

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Informal Development Background of the MOD B Standards

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RELIABILITY | ACCOUNTABILITY



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Executive Summary

This document provides a summary and information regarding the informal development efforts of the MOD B ad hoc group. A separate, thorough white paper and recommendations regarding MOD-010 through MOD-015 was completed by the NERC Planning Committee's System Analysis and Modeling Subcommittee (SAMS) (that whitepaper is available from the December 2012 NERC Planning Committee's agenda package, item 3.4, beginning on page 99, here: http://www.nerc.com/comm/PC/Agendas%20Highlights%20and%20Minutes%20DL/2012/2012_Dec_PC%20Agenda.pdf). Additionally, that whitepaper provided significant input into the technical background and discussion included within the Standards Authorization Request (SAR), and, for those reasons, a more thorough technical discussion of MOD-010 through MOD-015 is not repeated in this document.

NERC Reliability Standards MOD-010-0, MOD-011-0, MOD-012-0, MOD-013-1, MOD-014-0, and MOD-015-0.1 (referred to herein as the "existing MOD B standards") address modeling data requirements that support the mathematical model representations of transmission, generation, and load that are the foundation of virtually all power system studies. Of the six existing MOD B standards, only two were approved by the Federal Energy Regulatory Commission ("FERC" or "Commission") in Order No. 693. Four of them were neither approved nor remanded, and they remain in a pending status. The following provides a brief summary and status of the existing MOD B standards:

- The existing MOD B Standards
 - MOD-010-0—Steady-State Data for Modeling and Simulation of the Interconnected Transmission System
 - MOD-011-0—Maintenance and Distribution of Steady-State Data Requirements and Reporting Procedures
 - MOD-012-0—Dynamics Data for Modeling and Simulation of the Interconnected Transmission System
 - MOD-013-1—Maintenance and Distribution of Dynamics Data Requirements and Reporting Procedures
 - MOD-014-0—Development of Steady-State Models
 - MOD-015-0.1—Development of Dynamics System Models
- Four existing MOD B standards are not approved
 - MOD-011, MOD-013, MOD-014 and MOD-015 were not approved by FERC Order No. 693 and remain in "pending" state due to their "fill-in-the-blank" nature, with requirements applicable to Regional Reliability Organizations (RROs).
 - Approved standards MOD-010 and MOD-012 refer to specific modeling needs and processes outlined in unapproved standards MOD-011 and MOD-013, respectively.
- FERC directives regarding the existing MOD B standards remain unaddressed (discussed in detail later in this document)
 - FERC Order No. 890 (issued February 2007): 1 directive unaddressed
 - FERC Order No. 693 (issued March 2007): 12 directives unaddressed

NERC initiated an informal development process to address the remaining directives related to the existing MOD B standards from FERC Order Nos. 890 and 693. Participants were industry subject matter experts, NERC staff, and staff from FERC's Office of Electric Regulation. In discussing the existing MOD B standards during industry outreach, the informal effort proposed creation of two new reliability standards to replace the existing MOD B standards. The proposal included in this SAR package includes a combined modeling data standard, MOD-032-1, and a new validation standard to address directives related to validation, MOD-033-1 (collectively referred to herein as "proposed MOD B standards"). The proposed MOD B standards are as follows:

- MOD-032-1—Data for Power System Modeling and Analysis
- MOD-033-1—Steady-State and Dynamic System Model Validation

In preparing proposals to address the outstanding directives and proposed improvements to MOD-010 through MOD-015, the ad hoc group ensured that the requirements in the proposals were results-based and considered criteria from the Paragraph 81 project (Project 2013-02 Paragraph 81).

The group considered the criteria from the Paragraph 81 project to ensure that the standards proposals did not create requirements that meet those criteria. The Paragraph 81 project also prepared a "Paragraph 81 Project Technical White Paper," dated December 20, 2012, that includes discussion of the identifying criteria that must be satisfied before a

Reliability Standard requirement may be proposed for retirement.¹ Specifically, for a Reliability Standard requirement to be proposed for retirement, it must satisfy *both* the overarching criterion that it requires an activity or task that does little, if anything, to benefit reliability *and* additional identifying criteria (such as criteria that it is administrative, reporting, redundant, etc., as discussed in the Paragraph 81 Technical White Paper).²

In comments submitted to the Paragraph 81 project, there were some comments proposing retirement of requirements in existing MOD-010 and MOD-012 related to reporting data to the RROs on the basis that they were administrative or reporting requirements, or that the information could be collected via vehicles other than a Reliability Standard. In creating the proposed MOD B standards, the ad hoc group carefully considered these suggestions. The proposed MOD B requirements specify who must provide specific types of data to whom for purposes of supporting the system-wide Interconnection models. Importantly, with respect to modeling, providing modeling data itself supports reliability objectives. The paragraph 81 identifying criterion for administrative requirements (criterion B1) applies when the requirement “requires responsible entities to perform a function that is administrative in nature, *does not support reliability* and is needlessly burdensome.”³ Similarly, the identifying criterion for reporting requirements (criterion B4) applies to requirements that obligate responsible entities to report to a Regional Entity, NERC, or another party or entity “on activities *which have no discernible impact on promoting the reliable operation of the BES* and if the entity failed to meet this requirement there would be little reliability impact.”⁴ Absence of modeling data for use in the Interconnection models would be expected to have a reliability impact, and the requirements in the proposed MOD B standards do not create requirements that meet the Paragraph 81 criteria because they establish consistent modeling data requirements and reporting procedures to support analysis of the reliability of the interconnected transmission system.

The proposed MOD B standards are related to system-level modeling and validation. Standard MOD-032-1 is a consolidation and replacement of existing MOD-010-0, MOD -011-0, MOD-012-0, MOD-013-1, MOD-014-0, and MOD-015-0.1, and it requires a minimum level of data submission by applicable data owners to their respective Transmission Planners and Planning Coordinators to support the Interconnection model building process in their Interconnection. Standard MOD-033-1 is a new standard, and it requires each Planning Coordinator to implement a documented process to perform model validation within its planning area.

The modeling data standard proposal, MOD-032-1, is intended to provide clear expectations of “who” provides “what” data to “whom.” It does not prescribe the model building itself, as there are other requirements, namely from TPL-001-4, that address certain Planning Coordinator (PC) and Transmission Planner (TP) obligations in model building. Instead, the standard focuses on modeling data in support of, ultimately, the building of each Interconnection model. The requirements specify the “at a minimum” data that must be provided by each data owner.

MOD-032-1 also recognizes the differences among Interconnections in model building processes, but creates an obligation for PCs to provide the collected data in a manner that accounts for those differences. It specifies that PCs must submit the modeling data to the “ERO or its designee” to support the Interconnection model building process in the submitting PC’s particular planning area.

While different entities in each Interconnection create the Interconnection model, the requirement to submit the data to the “ERO or its designee” supports a framework whereby NERC, in collaboration with other organizations, can designate the appropriate organizations in each Interconnection to build the Interconnection-specific model. It does not prescribe a specific group or process to build the larger Interconnection models, but only requires the PCs to submit data in support of the models’ creation, consistent with the SAMS Proposed Improvements to NERC MOD Standards referenced earlier (at page 3 of that whitepaper) that, “industry best practices and existing processes should be considered in the development of requirements, *as many entities are successfully coordinating their efforts.*” (emphasis added).

¹ Paragraph 81 Project Technical White Paper, December 20, 2012. Available at http://www.nerc.com/pa/Stand/Project%20201302%20Paragraph%2081%20RF/P81_Phase_I_technical_white_paper_FINA_L.pdf.

² See *id.* at p. 7 and 8.

³ *Id.* at p. 8. (Emphasis added).

⁴ *Id.* at p. 9. (Emphasis added).

For example, under current practice, the Eastern Interconnection Reliability Assessment Group (ERAG) builds the Quebec and Eastern Interconnection models, the Western Electricity Coordinating Council (WECC) builds the Western Interconnection models, and the Electric Reliability Council of Texas (ERCOT) builds the Texas Interconnection models. This standard does not require a change to that construct, and, assuming continued agreement by those organizations, ERAG, WECC, and ERCOT could be the “designee” for each Interconnection. Similarly, the requirement does not prohibit transition, and the standard would not likely need to be updated if the Interconnection model building process changed in the future.

MOD-033-1 is a new standard focused on PC-level system validation within each PC’s planning area. At its core, the standard establishes a requirement for each PC to implement a documented process to validate data for steady state and dynamic models within its area, which is consistent with the Commission directives. The validation of the full Interconnection model is left up to the ERO or its designees, and is not addressed by this standard.

Validation of model data is a good utility practice, but it does not easily lend itself to Reliability Standards requirement language. Furthermore, it is challenging to determine specifications for thresholds of disturbances that should be validated and how they are determined. Therefore, this standard focuses on the Planning Coordinator performing validation pursuant to the required criteria without specifying the details of “how” it must validate, which is necessarily dependent upon facts and circumstances.

History of the MOD B Informal Development

Ad Hoc Group Meetings

The MOD B informal development group—a small group of industry subject matter experts, NERC standards staff, NERC reliability initiatives and systems analysis staff, and participants from FERC staff—met face to face several times to discuss the proposals and the outstanding directives from FERC Order Nos. 890 and 693 as follows:

- February 12-14, 2013 at NERC’s Washington, D.C. office.
- March 13-14, 2013 in Atlanta, GA.
- April 9-10, 2013, in Washington, D.C.
- April 17-18 in Baltimore, MD.
- June 12-13 at NERC’s Atlanta, GA office.

Other Outreach

There were three technical workshops in support of the MOD B informal development efforts. The purpose of these one-day workshops was to encourage industry participation and to gain industry insight into the topics addressed by the proposed MOD B standards. The three workshops were strategically placed within the western, central, and eastern locations of North America. The first one-day workshop occurred on May 9, 2013, in Minneapolis, Minnesota. There were 50 in-person attendees and 277 online registrants. The second one-day workshop occurred on June 18, 2013, in Salt Lake City, Utah. There were almost 40 in-person attendees and 186 online registrants. The third one-day workshop occurred on June 25, 2013 in Baltimore, Maryland. There were approximately 20 in-person attendees and 199 online registrants.

Topics of the workshops included:

- Informal development background
- The current practices and associated recommendations for the MOD-010 through MOD-015 standards;
- Approaches for each of the Modeling Data and Validation standard proposals and the responsibilities in these proposals as applied to various functional entities;
- Roles of the Planning Coordinator and Transmission Planner in the new standards;
- Interconnection model building impacts; and
- Participant-focused question and answer sessions.

The MOD B ad hoc group also conducted an industry webinar on April 12, 2013 which had 412 online registrants.

Outstanding Directives from FERC Order 890

Para 290

The Commission directs public utilities, working through NERC, to modify the reliability standards MOD-010 through MOD-025 to incorporate a requirement for the periodic review and modification of models for (1) load flow base cases with contingency, subsystem, and monitoring files, (2) short circuit data, and (3) transient and dynamic stability simulation data, in order to ensure that they are up to date. This means that the models should be updated and benchmarked to actual events. We find that this requirement is essential in order to have an accurate simulation of the performance of the grid and from which to comparably calculate ATC, therefore increasing transparency and decreasing the potential for undue discrimination by transmission providers.

Consideration of Issue or Directive

The concept that models should be updated and benchmarked, through periodic review and modification, are fully covered by both new standards addressing modeling data MOD-032-1 and model validation MOD-033-1. MOD-032-1 thoroughly addresses modeling data submission and review, along with providing a mechanism to update data that may have technical issues. MOD-033-1 addresses validation of models to ensure that expected system behavior acceptably matches actual system response. Additionally, MOD-032-1, Requirement R1 covers item (2) short circuit data and item (3) transient and dynamic stability simulation data by requiring those items as part of the data requirements, and MOD-032-1, Requirement R4 provides a feedback loop for issues of data from the data owners.

The portion of the directive related to contingency, subsystem, and monitoring files were addressed by MOD-001-1a, Requirement R9, and further consideration, if any, is being addressed by the MOD A effort.

Outstanding Directives from FERC Order 693

Para 1148

Supported by many commenters, we adopt the NOPR proposal to direct the ERO to modify MOD-010-0 to require filing of all of the contingencies that are used in performing steady-state system operation and planning studies. We believe that access to such information will enable planners to accurately study the effects of contingencies occurring in neighboring systems on their own systems, which will benefit reliability. Because of the lack of information on contingency outages and the automatic actions that result from these contingencies, planners have not been able to analyze neighboring conditions accurately, thereby potentially jeopardizing reliability on their own and surrounding systems. This requirement will make transmission planning data more transparent, consistent with Order No. 890 requiring greater openness of the transmission planning process.

Consideration of Issue or Directive

For operations, the sharing of contingencies is covered by MOD-001-1a, and for planning, TPL-001-4 requires lists of Contingencies be compiled in Requirements R3 and R4 as part of the required planning assessments in that standard. Those planning assessments must be distributed to adjacent PCs and TPs, and to any other functional entity with a reliability need, addressing the directives' focus related to access to information by planners in paragraphs 1148, 1154, 1178, and 1183.

Para 1154

We agree with APPA, SoCal Edison and TVA that the functional entity responsible for providing the list of contingencies in performing planning studies should be the transmission planner, instead of the transmission owner, as proposed in the NOPR. We also agree with APPA that the transmission operator should be one of the entities required to list contingencies used to perform operational studies. Transmission operators are usually responsible for compiling the operational contingency lists for both normal and conservative operation. Therefore, we direct the ERO to modify MOD-010-0 to include transmission operators as an applicable entity.

Consideration of Issue or Directive

For operations, the sharing of contingencies is covered by MOD-001-1a, and for planning, TPL-001-4 requires lists of Contingencies be compiled in Requirements R3 and R4 as part of the required planning assessments in that standard. Those planning assessments must be distributed to adjacent PCs and TPs, and to any other functional entity with a reliability need, addressing the directives' focus related to access to information by planners in paragraphs 1148, 1154, 1178, and 1183.

Transmission Operator has also been added as an applicable entity in MOD-032-1.

Para 1155

We adopt our NOPR proposal that the planning authority should be included in this Reliability Standard because the planning authority is the entity responsible for the coordination and integration of transmission facilities and resource plans, as well as one of the entities responsible for the integrity and consistency of the data. We disagree with APPA that it is duplicative and unnecessary to require the planning authority to provide all of this information. However, we direct the ERO, as the entity charged with developing Reliability Standards, to address all of these concerns and to develop a consensus standard using its Reliability Standard development process.

Consideration of Issue or Directive

The Planning Authority plays an integral role in the standard modifications, both receiving data from the respective data owners, submitting data for its planning area to support the Interconnection models, and validating models relative to their planning areas.

The referenced attachment 1 specifies the specific "at a minimum" data for steady-state, dynamics, and short circuit data, establishing a level of consistency of data to support larger-scale, Interconnection-specific models. However, the standard also recognizes that operational disparities may exist across North America, providing sufficient flexibility for Planning Coordinators to specify format and cases most appropriate to their specific circumstances and Interconnection.

Para 1662

We reiterate our position stated in the NOPR that the planning authority should be included in this Reliability Standard because the planning authority is the entity responsible for the coordination and integration of transmission facilities and resource planning, as well as one of the entities responsible for the integrity and consistency of the data. Therefore, we direct the ERO to add the planning authority to the applicability section of this Reliability Standard.

Consideration of Issue or Directive

See the response to Paragraph 1155.

Para 1178

Supported by several commenters, we adopt the NOPR proposal and direct the ERO to modify MOD-012-0 by adding a new requirement to provide a list of the faults and disturbances used in performing dynamics system studies for system operation and planning. We believe that access to such information will enable planners to accurately study the effects of disturbances occurring in neighboring systems on their own systems, which will benefit reliability. This requirement will also make transmission planning data more transparent, consistent with Order No. 890, which calls for greater openness of the transmission planning process on a regional basis.

Consideration of Issue or Directive

For operations, the sharing of contingencies is covered by MOD-001-1a, and for planning, TPL-001-4 requires lists of Contingencies be compiled in Requirements R3 and R4 as part of the required planning assessments in that standard. Those planning assessments must be distributed to adjacent PCs and TPs, and to any other functional entity with a reliability need, addressing the directives' focus related to access to information by planners in paragraphs 1148, 1154, 1178, and 1183.

Para 1183

We agree with APPA that the functional entity responsible for providing the fault and disturbance list should be the transmission planner, instead of the transmission owner, as proposed in the NOPR. We also agree with APPA that the transmission operator should be added to the list of applicable entities in the Reliability Standards development process. Therefore, we direct the ERO to modify MOD-012-0 to require the transmission planner to provide fault and disturbance lists.

Consideration of Issue or Directive

For operations, the sharing of contingencies is covered by MOD-001-1a, and for planning, TPL-001-4 requires lists of Contingencies be compiled in Requirements R3 and R4 as part of the required planning assessments in that standard. Those planning assessments must be distributed to adjacent PCs and TPs, and to any other functional entity with a reliability need, addressing the directives' focus related to access to information by planners in paragraphs 1148, 1154, 1178, and 1183.

For the second part of the directive, the Transmission Operator has been added as an applicable entity in MOD-032-1.

Para 1184

We adopt our NOPR proposal that planning authorities should be included in this Reliability Standard because the planning authority is the entity responsible for the coordination and integration of transmission facilities and resource plans, as well as one of the entities responsible for the integrity and consistency of the data. We therefore direct the ERO to add the planning authority to the list of applicable entities.

Consideration of Issue or Directive

See response to paragraph 1155.

Para 1197

We agree with many commenters and direct the ERO to modify the Reliability Standard to permit entities to estimate dynamics data if they are unable to obtain unit specific data for any reason, not just for units constructed prior to 1990. Achieving the most accurate possible picture of the dynamic behavior of the Interconnection requires the use of actual data. We disagree with FirstEnergy and EEI and reject the 1990 cut-off date, because the age of the unit alone may not be the only reason why unit-specific data is unavailable. We agree with the Small Entities Forum that the Reliability Standard should include Requirements that such estimates be based on sound engineering principles and be subject to technical review and approval of any estimates at the regional level. That said, the Commission directs that this Reliability Standard be modified to require that the results of these dynamics models be compared with actual disturbance data to verify the accuracy of the models.

Consideration of Issue or Directive

This paragraph was clarified in FERC Order 693-A, paragraph 131, which stated “that ‘[a]chieving the most accurate possible picture of the dynamic behavior of the Interconnection requires the use of actual data,’” but acknowledges “that, in certain circumstances, actual data may not be initially available and only obtained through ‘verification of the dynamic models with actual disturbance data.’”

This is being addressed by MOD-032-1, Requirement R4, which provides a mechanism to obtain more accurate information and data in cases where the initial data provided has technical or accuracy concerns. Furthermore, MOD-033-1 requires comparison of actual disturbance data to verify accuracy of dynamics models.

Para 1199

We adopt our NOPR proposal and direct the ERO to expand the applicability section in this Reliability Standard to include planning authorities because they are the entities responsible for the coordination and integration of transmission facilities and resource plans, as well as one of the entities responsible for the integrity and consistency of the data.

Consideration of Issue or Directive

See response to paragraph 1155.

Para 1210

We maintain our position set forth in the NOPR that analysis of the Interconnection system behavior requires the use of accurate steady-state models. Therefore, we direct the ERO to modify the Reliability Standard to include a requirement that the models be validated against actual system responses. We understand that NERC is incorporating recommendations from the Blackout Report and developing models for the Eastern Interconnection.

Consideration of Issue or Directive

Standard MOD-033-1 addresses this directive, adding a validation process requirement for PCs aimed specifically at ensuring models are validated against actual system responses.

Model validation for individual generators and/or power plants is already required by Reliability Standards MOD-025-2, MOD-026-1, and MOD-027-1.

Para 1211

Further, the maximum discrepancy between the model results and the actual system response should be specified in the Reliability Standard. The Commission believes that the maximum discrepancy between the actual system performance and the model should be small enough that decisions made by planning entities based on output from the model would be consistent with the decisions of operating entities based on actual system response. We direct the ERO to modify MOD-014-0 through the Reliability Standards development process to require that actual system events be simulated and if the model output is not within the accuracy required, the model shall be modified to achieve the necessary accuracy.

Consideration of Issue or Directive

Similar to the consideration of paragraph 1210, Standard MOD-033-1, Requirement 1.1 addresses this directive, adding a validation process requirement for PCs that requires validation through simulation to ensure that the maximum discrepancy

between actual system performance and the model do not exceed the point where decisions made by the Planning Coordinator based on output from the model would be inconsistent with actual system response.

In addition, the drafting team determined not to specify numeric accuracy thresholds in the standard itself. For instance, specifying percent for accuracy purposes is potentially problematic, as it may unintentionally exaggerate the degree of mismatch (e.g., 10 MW v. 20 MW (100% error) on a 345 KV line is not generally significant).

Para 1220

We maintain our position set forth in the NOPR that the analysis of Interconnection system behavior requires the use of accurate dynamics system models. Therefore, we direct the ERO to modify the Reliability Standard to include a requirement that the models be validated against actual system responses. We agree with EEI and NRC and confirm our position that a requirement to verify that dynamics system models are accurate should be a part of this Reliability Standard. We agree with EEI that this new requirement should be related to using the models to replicate events that occur on the system instead of developing separate testing procedures to verify the models. We direct the ERO to modify the standard to require actual system events be simulated and dynamics system model output be validated against actual system responses.

Consideration of Issue or Directive

See response to paragraph 1210.

Conclusion

The informal development for the MOD B initiative provided key input into the proposed MOD B NERC Reliability Standards. In conjunction with the informal outreach, discussions, presentations, and technical conferences, the MOD B informal effort was able to begin addressing issues early. Informal outreach provided an efficient and open venue to consider myriad perspectives, build consensus, and engage in important dialogue. The result is a set of two new MOD reliability standards that represent input from virtually every corner of the electric industry, and time, effort, and discussion spent on upfront informal development was instrumental in quickly resolving points that may have otherwise taken significantly more time during formal development.

Appendix A: Entity Participants

The below entities represent a non-exhaustive list of entities that had personnel that participated in the MOD B informal development effort in some manner, which may include one of the following: direct participation on the ad-hoc group, inclusion on the wider distribution (the “plus” list), attendance at workshops or other technical discussions, participation in a webinar or teleconference, or by providing feedback to the group through a variety of methods (e.g., email, phone calls, etc.). Additionally, though not listed here, announcements were distributed to wider NERC distribution lists to provide the opportunity for entities that were not actively participating to join the effort.

ACES Power	Comed	GTC	MISO	Seminole Electric	
AECI	ConEd	Hydro Quebec	MPW	Sempra Utilities	
AEP	CPS	IESO	National Grid	SF Water	
Alcoa	CPS Energy	IID	NaturEner	SMUD	
Ameren	CSU	IMEA	NIPSCO	Southern Company	
APS	Delmarva	ISONE	Northeast Utilities	SPP RC	
ATC	Dominion	ITC	Northwestern	SRP	Regional Entities
Austin Energy	Duke	JEA	NYISO	Sunflower	FRCC
Avista	Duquesne Light	KCPL	NYPA	SW Transco	MRO
BC Hydro	Dynegy	KEPCO	ODEC	TEP	NPCC
BEPC	EKPC	LBWL	OGE	Trans Bay Cable	RFC
Black Hills Corp	Entegra	LCPUD	OMPA	Tres Amigas LLC	SERC
BPA	Entergy	LCRA	OTPCO	TVA	SPP
Brazos Electric	ERCOT	LGE & KU	PacifiCorp	Vectren	TRE
Centerpoint Energy	Exelon	Lonestar Transmission	Pepco	WAPA	WECC
City of Glendale	FMPA	Luminant	PGE	We Energies	
City of Tacoma	Fortis BC	MAPP	PPL	WECC RC	
CMS Energy	FPL	MEAG Power	PSEG	Westar	
Cogentrix	GRDA	MGE	Quanta Technology	Wisconsin Public Service	
Columbia Grid	GRE	MidAmerican	SaskPower	WPSCI	
			SCE	Xcel Energy	

Table 2: Presentations and Events	
EPRI Power Plant meeting	North American Transmission Forum (NATF) Modeling Practices Group (MPG)
ERAG Management Committee	NPCC Compliance and Standards Spring Workshop
ERAG Multi-regional Modeling Working Group (MMWG)	NPCC Regional Standards Committee
GE PSLF users group	NPCC's Base Case Development working group (SS-37)
MRO Model Building Subcommittee	Siemens PSS/E Users Group
MRO Reliability Workshop	Southern-Florida Planning Group
NERC Modeling Working Group	Southwest Power Pool (SPP) Model Development Working Group (MDWG)
NERC NEWS	Various Regional Operating Committee
NERC Operating Committee	Various Regional Planning Committees,
NERC Planning Committee	Various Regional Standards Committees
NERC Planning Committee's System Analysis and Modeling Subcommittee (SAMS)	WECC Modeling & Validation WG
NERC Standards Committee	