

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

MOD-026-1 & MOD-024-2 WebEx and Conference Call

Bob Millard, GVSDDT Chairman
Lee Taylor, GVSDDT Vice Chairman

March 11, 2009

to ensure
the reliability of the
bulk power system

- Opening Remarks and Introductions
- Conference Call Objectives
- Drafting Team Objectives
- Review MOD-026-1
 - Brief Overview of Requirements
 - Key Issues
 - Question & Answer Session

- Review MOD-024-2
 - SDT Questioned Need for Standard & Affect on Reliability
 - Applicability
 - New Approach
 - Question & Answer Session
- Schedule
- Wrap-up

Standard Drafting Team Make-up

- 21 drafting team members
 - 11 members represent GOs and/or GOPs
 - 6 members represent TOs and/or TOPs
 - 2 members are part of RE staff
 - 2 members are Testing Contractors
- 3 members were part of Phase 3 & 4 SDT
- MRO, SERC & WECC field test coordinators are part of SDT
- Observer/member (very active participants) are manufacturer/industry representatives – GE, AWEA and Research Lab

GVSDT Roster

- Bob Millard, RFC (Chairman)
- Lee Taylor, Southern (Vice Chairman)
- Baj Agrawal, APS
- Tom Bradish, Reliant
- Don Davies, WECC
- Les Hajagos, Kestrel Power
- John Hanson, CenterPoint
- Gary Humphries, Duke Energy
- Sharma Kolluri, Entergy
- Dmitry Kosterev, BPA
- Dave Kral, Xcel Energy
- Roger Green, Southern
- Gary Kruempel, MidAmerican
- Dan Leonard, GE
- Craig Quist, PacifiCorp
- Balbir Sandhu, Manitoba Hydro
- Bill Shultz, Southern
- Vladimir Stanisic, Ontario Power
- Ken Stenroos, FPL Group
- Rick Terrill, Luminant
- Chifong Thomas, PGE
- Ed Wingard, AEP

GVSDT Observers

- Maureen Long, NERC Staff
- Julia Souder, NERC Staff
- Harry Tom, NERC Staff
- Thomas Vandervort, NERC Staff
- Chris Schaeffer, AREVA
- Reigh Walling, GE
- Brendan Kirby, AWEA
- Scott Berry, Indiana Municipal Power Authority

Conference Call Objectives

- MOD-026-1 Exciter Model Verification
 - Present basic layout of standard.
 - Present source information used to develop draft.
 - Explain rationale for draft requirements.
 - Q & A to help understand and clarify SDT positions to assist in submitting clearer and more focused comments.

- MOD-024-2 MW Verification
 - Present source information being used to develop draft.
 - Present key issues effecting revision.
 - Do we need this standard for reliability?
 - Explain rationale for new approach in developing draft requirements.
 - Q & A to help gage industry reaction to new approach so that SDT can develop more acceptable initial draft requirements.

Drafting Team Objectives

Create new standards:

- With requirements that:
 - Are clear & enforceable
 - Effectively utilize industry resources
 - Provide added value for reliability
- That are not Least Common Denominator
- Assign responsibilities to appropriate functional entities (removing “fill in the blanks”)
- Incorporating Phase 3&4 SDT & field test experience

- How to transition from “fill in the blank” to “continent - wide” requirements
 - Identification of who is ultimately responsible in the current Functional Model environment
 - How should Requirements be structured to ensure accurate dynamic models?
 - Development of appropriate Applicability and Periodicity
 - How should desired collaboration between Responsible Entities be ensured?
 - Development of Requirements that are not “technology dependent”

- Historically, many integrated utilities performed unit dynamic model verification through collaboration of planning and generation department personnel
 - Generation employees would “perform tests” and pass on the appropriate captured recordings to the Planners
 - Planners usually “took the lead” in verifying the model by comparing the actual equipment recordings captured during the test to the model’s predicted response per the Planner’s dynamic simulation software

- The majority of the SDT is of the opinion that a Generation entity should be responsible for unit dynamic models because:
 - As owners / operators, they have access to the equipment
 - They have access to the equipment's OEM for assistance with technical issues
- There is recognition that most GOPs will have to either hire consultants, or develop in-house expertise and acquire software to run model simulations
 - Software does not have to be full dynamics package
 - GOP, under permission from GO, would “operate the unit” in such a way to facilitate verification activities

Brief Overview of Requirements

- **R1** – Statement of the GOP schedule for verifying the excitation system model
- **R2** – TP provides the list of model data sheets to the GOP
- **R3** – TP provides the unit specific excitation system dynamics data to the GOP
- **R4** – GOP provides the verified model to the TP
- **R5** – TP ensures the provided model runs on its software
- **R6** – TP informs the GOP if the provided model ran on its software

Brief Overview of Requirements

- **R7** – GOP offers solutions, if any, if the model does not run on the TP software
- **R8** – GOP provides TP model verification documentation
- **R9** – GOP provides the RC, TO, or PC model verification documentation upon request
- **R10** – GOP responds to a technical review if initiated by the TP/PC
- **R11** – GOP responds to evidence by the TO/RC that equipment response did not match predicted model response
- **R12** – List of potential re-verification triggers within the 10 year cycle

- Based on the team's expert judgment, it was decided that the standard should be applicable to > 80% of installed generating capacity (MVA) within an interconnection (to be further documented)
 - EI and Quebec – units ≥ 100 MVA, ≥ 20 MVA units within a ≥ 200 MVA plant
 - WECC – units ≥ 75 MVA, ≥ 20 MVA units within a ≥ 150 MVA plant
 - ERCOT – units ≥ 50 MVA, ≥ 20 MVA units within a ≥ 100 MVA plant
- Units with a capacity factor less than 5% (calculated as an average over 3 year period) are excluded
- MOD-012 (dynamic modeling) should already result in good data the vast majority of the time

- Periodic re-verification once every 10 years
 - Expect the majority of benefit to occur during the first cycle
 - 10 years chosen, in part, due to increasing penetration of digital excitation systems
- Triggers that can result in earlier re-verification
 - Applicable new equipment or alterations
 - Indication that equipment did not perform as expected

- Verification performed on one unit could possibly be used for other units
 - MOD-026 – units 250 MVA or less, at the same plant site, are candidates
 - Identical MVA rating
 - Identical applicable components and settings
 - Sited at same physical location
 - Different unit has to be verified each cycle

- Though the GOP is ultimately responsible for the verification, requirements to ensure that the process results in an accurate model includes close collaboration with the TP and others:
 - TP shall provide a list of acceptable model structures
 - TP shall test the model parameters to ensure it is compatible with their dynamic simulation program
 - Requirements to facilitate interaction with the GOP to address any identified issues

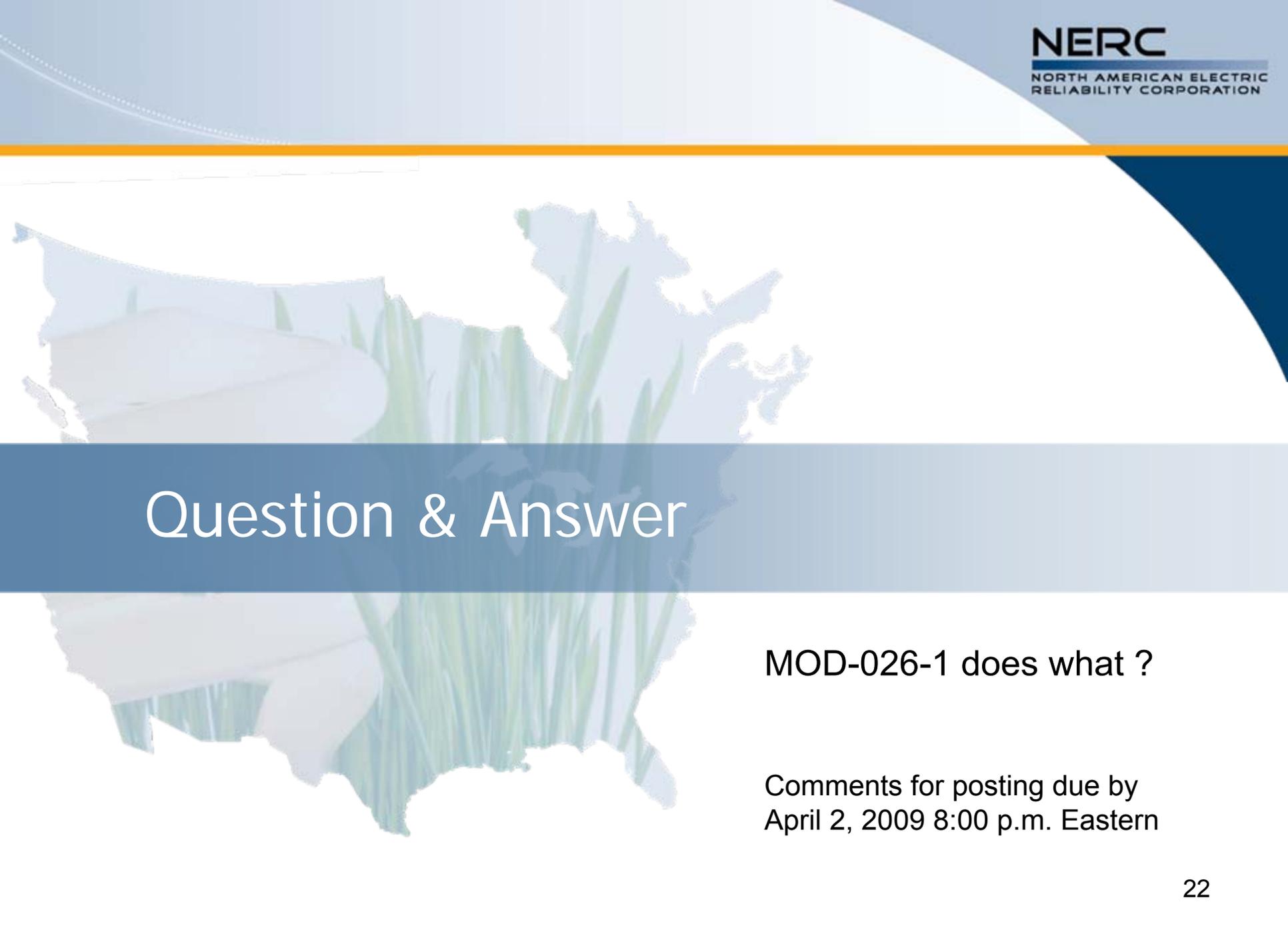
- GOP is required to respond to technical concerns related to model verification documentation when raised by TP, TO, or RC.
- GOP has the final authority to determine whether the model is acceptable or not (since it owns the model).
- The entire model verification process, including all activities and collaborations, is stated in the Requirements in the expected chronological order.

Unit Testing and Model Verification Details

- Planning Standards and Phase III-IV SDT drafts call for an “Open Circuit Test”
- SDT determined that standard should specify “what is required” but not impede industry innovation in the evolution of other acceptable techniques. Acceptable methods would include:
 - Open circuit voltage step test
 - Ambient Monitoring (reference EPRI project)

Unit Testing and Model Verification Details

- Since the GOP is ultimately responsible for the model, they determine if the simulated response appropriately matches the observed response of the actual equipment utilizing existing “good utility practice”
- Draft standard also contains “peer reviews” and required interactions which creates checks and balances that are expected to result in the development of robust models



Question & Answer

MOD-026-1 does what ?

Comments for posting due by
April 2, 2009 8:00 p.m. Eastern

- The SDT is conducting this informal industry wide WebEx to see if general industry beliefs are similar to SDT experience/thinking that MOD-024 may be redundant and not necessarily needed by itself to maintain reliability
- Posting draft standard without first checking industry's initial reaction could result in numerous comments not truly focused on questions but disputing initial general philosophy – reducing the value of the posting
- WebEx will potentially help buy-in by new entities, entities used to “we have always done it this way”, entities with compliance concerns and entities seeking efficiencies

Somewhat of a Clean Slate Approach

- To what extent is standard needed for reliability?
 - How does this standard fit in with FAC-009, IRO-004, MOD-010 & TOP-002.
 - Does verification fill in a gap of missing data
 - Verification only provides insight to accuracy of data at single point in time.
 - MW capability in most part can be found in normal daily operation
 - MW capacity is often times required by markets/contracts

Requirements to Provide Generator MW Output

Standard	Requirement	Entity Receiving Information	Entity Supplying Information	Periodicity
FAC-009	R2	RC, TOP, TP, PA	GO	Per requesting Entity
IRO-004	R4	RC (in conjunction with BA, TOP)	GO, GOP	Daily
MOD-010	R1	RRO + others specified in procedure (typically PA, TP)	GO	Per MOD-011 or on request (typically annual)
MOD-024	R1, R3	RRO + others specified in procedure	GO	Per procedure or on request (typically annual)
TOP-002	R3, R13, R14, R15	BA, TOP, TSP	GOP	Verify on request, provide data daily & as necessary

MOD-024-2

Data Availability

Minimum Number of Times Per Year MW Information Provided

Entity Receiving MW Information	Including MOD-024-1	Without MOD-024-1
RC	365 +	365+
TOP	365 +	365 +
BA	365 +	365 +
TSP	365 +	365 +
RRO	2	1
PA	1	1
TP	1	1
RP	+	+

Note: “ + “ includes “on request” & applicable procedures

Somewhat of a Clean Slate Approach

- What do system planners do with the data results?
 - Since system planners are only initially concerned with “permanent” longer term changes for annual TPL studies, usually do not look at verification reports – wait for next set of annual models
 - Variation in unit capability could be important for sensitivity studies
 - Transmission planning must accommodate numerous “expected values” so that small accuracy errors, especially for smaller units, are somewhat insignificant in the overall study results

Somewhat of a Clean Slate Approach

- Is value added by GOs & GOPs expending resources to capture test data?
 - GOs & GOPS do not want “another” paper to file when markets/contracts already have financial impacts
- What is the value of “test” knowing that:
 - Verification only provides data for a single set of conditions
 - MW capability is a family of values
 - Traditional rigorous approach seems to ignore practical reality of usefulness and value added

- Applicability could be different than the Compliance Registration guidelines for different subject matter
 - Resource Adequacy requires MW capacity regardless of voltage connection (near term small errors in MW can result in large sums of money for purchased reserves)
 - Transmission planning must accommodate numerous “expected values” so that small accuracy errors, especially for smaller units, are somewhat insignificant in the overall study results (Compliance Registration guidelines includes such small sizes)

- Let system planner inform generator of conditions for which verified data is needed
 - Planning studies consider a variety of conditions, for example
 - On average “expected” conditions, e.g. 98 degrees
 - Less frequent “stressed” conditions, e.g. 105 degrees
 - Planning philosophies vary by entity, location, etc.
- Utilize generator practical experience/tracking to adjust verified data taken near planner’s requested conditions

- Allowing generator to correct verified data for the requested conditions minimizes scheduling concerns, disruption of operations, and having verification disrupted by system conditions
- Reporting form flexible to accommodate ALL possible configurations (based on exception reporting)
- Assumes that TOP standards that allow TOP to request “verification” at any time will do so under very specific real-time or very near conditions (verified data will be used in very near term and retain value)



Question & Answer

Do I think this new
approach makes sense
OR
can I suggest a better way?

- Comments due back by April 2, 2009,
8:00 p.m. Eastern



Thank you for your participation.

Send any remaining questions concerning this session to:

- Harry Tom - harry.tom@nerc.net
- Bob Millard - bob.millard@rfirst.org
- Lee Taylor - ltaylor@southernco.com