

Draft Proposed Standard	Source Planning Standard
<p>The drafting team proposes to not include I.D.M2 in the reliability standards for the following reasons:</p> <ul style="list-style-type: none"> • These requirements are already met by the annual requirements of the system performance standards TPL-001-0, TPL-002-0, TPL-003-0, and TPL-004-0. • Measurement M1a is duplicative of III.C.M5, which has been translated into a proposed revision of VAR-001-1, and III.C.M6, which has been included in proposed new standard VAR-002-1. • Measurement M1b is redundant because the under-excitation limiter is typically the most limiting reactive capability for generators operating in the lead. The setting of the under-excitation limiter is covered in II.B.M4 and III.C.M8, which have been translated into proposed standard MOD-026-1. • A number of other measurements address specifics regarding generator reactive capability: II.B.M3 (MOD-025-1), II.B.M4 (MOD-026-1), III.C.M5 (VAR-001-1), III.C.M6 (VAR-002-1), and III.C.M8 (PRC-019-1). <p>The drafting team notes the following:</p> <ul style="list-style-type: none"> • There may be a gap in the standards in that voltage stability analysis is not required. • It is unrealistic to expect the full range of generator reactive capability, as defined by the generator D curve, to be available for all normal and abnormal system conditions at any time. 	<p>A. Introduction</p> <ol style="list-style-type: none"> 1. Title: Coordinate and optimize the use of generator reactive capability. 2. Number: I.D.M2 3. Purpose: 4. Applicability <ol style="list-style-type: none"> 4.1. Generation Owners and Transmission Providers 5. Effective Date: Approved by Engineering Committee: July 14, 1998 <p>B. Requirements</p> <p>R1. (Standard) Reactive power resources, with a balance between static and dynamic characteristics, shall be planned and distributed throughout the interconnected transmission systems to ensure system performance as defined in Categories A, B, and C of Table I in the I.A. Standards on Transmission Systems.</p> <p>C. Measures</p> <p>Generator reactive power capability.</p> <p>M1. Generation owners and transmission providers shall work jointly to optimize the use of generator reactive power capability. These joint efforts shall include:</p> <ol style="list-style-type: none"> a. Coordination of generator step-up transformer impedance and tap specifications and settings, b. Calculation of underexcited limits based on machine thermal and stability considerations, and c. Ensuring that the full range of generator reactive power capability is available for applicable normal and emergency network voltage ranges.

	<p>D. Compliance</p> <ol style="list-style-type: none">1. Compliance Monitoring Process<ol style="list-style-type: none">1.1. Compliance Monitoring Responsibility<p>Regions.</p>1.2. Compliance Monitoring Period and Reset Timeframe<p>Every five years or as required by changes in generator equipment or system conditions.</p>1.3. Data Retention<p>None specified.</p>1.4. Additional Compliance Information1.5. Full compliance: Transmission providers and generator owners shall coordinate on optimizing the amount of generator reactive power capability available for use by the transmission network. These efforts should address items such as generator step-up transformers impedance, transformer tap specifications and settings, as well as the calculation of underexcited limits, and other generator thermal and stability considerations.1.6. Transmission providers should generally perform an initial coordination assessment when all required data has been received from the generator owners. Follow-on coordination assessments should be performed at least every five years or when warranted by changes in generation equipment or system conditions. The current assessment results shall be provided to the Regions and NERC on request (within 30 days).2. Levels of Non-Compliance<ol style="list-style-type: none">2.1. Level 1: Assessments for the optimum use of generator reactive capability were provided on schedule,
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	<p>but were incomplete in one or more areas.</p> <p>2.2. Level 2: Assessments for the optimum use of generator reactive capability were not provided on schedule, but were complete when submitted.</p> <p>2.3. Level 3: Assessments for the optimum use of generator reactive capability were not provided on schedule, and were incomplete in one or more areas when submitted.</p> <p>2.4. Level 4: Assessments for the optimum use of generator reactive capability were not provided.</p> <p>E. Regional Differences</p> <ol style="list-style-type: none">1. None identified.
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The drafting team proposes to not to include I.D.M3 in the reliability standards for the following reasons:

- The drafting team believes it is unnecessary for reliability to establish a new standard on reporting of customer demand and DSM data to government agencies. Government agencies may choose to direct reporting of demand data to meet their needs, independent of reliability standards.*
- The measure’s focus was on ensuring consistency of reported data. The drafting team believes it is unnecessary to have a reliability standard that says a task required under a separate authority should be performed consistently. If there is a need for consistency, it should be established in the standard or directive that requires the task to be performed.*
- MOD-016 includes a requirement for a Regional Reliability Organization procedure to include a requirement that each Load-Serving Entity develop a set of actual and forecast customer demand values for use in all its data reporting during a calendar year.*

Introduction

Title:

II.D.M3 - Consistency of actual and forecast demands and controllable demand-side management data reported for reliability and to government agencies.

Standard:

S1. Actual and forecast customer demands and net energy for load data required for the analysis of the reliability of the interconnected transmission systems shall be developed and maintained on an aggregated Regional, subregional, power pool, and individual system basis and on a dispersed substation basis.

S2. Controllable demand-side management (interruptible demands and direct control load management) programs and data shall be identified and documented.

Applicability:

Entities required to report actual and forecast demand data

Effective Date: Approved by Engineering Committee July 14, 1998

Measures

M3. Procedures requiring consistency of data reported for reliability purposes and to government agencies.

Actual and forecast customer demand data and controllable demand-side management data reported to government agencies shall be consistent with data reported to those entities responsible for the reliability of the interconnected transmission systems, the Regions, and NERC

The procedures shall require consistency in reporting actual and forecast demands and controllable demand-side management data for reliability purposes and to government agencies.

Compliance

	<p>Compliance Monitoring Responsibility</p> <p>Regions</p> <p>Timeframe</p> <p>Annually or as specified in the documentation (Standard II.D. S1-S2, M1)</p> <p>Levels of Non-Compliance</p> <p>Level 1: Consistent demand data was provided on schedule, but was incomplete in one or more areas.</p> <p>Level 2: Consistent demand data was not provided on schedule, but was complete when submitted.</p> <p>Level 3: Consistent demand data was not provided on schedule, and was incomplete in one or more areas when submitted.</p> <p>Level 4: Consistent demand data was not provided.</p> <p>Regional Differences</p> <p>None identified.</p>
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- M Long comment here*

Introduction

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II.D.M3 - Consistency of actual and forecast demands and controllable demand-side management data reported for reliability and to government agencies.

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The procedures shall require consistency in reporting actual and forecast demands and controllable demand-side management data for reliability purposes and to government agencies.

Compliance

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Draft Proposed Standard	Source Planning Standard
<p>The drafting team proposes to not include II.E.M1, II.E.M2, and II.E.M3 in the reliability standards for the following reasons:</p> <ul style="list-style-type: none"> • <i>There are no generally accepted methods for determining customer demand dynamic characteristics for practical uses.</i> • <i>This area requires further research to develop and test such methods. No finite period has been established for the completion of that work.</i> • <i>The issue should be reviewed and a new SAR considered when the research and testing are completed and there is agreement on acceptable, practical methods for determining dynamic customer demand characteristics.</i> 	<p>Introduction</p> <p>Titles:</p> <p>II E M1 - Customer (dynamic) demand characteristics to be determined and reported for reliability analysis</p> <p>IIEM2 - Requirements for determining customer (dynamic) demand characteristics to be included in procedural manuals.</p> <p>II E M3 - Load-serving entities to provide customer (dynamic) demand characteristics.</p> <p>Standard:</p> <p>S1. (IIEM1, IIEM2, and IIEM3) Representative frequency and voltage characteristics of customer demands (real and reactive power) required for the analysis of the reliability of the interconnected transmission systems shall be developed and maintained.</p> <p>Applicability:</p> <p>IIEM1 - The entities responsible for the reliability of the interconnected transmission systems, in conjunction with the Regions</p> <p>IIEM2 - Systems Dynamics Database Working Group (Eastern Interconnection), and the Western, ERCOT, and Hydro-Québec Interconnections.</p> <p>IIEM3 – Load-Serving Entities</p> <p>Effective Date:</p> <p>IIEM1, IIEM2, and IIEM3 - Approved by Engineering Committee July 14, 1998</p> <p>Measures</p> <p>M1. Plans for the evaluation and reporting of the voltage and</p>

	<p>frequency characteristics of customer demands.</p> <p>The entities responsible for the reliability of the interconnected transmission systems, in conjunction with the Regions, shall develop a plan for determining and promoting the accuracy of the representation of customer demands, identify the scope and specificity of the frequency and voltage characteristics of customer demands, and determine the procedures and schedule for data reporting.</p> <p>Documentation of these customer demand characteristics (dynamic) plans and reporting procedures shall be provided to NERC and the Regions on request.</p> <p>Full compliance:</p> <p>Entities responsible for the reliability of the interconnected transmission systems in conjunction with the Regions, as appropriate, shall develop and maintain a plan for determining and promoting the accuracy of the dynamic representation (e.g., frequency and voltage characteristics) of customer demands in accordance with Measurements M1 and M2 of this Standard II.E. S1. This plan shall also include the procedures and scheduling for the reporting of customer (dynamic) demand characteristics by load-serving entities. The documentation of this plan and procedures shall be available to the Regions and NERC on request (five business days).</p> <p>M2. Documentation of requirements for determining dynamic characteristics of customer demands.</p> <p>The NERC System Dynamics Database Working Group or its successor group(s) shall maintain and publish customer demand characteristics requirements in its “procedural manual” pertaining to the Eastern Interconnection. Similar “procedural manuals” shall be maintained and published by the Western (WSCC), ERCOT, and Hydro-Québec Interconnections. These procedural manuals shall include plans for determining and promoting the accuracy of the</p>
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	<p>representation of customer demands.</p> <p>Procedural manuals for the Eastern, Western, ERCOT, and Hydro-Quebec interconnections shall include the requirements for determining and promoting the accuracy of the dynamic representation of customer demands in accordance with Measurement M5 above and Measurements M4 and M5 of Standard II.A. These procedural manuals should be available to the Regions and NERC on request (five business days).</p> <p>Full compliance:</p> <p>Procedural manuals for the Eastern, Western, ERCOT and Hydro-Québec Interconnections shall include the requirements for determining and promoting the accuracy of the dynamic representation of customer demands in accordance with Measurement M5 above and Measurements M4 and M5 of Standard II.A. These procedural manuals should be available to the Regions and NERC on request (five business days).</p> <p>M3. Customer (dynamic) demand characteristics.</p> <p>Load-serving entities shall provide customer demand characteristics to the Regions and those entities responsible for the reliability of the interconnected transmission systems in compliance with the respective procedural manuals for the modeling of portions or all of the four NERC Interconnections: Eastern, Western, ERCOT, and Hydro-Québec.⁷</p> <p>Full compliance:</p> <p>Load-serving entities shall provide customer demand characteristics in accordance with Measurement M3 above and the procedural manuals of Measurement M2 of this Standard II.E.</p> <p>Compliance</p> <p>Compliance Monitoring Responsibility</p>
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	<p>IIEM1 - Regions and NERC IIEM2 – NERC IIEM3 – Regions</p> <p>Timeframe</p> <p>IIEM1 - On request (five business days) IIEM2 - On request (five business days) IIEM3 - As specified in the documentation (Standard II.E. S1, M1-M2).</p> <p>Levels of Non-Compliance</p> <p>IIEM1 Level 1: Documentation of a plan for determining and reporting the dynamic characteristics of customer demand was provided on schedule, but was incomplete in one or more areas.</p> <p>IIEM2 Level 1: Procedural manuals that include requirements for determining customer (dynamic) demand characteristics were provided on schedule, but were incomplete in one or more areas.</p> <p>IIEM3 Level 1: Customer demand (dynamic) characteristics were provided on schedule, but were incomplete in one or more areas.</p> <p>IIEM1 Level 2: Documentation of a plan for determining and reporting the dynamic characteristics of customer demand was not provided, but was complete when submitted.</p> <p>IIEM2 Level 2: Procedural manuals that include requirements for determining customer (dynamic) demand characteristics were not provided on schedule, but were complete when submitted.</p> <p>IIEM3 Level 2: Customer demand (dynamic) characteristics were not provided on schedule, but were complete when submitted.</p>
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	<p>IIEM1 Level 3: Documentation of a plan for determining and reporting the dynamic characteristics of customer demand was not provided on schedule, and was incomplete in one or more areas when submitted.</p> <p>IIEM2 Level 3: Procedural manuals that include requirements for determining customer (dynamic) demand characteristics were provided on schedule, and were incomplete in one or more areas when submitted.</p> <p>IIEM3 Level 3: Customer demand (dynamic) characteristics were not provided on schedule, and were incomplete in one or more areas when submitted.</p> <p>IIEM1 Level 4: Documentation of a plan for determining and reporting the dynamic characteristics of customer demand was not provided.</p> <p>IIEM2 Level 4: Procedural manuals that include requirements for determining customer (dynamic) demand characteristics were not provided.</p> <p>IIEM3 Level 4: Customer demand (dynamic) characteristics were not provided.</p> <p>Regional Differences</p> <p>None identified.</p>
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Draft Proposed Standard	Source Planning Standard
<p>The drafting team proposes to not include III.B.M1 in the reliability standards for the following reasons:</p> <ul style="list-style-type: none"> • These requirements are already met by the requirements of the system performance standards TPL-001-0, TPL-002-0, TPL-003-0, and TPL-004-0. 	<p>Standard III.B.M1</p> <p>S1. Transmission control devices shall be planned and designed to meet the system performance requirements as defined in the I.A. Standards of the Transmission Systems and associated Table I. These devices shall be coordinated with other control devices within a Region and, where appropriate, with neighboring Regions.</p> <p>Measurement</p> <p>M1. When planning new or substantially modified transmission control devices, transmission owners shall evaluate the impact of such devices on the reliability of the interconnected transmission systems. The assessment shall include sufficient modeling of the details of the dynamic devices and encompass a variety of contingency system conditions. The assessment results shall be provided to the Regions and NERC on request.</p> <p>Applicable to</p> <p>Transmission owners.</p> <p>Items to be Measured</p> <p>Assessment of the reliability impact of transmission control devices.</p> <p>Timeframe</p> <p>On request (within 30 days).</p> <p>Full (100%) Compliance Requirements</p> <p>The performance of new or modified transmission control devices shall meet the requirements of Standard I.A. and its associated Table I. The analysis in support of this required performance may be included as part of the documentation for Standard I.A.</p> <p>Evidence must be provided that the models used for the analysis adequately represent the response and operation of the transmission control devices.</p>

	<p>A list of contingencies and system conditions tested must be provided along with a commentary on the sufficiency of these tests for the evaluation of the transmission control devices. The assessment results should be provided to the Regions and NERC on request (within 30 days).</p> <p>Levels of Non-Compliance</p> <p>Level 1</p> <p>Assessments of the reliability impact of transmission control devices were provided on schedule, but were incomplete in one or more areas.</p> <p>Level 2</p> <p>Assessments of the reliability impact of transmission control devices were not provided on schedule, but were complete when submitted.</p> <p>Level 3</p> <p>Assessments of the reliability impact of transmission control devices were not provided on schedule, and were incomplete in one or more areas when submitted.</p> <p>Level 4</p> <p>Assessments of the reliability impact of transmission control devices were not provided.</p> <p>Compliance Monitoring Responsibility</p> <p>Regions.</p>
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Draft Proposed Standard	Source Planning Standard
<p><i>The drafting team proposes to not include IVBM1, IVBM2, IVBM3, and IVBM4 in the reliability standards for the following reasons:</i></p> <ul style="list-style-type: none"> • <i>Automatic Load Restoration systems are used only in parts of three regions. Regional requirements apply where appropriate. If the standard was approved, it would apply only to a small number of entities.</i> • <i>Automatic Load Restoration is typically implemented at the distribution level and has limited significance for Bulk Electric System reliability.</i> • <i>The reliability concerns noted in IVBM1, IVBM2, IVBM3, and IVBM4 are addressed in restoration plans and procedures specific to each entity owning and operating such systems, as required in EOP-005-0 and EOP-006-0. Restoration planning requires coordination and verification of many elements, including Automatic Load Restoration where it exists, and it is unnecessary to single out this one issue when there are many other significant issues of equal or greater concern that are not singled out.</i> 	<p>Introduction</p> <p>Title:</p> <p>IVB M1 - Documentation of Regional load restoration policies and programs.</p> <p>IVB M2 - Documentation of automatic load restoration programs.</p> <p>IVBM3 - Assessment of the effectiveness of automatic load restoration programs.</p> <p>IVBM4 - Automatic load restoration equipment maintenance requirements.</p> <p>Standard:</p> <p>S1. (IVBM1, IVBM2, IVBM3 and IVBM4) Automatic load restoration programs shall be coordinated and in compliance with Regional load restoration programs. These automatic load restoration programs shall be designed to avoid recreating electric system underfrequencies or undervoltages, overloading transmission facilities, or delaying the restoration of system facilities and interconnection tie lines to neighboring systems.</p> <p>Applicability:</p> <p>IVBM1 - Regions</p> <p>IVBM2, IVBM3 and IVBM4 - Entities owning or operating automatic load restoration programs.</p> <p>Effective Date:</p> <p>IVBM1, IVBM2, IVBM3 and IVBM4 - October 9, 2000</p> <p>Measures</p> <p>M1. Documentation of Regional load restoration policy</p>

	<p>and program, and an updated Regional load restoration database.</p> <p>A Region that has a member with an automatic load restoration system shall have a documented load restoration policy and program which include:</p> <p>A description of how load restoration is coordinated with underfrequency and undervoltage load shedding programs within the Region and, where appropriate, among Regions.</p> <p>Automatic load restoration design details including acceptable size of coordinated load restoration blocks (% of connected load), corresponding frequency or voltage set points, and operating sequence (including relay and breaker operating times and intentional delays).</p> <p>Requirements for entities owning and operating automatic load restoration systems to provide on an annual basis current data for a Regional database to allow modeling the automatic load restoration programs in dynamic simulations of the interconnected transmission systems.</p> <p>The maintenance and annual update of an automatic load restoration program database. This database shall include information to model the automatic load restoration programs in dynamic simulations of the interconnected transmission systems.</p> <p>The Regional policies and programs shall conform with applicable NERC Standards and shall require programs to be designed to avoid recreating electric system underfrequencies or undervoltages, overloading transmission facilities, or delaying the restoration of system facilities and interconnection tie lines to neighboring systems.</p> <p>Documentation of the Regional load restoration policy and program and a current Regional load restoration database</p>
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	<p>shall be provided to other Regions and NERC on request (five business days).</p> <p>M2. Documentation of Regional member’s load restoration policy and programs and their conformance with the Regional load restoration policy and program as defined in IV.B. S1, M1, including coordination and data requirements.</p> <p>Regional members owning or operating an automatic load restoration system shall have a policy, and programs and documentation that demonstrate conformance with the Regional load restoration policy and program of Measurement IV.B. S1, M1.</p> <p>Documentation of each Regional member’s policy and program and its conformance to the Regional load restoration policy and program shall be provided to the Region and NERC on request (five business days).</p> <p>M3. Those entities owning or operating an automatic load restoration program shall demonstrate through simulation that the design and implementation of their programs do not cause electric system underfrequencies or undervoltages, the overloading of transmission facilities, or delay in the restoration of facilities and interconnection tie lines to neighboring systems.</p> <p>Documentation of the results of the simulation of the automatic load restoration programs shall be available to the appropriate (affected) Regions and NERC on request (30 business days).</p> <p>M4. Those entities owning or operating automatic load restoration programs shall document and implement a maintenance program that ensures accurate and reliable operation of the automatic load restoration relays.</p> <p>Documentation of the implementation of the maintenance</p>
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	<p>program shall be provided to the appropriate (affected) Regions and NERC on request (30 business days).</p> <p>Compliance</p> <p>Compliance Monitoring Responsibility</p> <p>IVBM1 - NERC</p> <p>IVBM2, IVBM3 and IVBM4 - Regions</p> <p>Timeframe</p> <p>IVBM1</p> <p>Updated Regional load restoration database: annually.</p> <p>Documentation of Regional policy and current database: on request (five business days).</p> <p>IVBM2 - On request (five business days)</p> <p>IVBM3 - On request (30 business days).</p> <p>IVBM4 - On request (30 business days).</p> <p>Levels of Non-Compliance</p> <p>IVBM1 Level 1: Documentation of the Regional load restoration policy and program was provided, but the Regional load restoration database was not updated.</p> <p>IVBM2 Level 1: Documentation of the Regional member’s automatic load restoration policy and programs was provided, but the required data was not current.</p> <p>IVBM3 Level 1: Not applicable.</p> <p>IVBM4 Level 1: Documentation of the implementation of the automatic load restoration maintenance program was complete, but the maintenance program documentation was incomplete.</p>
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	<p>IVBM1 Level 2: Not applicable.</p> <p>IVBM2 Level 2: Documentation of the Regional member’s automatic load restoration policy and programs was provided, but coordination as required in the Regional policy and program (IV.B. S1, M1) was not provided or was incomplete.</p> <p>IVBM3 Level 2: Not applicable.</p> <p>IVBM4 Level 2: Not applicable.</p> <p>IVBM1 Level 3: Documentation of the Regional load restoration policy and program was provided, but was incomplete in one or more elements as defined above in Measurement M1.</p> <p>IVBM2 Level 3: Documentation of the Regional member’s automatic load restoration policy and programs was provided, but was incomplete in one of the areas required by the Regional load restoration policy and program (IV.B. S1, M1).</p> <p>IVBM3 Level 3: Not applicable.</p> <p>IVBM4 Level 3: Documentation of the maintenance program and its implementation for the automatic load restoration system was not available, but maintenance is being performed.</p> <p>IVBM1 Level 4: Documentation of the Regional load restoration policy and program was not provided.</p> <p>IVBM2 Level 4: Documentation of the Regional member’s automatic load restoration policy and programs was not provided, or was provided but was missing two or more areas required by the Regional load restoration</p>
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	<p>policy and program, or does not conform with the Regional load restoration policy and program (IV.B. S1, M1).</p> <p>IVBM3 Level 4: Documentation of the simulations of the design and implementation of the entity's automatic load restoration program was not provided, or the entity's automatic load restoration program was not operated in conformance with the Region's load restoration policy and program or the requirements of the above Measurement M3.</p> <p>IVBM4 Level 4: Documentation of the maintenance program and its implementation for the automatic load restoration system was not available, and maintenance was not being performed.</p> <p>Regional Differences</p> <p>None identified.</p>
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