and the method used for estimation. The DT discussed the possible mechanism by which Distribution Providers would receive modeling data and parameters. The DT did not feel this rose to the level of a requirement as the Distribution Provider can ask for the modeling data and parameters from the respective entity.
P106. "Finally, as noted by commenters, we recognize that there may be instances where IBR-DERs are connected to an entity that does not meet the criteria for registration with NERC as a distribution provider. For those areas with IBR-DERs that in the aggregate materially affect the reliable operation of the Bulk-Power System but do not have an associated registered distribution provider, we direct NERC to determine the appropriate registered entity responsible for providing data of IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, or, when unable to gather such accurate IBR-DERs data, to provide instead	MOD-032 IRO-010 TOP-003	**Theme:** Who is the responsible entity when no registered DP of IBR-DER (1) an estimate of the modeling data and parameters of IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, (2) an explanation of the limitations of the availability of data, (3) an explanation of the limitations of any data provided by the IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, and (4) the method used for estimation. • After much deliberation, the DT determined that if there is no registered Distribution Provider, then the next best entity would be a Transmission Owner. The DT created a footnote to Attachment 1 stating: "The Distribution Provider is the typical responsible entity for collecting and providing data for DERs

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
to the Bulk-Power System planners and operators in their areas: (1) an estimate of the modeling data and parameters of IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, (2) an explanation of the limitations of the availability of data, (3) an explanation of the limitations of any data provided by the IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, and (4) the method used for estimation."		connected to its system either directly or through an unregistered Distribution Provider (i.e., not included on the NERC Compliance Registry) with no other registered entity systems between the DER connection point and the Distribution Provider's system. The Transmission Owner is the typical responsible entity for collecting and providing data for DERs where there is no associated registered Distribution Provider between the DER connection point and the Transmission Owner's system." • The DT asked industry the following question: "Do you agree that the Transmission Owner (TO) is typically the appropriate responsible entity for collecting and providing data for DER where there is no associated registered DP between the DER connection point and the TO's system?" Some commenters agreed that the TO is the correct entity who should gather data if there is no associated registered DP between the DER connection point and the TO system. However, many comments received stated that the TO has no authority to collect data, and the following entities would be better suited to gather the data needed: Registered DP, Balancing Authority, Planning Coordinator, LSE, Generator Owner, Transmission Operator, and Resource Planner. Based on this feedback, the DT modified the Requirement language to allow the Planning Coordinator and each of its Transmission Planners to identify the most appropriate entity to provide the data listed in Attachment 1 of MOD-032-2.
P108. "Regarding CAISO's concern regarding the potential "compliance trap" where planners and operators rely on third-party data and IRC's request	MOD-032 IRO-010 TOP-003	**Theme:** Minimum categories or types of data that must be provided to transmission planners, transmission operators, transmission owners, and distribution providers that are necessary to predict the behavior of all

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
that the final rule specify the data to be submitted by all IBRs (i.e., registered IBRs, unregistered IBRs, and IBR-DERs in the aggregate) and transmission devices using similar technologies, we direct NERC to determine through its standards development process the minimum categories or types of data that must be provided to transmission planners, transmission operators, transmission owners, and distribution providers necessary to predict the behavior of all IBRs and to ensure that compliance obligations are clear. As discussed in more detail in section IV.C of this final rule, we are also directing NERC to develop new or modified Reliability Standards that require the use of approved industry IBR models that accurately reflect the behavior of all IBRs during steady state, short-circuit, and dynamic conditions. By contrast, we believe that a directive to task distribution providers as the appropriate registered entity to collect and share the modeling data and parameters of IBR-DERs in the aggregate is preferable to deferring to the stakeholder process as suggested by APS. The distribution provider, as the entity providing and operating the lines between the transmission and distribution systems, is the entity best situated to have access to the data necessary for accurate estimation and, other than Indicated Trade Associations that suggested the piecemeal approach already discussed above, no commenter identified other potential entities as an equally efficient option."		IBRs and to ensure that compliance obligations are clear (ERO Approved Acceptable Criteria for Models/IEEE1547 ref./modify req./Tech rationale) **Applicability:** Transmission Planners, Transmission Operators, Transmission Owners, and Distribution Providers • The DT added Requirement R1, Part 1.4 to specify dynamic model submission requirements in Planning Coordinator/Transmission Planner data requirements and reporting procedures. • The focus of Requirement R1 Part 1.4 is obtaining accurate and usable models for IBRs. New Requirement R2 Part 2.3 provides that models with known deficiencies, such that the ERO included them on the Unacceptable Model List, shall not be submitted without technical justification. • Attachment 1 was modified to categorize the types of data required as per the directive (IBR, aggregate DER, Storage) necessary to facilitate model development. • Requirement R2, Part 2.1 requires entities to estimate unregistered IBR and IBR-DER data if the entity responsible for providing such data is unable to gather it.
P122. "Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal and direct NERC to develop	MOD-032 IRO-010	**Theme**: Require the use of approved industry generic library IBR models that accurately reflect the behavior of IBRs during steady state, short-

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
new or modified Reliability Standards that require the use of approved industry generic library IBR models that accurately reflect the behavior of IBRs during steady state, short-circuit, and dynamic conditions when developing planning, operations, and interconnection-wide models. For example, the new or modified Reliability Standards could reference the NERC approved component model list, which defines the models that may be used, and those models that may not be used, for specific types of studies. This approved component model list includes WECC's IBR models. Without requiring the use of approved industry generic library models, Bulk-Power System planners and operators may not be able to create system models that adequately predict IBR behaviors and subsequent impacts on the Bulk-Power System."	TOP-003	circuit, and dynamic conditions when developing planning, operations, and Interconnection-wide models. While FERC Order No. 901 directed NERC to "develop new or modified Reliability Standards that require the use of approved industry generic library IBR models that accurately reflect the behavior of all IBRs during steady-state, short-circuit, and dynamic conditions" (P 108), the DT determined to pursue an equally effective and efficient method for addressing what it believes is the overarching goal of this directive, which is to obtain IBR models that are accurate and usable by PCs/TPs for building their Interconnection-wide models and subsequently their planning cases. The DT considered that many entities have a different understanding for what is a "generic model", and that advancements in user-defined models have reduced some of the concerns identified by FERC in Order No. 901 and can be more accurate in representing the IBR. The DT further considered that NERC as the ERO does not presently maintain an "acceptable model library", but rather an "unacceptable model library", and it may prove practically difficult to keep an acceptable model library up to date in a timely fashion. Considering these factors, and the comments received, the proposed Requirement R1 revisions would allow flexibility to the PC/TP to define requirements for the submission of standard library models, user-defined models, or both. Where user-defined models are accepted, the TP/PC would need to include, at a minimum, requirements to provide documentation and instructions for model set up and use; these items would help minimize the risk of non-convergence, a concern identified by FERC for such models in Order No. 901.

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
		To bookend these criteria for acceptable models, proposed Requirement R2 would also require any entity submitting a model on the Unacceptable Models List maintained by the ERO include a technical rationale supporting its use. The Unacceptable Models List includes models that NERC has identified over time as having known issues. While the DT initially proposed to foreclose the use of such models, the DT considered feedback that some of the models included on the present Unacceptable Models List may be the best or only option for representing certain legacy equipment, particularly synchronous equipment. The DT believes that requiring a technical rationale for using such models, while presenting some administrative burden to submitters, would advance the state of modeling overall consistent with the intent of Order No. 901 and would help ensure parity of requirements among generation types. Further, it would help ensure models with identified, known deficiencies are not being submitted without good reason. It is important to note that this requirement to submit a technical rationale for such models is not intended to supplant the process described in Requirement R3 for addressing model quality concerns. The DT debated the proper placement of this requirement at length, whether in Requirement R1 addressing TP/PC data specifications or Requirement R2, addressing how entities respond. After much discussion, the DT ultimately decided to include this requirement in Requirement R2 as it relates to how entities respond to data specifications. The DT has elected to maintain the Unacceptable Model List separately from the MOD-032, due to the need to maintain flexibility to add or

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
		remove models in a faster manner than may be feasible under the NERC standard development process. To balance concerns about due process for mandatory and enforceable elements of standards, the DT has included in the MOD-032 standard a supporting document that describes the process that will be used to update the Unacceptable Model List. While the Unacceptable Models List will be maintained separately from the standard, the process itself would be considered part of the standard and subject to revision through the standard development process; however, the specific process steps would not be considered mandatory and enforceable requirements for entities for Reliability Standards compliance purposes. As described in that process, there are opportunities for public comment and technical vetting of specific model add/remove requests through the Reliability and Security Technical Committee. As part of this process, the RSTC would recommend an effective date for any changes, and the final recommendations would then be considered by the ERO and published on the NERC website. NERC staff are currently examining avenues for ensuring accessibility of this document as NERC transitions to a new website design in 2026. Any changes to the Unacceptable Models List would be communicated to industry and to the applicable governmental authorities so that entities using models added to/removed from the list would have multiple avenues to be made aware of their updated obligations and the relevant timing.
P124. "We direct NERC to determine through its standards development process which nation-wide approved component models are needed to build IBR plant models for steady state, short-circuit, and		**Theme:** Nation-wide approved component models are needed to build IBR plant models for steady state, short-circuit, and dynamics studies. (Uniform Modeling framework)

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
dynamics studies. We acknowledge NERC's comment that user-defined models may be helpful for specific local reliability studies; however, the user-defined model cannot be used in place of nation-wide approved component models for regional analysis or interconnection-wide analysis because the user-defined model may cause non-convergence and other issues. However, NERC may allow the submission of user-defined models alongside the approved industry generic IBR model. Various entities do not accept user-defined models or only accept them for limited instances along with the open-source code which then allows internal model components to be viewed and modified. For example, PJM does not accept user-defined models and requires generic models for model verification in accordance with currently effective Reliability Standards MOD-026-1 and MOD-027-1. NYISO accepts a user-defined model in limited instances but requires either the open-source code (allowing anyone to access the internal model) or dynamic link library data and code files (compiled code that must be decompiled to view the internal model) that must be supplied for existing power flow software and in perpetuity."		The uniform modeling framework established in the proposed MOD-032 will focus on the use and representation of positive sequence phasor domain (PSPD) models in registered entity footprints and in Interconnection-wide models. Interconnection-wide modeling may be different from the models used in specialized studies dedicated to a particular technical objective. The ERO Unacceptable Models List applies to the models where NERC Reliability Standards require its use (generally for planning and operation models where multiple entities share information beyond their portion of the electric system, which includes Interconnection-wide models). Further guidance for interconnection applications can be found in the *NERC Dynamic Model Recommendations*. The DT considered introducing an approved model list for use in building cases specifically for Interconnection-wide analysis through Requirement R1 Part R1.2 of the proposed MOD-032, however, pre-defining a limited set of models that could be used to represent generation and system components is potentially at odds with objectives to also have accurate models, especially as technology rapidly progresses. To meet this directive, the DT modified Requirement R1 of MOD-032 by specifying the use of standard library "generic" models in Interconnection-wide cases while allowing the use of user-defined models. This provision was careful to address typically reported issues associated with user-defined models (UDMs) including non-convergence, by requiring that TP/PCs establish usability requirements for UDMs while incorporating an open, transparent process of identifying deficient models through the use of the "MOD-032 Supporting Documentation – Process for Updating the Unacceptable Models List Maintained by the ERO" and the "ERO Unacceptable Model list". Any TPs/PCs accepting UDMs shall provide

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
		their UDM requirements to other PCs/TPs within the Interconnection upon request. The DT believes this approach balances the practical limitations of "generic models" raised by industry at the January 15-16 NERC Industry Engagement Workshop and re-iterated at the June NERC Industry Engagement Workshop with the need for an improved uniform modeling framework. The combination of specifying the use of standard library component models approved and offered by software simulation tools, along with the ERO maintained Unacceptable Model List and its processes, will ensure that models used in interconnection wide analysis are robust enough while accuracy is not compromised to any level of detail deemed necessary. The introductions to this framework increase the data specifications requirements when user-defined models are used. TOP-003 and IRO-010 proposed standards were modified to ensure models submitted are consistent with models submitted under the framework established in MOD-032.
P125. "Accordingly, we direct NERC to develop new or modified Reliability Standards that require the sole use of nation-wide approved component generic library models for system models to facilitate the exchange of neighboring entities' respective planning and operation models and to build interconnection-wide models. One example of a way NERC could meet this directive would be to require an equivalent generic library model along with all submissions of user-defined models so that the generic library model can be used when combining	MOD-032 IRO-010 TOP-003	**Theme:** Nation-wide approved component generic library models for system models to facilitate the exchange of neighboring entities' respective planning and operation models and to build Interconnection-wide models. (Uniform Modeling framework /Req language) • Nation-wide approved components via generic library models are addressed via the development of a framework established in the proposed MOD-032-2 through improvements to Requirements R1, R2, and R3. The inclusion of ERO Unacceptable Models List, MOD-032 Supporting Document, and additional

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
neighboring transmission system models and in interconnection-wide models."		requirement language aims to ensure uniformity in processes and models to facilitate the exchange of neighboring entities' respective planning/operation models and to build Interconnection-wide models. • The PC and TP are allowed to require provision of generic models, but if equipment-specific models satisfy usability criteria, and processes established through Requirements R1, R2, and R3 of the proposed MOD-032 standard, they are not prohibited. The framework explicitly allows for the submission of equivalent generic library models along with submissions of user-defined models which allows for the use of generic library models when combining neighboring transmission system models and Interconnection-wide models. • TOP-003 and IRO-010 proposed standards were modified to ensure models submitted are consistent with models submitted under the framework established in MOD-032.
P141. "We also direct NERC to require the generator owners of registered IBRs and the transmission owners that have unregistered IBRs on their system to provide to the Bulk-Power System planners and operators (e.g., planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities) dynamic models that accurately represent the dynamic performance of registered and unregistered IBRs, including momentary cessation and/or tripping, and all ride through behavior. Recognizing that there may be instances in which transmission owners are unable to gather accurate unregistered IBR modeling data and parameters to	MOD-032 IRO-010 TOP-003	**Applicability**: GO • Nation-wide approved components via generic library models are addressed via the modifications made to MOD-032, including incorporation of an ERO Unacceptable Models list, establishing an improved uniform modeling framework. This approach is aligned with the FERC Order directives while addressing the practical limitations raised by industry at the January 15-16 NERC Industry Engagement Workshop and re-iterated at the June NERC Industry Engagement Workshop. • MOD-032, Attachment 1 was modified to specifically add that capabilities related to momentary cessation, tripping, and Ride-

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
create and maintain accurate unregistered IBR dynamic models in their transmission owner areas, we modify the NOPR proposal and direct NERC to develop new or modified Reliability Standards that require each transmission owner, if unable to gather accurate unregistered IBR data or unable to gather unregistered IBR data at all, to provide instead to the Bulk-Power System planners and operators in their areas, dynamic models of unregistered IBRs using estimated data in accordance with this final rule's section IV.B.3 data sharing directives. Further, we direct NERC to require distribution providers to provide to the planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities aggregated dynamic models that adequately represent the dynamic performance of IBR-DERs on their systems that in the aggregate have a material impact on the Bulk-Power System, including momentary cessation and/or tripping, and all ride through behavior (e.g., IBR-DERs in the aggregate modeled by interconnection requirements performance to represent different steady-state and dynamic behavior). Recognizing that there may be instances in which distribution providers are unable to gather data that accurately represents IBR-DERs in the aggregate, we modify the NOPR proposal and direct NERC to include in the proposed new or modified Reliability Standards a requirement that the distribution provider, if unable to gather data of IBR-DERs that in the aggregate have a material impact on		through, be reflected in the required model data for IBR and DER. • Explicit reference to IBR data was added to the TOP-003 and IRO-010 standards along with provisions to ensure that models submitted under these standards are consistent with the models submitted under the framework established in MOD-032.

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
the Bulk-Power System, provide to the Bulk-Power System planners and operators (i.e., the data recipients) a dynamic model using estimated data for IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, in accordance with this final rule's section IV.B.3 data sharing directives. Furthermore, we acknowledge that there may be areas with IBR-DERs in the aggregate that materially impact the reliable operation of the Bulk-Power System but do not have an associated registered distribution provider. Therefore, we modify the NOPR proposal and direct NERC to determine the appropriate registered entity responsible for providing adequate data and parameters of IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, and to identify the registered entities for coordinating, verifying, and keeping up to date the respective dynamic models. Finally, NERC must ensure that the proposed new or modified Reliability Standards account for the dynamic performance of IBR-DERs that in the aggregate have a material impact on the Bulk-Power System."		
P146. Accordingly, **we direct NERC to develop new or modified Reliability Standards that require the use of the DER_A model or successor models to represent the behaviors of IBR-DERs that in the aggregate have a material impact on the Bulk-Power System at a sufficient level of fidelity for Bulk-Power System planners and operators to create valid planning and operations and interconnection-wide models and to**	MOD-032 IRO-010 TOP-003	**Theme**: IBR-DER Model • As per the directive, the DT is requiring the modeling of aggregate DER through requirement R1 and Attachment 1. The currently available DER_A model is sufficient only for positive sequence phasor domain simulations. With the variety of other simulation domains (such as EMT and short circuit) necessary to study IBRs, mandating this model could prevent TPs or PCs from

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
be able to perform respective system studies. For example, the new or modified Reliability Standards could require models of IBR-DERs (i.e., DER_A model) to adequately reflect the steady-state and dynamic aggregate resource performance in both a transmission area and across the interconnection. Additionally, estimated modeling data and parameters of IBR-DERs that in the aggregate (i.e., DER_A model) have a material impact on the Bulk-Power System could be used where measured and collected data is not available. We believe requiring the DER_A model will address NERC's request for entities to work collaboratively with the state regulators to identify, implement, and perform an effective model validation approach for IBR-DERs in the aggregate as opposed to requiring validated models of IBR-DER in the aggregate that can have a material impact on the reliable operation of the Bulk-Power System.		performing their studies. This further reinforces the DT's election to not require the use of the DER_A model, but rather a model that achieves specific performance criteria and conforms with MOD-032 edits in Attachment 1 and Requirement R1. The fidelity/accuracy components of the FERC directives were generally considered to be within the SAR scopes for Projects 2020-06 and 2021-01, not Project 2022-02. However, the model framework established with the proposed MOD-032-2 does facilitate model fidelity and accuracy by allowing flexibility in model selection (rather than mandating use of a defined set of models). Specific fidelity/accuracy evaluations are beyond the scope of MOD-032. • The DT considered referencing the DER_A model specifically, but refrained due to the rapidly evolving nature of models and concerns for the time required to update such a reference in a NERC Standard. Additionally, the DT is not specifying particular library models for other resources, so specifying a particular model for DER will invite challenges. Further, challenges with precisely defining and determining what a "successor model" is could potentially create more future reliability risks. The standard as currently written allows for additional future models of higher fidelity to be accommodated.
P157. We believe the development of new or modified Reliability Standards is an important corollary to NERC's ongoing effort to identify and register generator owners and operators of IBRs. Although NERC's registration changes will not at this time address IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, we believe APS's concerns	MOD-032 TOP-003 IRO-010	**Theme:** The responsible entity for IBR-DER data when there is no registered DP. Upon a decent amount of conversation, the DT determined that if there is no registered Distribution Provider, then the next best entity would be a Transmission Owner. The DT created a footnote to Attachment 1 stating: "The Distribution Provider is the typical responsible entity for

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
regarding system-wide model validation is addressed in NERC's Reliability Guidelines and through the use of the EPRI DER Settings Database. We recognize that some distribution providers may not be able to provide a precise set of modeling data and parameters that accurately represent IBR-DERs in the aggregate. For these situations, NERC has provided a technical means to estimate in aggregating the needed IBR-DER modeling data and parameters (i.e., for the DER_A model) in the IBR-DER Data Collection Guideline. Further, NERC's 2021 Aggregate DER Model Verification Guideline provides transmission planners and planning coordinators with tools and techniques that can be adapted for their specific systems to verify that aggregate DER models (i.e., DER_A models) are a suitable representation of these resources in planning assessments. **Furthermore, for those areas with IBR-DERs in the aggregate that materially impact the reliable operation of the Bulk-Power System but do not have an associated registered distribution provider, we modify the NOPR proposal to direct NERC to determine the appropriate registered entity responsible for the data and parameters of IBR-DERs in the aggregate and to establish a process that requires identified registered entities to coordinate, validate, and keep up to date the system models.**		collecting and providing data for DERs connected to its system either directly or through an unregistered Distribution Provider (i.e., not included on the NERC Compliance Registry) with no other registered entity systems between the DER connection point and the Distribution Provider's system. The Transmission Owner is the typical responsible entity for collecting and providing data for DER where there is no associated registered Distribution Provider between the DER connection point and the Transmission Owner's system." The use of the word "typical" is intentional to indicate the most likely entity based on the DT's broad understanding but allows flexibility per Requirement 1 for the PC/TPs to select a more appropriate entity or entities in their area based on regional or jurisdictional differences.
P161. "Pursuant to section 215(d)(5) of the FPA, we modify the NOPR proposal to provide additional specificity to explain coordination and keep up to date in a timely manner the verified data and models of	MOD-032 IRO-010 TOP-003	The DT modified MOD-032 to ensure it captures the uniform framework with modeling criteria, a registered modeling designee, and necessary data exchange requirements. Modifications in TOP-003 and IRO-010 are

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
registered IBRs, unregistered IBRs, and IBR-DERs in the aggregate in the system models. **Specifically, we direct NERC to develop new or modified Reliability Standards that require planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities to establish for each interconnection a uniform framework with modeling criteria, a registered modeling designee, and necessary data exchange requirements both between themselves and with the generator owners, transmission owners, and distribution providers to coordinate the creation of transmission planning, operations, and interconnection-wide models (i.e., system models) and the validation of each respective system model.** Further, we direct NERC to include in the new or modified Reliability Standards a requirement for generator owners, transmission owners, and distribution providers to regularly update and communicate the verified data and models of registered IBRs, unregistered IBRs, and IBR-DERs by comparing their resulting models against actual operational behavior to achieve and maintain necessary modeling accuracy for inclusion of these resources in the system models. For those areas with IBR-DERs in the aggregate that have a material impact on the reliable operation of the Bulk-Power System but do not have an associated registered distribution provider, we modify the NOPR proposal to direct NERC to determine the appropriate registered entity		intended to promote consistency in models submitted for planning purposes and operations purposes. • A uniform modeling framework is established in the proposed MOD-032-2 through improvements to R1, R2, and R3. The inclusion of ERO Unacceptable Models List, MOD-032 Supporting Document, and additional requirement language aims to ensure uniformity in processes and models to facilitate the exchange of neighboring entities' respective planning/operation models and to build Interconnection-wide models. • The PC and TP are allowed to require provision of standard library models, but if user-written models satisfy usability criteria, and processes established through R1, R2, and R3 of the proposed MOD-032 standard, they are not prohibited. The framework explicitly allows for the submission of standard library models along with submission of user-written models which allows for the use of standard library models when combining neighboring transmission system models and Interconnection-wide models. • The DT added IBRs (including unregistered-IBRs) and DER (including IBR-DER) to Attachment 1 of the MOD-032 standard. While the TO would be the typical entity for providing unregistered IBR data and the DP would be the typical entity to provide DER data (as noted in Attachment 1 of MOD-032), the DT modified the Requirement language to allow the Planning Coordinator and each of its Transmission Planners to identify the most appropriate entity to provide the data listed in Attachment 1 of MOD-032-2. Determination if an unregistered IBR or aggregate IBR-DER would "materially affect" the Bulk-Power System, requires engineering judgment and is not something that would be appropriate to

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
responsible for the models of those IBR-DERs and to determine the registered entities responsible for updating, verifying, and coordinating models for IBR-DERs in the aggregate to meet the system models directives. NERC may implement this directive by modifying Reliability Standards MOD-032-1 and MOD-033-2 or by developing new Reliability Standards to establish requirements mandating an annual process to coordinate, validate, and keep up-to-date the transmission planning, operations, and interconnection-wide models."		precisely specify in a reliability standard. Thus, Attachment 1 footnote 7 was added to explicitly allow Transmission Planners and Planning Coordinators to specify DER thresholds that may be appropriate when considering impact to their local areas. • The DT made changes to the IRO-010 and TOP-003 standards to include IBRs specifically (see R1 of each standard). To the extent modeling data is deemed necessary under IRO-010 and TOP-003, it should be consistent with modeling data provided for planning purposes. Therefore, the DT made changes to the IRO-010 and TOP-003 standards to require that model submissions for operations purposes under IRO-010 and TOP-003 are consistent with the model submissions for planning purposes. The fidelity/accuracy components of the FERC directives were generally considered to be within the SAR scopes for Projects 2020-06 and 2021-01, not Project 2022-02. However, the model framework established with the proposed MOD-032-2 does facilitate model fidelity and accuracy by allowing flexibility in model selection (rather than mandating use of a defined set of models). Specific fidelity/accuracy evaluations are beyond the scope of MOD-032. MOD-032-1 already mandated a "schedule for submission of data at least once every 13 calendar months." This requirement is maintained in MOD-032-2. With regards to that part of the directive addressing a "registered model designee", NERC considered the directive and concluded that the present framework, with enhancements since 2023, presents an equally effective and efficient alternative to designating a model designee for

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
		Interconnection-wide model building that is a registered entity. Further, this framework has distinct advantages over designating a responsible entity in that it maintains ongoing oversight, rather than compliance/audit-focused oversight. **Registered Modeling Designee:** The current MOD-032, Requirement R1, Part 1.1 requires the Planning Coordinator (PC) and each of its Transmission Planners (TPs) to identify the Entity responsible for each required item in Attachment 1. Requirement R3 requires notification from the PC or TP regarding technical concerns with the data submitted under Requirement R2. Additionally, a new Requirement R2, Part 2.2 has been added to require models provided under MOD-026 to be accepted by the Transmission Planner. This allows a more detailed model that has also been verified to receive a review and coordination in order to be accepted by the TP. These requirements allow for the coordination and model updates needed by registered entities. In addition, Requirement R4 requires each PC to make available models for its planning area under R2 to the Electric Reliability Organization (ERO) or its designee to support the creation of the Interconnection-wide cases. The ERO has designated Entities for each Interconnection, such as Texas Regional Entity, Western Electric Coordinating Council (WECC), and Eastern Interconnection Reliability Assessment Group (ERAG). Regarding the ERAG, there is an Eastern Interconnection Regional Entity

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
		Agreement[1]. In this agreement, important connections to MOD-032 are acknowledged, like the following: • Oversight of the Multiregional Modeling Working Group[2] (MMWG, whose membership is comprised of one power flow representative and one dynamics representative from each of the Data Submitting Entities (comprised of Planning Coordinators or group of Planning Coordinators) and non-voting representatives as follows: one liaison representative each of the EI Regions and the ERAG Chair, a coordinator from each of the organizations that provides model development services to MMWG, and NERC and FERC staff liaisons. ○ The purpose of the MMWG is to coordinate, in a timely manner, the development of designated power flow and dynamics simulation base case models that realistically simulate steady state and dynamic bulk electric system behavior of the Eastern Interconnection. ○ To ensure cases and models are done in a consistent fashion, the MMWG holds three annual meetings along with conference calls as needed. The MMWG roster includes a FERC liaison who can attend all meetings. The group maintains a case building procedure manual[3] that is used by its members. The manual contains a set of data checks that are performed on the steady state and dynamic cases.

1 EI-Regional-Entity-Agmt-Final-Signed.pdf

2 https://www.rfirst.org/wp-content/uploads/2024/01/MMWG-Charter-November-9-2020.pdf

3 *https://www.rfirst.org/wp-content/uploads/2025/03/MMWG_Procedural_Manual_v40.pdf*

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
		• Oversight of the Acceptable Model Working Group (AMWG)[4], which is comprised of: (1) Planning Coordinators or group of Planning Coordinators who are responsible for the development and maintenance of an Eastern Interconnection dynamic acceptable model list, and (2) RE and NERC staff who are responsible for coordination and facilitation. ○ The group was formed in 2023 and recently published the first version of its acceptable model list which was posted to the public ERAG website[5]. As models are removed from the acceptable list, the group develops an industry communication to begin removing those models from the annual set of cases. ○ Oversight includes review of all process changes made to the AMWG procedures to ensure consistency with the NERC case quality metrics. • The ERO Enterprise Designation for MOD-032-1: NERC is designating the MOD-032-1 "Designated Entity: responsibilities to the Regional Entities to support NERC in fulfilling its obligations under Requirement R4 given their expertise in their respective geographic jurisdiction." The MOD-032 designees are contractually bound to carry out their duty for building the Interconnection-wide base cases.

[4] https://www.rfirst.org/wp-content/uploads/2023/10/ERAG_AcceptableModel_WorkingGroup_Charter.pdf

[5] www.erag.info

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
		In addition, the DT has considered the following information provided by the MOD-032 Designee Group: **MOD-032 Designee Group:** The electric grid is evolving at an unprecedented pace, driven by the rapid integration of inverter-based resources (IBRs), changing load characteristics, and emerging technologies. As the system transforms, too must the models we use to study and understand its behavior. We recognize the growing challenge of obtaining and coordinating accurate dynamic models for IBRs, including securing the appropriate parameters needed to ensure that simulation results reflect real-world system performance. Addressing these modeling challenges is essential to maintaining the reliability and resilience of the bulk power system and requires close collaboration, and the MOD-032 designees along with PCs are committed to and holding data providers accountable for model coordination and model quality. The MOD-032 designees are committed to ensuring that the model quality is maintained and there is a mechanism in place for the PC/TP to gather the appropriate information from the Generator Owners (GO). NERC facilitates the designee group of Regional Entity staff who are responsible for designee activities. This group meets periodically to discuss case quality metrics and to improve the interconnection case-building process. A sub-team has been assembled to write a MOD-032 SAR to add authority for the Designee to enforce model quality. Overall, the FERC directive has been addressed through current and updated requirements/processes.

FERC Order No. 901 Directives		
Directive Language	**Standards Impacted**	**Consideration of Directives**
P226. "Although we are not directing NERC to include implementation dates in its informational filing and are leaving determination of the proposed effective dates to the standards development process, we are concerned that the lack of a time limit for implementation could allow identified issues to remain unresolved for a significant and indefinite period. Therefore, we emphasize that industry has been aware of and alerted to the need to address the impacts of IBRs on the Bulk-Power System since at least 2016. The number of events, NERC Alerts, reports, whitepapers, guidelines, and ongoing standards projects more than demonstrate the need for the expeditious implementation of new or modified Reliability Standards addressing IBR data sharing, data and model validation, planning and operational studies, and performance requirements. Thus, in that light, the Commission will consider the justness and reasonableness of each new or modified Reliability Standard's implementation plan when it is submitted for Commission approval. Further, we believe that there is a need to have all of the directed Reliability Standards effective and enforceable well in advance of 2030 and direct NERC to ensure that the associated implementation plans sequentially stagger the effective and enforceable dates to ensure an orderly industry transition for complying with the IBR directives in this final rule prior to that date."	MOD-032 IRO-010 TOP-003	**Theme:** Sufficient timeframe. The DT felt that four years was an appropriate timeframe for the MOD-032, IRO-010, and TOP-003 implementation times. It is understood that based on what is required via MOD-032, industry would need two years to hold meetings with stakeholders to establish processes for collecting the needed models and data, and then an additional two years to update models based on the new requirements, etc. However, taking into consideration the FERC Order 901 implementation deadline of 2030, the DT settled on a three-year implementation time knowing that milestone 4 revisions still need to be implemented by 2030 and are dependent on the Milestone 3 implementation plan time. Three- year implementation plans were also selected for TOP-003 and IRO-010 to align potential new data requests under TOP-003 and IRO-010 with the expected data availability under MOD-032 processes.