

The logo for NERC (North American Electric Reliability Corporation) features the letters "NERC" in a bold, black, sans-serif font. A horizontal blue bar is positioned directly beneath the letters.

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Improvement of Seasonal and Long-Term Reliability Assessment

Reliability Assessment Improvement Task Force

to ensure
the reliability of the
bulk power system

October 2, 2008

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Executive Summary

Under Section 215(g) of the Federal Power Act¹, one of NERC's duties is to “conduct periodic assessments of the reliability and adequacy of the bulk-power system in North America.” NERC's Rules of Procedures², sections 802-805 identify the specifics of Reliability Assessments. Further, in light of the guidance in FERC's Order 672, the Planning Committee (PC) decided the current reliability assessment processes required improvement.

Therefore, NERC's PC, at its June 6-7 2007 Meeting, “**Endorsed the establishment of a new PC task force made up of PC members to provide a comprehensive review of our Reliability Assessment process and make recommendations to the PC about that process, including the development of white papers for emerging issues.**” The RAITF focused on three fundamental questions:

1. *What are we currently doing?* Review NERC and the Regional Entities' current Reliability Assessment and Emerging Issues Process.
2. *What should we be doing?* Identify immediate and long-range process enhancements and improvements to the reliability assessment process.
3. *How do we get there?* Proposed metrics and timeline for implementation.

The Task Force members agreed that after the establishment of the United States Electric Reliability Organization (ERO), expectations by both FERC and NERC regarding seasonal and long-term assessments have changed (see Appendix III). These expectations need to be clarified, documented and relayed to the NERC regional entities and stakeholders. The improvements to the reliability assessment process and analysis should be performed by the regional entities that are closer to the technical details and system conditions being assessed; at the same time, NERC needs to set forth more clearly the expectations it has for these regional assessments. Furthermore, evaluation by NERC and/or NERC staff of the regional self-assessments should provide the independence required to ensure an unbiased evaluation.

This report contains the observations and recommendations of the RAITF that the Task Force believes will assist the NERC community in achieving improved regional assessments and strengthening the Long Term Reliability Assessment (LTRA) report to be a more effective tool to highlight and communicate reliability issues among NERC stakeholders, legislative and regulatory groups, and consumers. The Task Force recognizes that much work remains to be done in the area of improving reliability assessments, and some recommendations presented in this report will be challenging to implement.

In developing its list of recommendations, the RAITF considered the following question: what does/should a sufficiently rigorous reliability assessment include? The

¹ NERC has been subsequently named the Electric Reliability Organizations or ERO in the U.S.

² http://www.nerc.com/~filez/rules_of_procedure.html

recommendations from the RAITF (see Section 1.0) are divided into near-term and long-term groups intended to shape the LTRA and the seasonal assessments over the next 2-3 years.

The fundamental principles that the RAITF believes should guide ongoing improvements to the reliability assessment process are outlined in Section 3.0, followed by some detailed discussion of how these principles could be implemented in the assessment process (see Section 4.0). An Improvement Plan for the 2008-2010 period is outlined in Appendix IX and the status of specific steps in this plan are presented in Section 5.0.

As part of its efforts to recommend improvements to NERC's reliability assessment procedures, the Task Force developed two work products that have already been accepted by the NERC PC and implemented in the LTRA process: (i) enhancements to the capacity definitions used in the assessment reports (see Appendix V), and (ii) the use of scenario analysis to develop a quantitative assessment of emerging issues that represent future impacts to reliability of the bulk electric system (Appendix IV).

The effort related to capacity definitions is directly related to the objectives of granularity and transparency (Section 3.0). In the area of emerging issues and scenario analysis, the RAITF recommended a process that translates significant issues into an evaluation of reliability risk. In proposing the scenario analysis approach, the Task Force is not telling individual utilities how to do resource planning. We are suggesting that Regions need to look as quantitatively as possible at the reliability impact (risks) associated with these scenarios, so that responses to the potential threat to reliability can be developed in a timely manner.

Overall, the goal of the RAITF has been to suggest ways in which the approach and content of the assessments conducted by NERC and the regional entities can become as quantitative as possible recognizing time and data constraints. Particularly as it relates to the scenario analysis approach, the Task Force recognizes that the results of the assessment may or may not lead to an implementation plan for infrastructure investment; it should, however, lead to a better understanding of the reliability impact the emerging issue and the associated scenario will have on the grid.

Ultimately, the NERC PC, as the program support committee for NERC's reliability assessment program, will have to decide if the benefits that could be achieved through implementation of these and other recommendations justify the commitment of resources and the substantive changes in processes that will be required in the Regions. The RAITF appreciates the support and participation of the NERC PC and its subcommittees in developing the recommendations and the improvement plan matrix presented in this report. The Task Force encourages the NERC PC to ensure that the 3-year work plan formally incorporates the recommended assignments outlined in Appendix IX so that ongoing improvements in the reliability assessment process can be achieved.

1.0 Recommendations

Based on the vision and the approach described in the following sections of this report, a number of steps need to be taken to make the reliability assessment process more effective and more informative. The RAITF therefore makes the following recommendations for improvement in the near-term and longer-term:

Near-term Recommendations (applied to the 2009 LTRA):

1. Develop a better way to address deliverability in the assessment of resource adequacy
2. Make further enhancements to the capacity definitions for clarity and to capture resources not clearly addressed in the current definitions
3. Develop a Reliability Assessment Guidebook that will improve consistency and transparency in the regional self-assessments and provide an outline for a comprehensive assessment
4. Identify appropriate metrics for the years 1-5 and for years 6-10 to provide more insight into the resource adequacy and transmission reliability in the regions
5. Develop a more consistent treatment of variable generation (particularly wind) in the resource adequacy assessments
6. Identify a more consistent treatment and method of integrating DSM into the resource adequacy evaluations

Longer-term Recommendations (applied to 2010 LTRA or beyond):

1. Revisit the seasonal reporting cycle and consider revising the timing when seasonal assessments are released
2. Determine how to utilize risk assessments and probabilistic studies in adequacy assessments
3. Further enhance sub-regional granularity in assessment reports and trends
4. Develop a method to explicitly include and report transmission reliability issues and metrics
5. Expand the focus of the LTRA to consider reliability assessment in off-peak periods
6. Include voltage profile and reactive reserve issues in the LTRA report
7. Include stability analysis results or recommendations in the LTRA
8. Improve the integration of issues specifically related to generation/fuel interdependency into the LTRA

These recommendations are a summary of the PC approved 2008-2010 Plan outlined in Section 5 of this report. More details can be found in the Improvement Plan matrix included in Attachments VI-IX.

2.0 Introduction

Under Section 215(g) of the Federal Power Act³, one of NERC's duties is to “conduct periodic assessments of the reliability and adequacy of the bulk-power system in North America.” NERC's Rules of Procedures⁴, sections 802-805 identify the specifics of Reliability Assessments. Further, in light of the guidance in FERC's Order 672, the Planning Committee (PC) deemed the current reliability assessment processes required improvement.

Therefore, NERC's PC, at its June 6-7 2007 Meeting, “**Endorsed the establishment of a new PC task force made up of PC members to provide a comprehensive review of our Reliability Assessment process and make recommendations to the PC about that process, including the development of white papers for emerging issues.**”. The Reliability Assessment Improvement Task Force (RAITF) charter (Roster of the Task Force in Appendix I) can be found in Appendix II. The charter focused the RAITF on three fundamental questions:

4. *What are we currently doing?* Review NERC and the Regional Entities' current Reliability Assessment and Emerging Issues Process.
5. *What should we be doing?* Identify immediate and long-range process enhancements and improvements to the reliability assessment process.
6. *How do we get there?* Proposed metrics and timeline for implementation.

The RAITF initially established a long-term mission statement for reliability assessments that will form the basis for development of recommendations and the LTRA improvement plan.

Mission

The LTRA will be the authoritative information source for North American electricity users, owners and operators to assess bulk power system reliability.

The task force believes reliability assessment, including bulk electric system security and adequacy⁵, must include a comprehensive review of regions and their stakeholders. To achieve this mission, reliability assessments conducted by NERC and its stakeholders must evolve beyond the current deterministic metrics towards scenario planning including risk assessments and probabilistic analysis to identify the relative levels of reliability. Consistently defined metrics, with sufficient granularity are needed to enable robust regional assessments.

The task force reviewed NERC's reliability assessment approach. Development of a consensus view started with a brainstorming session to develop a consistent mission and a proposed plan of action. Informal information gathering augmented the task force evaluations

³ NERC has been subsequently named the Electric Reliability Organizations or ERO in the U.S.

⁴ http://www.nerc.com/~filez/rules_of_procedure.html

⁵ <http://www.nerc.com/docs/pc/Definition-of-ALR-approved-at-Dec-07-OC-PC-mtgs.pdf>

including discussions with NERC's stakeholders and the Federal Energy Regulatory Commission (FERC) staff.

Current Reliability Assessment Report Preparation

The NERC Reliability Assessment Subcommittee (RAS), working with the NERC Manager of Reliability Assessments, has the lead in preparing the NERC seasonal and long-term reliability assessments. NERC annually prepares one long-term (10 year) and two seasonal (Summer and Winter) assessments reporting on its independent appraisal of North American bulk power system reliability. NERC's reliability assessments form a framework in which bulk power system users, owners and operators can address bulk power system reliability concerns, exchange vital system reliability information, systematically document operational preparations, identify existing or emerging issues that can measurably influence bulk power system reliability.

NERC prepares the Reliability Assessments with support from the Reliability Assessment Subcommittee (RAS) under the direction of the NERC Planning Committee (PC). The reports are based on data and information submitted by each of the eight Regional Entities and updated, as required, throughout the process.

NERC uses an active peer review process in preparing its reliability assessments, which takes full advantage of industry subject matter expertise from all sectors of the industry. This process provides an essential check and balance for ensuring the validity of the data and information provided by the Regional

Entities. Each regional self-assessment is individually assigned to two or three subcommittee members from other regions for an in-depth and comprehensive review. Reviewer comments are discussed with the Regional Entity representative and refinements/adjustments are made as necessary. Each regional self-assessment is then subjected to scrutiny and review by the entire subcommittee as a group through several sessions. This review ensures that each member of the subcommittee is convinced individual regional self-assessments are accurate, thorough, and complete.

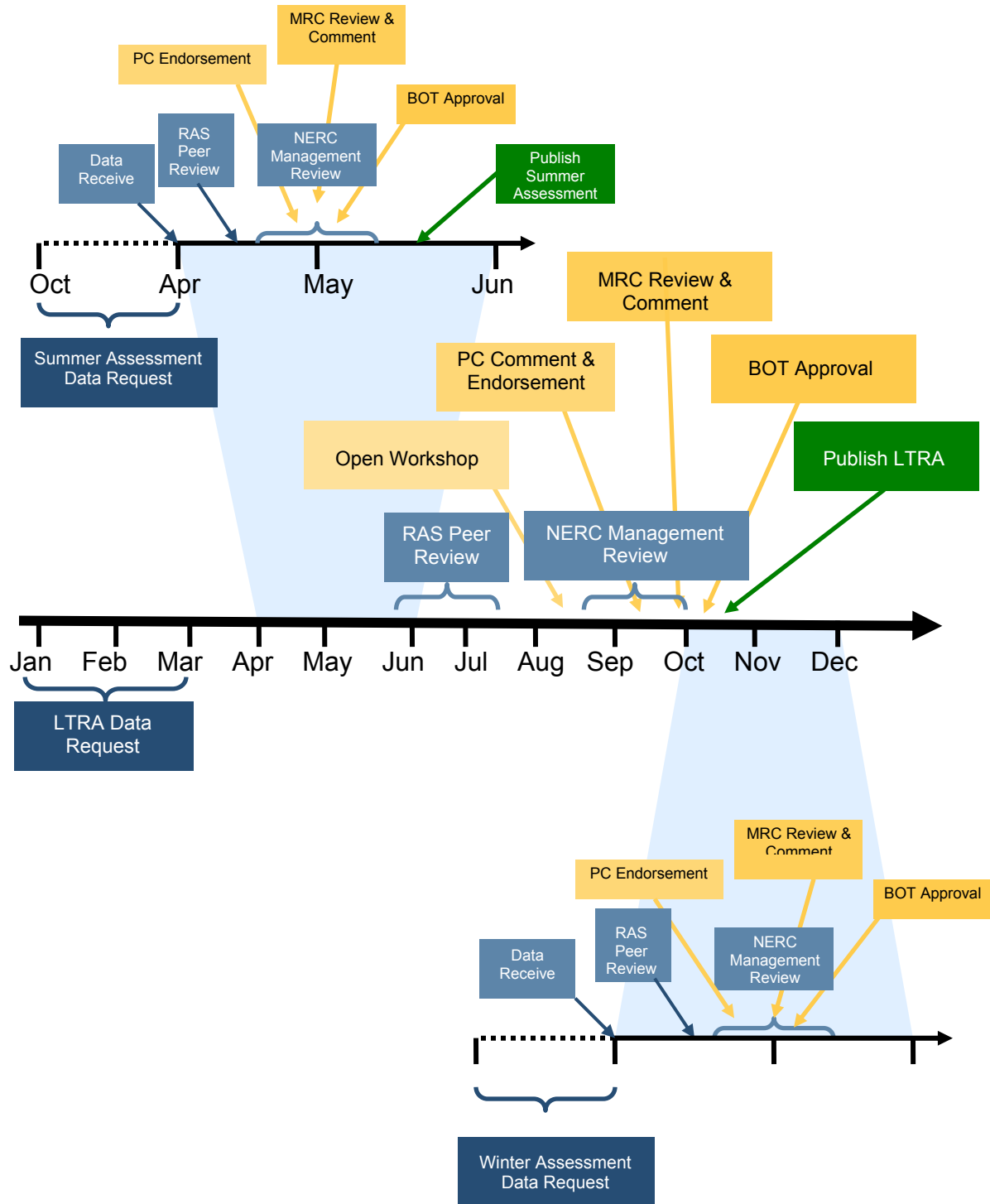
NERC staff provides its independent assessment along with judgment on existing and emerging issues influencing the reliability of the bulk power system. To obtain a broader perspective of emerging issues, information and data collected from other sources (such as FERC, DOE, or industry associations) are used to supplement this evaluation.

The entire document, including NERC's independent assessment and the regional self-assessments, is reviewed by the Operating and Member Representatives Committee and, finally, endorsed by the Planning Committee (PC) for approval by the NERC Board of Trustees.

NERC's Annual Assessments		
Assessment	Outlook	Published
Summer Assessment	Upcoming season	May
Long-Term Assessment	10 year	October
Winter Assessment	Upcoming season	November

A high level annual schedule for annual reliability assessments is shown in Figure 1:

Figure 1: Reliability Assessment Schedule



3.0 Principles

Improvements to the reliability assessment process are needed at both NERC and the Regional Entities. The reliability assessments submitted by the NERC Regional Entities must be improved to support the requirements of NERC's Planning Committee and its Subcommittees. Reliability assessment starts with the regional entities who appraise bulk power system reliability of NERC registered entities within their footprint. The Task Force members agreed upon some fundamental principles:

1. **Transparency & Granularity:** establishment of NERC as a self-regulatory organization amplified the need to enhance seasonal and long-term assessments. Expectations of both FERC (see Appendix III) and NERC appreciably changed required transparency and granularity. These expectations need to be clarified, documented and distributed to NERC's regional entities and their registered entities.
2. **Consistency:** Reliability analysis should be performed by the Regional Entities who understand regional specifics and bulk power system conditions being assessed. The analysis must be performed in a more systematic way with consistent rigor, including scenario investigation, the inclusion of risk assessments and ultimately appropriate probabilistic analysis. The results of regional analyses should be reported using a set of consistently-defined metrics with sufficient granularity to support robust assessment of regional and NERC-wide reliability. Also, NERC staff should increase their involvement at the regional level with the intent to facilitate consistency in the analysis, increase knowledge of specific regional issues and provide input to the final regional assessments.
3. **Independence:** Independent evaluation of the regional assessments by NERC's stakeholders and NERC staff will provide the independence required to ensure unbiased evaluation. The method used by the regions to conduct these assessments should be subject to peer review through the Reliability Assessment Subcommittee.

4.0 Enhancing Reliability Assessments

As mentioned above, industry requirements and needs have shifted now requiring a more comprehensive reliability assessment. The seasonal and long-term reports document the assessments performed and provide a platform from which the industry speaks about the upcoming seasonal and long-term reliability of the bulk power system.

Therefore, to support this fundamental shift, a reliability assessment guidebook outlining expectations is needed to provide direction for the regional entity reliability assessments. Among other items, this guidebook should define the requisite consistency in application and computation of metrics required to understand reliability trends and identify specific reliability challenges.

Reliability assessments now require a higher degree of transparency. A more comprehensive and consistent set of resource definitions is now required to portray a higher resolution of resource acquisitions strategies experienced in each of the regions or subregions. For example, based on the definitions used in 2007 (“Committed & Uncommitted”)⁶, in many cases capacity margins became opaque after the 1-5 year timeframe because the definitions of “committed” and “uncommitted” resources were open to interpretation and inconsistently applied. This inconsistency further complicates the interpretation of resource adequacy that is already unclear in the later years of the assessment period due to uncertainties surrounding fuel supply, transmission capacity, and regulatory changes (See Figure 2).

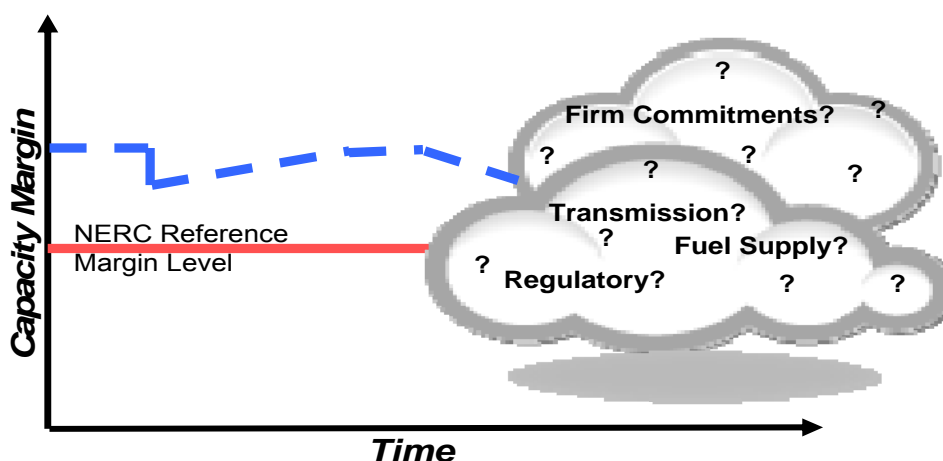


Figure 2: Future Uncertainty Clouds Resource Acquisition

⁶ **Committed Capacity Resources** — Generating capacity resources that are existing, under construction, or planned that are considered available, deliverable, and committed to serve demand, plus the net of capacity purchases and sales.

Uncommitted Capacity Resources — Capacity resources that include one or more of the following:

- Generating resources that have not been contracted nor have legal or regulatory obligation to deliver at time of peak.
- Generating resources that do not have or do not plan to have firm transmission service reserved (or its equivalent) or capacity injection rights to deliver the expected output to load within the region.
- Generating resources that have not had a transmission study conducted to determine the level of deliverability.
- Generating resources that are designated as energy-only resources or have elected to be classified as energy-only resources. Transmission-constrained generating resources that have known physical deliverability limitations to load within the region.

Figure 3 below is an example of the information provided with the “committed” and “uncommitted” capacity categorization. This graph illustrates the bandwidth between available and potential capacity margin⁷ is significant and grows over time, making an assessment of the underlying uncertainties impossible to identify and evaluate when assessing how target reliability margins are maintained.

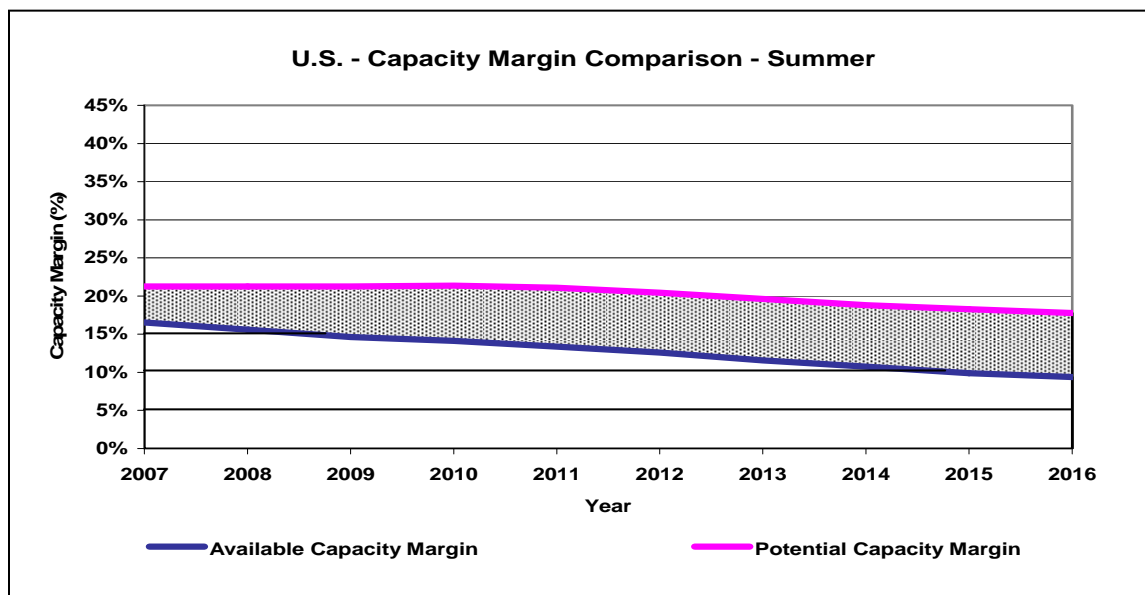


Figure 3: “Committed” & “Uncommitted” Supply-Side Resources in 2007 LTRA

The Task Force observations were:

1. **New supply-side resource categories are required to increase granularity.** The Task Force members developed updated categories, which were approved for use by the PC at its December 2007 meeting. These were used for the 2008 LTRA, and Seasonal Assessments. To better understand the resource acquisition strategy and the relative resource certainty, a layered resource graph (see Figure 4), deploying more detailed resource categorization, can show the risk profile for future resources to meet capacity margins. As an example, referring to Figure 4, the reliability assessment can be more focused by inquiring specifically about the status and confidence level associated with the planned resources, since those resources are required to meet the target margin within the first two years of the assessment period. These categories are being further enhanced to include market resources and long-range conceptual resources in 2009 (See Appendix V).

⁷ **Available Capacity Margin** — The difference between *committed* capacity resources and peak demand, expressed as a percentage of capacity resources.

Potential Capacity Margin — The difference between *committed* plus *uncommitted* capacity resources and peak demand, expressed as a percentage of capacity resources. This is the capacity that could be available to cover random factors such as forced outages of generating equipment, demand forecast errors, weather extremes, and capacity service schedule slippage.

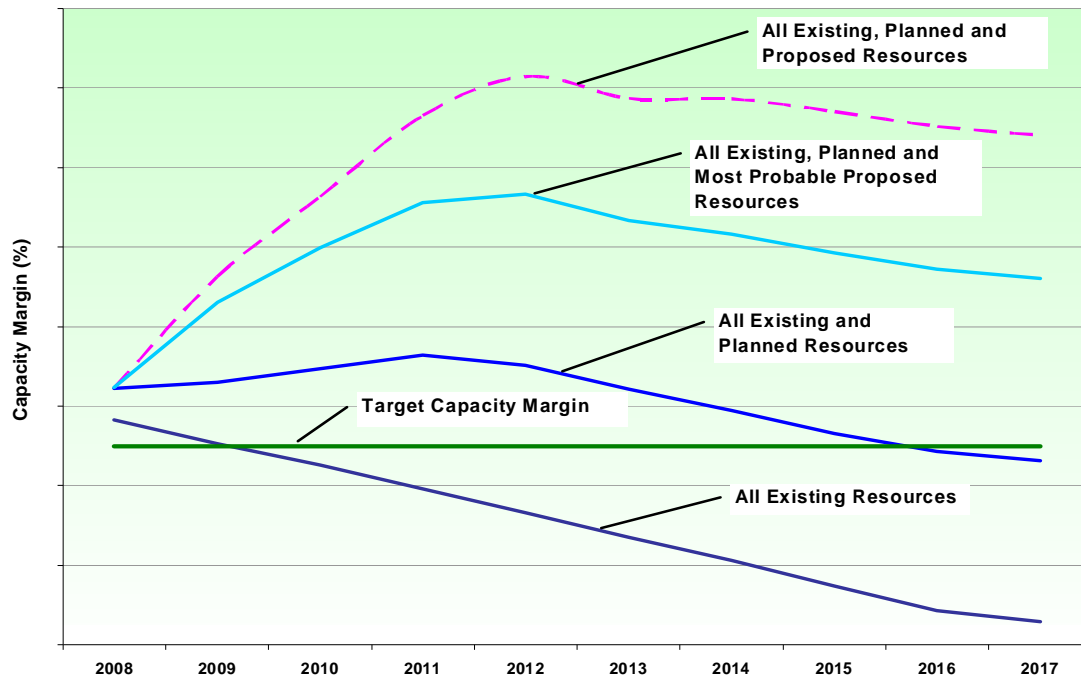


Figure 4: Layers Resource Acquisition Plan

- 2. Broader demand-side resource categories are needed along with a better understanding of the influence of these resources on bulk power system reliability from integrating large quantities of demand response.** The Demand-Side Management Task Force (DSMTF) issued their final report⁸ outlining categories of demand-side resources which were incorporated into the 2008 assessments (See Figure 5). Work continues to develop ongoing performance statistics with the Demand Response Data Task Force (DRDTF). The objectives of this task force are to identify how to collect Demand Response (DR) event data: then design a data collection system, obtain suitable authorization for data collection and begin the data collection process.

⁸ ftp://ftp.nerc.com/pub/sys/all_updl/docs/pubs/NERC_DSMTF_Report_040308.pdf

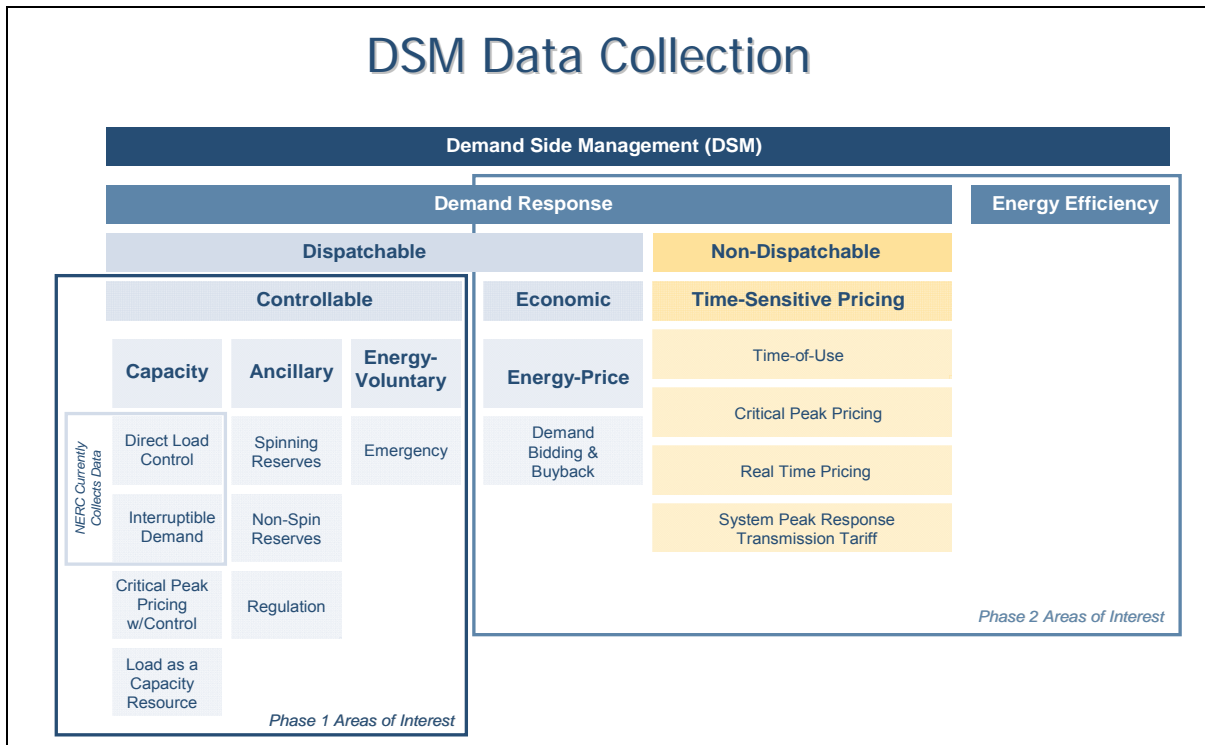
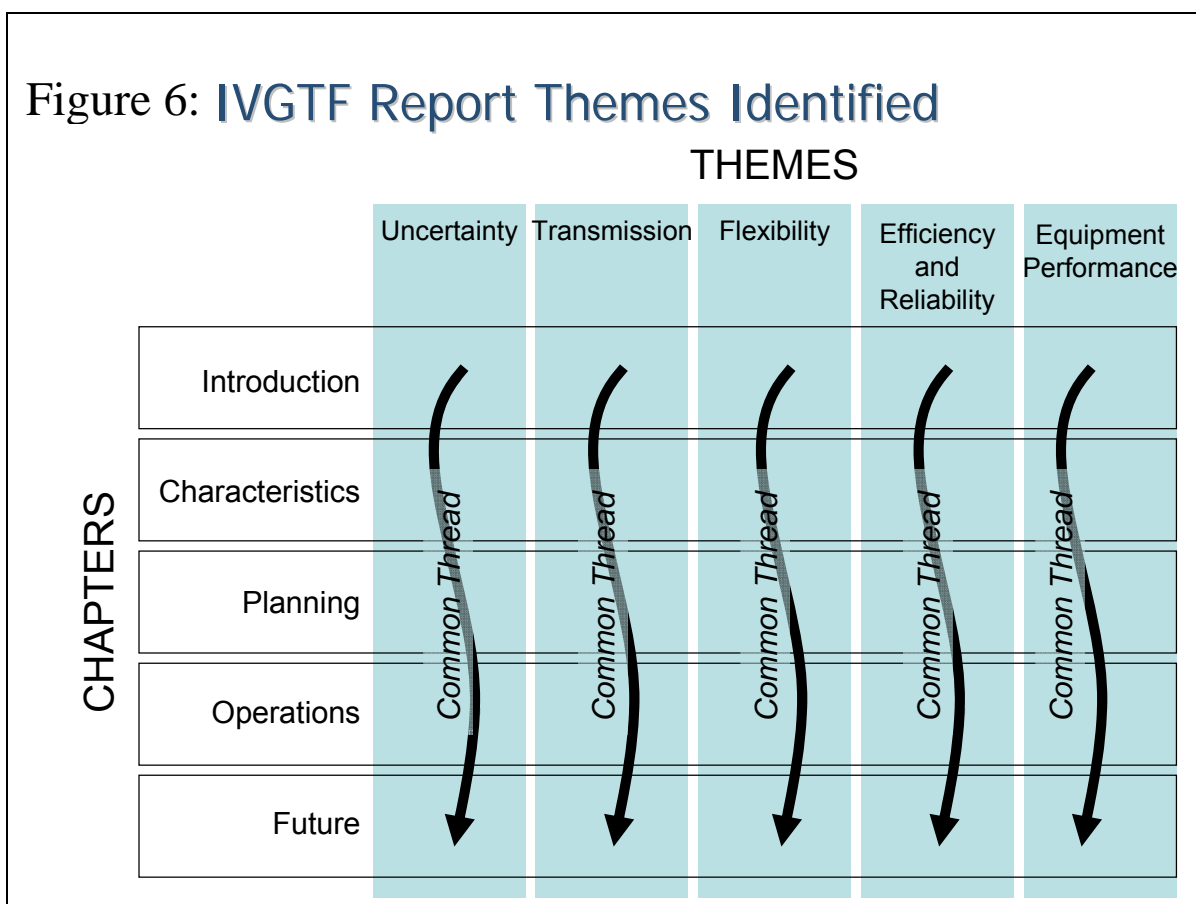


Figure 5: Demand Side Management Categorization

3. **Integration of large amounts of variable generation require further study to incorporate their impacts on bulk power system reliability.** The Integration of Variable Generation Task Force (IVGTF) is currently developing its report and recommendations (See Figure 6). The Task Force will prepare 1) a concepts document that includes the philosophical and technical considerations for integrating variable resources into the Interconnection, and 2) specific recommendations for practices and requirements, including reliability standards, that cover the planning, operations planning, and real-time operating timeframes. The document will include:

- Planning timeframe issues, such as contribution to reserve margins and modeling requirements to test system reliability,
- Operational Planning and Real-time operating timeframe issues, including Interconnection frequency, and primary and secondary generation control
- Gaps in NERC Standards, and
- Conclusions and recommendations.



4. **The 1-5 year and 6-10 year timeframes within the LTRA window should be differentiated. The 1-5 year long-term assessment timeframe would have a much higher degree of confidence than the 6-10 year long-term assessment timeframe.** This distinction requires different metrics measuring sensitivity to a variety of scenarios providing a basis for a bounded assessment⁹. More metrics beyond capacity margin are required for a deeper reliability assessment, including bulk transmission adequacy. It should also be possible to use some of these metrics for “post-mortem” trending for a comparative analysis of the accuracy of seasonal and long-term assessments. The Reliability Metrics Working Group (RMWG) is currently engaged in developing broader metrics for these purposes.

5. **Scenario analysis should be incorporated into the LTRA as an additional enhancement to support reliability assessment.** To implement this, the NERC Planning Committee adopted a process in December 2007 that includes identification of emerging issues, based on input from its subcommittees, for possible regional and NERC-wide evaluation. Transmission and resource (including internal demand) emerging issues will be proposed for Planning Committee consideration, and if an issue is selected for a scenario assessment, this scenario

⁹ This approach mirrors NERC’s TPL Standards highlighting these two time periods, providing specific requirements for each.

would be provided for regional entity reliability assessment as part of the data requests. Based on input from the industry, analysis could include both adequacy and security issues which are affected by issues such as:

- Substantial Non-dispatchable Resources Penetration
- High level of Demand Response Penetration¹⁰
- Weather uncertainty evaluation
- Gas deliverability and supply
- Capacity planning indicators that are separate from energy planning indicators
- Nuclear scenarios, e.g. what if large nuclear units do not come on-line?
- Transformation from summer to winter peaking in some regions

PC selected scenarios should be summarized by the Regional Entities as part of their submitted regional assessments. Full reports could be provided to NERC¹¹ as supporting documentation for regional and long-term reliability assessments when they become available. Figure 7 shows the recommended flowchart for this process (as approved by the PC in December 2007).

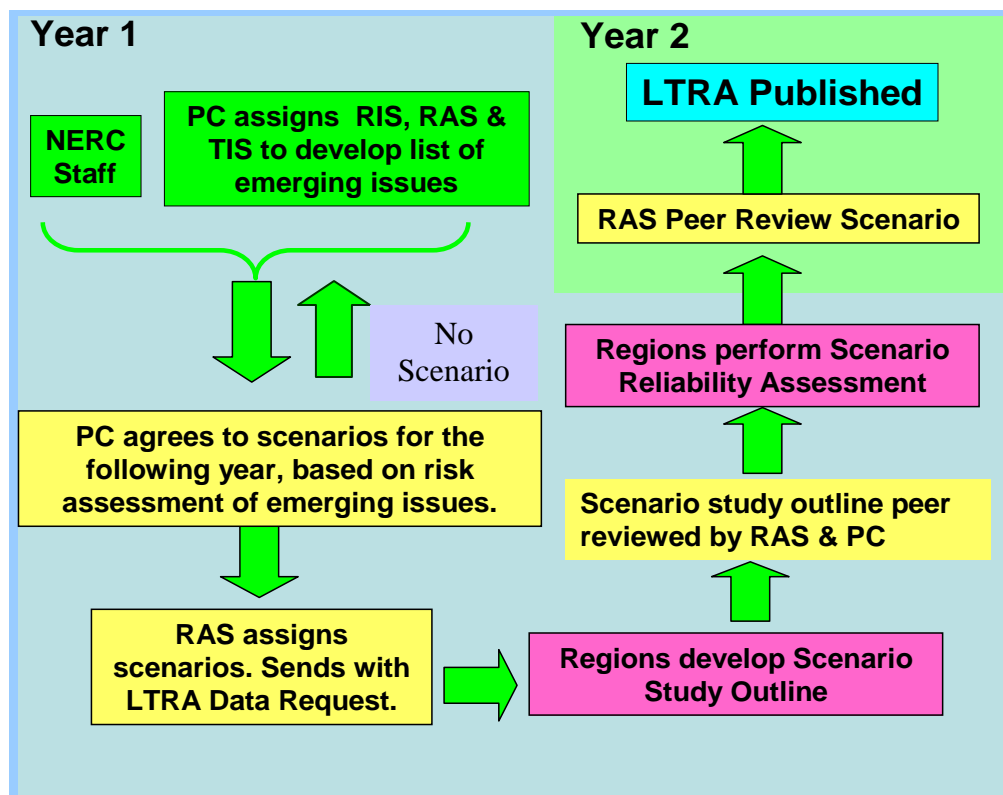


Figure 7: 2008 Emerging Issues and Scenario Analysis

The scenario selection and risk assessment process is provided in Appendix IV.

¹⁰ This activity has been taken up by the (Demand-Side Management Task Force), under the direction of the Resource Issues Subcommittee.

¹¹ Confidential Information will be handled by NERC staff, following Section 1500 of NERC's Rules 7 Procedures ([ftp://www.nerc.com/pub/sys/all_updl/rop/NERCRulesofProcedure-Complete.pdf](http://www.nerc.com/pub/sys/all_updl/rop/NERCRulesofProcedure-Complete.pdf))

5.0 2008-2010 Improvement Plan

The planned improvements for the NERC Long-Term Reliability Assessment (LTRA) and future assessments are identified below in the form of two objectives. As there generally is a one year lag between the time the proposals are vetted and approved for implementation, the activities outlines cover the years 2008-09 Planning Committee activities supporting the reliability assessment improvements for 2008-2010 (See Appendix IX for the Approved Plan). The activities that each subgroup of the NERC PC is undertaking in support of this improvement plan, including estimated timelines, are described under each objective.

Objectives

1. Increase the transparency in reporting regional resource adequacy assessment results (process related items)

- 1.1. Expand categorization of planned supply-side resources with new categories
- 1.2. Develop a NERC Reliability Assessment Guidebook
- 1.3. Develop generation and transmission metrics with sufficient granularity to support reliability assessment
- 1.4. Increase subregional granularity
- 1.5. Include risk analysis and probabilistic studies
- 1.6. Address any other issues identified by the PC and its Subcommittees

2. Enhance the technical, substantive content of the reliability assessments (*this objective will be facilitated in part by proposed changes to the NERC TPL standards*)

- 2.1. Incorporate risk-based, PC-prioritized emerging issues supporting regional scenario analysis.
- 2.2. Review Seasonal assessment reporting cycle
- 2.3. Incorporate more detailed analysis of the influence of key emerging issues on reliability.
 - 2.3.1. Detailed reporting of DSM projections and performance.
 - 2.3.2. Detailed reporting and discussion of variable/energy-limited generation.
 - 2.3.3. Off-peak assessment for generation, demand and transmission resources
 - 2.3.4. Reactive reserve assessment
 - 2.3.5. Generating/fuel interdependency analysis
 - 2.3.6. Stability study results
- 2.4. Address any other issues identified by the PC and its Subcommittees

2008-10 Work Plan

These are the proposed 2008-10 improvements and work plan recommended by the RAITF to the PC. Overall work plan and schedules can be found in Appendix VI-IX.

1. Increase the transparency in reporting regional resource adequacy assessment results (process related items)

The goal of this effort is to provide more consistency and transparency in reporting regional resource adequacy assessment results, including but not limited to identification of region/subregion target margin levels; the basis for target margins; sensitivity analyses; load forecast assumptions; resource deliverability; etc.

1.1. Expand categorization of planned supply-side resources with new categories

- **RAITF (2008)**
Recommendation to refine capacity definitions to increase the clarity of expected resources (An alternative to “committed/uncommitted” resources). RAITF also has an ongoing assignment to propose other/additional changes to the definitions for the 2009 LTRA
- **RAS & DCWG (2008)**
Integrating new resource definitions into 2008 LTRA data request. Additional definition enhancements will be integrated, upon PC approval, for the 2009 LTRA.

1.2. Develop a NERC Reliability Assessment Guidebook

- **RAITF (2008)**
Recommended the development of a Reliability Assessment Guidebook.
- **RAGTF (Reliability Assessment Guidebook *ad hoc* Task Force) (2008)**
Responsible for the development of a Reliability Assessment Guidebook for Regional Entities. The guidebook will outline the expectations of the Planning Committee in performing reliability assessment. Consistency will be sought in data collection and assessment approaches, including load forecasting, system studies, capacity categorization, etc. Examples will be developed to support the guidebook development.
- **RAS, DCWG & LFWG (2008-2010)**
Support the development and maintenance of the Reliability Assessment Guidebook for the Regional Entities to use in developing their regional self-assessments and reporting data requested by NERC.

1.3. Develop generation and transmission metrics with sufficient granularity to support reliability assessment

- **RAITF (2008)**

PC approved recommendation to establish consistently-defined metrics with suitable granularity for long-term reliability assessments.

- **Reliability Metrics Working Group (RMWG) (2008-09)**
Working Group will develop metrics useful for granular comparisons.
- RFC has committed to increased the data granularity for the 2008 LTRA (2008)
-

1.4. Increase Subregional Granularity

- **RIS (2009)**
Develop an approach and metrics to determine subregional reliability and identify potential concerns.

1.5. Include Risk Analysis and Probabilistic Studies

- **Ad Hoc Task Force reporting to the PC (2009)**
Develop a probabilistic approach and metrics to determine regional and subregional reliability, identifying potential concerns.

2. Enhance the technical content of the reliability assessments

The goal of this objective is to investigate the influence on reliability of emerging issues driven by policies and technologies. In some cases, scenario analysis is desired while in others, analysis of individual items with reports and recommendations will be developed.

2.1. Incorporate risk-based, PC-prioritized emerging issues supporting regional scenario analysis

- **RAITF (2008)**
 - RAITF recommendations for Scenario Analysis were approved by the PC in December, 2007. The improved process was approved by the PC in March, 2008.
 - RAITF recommends TIS and RIS review and expand the long-term emerging issues in the 2009 LTRA.
- **RAS (2008-2010)**
 - 2007 Scenarios Assessments by the regions (to be reported in the 2009 LTRA) were assigned by the PC:
 - Scenario #1: Study renewable integration in 2009. If there is little or no impact of Scenario #1, then the region must perform Scenario #2.
 - Scenario #2: A scenario chosen by the region for study in 2009.
 - Details of scenario plans proposed by regions/sub-regions, coordinated and reviewed by RAS, were approved at the PC's June 2008 meeting.
 - Develop emerging issues for the 2009-10 LTRA, as directed by the PC

- Regions are to develop assessment outlines in 2008 for resource adequacy assessment for the assigned scenario, to be carried out and the results included in the 2009 LTRA.
- The PC will annually decide, based on risk assessment of emerging issues, the need for, and specification of, scenarios for future study.
- Develop the 2008 Emerging Issues for PC risk assessment
- **PC (2008-2010)**
 - Perform Risk assessment on emerging issues identified by TIS, RIS and RAS
- **RAS, TIS & RIS (2009-10)**
 - TIS & RIS to develop a comprehensive list of emerging issues, to be prioritized by the PC with a risk assessment survey.

2.2. Review Seasonal assessment reporting cycle

- **RAS (2009)**
 - Review and make recommendation to the PC regarding the current timing for publication of the seasonal assessments.

2.3. Incorporate more detailed analysis of the influence of key emerging issues on reliability

NERC Staff, PC and its subcommittees continue to review the horizon to identify key emerging issues influencing reliability.

2.3.1. Detailed reporting of DSM projections and performance.

- **RIS (2008)**

A task force (Demand Response Data Task Force, DRDTF) reporting to RIS will develop data collection to measure demand response influence on reliability and suitable consistent methods for their inclusion in reliability assessment.
- **Demand Response Data Task Force (DRDTF) (2008)**
 - PC approved the demand side management Task Force's recommendations at its December 2007 meeting. This group is now dissolved. The DRDTF was directed to collect demand response data in a two-phase approach:
 - **Phase I:** Validate the glossary and metrics in this report and create data collection manuals required to support metric development for Demand Response (DR). This will include data collected for historic Dispatchable Controllable DR.

- **Phase II:** Once the Phase I data collection and analysis has begun, augment it to include the identified Phase II requirements. DR data collection to be expanded to collect both historic/forecast Dispatchable Economic DR and Non-Dispatchable DR.

2.3.2. Detailed reporting and discussion of variable/energy-limited generation

- **Integration of Variable Generation Task Force (IVGTF)**
PC/OC formed this task force at their December 2007 meeting (Task Force report expected by September 2008).

2.3.3. Off-peak assessment for generation, demand and transmission resources

- **TIS (2009)**
Develop a proposal to including transmission reliability during off-peak
- **RIS (2009)**
Develop a proposal for including generation and demand resource reliability during off-peak periods

2.3.4. Reactive reserve assessment

- **TIS (2009)**
Develop a proposal to include reactive reserves into reliability assessments

2.3.5. Generating/fuel interdependency analysis

- **Ad Hoc task force reporting to the PC (2009)**
Identify how best to include generation/fuel interdependency into reliability assessments. Use the existing report¹² as a starting point.

2.3.6. Add Stability study results

- **TIS (2009)**
Develop a proposal to report stability (long-term, mid-term, transient, voltage and small-signal stabilities) analysis into reliability assessments

The following appendices provide background the aforementioned plan:

- Appendix VI: Reliability Assessment Improvement Timeline
- Appendix VII: Recommended Assignment Matrix.
- Appendix VIII: Reliability assessment timeline.
- Appendix IX: 2008-2010 Improvement Plans.

¹²http://www.nerc.com/pub/sys/all_updl/docs/pubs/Gas_Electricity_Interdependencies_and_Recommendations.pdf

Appendix I: Roster of the Reliability Assessment Improvement Task Force

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Appendix II: Reliability Assessment Improvement Task Force

Purpose

The task force will:

1. Review the current reliability assessment requirements and process used by NERC, Regional Entities, and the Planning Committee (including its subgroups) to develop the current reliability assessments (seasonal and long-term) including the development of information regarding emerging issues,
2. Using input from FERC, DOE, NERC, industry stakeholders, various Federal and State laws, and others as the Task Force deems necessary, the Task Force is to assist NERC with identifying the reliability assessment requirements and the process to be used by NERC and the Planning Committee to develop such reliability assessments, including the development of information regarding emerging issues, and
3. Based on any differences between the current and future requirements and process, the Task Force is to recommend immediate, and long-range, process enhancements and improvements, including timeline for implementation, to be used by NERC and the Planning Committee for the development of reliability assessments including information for emerging issues.

The Task Force shall immediately begin its work and is requested to submit a status report, including any preliminary recommendations, to the Planning Committee at its September, 2007 meeting followed by a final report at its December, 2007 meeting.

Background

Under Section 215(g) of the Federal Power Act, one of the ERO's (NERC's) duties is to "*conduct periodic assessments of the reliability and adequacy of the bulk-power system in North America.*" Further, NERC's Rules of Procedures, sections 802-805 identify the specifics of Reliability Assessments while sections 806-811 the Reliability Performance Analysis.

In light of the current FERC reviewed version of "Rules of Procedures for the North American Electric Reliability Corporation" and guidance in FERC's Order 672, the Planning Committee, regards the current processes requiring improvement to meet the needs of the ERO and its stakeholders.

Membership

Membership consists of four to five current Planning Committee members, including a chair, and the support from NERC's staff.

Appendix III: Rules Concerning Certification

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION
18 CFR Part 39

(Docket No. RM05-30-000; Order No. 672)

Rules Concerning Certification of the Electric Reliability Organization; and
Procedures for the Establishment, Approval, and Enforcement of Electric
Reliability Standards
(Issued February 3, 2006)

Paragraphs:

803. The Final Rule requires the ERO to provide to the Commission two types of periodic reliability reports. First, the ERO must conduct reliability assessments and report its findings to the Commission regarding the overall state of the Reliable Operation of the Bulk-Power System. Second, the ERO must conduct assessments of the adequacy of the Bulk-Power System and report its findings to the Commission, the Secretary of Energy, each Regional Entity and each Regional Advisory Body.

805. With respect to the concerns about the scope and content of the reliability and adequacy assessments prepared by the ERO, the Commission expects each assessment to be comprehensive in order for the Commission, the ERO, and the Regional Entities to fulfill their respective oversight responsibilities. As will be established in later proceedings, we would expect that such assessments could include, for example, operating and planning reports, reports of ongoing activities such as readiness audits, seasonal reliability assessments, as well as relevant recommendations. In addition, the Commission may determine that reliability and adequacy assessments should include appropriate metrics, if applicable, to assist the Commission in monitoring actual reliability performance and plans.

Appendix IV: 2008 Scenario Analysis

Background

Each year, NERC's staff and its technical committees prepare a 10-year *Long-Term Reliability Assessment* (LTRA). This preparation includes data concentrated on Summer and Winter peak internal demand and associated demand and supply capacity, along with separately written regional self-assessments. These assessments form the basis for the *NERC reference case*, for which detailed analysis and discussion follows. The reference case generally is based on the assumption that policy/regulations will be constant throughout the studied timeframe and a variety of economic growth, weather patterns and system equipment behaves as expected, usually based on historic performance trends.

Scenario analysis can indicate the relative sensitivity of the reference case to changes in pre-specified conditions and may provide some insight into risks to regional reliability. Based on feedback from FERC and industry, a deeper understanding is desired regarding the potential reliability implications of a focused spectrum of reference case sensitivities. Development of a small set of scenarios for comparison to the reference case is an extremely valuable way to better understand the robustness of the reference case and to study potential impacts of scenarios on reliability.

For the 2008 LTRA cycle, NERC will begin development of plans to address scenarios identified in the 2007 LTRA. The plans developed to address the scenarios will be studied during 2008, and the results will then be reported by the regions for comparative purposes in 2009 LTRA. In the summer of 2008, the Planning Committee will be requested to prioritize emerging issues for possible scenario assessment plans developed in 2009 for study in 2010, using a simplified risk analysis approach. This process will continue in this fashion so that the LTRA will include not only the reference case, but also specific scenario analysis if a scenario is chosen by the PC. Figure below outlines the enhanced process.

Scenario Assessment

Based on the RAITF recommendations, two 2008 regional scenarios were assigned to RAS by the PC:

- Scenario #1: Study renewable integration in 2009. If there is little or no impact of Scenario #1, then the region must perform Scenario #2.
- Scenario #2: A scenario picked by the region for study in 2009.

2008 LTRA Submission

Regions are to develop assessment outlines in 2008 for resource adequacy assessment for the assigned scenario, to be carried out and the results included in the 2009 LTRA. Details of scenarios plans would be proposed by regions/sub-regions, coordinated and reviewed by RAS, and approved by the PC at its June 2008 meeting.

2009 LTRA Submission

As part of the cycle for the 2009 LTRA submission, NERC will request a qualitative and quantitative analysis, conforming to the study plan submitted as part of the 2008 LTRA.

Template for Submittal

For consistent submittal, a template for scenario submittal was developed by the Reliability Assessment Subcommittee. The risk assessment process the PC will follow was also outlined in this template, and shown below.

Emerging Issue Template

Background, Qualification and Submittal

Background

Each year, the 10-year *Long-Term Reliability Assessment* (LTRA) forms a basis for the NERC *reference case*. The reference case is generally based on the assumption that policy/regulations will be constant throughout the studied timeframe and a variety of economic trends, weather patterns and system equipment behaves as expected, usually based on historic performance trends.

Emerging issue analysis supports the development of scenarios, analysis of which can indicate the sensitivity of the reference case to changes in pre-specified conditions and provide insight into risks to regional reliability. Development of a small set of scenarios for comparison to the *reference case* is a valuable way to better understand the robustness of the reference case and to study potential impacts of scenarios on reliability.

In support of this effort, NERC's Planning Committee (PC) has charged the Transmission Issues, Resource Issues and Reliability Assessment Subcommittees each to submit 3 to 5 high priority plausible emerging issues that could impact the bulk power system reliability over the next 10 years.

The PC will then prioritize the resulting emerging issues using a risk assessment matrix (Attachment I) and, based on the results and PC member judgments, they may select potential scenario(s) for study in the future. For each emerging issue, it is important to understand the impact on bulk power system reliability and influence on planning, operations and resources plans.

Emerging Issue Qualification

To qualify for consideration in this process, candidate emerging issues must meet the following criteria:

- Subcommittees should have a high degree of confidence that the emerging issue to be evaluated would affect the reliability of the bulk power system for more than a single year in the LTRA time period (10 year assessment window)
- The effects of the emerging issue on reliability are projected to be seen in the region no sooner than 3 years out, to allow sufficient time for analysis
- The effects of the emerging issue should represent a potentially significant impact to the bulk power system reliability across at least a regional footprint, and should not be a local/subregional reliability issue more effectively assessed by the affected Transmission Planners/Planning Authorities.

Template for Submittal

For each candidate emerging issues, submitted to Mark Lauby (mark.lauby@nerc.net) by **May 2, 2008**, provide:

Emerging Issue #X: Title of Emerging Issue here.

Specifications of Emerging Issue #X

Emerging Issue	Item	Specifics
Horizon	Number of years	
Background	What is the change from the reference case?	
	What changes during the 10-year horizon?	
	What is the impact to regional reliability?	
Assessment Factors ¹³	Resource Adequacy Considerations [Yes/No]?	
	Transmission Adequacy Considerations [Yes/No]?	
	Resource Siting Impacts [Yes/No]?	
	Operations Impacts [Yes/No]?	
Potential Study Scenarios (optional)	Describe assumptions	
	Provide guidance on future studies	

¹³ If “Yes” explain how this item could be affected

The information in this table should be of sufficient detail to allow the PC to conduct its risk assessment & ranking exercise. The optional Potential Study Scenarios section, if completed, can assist the RAS in understanding how the emerging issue could impact bulk system reliability. Additional information will be collected by RAS for those emerging issues that are selected and approved by the PC for consideration in the LTRA assessment cycle.

An example Emerging Issue submittal can be found in Attachment II.

Attachment I

Reliability Impact Ranking:

The following question IS DESIGNED TO GATHER information on your view of each of the emerging issues below along with your RANKING of the LIKELIHOOD and how SEVERE the impact would be on bulk power system reliability.

INDIVIDUAL RESPONSES WILL BE KEPT CONFIDENTIAL.

What do you believe is the LIKELIHOOD of occurrence and how SEVERE the impact would be on bulk power reliability for each of the following?

Please indicate H (High), M (Medium), or L (Low).

Issue	Likelihood						Consequence					
	1-5 Years			6-10 Years			1-5 Years			6-10 years		
	H	M	L	H	M	L	H	M	L	H	M	L
Emerging Issue #1												
Emerging Issue #2												
Emerging Issue #3												
Etc...												

Ranking – User Identified

User Identified Issue	Likelihood						Consequence					
	1-5 Years			6-10 Years			1-5 Years			6-10 years		
	H	M	L	H	M	L	H	M	L	H	M	L
Emerging Issue #1												
Emerging Issue #2												
Emerging Issue #3												
Etc...												

Attachment II

Example Emerging Issue Submittal

Emerging Issue #1: Accelerated integration of renewable capacity

Emerging Issue	Item	Specifics
Horizon	Number of years	10 years
Background	What is the change from the reference case?	Significant penetration of renewable and demand response resources (up to 15 % of all energy)
	What changes during the horizon?	Ramp to 15% energy should not be instantaneous, but at a rate that can be integrated while sustaining bulk power system reliability. Renewable and demand response resources in place at the end of 10 years.
	What is the impact to regional reliability?	Weather patterns of the region/subregion, the variety of renewable sources installed, the existing generation mix, and the bulk power system transfer capability with neighboring areas all influence amount of penetration of variable resources. Another consideration is the availability of ancillary services and system re-dispatch needed to support reliable operation.
Assessment Factors ¹⁴	Resource Adequacy Considerations [Yes/No]?	Yes. Significant changes in capacity mix: both in fuel and type. Incorporating both renewable and demand response will require new planning and operational strategies.
	Transmission Adequacy Considerations [Yes/No]?	Yes. Significant increase in transmission requirements may be required to support the delivery of the renewable resources.
	Resource Siting Impacts [Yes/No]?	Yes. Wind is not a portable fuel and must be sited where it is prominent.
	Operations Impacts [Yes/No]?	Yes. Managing the variability of the generating resources and demand response will require more flexibility in the power system. The changes in the bulk power system flows from both the variable generation and demand response implementation must be better understood.
Potential Study Scenarios (optional)	Describe assumptions	Accommodate a minimum of an additional 15% of total energy from new renewable sources, with no more than 5% made up from energy efficiency. The base year for energy is 2008
	Provide guidance on future studies	Substantial change in on-peak (demand response and variable/traditional capacity) and off-peak a(variable generation) capacity mix could influence reliability, as planning approaches need more study. Namely, what are the appropriate tests to perform to ensure bulk power system reliability? Further, transmission requirements may significantly change.

¹⁴ If “Yes” explain how this item could be affected

Appendix V: Proposed Generating Capacity and Resource Categories for 2009

[As submitted to the NERC Planning Committee in September 2008]

All existing and future (including conceptual) resources must be reported in one of the following categories. Resources may not be double counted across categories. It is up to the reporting entity as to which category resources are reported. Best judgment should be exercised in the determination of which category to report resources.

Resources that are contained within the region's and/or subregion's physical or electrical boundary must be reported by that region and/or subregion. Resources that are located outside of a certain reporting region's and/or subregion's physical footprint but are electrically connected only to that reporting region's and/or subregion's system should be reported by that region and/or subregion. The output of resources that cross boundaries to serve load should be reported as a purchase or sale.

I. EXISTING GENERATION RESOURCES

I.A. – Existing, Certain — Existing generation resources available to operate and deliver power within or into the region during the period of analysis in the assessment. Resources included in this category may be reported as a portion of the full capability of the resource, plant, or unit. This category includes, but is not limited to the following:

- Contracted (or firm) or other similar resource confirmed able to serve load during the period of analysis in the assessment.
- Where organized markets exist, designated market resource¹⁵ that is eligible to bid into a market or has been designated as a firm network resource.
- Network Resource¹⁶, as that term is used for FERC *pro forma* or other regulatory approved tariffs.
- Energy-only resources confirmed able to serve load during the period of analysis in the assessment and will not be curtailed¹⁷
- Capacity resources that can not be sold elsewhere
- Other resources not included in the above categories that have been confirmed able to serve load and not to be curtailed¹⁸ during the period of analysis in the assessment

¹⁵ Curtailable demand or load that is designated as a network resource or bid into a market is not included in this category, but rather must be subtracted from the appropriate category in the demand section.

¹⁶ Curtailable demand or load that is designated as a network resource or bid into a market is not included in this category, but rather must be subtracted from the appropriate category in the demand section.

¹⁷ Energy only resources with transmission service constraints are to be considered in category I.B

¹⁸ Energy only resources with transmission service constraints are to be considered in category I.B

I.B. – Existing, Other — Existing generation resources that may be available to operate and deliver power within or into the region during the period of analysis in the assessment, but may be curtailed or interrupted at any time for various reasons. This category also includes portions of intermittent generation not included in I.A. This category includes, but is not limited to the following:

- A resource with non-firm or other similar transmission arrangements
- Energy-only resources that have been confirmed able to serve load for any reason during the period of analysis in the assessment, but may be curtailed for any reason
- Mothballed generation (that may be returned to service for the period of the assessment)
- Portions of variable generation not counted in the I.A. category (e.g. wind, solar, etc. that may not be available or de-rated during the assessment period)
- Hydro generation not counted as I.A. or de-rated
- Generation resources constrained for other reasons

I.C. – Existing, but Inoperable — This category contains the existing portion of generation resources that are out-of-service and cannot be brought back into service to serve load during the period of analysis in the assessment. However, this category can include inoperable resources that could return to service at some point in the future. This value may vary for future seasons and can be reported as zero (0). This includes all existing generation not included in categories I.A. or I.B., but is not limited to, the following:

- Mothballed generation (that can not be returned to service for the period of the assessment)
- Other existing but out-of-service generation (that can not be returned to service for the period of the assessment)
- This category does not include behind-the-meter generation or non-connected emergency generators that normally do not run.
- This category does not include partially dismantled units that are not forecasted to return to service

All existing generation resources must be counted in I.A., I.B. or I.C. and should not be double counted between these three categories. Where categorization as to the I.A. or I.B. category is not clear, the generation should be designated as I.B.

II. – FUTURE GENERATION RESOURCES

This category includes generation resources the reporting entity has a reasonable expectation of coming online during the period of the assessment. As such, to qualify in either of the Future categories, the resource must have achieved one or more of these milestones:

- Construction has started
- Regulatory permits being approved, any one of the following:
 - Site permit
 - Construction permit
 - Environmental permit
- Regulatory approval has been received to be in the rate base
- Approved power purchase agreement.
- Approved and/or designated as a resource by a market operator

II.A. – Future, Planned —Generation resources anticipated to be available to operate and deliver power within or into the region during the period of analysis in the assessment. This category includes, but is not limited to, the following:

- Contracted (or firm) or other similar resource
- Where organized markets exist, designated market resource¹⁹ that is eligible to bid into a market or has been designated as a firm network resource.
- Network Resource²⁰, as that term is used for FERC *pro forma* or other regulatory approved tariffs.
- Energy-only resources confirmed able to serve load during the period of analysis in the assessment and will not be curtailed²¹
- Where applicable, included in an integrated resource plan under a regulatory environment that mandates resource adequacy requirements and the obligation to serve

II.B. – Future, Other – this category includes future generating resources that do not qualify in II.A. and are not included in the Conceptual category. This category includes, but is not limited to, generation resources during the period of analysis in the assessment that may:

- Be curtailed or interrupted at any time for any reason
- Energy-only resources that may not be able to serve load during the period of analysis in the assessment
- Variable generation not counted in the II.A. category or may not be available or is de-rated during the assessment period
- Hydro generation not counted in category II.A. or de-rated

¹⁹Curtailed demand or load that is designated as a network resource or bid into a market is not included in this category, but rather must be subtracted from the appropriate category in the demand section.

²⁰Curtailed demand or load that is designated as a network resource or bid into a market is not included in this category, but rather must be subtracted from the appropriate category in the demand section.

²¹Energy only resources with transmission service constraints are to be considered in category II.B

III. – CONCEPTUAL GENERATION RESOURCES

Conceptual — This category includes generation resources that are not in a prior listed category, but have been identified and/or announced on a resource planning basis through one or more of the following sources:

- Corporate announcement
- Entered into or is in the early stages of an approval process
- Is in a generator interconnection (or other) queue for study
- “Place-holder” generation for use in modeling, such as generator modeling needed to support NERC Standard TPL analysis, as well as, integrated resource planning resource studies.

Resources included in this category may be adjusted using a confidence factor to reflect uncertainties associated with siting, project development or queue position.

Appendix VI: Reliability Assessment Improvement Timeline

(As presented to the NERC PC in March 2008)

Mar 2008	June 2008	Sept 2008	Dec 2008	Mar 2009
Endorse the improvement tasks	Proposed deliverability methodology	Approval of deliverability methodology	Revisit seasonal assessment reporting cycle	Proposal for including risk analysis & probability studies in LTRA
Approve use of scenario testing for emerging issues	Proposed enhanced capacity definitions	Approval of capacity definitions	Proposal for enhanced subregional granularity	Proposal for inclusion of stability study results
	Draft of the LTRA guidebook	Finalize the guidebook	Proposal for including transmission reliability in off-peak periods	
	Proposal for improved metrics	Finalize metrics	Proposal for including off-peak resource reliability assessments	
	Proposed treatment of DSM	Consistent treatment of variable generation	Proposal for inclusion of reactive reserve assessment	
			Proposal for including transmission reliability metrics	
			Proposal for including transmission reliability assessments in LTRA	
			Proposal for including generating/fuel interdependency	

= For the 2009 LTRA cycle

Appendix VII: Recommended Assignment Matrix

(As presented to the NERC PC in March 2008)

RAITF	RAS	RMWG	RIS	TIS	IVGTF	Ad Hoc
Proposed deliverability methodology	Use of scenario testing for emerging issues	Proposal for improved metrics	Proposed treatment of DSM	Proposal for including transmission reliability in off-peak periods	Consistent treatment of variable generation	Draft of the LTRA guidebook
Proposed enhanced capacity definitions	Revisit seasonal assessment reporting cycle	Proposal for including transmission reliability metrics	Proposal for enhanced subregional granularity	Proposal for inclusion of reactive reserve assessment		Proposal for including risk analysis & probability studies in LTRA
			Proposal for including off-peak resource reliability assessments	Proposal for including transmission reliability assessments in LTRA		Proposal for including generating/fuel interdependency
				Proposal for inclusion of stability study results		

 = For the 2009 LTRA cycle

Appendix IX: 2008–2010 Plan

1. Improve Consistency and Transparency

The goal of this effort is to provide more consistency and transparency in reporting regional resource adequacy assessment results, including but not limited to identification of region/subregion target margin levels; basis for target margins; sensitivity analyses; load forecast assumptions; resource deliverability; etc.

2008 Action Plan

Item #	Proposed Improvement	Abstract	Lead	Deliverables	Milestones
1.1	Better way to deal with resource deliverability	<p>FERC defines "deliverability as "the ability to deliver the output from generation resources to firm load without any reliability criteria violations for plausible generation dispatches." Consistency is particularly challenging between regions as the structure of organizations and associated markets vary.</p> <p>This effort will review current methods used to account for deliverability to determine if deliverability is adequately addressed in the reliability assessments.</p>	RAITF	Method to for reliability assessment to address deliverability and the required enhancements to the Reliability Assessment Guidebook.	<ul style="list-style-type: none"> ● Outline approach at March 2008 PC meeting ● Draft method introduced to the PC in June 2008. ● Regional entities vet method ● Sent to the PC for final approval at the September 2008 meeting.
1.2	Enhanced capacity definitions	Capacity definitions were recently improved by the PC (using earlier RAITF recommendations). Based on the feedback from the entities implementing the new PC definitions, and experience obtained from the data submitted for the 2008 Summer and LTRA with these enhanced capacity definitions, additional enhancements will be reviewed and proposed	RAITF	Enhanced capacity resource definitions	<ul style="list-style-type: none"> ● Explain approach at March 2008 PC meeting ● Draft definition to the PC in June 2008 ● Regional entities vet definitions ● PC approves at its September 2008 meeting.

Item #	Proposed Improvement	Abstract	Lead	Deliverables	Milestones
1.3	Seasonal and Long-Term Reliability Assessment Guidebook to clarify expectations & objectives	Regional entities perform reliability assessments using a variety of tools, assumptions and methodology. There is a need to provide a guidebook, for the regional entities to use in preparation of the assessments and for peer reviewers to ensure consistency in the reliability assessments, outlining NERC's expectations and forming a foundation for a sufficiently robust reliability assessment. The objectives of the reliability assessment guidebook are: a. Clarifying reliability assessment expectations b. Fortify peer review of assessments c. Address inconsistency in regional responses d. Ensure transparency e. Increase linkage between NERC staff and regional assessments f. Balancing areas that cross regional entity boundaries, especially regional transmission organizations (RTOs) and Independent System Operators (ISOs), may require attention as their assessment can be fragmented between two regions and may not accurately reflect reliability	<i>Ad Hoc</i> group: Members from RAITF, DCWG, LFWG	Seasonal and Long-Term Reliability Assessment Guidebook	<ul style="list-style-type: none"> ● PC reviews first draft June 2008 ● PC approval of final draft September 2008 PC

2009-2010 Action Plan

Item #	Proposed Improvement	Abstract	Lead	Deliverables	Milestones
1.4	Seasonal cycle	<p>Seasonal assessments are performed annually for the Summer and reported in May and for the Winter and reported in November. If issues are identified, there is little time for the industry to make modifications and to obtain the support to make seasonal adjustments if required (in fact, the assessments often presume solutions in place that are still being completed at the time the report was drafted). In addition, evaluation of the previous season becomes stale by the time the next summer assessment is produced.</p> <p>To maximize the value of the Summer/Winter seasonal assessments, the assessment results should be available sooner: i.e. the Winter assessment should be completed/reported in May of the prior year, and the Summer assessment completed/ reported in November of the prior year.</p>	RAS	<p>A report identifying the users of the seasonal reports, documenting any benefits of changing the existing cycle for seasonal reliability assessments & identifying the procedure needed to shift the report deadlines with recommendations to maximize the value of the seasonal assessments. Reporting due dates may be the same, but would change to different seasonal data. (e.g. summer data would be due to NERC staff in September).</p>	<ul style="list-style-type: none"> Recommendation to PC December 2008.
1.5	Risk & probability assessments	<p>The RAITF vision of NERC's reliability assessment is to incorporate the results of a probabilistic approach to determining reliability, along with risk analysis results, into both the seasonal and LTRA documents. The effort will identify and advance concepts of the risk & probabilistic analysis methods that could be utilized to support NERC's reliability assessment obligations. This work will be principally reflected in enhancements to the reliability assessment guidebook, and will also include how the data request used in the current LTRA process should be modified.</p>	PC <i>Ad Hoc</i> Task Force	<p>A report with recommendations about what risk & probability analysis methods might be appropriate for reliability assessments, and suggested modifications to the reliability assessment guidebook incorporating these enhancements and what information/data NERC should collect to support this.</p>	<ul style="list-style-type: none"> Study plan discussed with PC at their March 2009 meeting

2. Increase granularity

The goal of this effort is to provide appropriately granular data for use in determining the reliability of the existing and future bulk power system. The information would also be used to compare the relative reliability trends for regions/subregions and the specific elements that significantly impact the reliability.

2008 Action Plan

Item #	Proposed Improvement	Abstract	Lead	Deliverables	Milestones
2.1	Metrics development for 1-5 and 6-10 years	The certainty and granularity of long-term and seasonal reliability assessments are different between the 1-5 year and the 6-10 year timeframes of the 10-year LTRA. In addition, metrics are also needed for seasonal assessments to provide an indication of continuity between the operating and future planning horizons. Meaningful metrics (beyond just capacity margin) are required to more fully assess regional/subregional reliability and adequacy and achieve an appropriate level of granularity; this work will also include considerations about the data that needs to be collected to calculate these metrics.	RMWG	Propose reliability assessment metrics for seasonal assessments along with the 1-5 year and 6-10 year timeframes for the LTRA.	<ul style="list-style-type: none"> Proposed metrics reviewed by PC in June 2008. Final recommendations to PC in September 2008 for approval

2009-2010 Action Plan

Item #	Proposed Improvement	Abstract	Lead	Deliverables	Milestones
2.2	Enhanced subregional granularity	The Long-Term Reliability Assessment currently provides assessment of regions and, in many regions, subregions. Improving the reliability review beyond the subregion level, by defining key load zones, i.e., will more accurately identify potential reliability concerns and provide enhanced understanding of appropriate solutions.	RIS	A report with methods and definitions that increases the granularity of the regional and subregional reliability assessments	<ul style="list-style-type: none"> Recommendation by RIS on next steps at December 2008 PC
2.3	Investigation of transmission reliability during off-peak periods	During shoulder load or off-peak periods, more expensive peak units are often shut down and replaced by importing power from more remote resources. This practice can remove needed local reactive voltage support, and also introduce transmission stability issues. The future addition of variable generation resources, which are often connected as Energy Resources, will also displace Network Resources in these off-peak periods, further taxing the ability of the transmission system to deliver this generation to load. Assessment of the transmission adequacy during the off-peak periods will enhance the understanding of the overall reliability of the regions/subregions.	TIS	<p>Report with recommendations on the value of including a requirement for assessing transmission capability for shoulder load or other off-peak load conditions in the seasonal and LTRA.</p> <p>Recommended enhancements to the Reliability Assessment Guidebook and data collection requirements to support these off-peak assessments.</p>	<ul style="list-style-type: none"> Recommendation by TIS on next steps at December 2008 PC.

Item #	Proposed Improvement	Abstract	Lead	Deliverables	Milestones
2.4	Include off-peak resource reliability assessments in LTRA	The reliability and adequacy of the electric system should be assessed and reported for time frames other than the system peak hour. By computing and reporting capacity margins or other metric in off-peak periods, additional insight can be gained into the overall risks to the system, leading to additional investigations by regions to ensure reliability is not compromised outside the system peak hour.	RIS (with support from RMWG)	Recommendations on possible off-peak periods that should be included in adequacy & reliability assessments, along with metrics to be used in this assessment.	<ul style="list-style-type: none"> Recommendations on next steps to the PC by December 2008.
2.5	Voltage/reactive reserves	Unlike capacity margins, a reactive margin is not easily measured nor is reactive power easily deliverable. But reactive resources, and reactive supplies/reserves, are a key to system reliability. As capacity becomes more remote from demand centers, reactive margins may be eroding and require measurement and reporting in the reliability assessments. A study is needed to identify the appropriate method to assess reactive power adequacy, so that reliability assessment guidebook improvements and any new data collection procedures can be implemented.	TIS	A report on the need for a Standard on reactive margin that ascertains reactive margin as a reliability consideration and recommends methods/approaches for their measure and reporting in reliability assessments	<ul style="list-style-type: none"> Recommendation on next steps from TIS in December 2008
2.6	Reporting on Stability Evaluations	The LTRA currently, through its narrative, can provide a vehicle for regions/subregions to outline the result of stability analysis. The stability studies conducted by the RE documenting the method & contingencies studied, the time frames and type of analysis (transient, mid-term, long-term, voltage and small signal stability) are not discussed. A more comprehensive treatment of stability analysis reported by the regions would enhance independent assessment.	TIS	A report with recommendations for LTRA stability analysis enhancements, and the required enhancements to the Reliability Assessment Guidebook and information NERC should collect in the reliability assessments.	<ul style="list-style-type: none"> Recommendation on next steps from TIS in March 2009

Item #	Proposed Improvement	Abstract	Lead	Deliverables	Milestones
2.7	Transmission Reliability Metrics	Industry accepted measures of transmission reliability are not available, and transmission capability/margins are not easily measured. This effort will identify metrics for reliability assessment reports, consistent with NERC's definition of Adequate Level of Reliability (and building on the work of the TADSTF).	RMWG	A report with recommendations evaluating what transmission reliability metrics should be added to the NERC reliability assessment guidebook and what information NERC should collect to support this.	○ Recommendation on next steps from RMWG in December 2008
2.8	Expansion of transmission reliability evaluations in LTRA	Currently, reliability assessments in the LTRA focus on resource adequacy and reliability, but do not address issues related to reliability of the associated transmission system. This effort would identify what aspects of transmission reliability should be integrated into the LTRA to enhance this report	TIS	Recommendations about what aspects of transmission reliability should be included in the LTRA	○ Recommendations on next steps from the TIS by December 2008.

3. Assess emerging industry issues

The goal of this objective is to investigate the influence on reliability of emerging issues driven by policies and technologies. In some cases, scenario analysis is desired while in others, analysis of individual items, with reports and recommendations will be developed.

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Item #	Proposed Improvement	Abstract	Lead	Deliverables	Milestones
3.1	Consistent treatment of Variable generation (i.e. solar, wind, etc.) in the analysis of capacity in the calculation of capacity reserves.	In support of renewable energy portfolio standards (RPS), the quantity of variable generation is expected to dramatically increase in the near future. Many of these technologies (i.e. wind, solar, etc.) have variable capacity and characteristically their capacity is lower during peak load conditions (i.e. wind). Regional entities and plant owners use a variety of methods to determine capacity. A method is needed to provide consistency in reporting capacity in the reliability assessment.	IVGTF	Consistent capacity calculation method for variable generation	<ul style="list-style-type: none"> September 2008 PC meeting for approval.
3.2	Consistent integration of DSM & treatment in the LTRA	DSM is increasingly applied to manage capacity margins. Currently NERC collects information on the dispatchable/controllable Demand response and new energy efficiency. As use of non-dispatchable demand response & additional energy efficiency programs increases to manage capacity margins, consistent approaches will be required to integrate a variety of demand-side management resources and properly reflect the impact on capacity margin calculations.	RIS	A consistent DSM integration method vetted with the regions	<ul style="list-style-type: none"> Approve the assignment of this activity to RIS in March 2008. Regional entities vet Final method sent to the PC for final approval at the June 2008 meeting.

Item #	Proposed Improvement	Abstract	Lead	Deliverables	Milestones
3.3	Use of Scenario evaluations to incorporate emerging issues into the LTRA	The LTRA provides a reference case from which select scenarios can be compared. Identifying significant emerging issues should drive scenario development. A process has been proposed by the RAITF that includes RIS/TIS/RAS identification of emerging issues, survey of the PC membership to develop a risk matrix, vetting the results and development of reliability assessment for comparative purposes to the LTRA reference case. Once approved by the PC, materials to support this process and execution of the process are next steps.	RAS	Develop a process for the RAS to identify critical emerging issues via use of industry based risk assessment to determine scenarios for reliability assessment study.	<ul style="list-style-type: none"> ● Proposal review and approval by PC in March, 2008, ● Agreement on the emerging issues by PC in June 2008, ● PC reviews results and approves emerging issues risk assessment at September 2008 meeting ● PC reviews and approves scenario description at December 2008 meeting.

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Item #	Proposed Improvement	Abstract	Lead	Deliverables	Milestones
3.4	Generation/fuel interdependency	Specific narrative questions from the seasonal and long-term reliability assessments focus on fuel availability and generation/fuel interdependency. This effort will build on NERC's earlier report and recommendations ²² identifying the analysis that should be performed for reliability assessments.	<i>PC Ad Hoc Task Force</i>	A report with recommendations evaluating what specific generation/fuel interdependency analysis enhancements might be required to the reliability assessment guidebook and what information NERC should be collected for inclusion in the reliability assessment reports.	<ul style="list-style-type: none"> • Recommendation on next steps from in December 2008

²² ftp://ftp.nerc.com/pub/sys/all_updl/docs/pubs/Gas_Electricity_Interdependencies_and_Recommendations.pdf