A. Introduction

1. **Title: Planning Resource Adequacy Analysis, Assessment and Documentation**
2. **Number: BAL-502-RFC-02**
3. **Purpose:**

   To establish common criteria, based on 1 day in ten year loss of load expectation principles, for the analysis, assessment and documentation of Resource Adequacy for load in the Reliability*First* Corporation (RFC) region.

4. **Applicability**

   4.1 Load Serving Entity

5. **Effective Date:**

   5.1 Upon RFC Board approval for RFC members and associated load in the RFC footprint

   5.2 Upon regulatory agencies' approval, for all other LSEs and associated load in the RFC footprint

B. Requirements

R1 Each LSE shall be a member of one or more PRSGs so that all its load in the RFC footprint is included in a PRSG and no load is included more than once *[Violation Risk Factor: Lower]*.

R1.1 Each LSE that has not reported to RFC its membership in a PRSG, as of the effective date, shall report to RFC within 90 days to which PRSG it belongs.

R1.2 Each LSE shall notify RFC at least 90 days prior to a proposed PRSG membership change or 180 days prior to the planning period under review, whichever is earlier.

R2 The PRSG shall perform and document a Resource Adequacy analysis annually. The Resource Adequacy analysis shall *[Violation Risk Factor: Medium]*:

R2.1 Calculate a Planning reserve margin that will result in the sum of the probabilities for loss of load for the integrated peak hour for at least all non-holiday weekdays for each planning year being equal to 0.1. (This is comparable to a 1 day in 10 year criterion).

R2.1.1 The calculation shall be performed using the Net Internal Demand

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R2.1.2 The planning reserve developed from R2.1 shall be expressed as a percentage of the Median (50:50) forecast peak Net Internal Demand (planning reserve margin).

R2.2 Be performed or verified separately for individual years of Year One through Year Ten. Year One is defined as the planning year that begins with the upcoming annual peak period.

R2.2.1 Perform an analysis for Year One.

R2.2.2 Perform an analysis or verification at a minimum for one year in the 2 through 5 year period and at a minimum one year in the 6 though 10 year period.

R2.2.2.1 If the analysis is verified, the verification must be supported by current or past studies for the same planning year.

R2.2.3 The annual peak period for Resource Adequacy analysis shall be determined by the PRSG.

R2.3 Include the following subject matter and documentation of its use:

R2.3.1 Load forecast characteristics:

- Median (50:50) forecast peak load.
- Load forecast uncertainty.
- Load diversity.
- Seasonal load variations.
- Load variability due to weather, regional economic forecasts, etc.
- Daily demand modeling assumptions (firm, interruptible).
- Contractual arrangements concerning curtailable/interruptible load.

R2.3.2 Resource characteristics:

- Historic resource performance and any projected changes
- Seasonal resource ratings
- Modeling assumptions of firm capacity purchases from and sales to entities outside the PRSG.

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R3.8.5.

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R3.10. consider the benefit of interconnections to other entities outside the PRSG recognizing transmission limitations and the likelihood of capacity resources being available to the PRSG when needed.¶
R3.11 documentation of the consideration for each of the items in R3.1 through R3.10 must be provided.¶
<#>Each PRSG shall document that it has an agreement to enforce the requirement of R3.3 on its LSE members.¶
<#>Each LSE shall secure the resources needed to meet the resource planning reserve requirement established by a PRSG for the upcoming planning year. ¶
<#>The consideration of any resources within the PRSG not committed to serving the capacity needs of the Group that are included as resources in the calculation of required reserve lev... [9]

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- Resource planned outage schedules, deratings, and retirements.
- Modeling assumptions of intermittent and energy limited resource such as wind and cogeneration.

R2.3.3 Transmission limitations, including the effect of firm commitments that prevent the delivery of generation reserves

R2.3.4 Assistance from other interconnected systems including multi-area assessment considering transmission limitations.

R2.4 Consider the following Resource availability characteristics and document how and why they were included in the analysis or why they were not included:

- Availability and deliverability of fuel.
- Common mode outages that affect Resource availability
- Environmental or regulatory restrictions of resource availability.
- Any other Demand (Load) Response Programs not included in R2.4.1.
- Sensitivity to resource outage rates and resource capabilities.
- Impacts of extreme weather/drought conditions that affect unit availability.
- Modeling assumptions for emergency operation procedures used to make reserves available.
- Market resources not committed to serving load (uncommitted resources) within the PRSG.

R2.5 Consider the following Transmission characteristics and document how and why they were included in the analysis or why they were not included:

- Transmission maintenance outage schedules.
- Transmission forced outage rates

R2.6 Document that the resource capacity is not counted more than once, as reserve, by multiple PRSGs.

R3 The PRSG shall annually document a comparison of its load and resource capability for each of the years in the ten year period in R2.2 with the planning reserve margin benchmark in R2.1.2 *[Violation Risk Factor: Medium]*.

Deleted: <#>Each PRSG shall provide the documentation as required in R3.11 and the documentation that the calculations meet the requirements of R1 by the date established by RFC.¶
<#>Each LSE shall meet the reporting requirements of R2.2¶
<#>Each PRSG shall provide a record of the agreement required by R4.¶
<#>Each LSE shall meet the resource requirement of R5.¶
Each PRSG shall provide justification for use of non-committed resources as required in R6.

C. Measures

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M1 Each LSE shall have evidence of membership within a PRSG in accordance with R1

M2 Each PRSG shall possess the documentation that a valid Resource Adequacy analysis was performed or verified in accordance with R2

M3 Each PRSG shall have documentation of a comparison of its Resource Adequacy by comparing its load and resource capability for each of the years in the ten year period in R2.2 with the planning reserve margin benchmark in R2.1.2 on an annual basis in accordance with R3.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Compliance Monitor - Reliability*First* Corporation

1.2. Compliance Monitoring Period and Reset Timeframe

One calendar year

1.3. Data Retention

The PRSG shall retain information from the most current and prior two years.

The Compliance Monitor shall retain any audit data for five years.

2. Violation Severity Levels

Req. Number	VIOLATION SEVERITY LEVEL			
	LOWER	MODERATE	HIGH	SEVERE
R1		The LSE that has not reported to RFC its membership in a PRSG, as of the effective date, reported to RFC more than 90 but less than or equal to 120 calendar days of the effective date of BAL-502-RFC-02 which PRSG it belongs to per R1.1.	The LSE is a member of one or more PRSGs but the load was included more than once per R1	The LSE that has not reported to RFC its membership in a PRS as of the effective dat reported to RFC more than 120 days of the effective date of BAL 502-RFC-02 which PRSG it belongs to p R1.1. **OR**

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2.1 Level 1 - Resource planning reserve requirement analysis, as required in R3, was performed but did not meet one of the requirements of R3.¶
2,2 Level 2 ¶
2.2.1. Justification for use of non-committed resources as required in R.6 was not provided, or¶
2.2.2. An LSE did not report a change of PRSG as required in R2.2.¶
2.3 Level 3 - Resource planning reserve requirement analysis was performed but did not meet two or more of the requirements of R3.¶
2.4 **Level 4¶**
2.4.1. Resource planning reserve requirement analysis was not performed or verified to meet the requirements of R3.1, or¶
2.4.2. That the resource planning reserve requirement is inadequate to meet the requirements of R1 for the upcoming planning year, or¶
2.4.3. An LSE has not secured adequate resources determined by the PRSG to meet the requirements of R5. ¶
2.4.4 No agreement exists to enforce compliance on the LSEs to meet the requirements of R4, or¶
2.4.5. An LSE in RFC does not meet the requirements of R2.1.
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		OR The LSE either notified RFC more than 60 but less than 90 calendar days prior to a proposed PRSG membership change or more than 150 but less than 180 calendar days prior to the planning period under review, which ever is earlier per R1.2		The LSE either notified RFC less than 60 days prior to a proposed PRSG membership change or less than 150 calendar days prior to the planning period under review, which ever is earlier per R1.2 **OR** The LSE has failed to be a member of one or more PRSGs so that all its load in the RFC footprint is included in a PRSG per R1
R2		The PRSG Resource Adequacy analysis failed to express the planning reserve developed from R2.2 as a percentage of the net Median (50:50) forecast peak load per R2.1.2 **OR** The PRSG failed to determine the annual peak period for Resource Adequacy analysis per R2.2.3. **OR** The PRSG Resource Adequacy analysis failed to consider 1 or 2 of the Resource availability characteristics	The PRSG Resource Adequacy analysis failed to be performed or verified separately for individual years of Year One through Year Ten per R2.2 **OR** The PRSG Resource Adequacy analysis failed to include 1 of the Load forecast Characteristics subcomponents under R2.3.1 and documentation of its use **OR** The PRSG Resource Adequacy analysis failed to include 1 of the Resource	The PRSG failed to perform and document a Resource Adequacy analysis annually per R2. **OR** The PRSG Resource Adequacy analysis failed Calculate a Planning reserve margin that will result in the sum of the probabilities for loss of load for the integrated peak hour for at least all non-holiday weekdays for each planning year being equal to 0.1 per R2.1 **OR** The Planning reserve margin calculation failed to be performed using the Net Internal

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		subcomponents under R2.4 and documentation of how and why they were included in the analysis or why they were not included **OR** The PRSG Resource Adequacy analysis failed to consider 1 of the Transmission characteristics subcomponents under R2.5 and documentation of how and why they were included in the analysis or why they were not included	Characteristics subcomponents under R2.3.2 and documentation of its use **OR** The PRSG Resource Adequacy analysis failed to Document that the resource capacity is not counted more than once, as reserve, by multiple PRSGs per R2.6	Demand per R2.1.1 **OR** The PRSG failed to perform an analysis for Year One per R2.2.1 **OR** The PRSG failed to perform an analysis or verification for one year in the 2 through 5 year period or one year in the 6 though 10 year period or both per R2.2.2 **OR** If the analysis is verified per R2.2.2, the PRSG verification failed to be supported by current or past studies for the same planning year per R2.2.2.1 **OR** The PRSG Resource Adequacy analysis failed to include 2 or more of the Load forecast Characteristics subcomponents under R2.3.1 and documentation of their use **OR**

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				The PRSG Resource Adequacy analysis failed to include 2 or more of the Resource Characteristics subcomponents under R2.3.2 and documentation of their use **OR** The PRSG Resource Adequacy analysis failed to include Transmission limitations and documentation of its use per R2.3.3 **OR** The PRSG Resource Adequacy analysis failed to include Assistance from other interconnected systems and documentation of its use per R2.3.4 **OR** The PRSG Resource Adequacy analysis failed to consider all of the Resource availability characteristics subcomponents under R2.4 and documentation of how and why they were included in the analysis or why they

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				were not included **OR** The PRSG Resource Adequacy analysis failed to consider all of the Transmission characteristics subcomponents under R2.5 and documentation of how and why they were included in the analysis or why they were not included
R3		The PRSG failed to document an assessment of its Resource Adequacy by comparing its load and resource capability for one of the years in the 2 through 10 year period per R3.	The PRSG failed to document an assessment of its Resource Adequacy by comparing its load and resource capability for year 1 of the 10 year period per R3. **OR** The PRSG failed to document an assessment of its Resource Adequacy by comparing its load and resource capability for two or more of the years in the 2 through 10 year period per R3.	The PRSG failed to document an assessment of its Resource Adequacy by comparing its load and resource capability per R3.

Definitions:

Resource Adequacy - the ability of supply-side and demand-side resources to meet the aggregate electrical demand and energy requirements of the end-use customers.

Planned Reserve Sharing Group (PRSG) - a PRSG is composed of one or more LSEs or a group of LSEs that agree to study its collective resources to assess the planned Resource Adequacy for the load of the PRSG as a whole.

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Net Internal Demand - Total of all end-use customer demand and electric system losses within specified metered boundaries, less the amount of demand curtailment of all end-use customer demand that can contractually be curtailed or is under direct control to be curtailed within the specified metered boundaries by the system operator.

Version History

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Entities (LSEs) and Planned Reserve-Sharing Groups (PRSGs) within ReliabilityFirst. PRSGs may be a single LSE, or group of LSEs (for example, participants in an RTO or ISO) that contractually commit to use its shared resources to meet the reliability obligation to serve the load of the PRSG as a whole, in accordance with applicable regulatory requirements. An LSE may choose to delegate specific requirements as defined herein to the PRSG in which it participates.

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April 1, 2006 to permit a reasonable transition and implementation for the 2007 and 2008 Planning Years

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The Loss of Load Expectation (LOLE) for any load in RFC due to resource inadequacy shall not exceed one occurrence in ten years. This requirement applies to all PRSGs within RFC.

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a PRSG for determining its resource planning reserve requirements. Membership in PRSGs must recognize interconnected system arrangements and are subject to verification by RFC.

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R2.2 shall report to RFC within 90 days of the effective date of BAL-502-RFC-01 which PRSG is responsible for determining its resource planning reserve requirements. In addition, if a LSE changes the PRSG that is responsible for determining its resource planning reserve requirements, the

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Resource Planning Reserve Requirement analyses performed by each PRSG shall:

R3.1. be performed or verified annually

R3.2. express resource planning reserve requirements as a percentage of the 50:50 probability forecast peak load (Reserve Margin).

R3.3. determine a resource planning reserve requirement for each of the PRSG members for the upcoming planning year as defined by the PRSG.

R3.4. be performed or verified for the nine subsequent planning years to provide information for long-term resource planning without establishing specific resource planning reserve requirements

R3.5. model a “loss-of-load event” as system conditions before taking emergency actions (e.g. unplanned voltage reductions or public appeals) but including

system conditions subsequent to taking planned contractual actions (e.g. direct control load management).

R3.6. consider the availability of all generating units within the PRSG committed to meet the adequacy of Group load. At a minimum, the calculations must consider the following characteristics of the generating unit population:

R3.6.1. Historic generating unit performance and any projected changes

R3.6.2. Generating unit seasonal ratings

R3.6.3. The population of units deemed "typical" for compiling the history to determine generating performance statistics for new units

R3.6.4. Projected planned generator outages and maintenance schedules

R3.6.5. Fuel limitations, wind or hydro energy limitations or other reasons for limited dispatchability of generators

R3.6.6. Common mode outages that effect resource adequacy

R3.6.7. Availability of Resources with Environmental or Regulatory Restrictions

R3.7. consider the characteristics of other resources within the PRSG committed to meet the adequacy of Group load. At a minimum, the calculations must consider the following:

R3.7.1. Limitations such as notice, buy-through provisions, duration, or frequency

R3.7.2. How it is dispatched

R3.7.3. Physical characteristics such as weather, cold load pickup, etc.

R3.8. consider the characteristics of load, such as the following:

R3.8.1. Load

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R3.9. shall base the LOLE calculation on a methodology employing the sum of the daily loss of load probabilities.

R3.10. consider the benefit of interconnections to other entities outside the PRSG recognizing transmission limitations and the likelihood of capacity resources being available to the PRSG when needed.

R3.11 documentation of the consideration for each of the items in R3.1 through R3.10 must be provided.

Each PRSG shall document that it has an agreement to enforce the requirement of R3.3 on its LSE members.

Each LSE shall secure the resources needed to meet the resource planning reserve requirement established by a PRSG for the upcoming planning year.

The consideration of any resources within the PRSG not committed to serving the capacity needs of the Group that are included as resources in the calculation of required reserve levels or accepted as resources used to meet requirements must be specifically justified and documented.