

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

White Paper on the MOD C Standards

MOD-016, MOD-017, MOD-018,
MOD-019, and MOD-021

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RELIABILITY | ACCOUNTABILITY



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Executive Summary

NERC Reliability Standards MOD-016, -017, -018, -019, and -021 (referred to herein as the “MOD C” standards), were approved in the Federal Energy Regulatory Commission’s (“FERC” or “Commission”) Order No. 693. Collectively, the MOD C standards pertain to the collection of data necessary to analyze the resource needs to serve peak demand while maintaining a sufficient margin to address operating events as follows:

- MOD-016-1.1 is the umbrella standard that contains the documentation required for the data collection requirements.
- MOD-017-0.1 provides for the data requirements for actual and forecast peak demand and net energy for load.
- MOD-018-0 provides for [the documentation of](#) the treatment of nonmember demand data and how uncertainties are addressed in the forecasts of demand and net energy for load.
- MOD-019-0.1 provides for the collection of interruptible demands and direct control load management.
- MOD-020-0 addresses the need to provide interruptible demands and direct control load management data to System Operators and Reliability Coordinators.
- MOD-021-1 provides for the documentation of how Demand-Side Management demands are accounted for in demand and energy forecasts.

NERC initiated an informal development process to address directives in Order No. 693 to modify certain aspects of the MOD C standards. The first informal meeting was held in February 2013 at NERC’s Washington, D.C. office. Participants were industry subject matter experts (SMEs), NERC staff, and staff from FERC’s Office of Electric Regulation. The small ad hoc group of SMEs participated in discussions about the outstanding FERC directives and possible resolutions to address the directives. The group also discussed the six standards (MOD-016 through MOD-021) and identified issues with the present standards. The group very quickly identified MOD-020 as dealing with the operational time frame and concluded that it should not be addressed with the other standards at this time since they were applicable to the planning horizon.

~~Although a~~ pure data reporting standard would be a candidate for retirement under Paragraph 81. ~~During the review of the requirements in the current standards, it was not clear whether every Planning Authority (PA) and Balancing Authority (BA) had authority to collect this data from all registered entities in their PA/BA area. Since~~ the data being collected has a reliability purpose in the development of future reliability assessments ~~for resource adequacy each PA/BA needs the authority to collect this data. In order to specify the scope and limitations of the data collection authority, there was a~~ ~~was decided to present a pro forma standard that~~ consolidations of the remaining five MOD C standards into a single standard. ~~The consolidation effort which~~ was supported by the industry as the group conducted informal development outreach. Creating a single standard provides a means of ensuring data will be collected and shared among the necessary parties (LSEs, BAs, TPs, etc.) in both the United States and Canada.

As detailed below, this document discusses the ~~MOD C informal ad hoc group discussed the~~ outstanding directives from FERC Order No. 693 ~~and, through the informal development, provided a resolution to address each one and identifies the applicable requirements in standard MOD-031-1 Demand and Energy Data that address each directive.~~

Purpose

The purpose of this white paper is to provide background and technical rationale for the proposed revisions to the group of approved MOD standards that have a common mission of collecting data used in ~~the analysis of resource needs~~reliability assessments. This document outlines the next generation of these standards and proposes to combine the reliability components of this package of standards into one standard. The remaining requirements in this package would either be retired as administrative or captured as instructional or explanatory in a white paper.

This white paper lays out a common understanding of industry perspectives on topics included in these standards. It further provides an explanation of how NERC is addressing each of the outstanding FERC directives assigned to these FERC-approved standards. This paper will also provide technical justifications and support for the proposed requirements that are retained and placed into the pro forma standard. ~~The contents of this paper are intended to assist the standard drafting team (SDT) assigned to MOD C and industry stakeholder participants with background information to move this standard package through the formal development process.~~ Eventually, following industry and the NERC Board of Trustees' adoption of the proposed standard, this white paper will be used to support the filing to the applicable regulatory authorities.

Technical Discussion

The fundamental test for determining the adequacy of the bulk power system (BPS) is to determine the amount of resources and the certainty of these resources to be available to serve peak demand while maintaining a sufficient margin to address operating events. This test requires the collection and aggregation of demand forecasts on a normalized basis. This is defined as a forecast that has been adjusted to reflect normal weather conditions and is expected on a 50 percent probability basis, also known as a 50/50 forecast (i.e., there is a 50 percent probability that the actual peak realized will be either under or over the projected peak). This forecast can then be used to test against more extreme conditions.

The collection of demand projections requires coordination and collaboration between Planning Authorities/Planning Coordinators, Transmission and Resource Planners, and Load-Serving Entities. Ensuring that planners and operators have access to complete and accurate load forecasts—as well as the supporting methods and assumptions used to develop these forecasts—will ultimately enhance the reliability of the BPS. Consistent documenting and information-sharing activities will also improve the efficiency of planning practices and support the identification of needed system reinforcements. Furthermore, collection of actual demand and Demand-Side Management performance during the prior year will allow for comparison to prior forecasts and further contribute to enhanced accuracy of load forecasting practices.

The ad hoc group identified two options to address MOD-016 through MOD-019 and MOD-021. The first option was to retire the five standards and include the data being collected in the *Long-Term Reliability Assessment* (LTRA). The second option was to combine the five standards into a single standard with three or four clear requirements.

Initially, the ad-hoc group suggested tying the standard to the LTRA. Currently, the majority of LTRA data is required for the completion of the Form EIA-411, administered by the Energy Information Administration (EIA). Accordingly, failure by the Regional Entities to provide this data to NERC on an annual basis is in violation of federal law. In the absence of a standard however, NERC has no ability to directly address an entity that fails to provide requested LTRA data. This especially applies for Canadian provinces that do not provide data for the Form EIA-411.

A second alternative to addressing data requirements in the absence of a standard is the implementation of either a Section 800 or Section 1600 data request. The SDT concluded that a standard was necessary for two reasons. First, the standard provides a more efficient and enforceable mechanism for NERC and the Regional Entities to obtain Demand data from all applicable registered entities across the entire continent.¹ The data to be collected under the standard is necessary for the ERO to conduct its reliability assessments, such as the Long Term Reliability Assessment.

Second, the standard provides a mechanism for (1) Planning Coordinators and Balancing Authorities to obtain demand data from data owners for their own reliability purposes that is not necessarily connected to the ERO's reliability assessments; and (2) the sharing of such data between Load Serving Entities, Distribution Providers, Planning Coordinators, Balancing Authorities, Resource Planners and Transmission Planners to obtain the data from a neighboring entity. Replacing the MOD C standards with a data request would not provide a mechanism for this data sharing or allow Planning Coordinators and Balancing Authorities to obtain demand data from data owners for their own reliability purposes. The SDT concluded that because there is a reliability need for Planning Coordinators and Balancing Authorities to obtain demand data for their own reliability purposes and for data sharing between registered entities, a standard was appropriate.

This approach, while effective, has a number of disadvantages. First, some Canadian provinces are not subject to FERC rule, which makes it more difficult for NERC to enforce an 800 or 1600 data request. The second issue is with entities within the continental United States. The 800 or 1600 data request is not mandatory and does not provide a mechanism to compel participation other than pursuing federal action under Section 215 of the Federal Power Act. In addition, using either of these approaches does not provide a mechanism for other LSEs, DPs, BAs or TPs to obtain the data from a neighboring entity.

The recommended option of modifying the existing standards to remove the ambiguity and address the FERC directives solves the issues identified with the first two options. Creating a single standard provides a means of ensuring data will be collected and shared among the necessary parties (LSEs, BAs, TPs, etc.) in both the United States and Canada. The informal

¹ Because certain Canadian provinces have adopted only select portions of the NERC Rules of Procedure, a standard is necessary to ensure that NERC and the Regional Entities has the authority to collect the necessary data from all applicable registered entities.

development effort ~~resulted in the recommendation~~ edation this approach and the standard drafting team has accepted this approach for the development of a consolidated standard. ~~and has provided a draft version that combines the five existing standards into a single, comprehensive, and clear standard with three requirements.~~

Outstanding FERC Directives

There are 11 outstanding FERC directives from Order 693. Each of the directives was extensively reviewed and discussed in detail ~~during the informal development stage, and summaries of the discussions can be found below. The ad hoc group by the standard drafting team extensively reviewed each of the directives with consideration of where the existing standards are today, where the group landed with the pro forma standard following its extensive industry outreach, and how the group addressed each directive.~~

~~In t~~The “Paragraph 81 initiative ~~of its,” which was issued by FERC in their~~ March 15, 2012 order accepting a new enforcement mechanism,² FERC invited the ERO to identify possible requirements that have little to no effect on reliability that could be removed from the NERC Reliability Standards. The ~~ad hoc group~~standard drafting team took the information from the FERC order into consideration when it discussed the directives related to the MOD C initiative.

Para 1232

Supported by many commenters, **the Commission directs the ERO to modify MOD-016-1 and expand the applicability section to include the transmission planner, on the basis that under the NERC Functional Model the transmission planner is responsible for collecting system modeling data, including actual and forecast load, to evaluate transmission expansion plans.** We disagree with EEI that this Reliability Standard should not be applied to the transmission planner because load-related data for controllable DSM is not only needed for distribution and transmission operations, but is also necessary for the transmission planner to take controllable DSM into account in planning the transmission system. Requirement R1.1 relates to data submittal, and requires data to be consistent with that supplied for the TPL-005 and TPL-006 standards, which clearly apply to transmission planners. We approve the ERO’s definition in the glossary of DSM as “all activities or programs undertaken by a Load-Serving Entity or its customers to influence the amount or timing of electricity they use.” Only activities or programs that meet the ERO definition, with the modification directed below, may be treated as DSM for purposes of the Reliability Standards. Recognizing the potential role that industrial customers who do not take service through an LSE and load aggregators, for example, may play in meeting the Reliability Standards, we direct the ERO to modify the definition of DSM. **Specifically, we direct the ERO to add to its definition of DSM “any other entities” that undertake activities or programs to influence the amount or timing of electricity they use without violating other Reliability Standard Requirement.**

Consideration of Directive

With regard to the first directive, ~~the ad hoc group is recommending that~~ the Transmission Planner has been added to the Applicability Section of the proposed standard MOD-031-1 Demand and Energy Data.

Regarding the second directive, ~~the ad hoc group is proposing~~ a modified definition for Demand-Side Management (DSM) is proposed which includes the language directed by the Commission. However, t~~The group felt drafting team believes this is that the FERC proposed definition needed further clarity, so they modified it in~~ an equally effective and efficient manner~~definition~~. It now reads:

Demand-Side Management: All activities or programs undertaken by any applicable entity to achieve a reduction in Demand.

Para 1249

The Commission also directs the ERO to modify the Reliability Standard to require reporting of temperature and humidity along with peak load because actual load must be weather normalized for meaningful comparison with forecasted values. In response to MidAmerican’s observation that it sees little value in collecting this data, we believe that collecting it will allow all load data to be weather-normalized, which will provide greater confidence when comparing data accuracy, which ultimately will enhance reliability. As a result, we reject Xcel’s proposal that the standard be revised to include only the generic term “peak producing weather conditions” because it is too generic for a mandatory Reliability Standard.

² http://www.nerc.com/files/OrderConditionallyAcceptingNewEnforcementMechFiling_031512.pdf

Consideration of Directive

Weather effects actual ~~load~~ demand. Among other things, space conditioning (Air conditioning, heat pumps and electric other heating loads) influences actual ~~load~~ demand values significantly.

~~The informal ad hoc group developed Requirement R1 of the proposed standard MOD-031-1 Demand and Energy Data. Requirement R1 now requires weather-normalized actual demand data to be reported (Requirement R1 part 1.3.4). The standard drafting team believes the important consideration in this directive is to be able to adjust the actual demand data to account for weather effects, so a "meaningful comparison with forecast values" can be made. Requirement R1 of the proposed standard MOD-031-1 Demand and Energy Data now requires weather-normalized actual demand data to be reported (Requirement R1 part 1.3.2.1). Further, Requirement R1 part 1.5.5 also requires that a comparison be made. Each load forecasting entity can decide which aspects of weather need to be measured so as to adjust the actual demand for the difference in demand due to the differences between forecast weather conditions and actual weather conditions (weather normalization). Reporting weather normalized actual demand data instead of the temperature and humidity data also addresses the concerns in the paragraph 1250 directive below. Entities forecasting demand that is not weather sensitive will not be required to provide data that has no impact on their forecast or actual demand data.~~

Para 1250

We also reject Alcoa's proposal that the reporting of temperature and humidity along with peak loads should apply only to load that varies with temperature and humidity because it essentially is a request for an exemption from the requirements of the Reliability Standard and should therefore be directed to the ERO as part of the Reliability Standards development process. We agree, however, with APPA that certain types of load are not sensitive to temperature and humidity. **We therefore find that the ERO should address Alcoa's concerns in its Reliability Standards development process.**

Consideration of Directive

~~The informal ad hoc group discussed this issue at length and decided that there should not be an exemption. The group believes that if the load is not weather sensitive then an explanation will be provided (Requirement R1 part 1.5.4), which will accomplish the same objective as providing an exemption. Requirement R1 part 1.3.2.1 of the proposed standard MOD-031-1 Demand and Energy Data asks for weather normalized data. If the load is not sensitive to weather, then the weather normalized and actual load will be the same.~~

Para 1251

The Commission adopts the NOPR proposal directing the ERO to modify the Reliability Standard to require reporting of the accuracy, error and bias of load forecasts compared to actual loads with due regard to temperature and humidity variations. This requirement will measure the closeness of the load forecast to the actual value. We understand that load forecasting is a primary factor in achieving Reliable Operation. Underestimating load growth can result in insufficient or inadequate generation and transmission facilities, causing unreliability in real-time operations. Measuring the accuracy, error and bias of load forecasts is important information for system planners to include in their studies, and also improves load forecasts themselves.

Consideration of Directive

~~The informal ad hoc group developed Requirement R1 of the proposed standard MOD-031-1 Demand and Energy Data. The requirement~~ now states that an entity must provide an explanation of how the actual and forecast demand compared (Requirement R1 part 1.5.5).

Para 1252

The Commission agrees with APPA that accuracy, error and bias of load forecasts alone will not increase the reliability of load forecasts, and, as a result, will not affect system reliability. Understanding of the differences without action based on that understanding would not change anything. Therefore, **we direct the ERO to add a Requirement that addresses correcting forecasts based on prior inaccuracies, errors and bias.**

Consideration of Directive

~~The informal ad hoc group developed~~ Requirement R1 of the proposed standard MOD-031-1 Demand and Energy Data. ~~The requirement~~ now states that an entity must provide an explanation of how the assumptions and methods for future forecasts were adjusted (Requirement R1 part 1.5.45).

Para 1255

We agree with FirstEnergy that transmission planners should be added as reporting entities, and direct the ERO to modify the standard accordingly. We agree that in the NERC Functional Model, the transmission planner is responsible for collecting system modeling data including actual and forecast demands to evaluate transmission expansion plans.

Consideration of Directive

~~The informal ad hoc group, as a result of its informal outreach, is recommending that t~~he Transmission Planner has been added to the Applicability Section of the proposed standard MOD-031-1 Demand and Energy Data.

Para 1256

The Commission disagrees in general with MISO's recommendation to allow some exceptions to the requirement to provide hourly demand data. However, the metering for some customer classes may not be designed to provide certain types of data. **The Commission therefore directs the ERO to consider MISO's concerns in the Reliability Standards development process.**

Consideration of Directive

~~The informal ad hoc group discussed this issue at length with industry participants during informal outreach and decided that there should not be an exemption. The group believes that all load data should be reported to accurately model the Bulk Power System. The requirements of MOD-018 are now included in MOD-031 Requirements R1.5.1 and R1.5.5 which require explanations of forecast assumptions, comparisons of actual to forecast data and a discussion of how assumptions and forecasts were adjusted. The SDT believes these requirements allow an entity to explain if certain data is unavailable and why the entity believes the lack of data does not materially impact reliability.~~

Para 1265

Regarding TAPS's concern that small entities should not be required to comply with MOD-018-0 because their forecasts are not significant for system reliability purposes, **the Commission directs the ERO to address this matter in the Reliability Standards development process.**

Consideration of Directive

~~The informal ad hoc group discussed this issue at length during its outreach and concluded that there should not be an exemption. The group believes that all load data should be reported to accurately model the Bulk Power System. The requirements of MOD-018 are now included in MOD-031 Requirements R1.5.1 and R1.5.5 which require explanations of forecast assumptions, comparisons of actual to forecast data and a discussion of how assumptions and forecasts were adjusted. The SDT believes these requirements allow an entity to explain why the entity believes their forecast method does not materially impact reliability.~~

Para 1276

The Commission adopts the NOPR proposal directing the ERO to modify this standard to require reporting of the accuracy, error and bias of controllable load forecasts. This requirement will enable planners to get a more reliable picture of the amount of controllable load that is actually available, therefore allowing planners to conduct more accurate system reliability assessments. The Commission finds that controllable load can be as reliable as other resources, and therefore should also be subject to the same reporting requirements. Although we recognize that verifying load control devices and interruptible loads may be complex, we do not believe that it is overly so. **Further, we believe that the ERO, through its Reliability Standards development process can develop innovative solutions to the Commission's concern.** We also note that EEI is concerned about such testing at times of peak load. We clarify that we are not requiring the testing to be conducted at peak load conditions. Consequently, we reject the proposals of EEI, FirstEnergy and International Transmission to discard the requirement for reporting of the accuracy, error and bias of controllable load forecasts.

Consideration of Directive

~~The SDT developed~~ Requirement R1 of the proposed standard MOD-031-1 Demand and Energy Data. ~~The requirement~~ now states that an entity must provide an explanation of how the assumptions and methods for future forecasts were adjusted (Requirement R1 part 1.5.4).

Para 1277

We direct the ERO to include APPA's proposal in the Reliability Standards development process to add a new requirement to MOD-019-0 that would oblige resource planners to analyze differences between actual and forecasted demands for the five years of actual controllable load and identify what corrective actions should be taken to improve controllable load forecasting for the 10-year planning horizon.

Consideration of Directive

~~The informal ad hoc group developed~~ Requirement R1 of the proposed standard MOD-031-1 Demand and Energy Data. ~~The requirement~~ now states that an entity must provide an explanation of how the assumptions and methods for future forecasts were adjusted (Requirement R1 part 1.5.4).

Para 1298

We agree with FirstEnergy and SMA that standardization of principles on reporting and validating DSM program information will provide consistent and uniform evaluation of demand response to facilitate system operator confidence in relying on such resources, which will further increase accuracy of transmission system reliability assessment and consequently enhance overall reliability. We direct the ERO to modify this Reliability Standard to allow resource planners to analyze the causes of differences between actual and forecasted demands, and to identify any corrective actions that should be taken to improve forecasted demand responses for future forecasts. **Therefore, we adopt the NOPR proposal and direct the ERO to modify MOD-021-0 by adding a requirement for standardization of principles on reporting and validating DSM program information.**

Consideration of Directive

~~The informal ad hoc group developed~~ Requirement R1 parts 1.3.5 and 1.4.5 of the proposed standard MOD-031-1 Demand and Energy Data. ~~The requirement~~ now states that an entity must report DSM data in parts 1.3.5, and 1.4.5. ~~The requirement also states that an entity must~~ and provide an explanation of how DSM is forecasted and adjusted for errors (Requirement R1 parts 1.5.2, 1.5.3 and 1.5.4).

Conclusion

In developing the MOD C initiative, the informal ad hoc group and entities that participated in informal development discussed the key reliability impacts of the existing MOD C NERC Reliability Standards. The group identified and discussed issues at varying lengths early in the process and decided to consolidate the existing five standards into one pro forma standard. The ~~standard drafting team accepted this consolidation approach and modified the requirements is intended to maintain NERC's focus on developing and retaining requirements ensure data will be made available to that support the assessments of the reliability operation~~ of the Bulk Power System.

~~This white paper provides a record of how the ad hoc group and industry participants in the informal development decided to address the outstanding directives from FERC Order 693, along with the other components of the results-based standards, such as a risk-based and performance-based standard, along with incorporating the Paragraph 81 initiative.~~

