TEXAS RE
Ensuring electric reliability for Texans

Description of Changes to Regional Standard BAL-001-TRE-2
Project SAR-013

General Changes

- Revised BAL-001-TRE-2 to BAL-001-TRE-3

BAL-001-TRE-3 Section	Description	Rationale
A 6 Background	Corrected the typo “measureable” to measurable”	Corrected a typo.
A 6 Background	Added a description of resource to the end of the description. Included the various types that were previously in Requirement Part 6.2. Added Battery Energy Storage System (BESS) to the list of examples.	This revision fulfills one of the objectives of the SAR.
M1	Added “that”	Corrected a typo.
Requirement R2 Footnote 1	Added “Attachment 1” to Primary Frequency Response Reference Document.	This revision specifies the Primary Frequency Response Reference Document is in Attachment 1. It is also to be consistent with Requirements R6, R9, and R10.
R2.3	Changed (8) eight to eight (8).	This is consistent with Requirement R4.
M3	Removed the “per” that should not have been there.	Corrected a typo
Requirement R4	Changed “occurs” to “occur”	Corrected a grammatical error.
Requirement R6	Revised the parent Requirement R6	Clarifies the language.
Requirement Part 6.1	Added “Generating units/generating facilities that are not qualified to provide Operating Reserves and have obtained prior written approval” to Table 6.1.	This revision fulfills one of the objectives of the SAR.
Requirement Part 6.1	Corrected capitalization of Generating unit/generating facility	Clarifies the language.
Requirement Part 6.1 Footnote 2	Added footnote 2: “Refers to ancillary service qualification criteria as required by the Balancing Authority.	This revision fulfills one of the objectives of the SAR.

BAL-001-TRE-3 Section	Description	Rationale
Requirement Part 6.2	Revised the table to only include Combustion Turbine (Combined Cycle) and All other generating units/generating facilities. The other Generator types were moved to Section A Background.	Clarifies the language.
Table 6.2 Asterisk	Changed the asterisk to footnotes 4 and 5: "Requirements R6.1, R6.2, and R6.3 are not applicable to steam turbine(s) of a combined cycle resource. Moved this note from an asterisk to the body of Requirement R6.	This revision makes the language consistent.
Requirement Part 6,.3	Added Primary Frequency Response Reference Document to Attachment 1.	This aligns with footnote 1.
M6	Added "Written approval from the Balancing Authority to widen generating units'/generating facilities' deadband settings to +/- 0.036 Hz.	This clarifies how Requirement R6 can be measured.
Requirement R9	Added Primary Frequency Response Reference Document to Attachment 1.	This aligns with footnote 1.
Requirement R10	Added Primary Frequency Response Reference Document to Attachment 1.	This aligns with footnote 1.
Section C 1.1	Added abbreviation for Compliance Enforcement Authority (CEA)	This change makes it consistent with other NERC Reliability Standards.
Section C 1.2	Revised this section to include more detail on when the reset time frame will occur.	This revision fulfills one of the objectives of the SAR.
Section C 1.3	Abbreviated CEA	This is consistent with the change made in Section C 1.1.
Violation Severity Levels	Corrected formatting for R4	Format correction.
Standard Attachments	Changed font to size 12 to match the rest of the document.	Format correction.

Attachment 1

General

- Changed font size from 11pt to 12pt
- Removed capitalization from “capacity” as it is not defined in the NERC Glossary.

Attachment 1 Section	Description	Rationale
I. Introduction	Revised description of Low Sustained Limit (LSL)	Definition was modified to capture the charging side of the operation curve for BESS units.
I. Introduction	Added description for Maximum Megawatt Governor Control System (MW_{GCS})	Captures the available range of MW response for performance calculations.
	Added the same description of resource and list of examples from Section A Background.	This replaces the previous description of resource and is consistent with the language in the standard.
I. Introduction	Added description for Design Settings versus Real-time Evaluation	To clarify the difference in expectation in minimum design requirements vs operational settings and evaluation.
I. Introduction	Added the revised description of the terms resource and generating unit/generating facility to be consistent with Section A 6 Background.	This revision fulfills one of the objectives of the SAR.
I. Introduction	Revised Footnote 1 to indicate that the spreadsheets are found on Texas RE's public website, rather than a specific link.	This will not need to be updated if the link changes.
II Initial Primary Frequency Response Calculations Requirement R9	Corrected the language for Requirement R9.	This change is to be consistent with the Regional Standard language.
Initial Primary Frequency Response Performance Calculation Methodology	Changed Primary Frequency Response to the acronym (PFR).	The acronym is described in the Introduction paragraph.

Initial Primary Frequency Response Performance Calculation Methodology	Changed Adjusted Actual to lower case (actual).	This is not a NERC Glossary term.
Initial Primary Frequency Response Performance Calculation Methodology	Changed Final Expected to lower case (final expected).	This is not a NERC Glossary term.
Actual Primary Frequency Response	Changed Adjusted Actual to lowercase (adjusted actual).	This is not a NERC Glossary term.
Actual Primary Frequency Response	Changed Actual to lowercase (actual)	This is not a NERC Glossary term.
Expected Primary Frequency Response (EPFR)	Changed Expected to lowercase (expected).	This is not a NERC Glossary term.
Expected Primary Frequency Response (EPFR)	Revised equations for Expected Primary Frequency Response to change HSL to MW_{GCS}	Equation was revised to align with the definition of MW_{GCS}
Expected Primary Frequency Response (EPFR) - Pre-perturbation Average Hz	Pre-perturbation Average Hz – Removed capitalization of net dependable capacity.	This term is not defined in the NERC Glossary.

Expected Primary Frequency Response (EPFR) - Pre-perturbation Average Hz	Removed capitalization of combined cycle.	This is not a NERC Glossary term.
Expected Primary Frequency Response (EPFR) - Pre-perturbation Average Hz	Removed sentence: “The Capacity for wind powered generators is the real time HSL of the wind plant at the time the FME occurred.”	The pre-perturbation Average Hz is different than capacity for wind. Statement is no longer needed due to updated definition of MW_{GCS}.
$EPFR_{final}$ for Combustion Turbines and Combined Cycle Facilities	Revised equations for $EPFR_{final}$ for combustion turbines, combined cycle facilities and steam turbines to change HSL to MW_{GCS}	The equations were revised to align with the definition of MW_{GCS}.
$EPFR_{final}$ for Steam Turbine	Revised equations for $EPFR_{final}$ for combustion turbines, combined cycle facilities and steam turbines to change HSL to MW_{GCS}	The equations were revised to align with the definition of MW_{GCS}.
$EPFR_{final}$ for Steam Turbine	Removed capitalization on rated throttle pressure.	This term is not defined in the NERC Glossary.
$EPFR_{final}$ for Steam Turbine	Removed capitalization on pressure.	This term is not defined in the NERC Glossary.
$EPFR_{final}$ for Steam Turbine	Removed capitalization on steam flow change factor.	This term is not defined in the NERC Glossary.
$EPFR_{final}$ for BESS with capacity that is not expected to provide PFR	Added this new section to account for BESS.	This intended to be used for energy storage resources with Fast Frequency Response (FFR) capacity without having to define FFR capacity.

III. Sustained Primary Frequency Response Calculations	Corrected the language for Requirement R10 and Part 10.3.	To be consistent with the Regional Standard.
Sustained Primary Frequency Response Performance Calculation Methodology	Changed Per Unit Sustained to lowercase (per unit sustained)	This term is not defined in the NERC Glossary.
Sustained Primary Frequency Response Performance Calculation Methodology	Changed Primary Frequency Response to the acronym (PFR).	The acronym is described in the Introduction paragraph.
Sustained Primary Frequency Response Performance Calculation Methodology	Changed Final Expected to lowercase (final expected).	This term is not defined in the NERC Glossary.
Sustained Primary Frequency Response Performance Calculation Methodology	Changed Frequency Measurable Event to acronym (FME).	The acronym is described in the Introduction paragraph.

Sustained Primary Frequency Response performance requirement	Changed Primary Frequency Response to the acronym (PFR).	The acronym is described in the Introduction paragraph.
Sustained Primary Frequency Response performance requirement	Changed Frequency Measurable Event to acronym (FME).	The acronym is described in the Introduction paragraph.
Sustained Primary Frequency Response Calculation	Corrected the equation to reflect P.U.SPFR	Corrected a typo.
Sustained Primary Frequency Response Calculation	Changed Primary Frequency Response to the acronym (PFR).	The acronym is described previously.
Sustained Primary Frequency Response Calculation	Changed Frequency Measurable Event to acronym (FME).	The acronym is described previously.
Actual Sustained Primary Frequency Response, Adjusted	Changed Primary Frequency Response to the acronym (PFR).	The acronym is described previously.
Expected Sustained Primary Frequency Response (*ESPFR*) Calculations	Changed Expected Sustained to lower case (expected sustained)	This term is not defined in the NERC Glossary.

Expected Sustained Primary Frequency Response (*ESPFR*) Calculations	Changed Primary Frequency Response to the acronym (PFR).	The acronym is described in the Introduction paragraph.
Expected Sustained Primary Frequency Response (*ESPFR*) Calculations	Changed High Sustainable Limit to the acronym (HSL)	The acronym is described in the Introduction paragraph.
Expected Sustained Primary Frequency Response (*ESPFR*) Calculations	Changed Low Sustainable Limit (LSL) to the acronym.	The acronym is described in the Introduction paragraph.
Expected Sustained Primary Frequency Response (*ESPFR*) Calculations	Removed capitalization from power augmentation capacity.	This term is not defined in the NERC Glossary.
Establishing the Ideal Expected Primary Frequency Response	Removed capitalization from expected sustained.	This term is not defined in the NERC Glossary.
Establishing the Ideal Expected Primary Frequency Response	Changed Primary Frequency Response to the acronym (PFR).	The acronym is described in the Introduction paragraph.
Establishing the Ideal Expected Primary Frequency Response	Updated the $ESPRF_{ideal}$ equation to remove the vertical bar.	Corrected a typo.

Establishing the Ideal Expected Primary Frequency Response	Revised the equation to replace HSL with MW_{GCS}.	Equations were revised to align with the definition of MW_{GCS}
Establishing the Ideal Expected Primary Frequency Response	Changed net dependable capacity to the acronym (NDC).	The acronym is described previously.
Establishing the Ideal Expected Primary Frequency Response	Removed the sentence: The capacity for wind powered generators is the real-time HSL of the wind plant at the time the FME occurred.	The pre-perturbation Average Hz is different than the capacity for wind. Statement is no longer needed due to updated definition of MW_{GCS}
Establishing the Ideal Expected Primary Frequency Response	Removed capitalization from combined cycle.	This term is not defined in the NERC Glossary.
Establishing the Ideal Expected Primary Frequency Response	Removed capitalization from power augmentation capacity.	This term is not defined in the NERC Glossary.
Establishing the Ideal Expected Primary Frequency Response	Changed HSL to MW_{GCS}.	Equation was revised to align with the definition of MW_{GCS}
$ESPFR_{final}$ for Combustion Turbines and Combined Cycle Facilities	Revised equations for $EPFR_{final}$ for Combustion Turbines and Combined Cycle Facilities to change HSL to MW_{GCS}	Equation was revised to align with the definition of MW_{GCS}
$ESPFR_{final}$ for Steam Turbine	Revised equations for $EPFR_{final}$ for Steam Turbine to change HSL to MW_{GCS}	Equation was revised to align with the definition of MW_{GCS}

$ESPFR_{final}$ for Steam Turbine	Changed rated throttle pressure to lowercase.	This term is not defined in the NERC Glossary.
$ESPFR_{final}$ for Steam Turbine	Changed pressure to lowercase.	This term is not defined in the NERC Glossary.
$ESPFR_{final}$ for Steam Turbine	Changed minimum throttle pressure to lowercase.	This term is not defined in the NERC Glossary.
$ESPFR_{final}$ for Steam Turbine	Changed steam flow change factor to lowercase.	This term is not defined in the NERC Glossary.
$EPFR_{final}$ for BESS with capacity that is not expected to provide PFR	Added this new section to account for BESS.	Added this new section to account for BESS.
IV. Limits on Calculation of Primary Frequency Response Performance (Initial and Sustained):	Changed HSL to MW_{GCS} and added "capacity and additional capacity not expected to provide PFR. Added "or a BESS is operating within 2% or 3MW of its MW_{GCS}	Revised the equations to align with the definition of MW_{GCS} 3 MW or 2% limit was the agreed limit for BESS units to be excluded from evaluation.
IV. Limits on Calculation of Primary Frequency Response Performance (Initial and Sustained):	Added the language "and additional capacity not expected to provide PFR" and "less capacity not expected to provide PFR"	This aligns the calculations to ensure that FFR capacity is excluded when identifying conditions where there is limited capacity available to provide PFR.

IV. Limits on Calculation of Primary Frequency Response Performance (Initial and Sustained):	Revised equations to change HSL to MW_{GCS}	Equation was revised to align with the definition of MW_{GCS}
IV. Limits on Calculation of Primary Frequency Response Performance (Initial and Sustained):	Added “where Y is 5 MW for generating units/generating facility and 3 MW for BESS”	This language aligns with ERCOT Operating Guides.
IV. Limits on Calculation of Primary Frequency Response Performance (Initial and Sustained):	Changed Primary Frequency Response to the acronym (PFR).	The acronym is described in the Introduction paragraph.
Final Expected Primary Frequency Response ($EPFR_{final}$) is greater than Operating Margin:	Changed HSL to MW_{GCS}	Equation was revised to align with the definition of MW_{GCS}

Final Expected Primary Frequency Response ($EPFR_{final}$) is greater than Operating Margin:	Added “for generating unts/generating facilities or 3 MW for BESS”	3 MW or 2% limit was the agreed limit for BESS units to be excluded from evaluation
Final Expected Primary Frequency Response ($EPFR_{final}$) is greater than Operating Margin:	Added: The BESS’s pre-perturbation operating margin (appropriate for the frequency deviation direction) is greater than 2% of its (MW_{GCS} less PA capacity and additional capacity not expected to provide PFR) and greater than 3 MW; and	3 MW or 2% limit was the agreed limit for BESS units to be excluded from evaluation
Final Expected Primary Frequency Response ($EPFR_{final}$) is greater than Operating Margin:	Changed HSL to $MW_{GCS.}$	revised to align with the definition of MW_{GCS}
Final Expected Primary Frequency Response ($EPFR_{final}$) is greater than Operating Margin:	To #2 – Added “MW_{GCS} less PA capacity and additional capacity not expected to provide PFR”	This aligns the calculations to ensure that FFR capacity is excluded when identifying conditions where there is limited capacity available to provide PFR.

Final Expected Primary Frequency Response ($EPFR_{final}$) is greater than Operating Margin:	Changed initial and sustained to lower case.	These terms are not defined in the NERC Glossary.

Attachment A

- Added LSL = Low Sustained Limit
- Added MW_{GCS} = maximum megawatt control range of the Governor control system
- Made conforming changes to the flowcharts to align with Attachment 1
- Removed capitalization from “capacity” as it is not defined in the NERC Glossary.
- Added the flowchart for Adjustment for BESS with capacity that is not expected to provide PFR.
- Updated the verbiage under P.U. Initial Primary Frequency Response Calculation to include additional capacity that is not expected to provide PFR.
- Updated the formula for low frequency events.
- Added Adjustment for BESS with capacity that is not expected to provide PFR,

Attachment B

- Made conforming changes to the flowcharts to align with Attachment 1
- Removed capitalization from “capacity” as it is not defined in the NERC Glossary.
- Added the flowchart for Adjustment for BESS with capacity that is not expected to provide PFR.