## **KP7 - Additional Performance Monitoring Topics**

* **Ancillary Service (AS) Capacity Compliance Criteria**
	1. Currently in Real Time ERCOT measures QSE’s total telemetered Ancillary Service Responsibility with its total obligation to identify any non-compliance. Reports are sent to QSEs every 5mins, QSEs who are not compliant have 10 minutes to correct the issue or provide an explanation. Also ERCOT provides a QSE specific Ancillary Service Capacity Monitor report every 5 mins.
	2. Per Key Principle 1.5 (9), the existing process for QSEs to update telemetered AS schedules following manual deployment for Generation Resources and Controllable Load Resources will be removed under RTC.
	3. Consequently in RTC the report and compliance related follow up related to QSE Ancillary Service Responsibility vs. its obligation **will be removed**. Also the QSE specific Ancillary Service Capacity Monitor report will be **updated to remove the data that is derived from Ancillary Service Responsibility telemetry**.

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| 8.1.1.3 Ancillary Service Capacity Compliance Criteria 1. ERCOT shall provide each QSE representing Resources a capacity summary containing as a minimum the same general information required in Section 6.5.7.5, Ancillary Services Capacity Monitor, except specific to only the QSE. The summary shall be updated with calculations every ten seconds by ERCOT and then provided to the QSE every five minutes using the MIS Certified Area.
2. ERCOT shall continuously measure the overall performance of each QSE in providing each Ancillary Service by comparing the sum of each of the QSE’s Resources’ telemetered Ancillary Services Resource Responsibility with the QSE’s total Ancillary Service responsibility. If the comparison indicates the QSE is not providing sufficient capacity to meet its Ancillary Services responsibility, ERCOT shall notify the QSE via the MIS Certified Area.
3. The QSE, within ten minutes of receiving the insufficient capacity notification from ERCOT, the QSE must:
4. If due to a telemetry issue, correct the telemetered Ancillary Services Resource Responsibility to provide sufficient capacity; or
5. Must provide both appropriate justification for not satisfying their Ancillary Service Obligation and a plan to correct the shortfall that is acceptable with the ERCOT operator. ERCOT shall report non-compliance of Ancillary Service capacity requirements to the Reliability Monitor for review.

*\* This is a summary of the current protocol and it not expected to be a perfect match.* |

* **Responsive Reserve Service (RRS), ERCOT Contingency Reserve Service (ECRS)**
1. Currently, for every event wherein Responsive Reserve Service (RRS) is released, Generation Resources and Load Resources that provide RRS are evaluated on the following two criteria.
	* 1. Update telemetered Ancillary Service Schedule for RRS within one minute of the deployment instruction[[1]](#footnote-1)
		2. Primary Frequency Response per measurements outlined in Nodal Operating Guide Section 8, Attachment J or QSE level Load Resource response per Nodal Protocol 8.1.1.4.1 (4).
2. Currently, for every event wherein Fast Frequency Response (FFR) is released, Resources providing FFR are evaluated on the following two criteria
	* 1. Update telemetered Ancillary Service Schedule for RRS within one minute of the deployment instruction[[2]](#footnote-2)
		2. FFR per method outlined in Nodal Operating Guide Section 2.3.1.2 (10)(c) & 2.3.1.2 (10)(d).
3. Currently, for every event wherein ERCOT Contingency Reserve Service (ECRS) is released, Generation Resources and Load Resources that provide RRS are evaluated on the following two criteria.
	* 1. Update telemetered Ancillary Service Schedule for RRS within one minute of the deployment instruction
		2. QSE level Load Resource response per Nodal Protocol 8.1.1.4.4 (1)(b).
4. Per Key Principle 1.5 (9), the existing process for QSEs to update telemetered AS schedules following manual deployment for Generation Resources and Controllable Load Resources will be removed under RTC.
5. Consequently in RTC, the performance evaluation criteria regarding release of the Resource’ High Ancillary Service Limit (HASL) outlined in (a)(i), (b)(i) and (c)(i) above **will be removed**.
6. In RTC, Generation Resources and Load Resources that provide RRS and Resources that provide FFR will continue to be evaluated for their actual response during events using the mechanisms outlined in (a)(ii) and (b)(ii). Also Load Resources that provide ECRS continue to be evaluated for their actual response during events using the mechanisms outlined in (c)(ii)

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| 8.1.1.4.1 Responsive Reserve Energy Deployment Criteria (post NPRR 863 implementation)\*1. Each QSE providing RRS shall so indicate by appropriate entries in the Resource’s Ancillary Service Schedule and the Ancillary Service Resource Responsibility providing that service. When manually deployed as specified in Nodal Operating Guide Section 4.8, Responsive Reserve Service During Scarcity Conditions, SCED shall adjust the Generation Resource’s Base Point for any requested RRS energy in the next cycle of SCED as specified in Section 6.5.7.6.2.2, Deployment of Responsive Reserve Service. For Controllable Load Resources, the QSE shall control its Resources to operate to the Resource’s Scheduled Power Consumption minus any Ancillary Service deployments.
2. Following a manual deployment instruction, within one minute, the QSE must update the telemetered Ancillary Service Schedule for RRS for Generation Resources and Load Resources to reflect the deployment amount. The difference between the sum of the QSE’s Resource RRS schedules and the sum of the QSE’s Resource RRS responsibilities must be equal to the QSE’s total RRS deployment instruction, excluding the deployment to Load Resources which are not Controllable Load Resources.
3. A QSE providing RRS must reserve sufficient PFR capable capacity on each Generation Resource with a RRS responsibility or must reserve sufficient capacity capable of FFR to supply the full amount of RRS scheduled for that Resource. The QSE shall not use NFRC, such as power augmentation capacity on a Generation Resource, to provide RRS.
4. ERCOT shall evaluate the Primary Frequency Response of all RRS providers as calculated in Nodal Operating Guide Section 8, Attachment J, Initial and Sustained Measurements for Primary Frequency Response.
5. ERCOT shall monitor the Primary Frequency Response that is delivered during FMEs of Generation Resources, SOTGs, SOTSGs, Resources capable of FFR, and Controllable Load Resources with RRS responsibilities using the methodology specified in the Operating Guides.
6. For QSEs with Load Resources, excluding Controllable Load Resources, ten minutes following deployment instruction the sum of the QSE’s Load Resource response shall not be less than 95% of the requested MW deployment, nor more than 150% of the lesser of the following:

*\* This is a summary of the current protocol and it not expected to be a perfect match.* |

* **Offline Non-Spinning Reserve Service**
1. Currently, for every instance wherein offline Non-Spinning Reserve Service (Non-Spin) is released, Generation Resources and Controllable Load Resources are evaluated on the following two criteria
	* 1. Update telemetered Ancillary Service Schedule for Non-Spin within 20 minutes of the deployment instruction
		2. Within 25 minutes, telemetered net generation must be at 0.9\*LSL for Generation Resources and telemetered net consumption must be at LPC for Controllable Load Resources.
	1. Per Key Principle 1.5 (9), the existing process for QSEs to update telemetered AS schedules following manual deployment for Generation Resources and Controllable Load Resources will be removed under RTC.
	2. Consequently in RTC, the performance evaluation criteria regarding updating a Resource’ Ancillary Service Schedule for Non-Spin outlined in (a)(i) above **will be removed**.
	3. In RTC, Generation Resources and Controllable Load Resources that provide Non-Spin will continue to be evaluated for their actual response using the mechanisms outlined in a(ii) above.

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| 8.1.1.4.3 Non-Spinning Reserve Service Energy Deployment Criteria1. Control performance during periods in which ERCOT has deployed Non-Spin shall be based on the requirements below and failure to meet any one of these requirements for the greater of one or 5% of Non-Spin deployments during a month shall be reported to the Reliability Monitor as non-compliance:
2. Within 20 minutes following a deployment instruction, the QSE must update the telemetered Ancillary Service Schedule for Non-Spin for Generation Resources and Controllable Load Resources to reflect the deployment amount.
3. Off-Line Generation Resources, within 25 minutes following a deployment instruction, must be On-Line with an Energy Offer Curve and the telemetered net generation must be greater than or equal to the Resource’s telemetered LSL multiplied by P1 where P1 is defined in the “ERCOT and QSE Operations Business Practices During the Operating Hour.” The Resource Status that must be telemetered indicating that the Resource has come On-Line with an Energy Offer Curve is ON as described in paragraph (5)(b)(i) of Section 3.9.1, Current Operating Plan (COP) Criteria.
4. If an Off-Line Generation Resource experiences a Startup Loading Failure (excluding those caused by operator error), the Resource may be considered for exclusion from performance non-compliance if the QSE provides to ERCOT the following documentation regarding the incident:
	1. Its generation log documenting the Startup Loading Failure; and
	2. Equipment failure documentation such as, but not limited to, GADS reports, plant operator logs, work orders, or other applicable information.
5. Controllable Load Resources must be available to SCED, and within 25 minutes following a deployment instruction must have a Real-Time Market (RTM) Energy Bid and the telemetered net real power consumption must be greater than or equal to the Resource’s telemetered LPC.

*\* This is a summary of the current protocol and it not expected to be a perfect match.* |

* **Current Operating Plan Offline Compliance**
1. Currently, ERCOT evaluates Ancillary Service Responsibilities submitted in COP matches its obligation and provides monthly reports that track COP failures to comply with this requirement.
2. Per Key Principle 3 (1)-(5), RUC will use the AS capabilities of each Resource in the fleet, as reflected in the new COP structure, to ensure that there is enough AS capability when RT arrives.
3. Consequently there is no need to submit Ancillary Service Responsibilities in COPs and the COP submission failure reports outlined in (a) above **will be removed.**

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| 8.1.2 Current Operating Plan (COP) Performance Requirements\*1. For each QSE, ERCOT shall post for each month the number, by Operating Hour, of valid COP failures to meet the provisions of paragraphs (3) and (4) of Section 3.9.2, Current Operating Plan Validation, for Ancillary Service Resource Responsibilities contained in the QSE’s COP used for the DRUC and each HRUC during the Operating Day. QSEs shall have no more than three hours during an Operating Day or 74 hours during a month that contains COP Ancillary Service Resource Responsibility validation failures.

*\* This is a summary of the current protocol and it not expected to be a perfect match.* |

## **KP7 - Change in GREDP Formulation - Associated with LFC Changes (Discussed on 10/31/2019)**

* Currently a Generation Resource Energy Deployment Performance (GREDP) is calculated for each Generation Resource that is On-Line and released to SCED Base Point Dispatch Instructions.
* This GREDP is based on the resource’s Base Point and Regulation Service instruction.

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| 8.1.1.4.1 Regulation Service and Generation Resource/Controllable Load Resource Energy Deployment Performance\*The GDREP is calculated for each five-minute clock interval as a percentage and in MWs for a Resources with as follows:**GREDP (%) = ABS[((ATG – AEPFR)/(ABP + ARI)) – 1.0] \* 100****GREDP (MW) = ABS(ATG – AEPFR – ABP - ARI)**Where:ATG = Average Telemetered Generation = the amount of regulation that the Generation Resource or IRR Group should have produced based on the LFC deployment signals, calculated by LFC, during each five-minute clock intervalARI = Average Regulation Instruction = ….∆frequency is actual frequency minus 60 HzEPFR = Estimated Primary Frequency Response (MW) = ….AEPFR = Average Estimated Primary Frequency Response = …ABP = Average Base Point = the time-weighted average of a linearly ramped Base Point or sum of Base Points for IRR Groups, for the five-minute clock interval. The linearly ramped Base Point is calculated every four seconds such that it ramps from its initial value to the SCED Base Point over a five-minute period. The initial value of the linearly ramped Base Point will be the four-second value of the previous linearly ramped Base Point at the time the new SCED Base Point is received into the ERCOT Energy Management System (EMS). In the event that the SCED Base Point is received after the five-minute ramp period, the linearly ramped Base Point will continue at a constant value equal to the ending four-second value of the five-minute ramp. *\* This is a summary of the current protocol and it not expected to be a perfect match.* |

* Per Key Principle 1.5 (5), LFC will send an Updated Desired Set Point (UDSP) for all Resources receiving a Base Point from RTC. UDSP will be a single value that is the sum of two components: Base Ramp and Resource-specific Regulation Service instruction.
	+ Base Ramp will be a four minute ramp similar to UDBP, except that the starting point of the Base Ramp will be the expected output of the Resource using the previous Base Point and the last Resource-specific Regulation instruction from LFC before new Base Points were input to LFC (i.e., the expected output based on these two components).
	+ For Resources that are not providing Regulation Service, the Regulation instruction component will be zero.
	+ LFC will then determine the Resource-specific instruction and add it to the Base Ramp.
	+ LFC will send UDSP every four seconds for all Resources receiving a Base Point from RTC and will continue to do so as new RTC results become available.
	+ The UDSP ramp may be temporarily halted for Resources that have Base Points directionally opposite a significant frequency deviation.
* Consequently in RTC, GREDP will be modified to include UDSP.

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| **GREDP (%) = ABS[((ATG – AEPFR)/(ASP)) – 1.0] \* 100****GREDP (MW) = ABS(ATG – AEPFR – ASP)**Where:ATG = Average Telemetered Generation = …∆frequency is actual frequency minus 60 HzEPFR = Estimated Primary Frequency Response (MW) = ….AEPFR = Average Estimated Primary Frequency Response = …ASP = Average Set Point = the time-weighted average of the sum of a linearly ramped Base Point (Base Ramp) and Regulation Service instruction that a Generation Resource or IRR Group should have produced, for the five-minute clock interval. The linearly ramped Base Point (Base Ramp) is calculated every four seconds such that it ramps from its initial value to the SCED Base Point over a four-minute period. The initial value of the linearly ramped Base Point (Base Ramp) will be the expected output of the Resource using the previous Base Point and the last Resource-specific Regulation instruction from LFC before new Base Points were input to LFC (i.e., the expected output based on these two components).  |

* The performance criteria framework for GREDP tracked using parameters X%, Y MW and Z% in current protocols will be carried over as is to RTC.

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| 8.1.1.4.1 Regulation Service and Generation Resource/Controllable Load Resource Energy Deployment Performance\*(7) All Generation Resources, excluding IRRs shall meet the following GREDP criteria for each month. (a) A Generation Resource, excluding an IRR, must have a GREDP less than the greater of X% or Y MW for 85% of the five-minute clock intervals in the month during which GREDP was calculated.(8) All IRRs and IRR Groups shall meet the following GREDP criteria for each month. :(a) An IRR or IRR Group must have a GREDP less than Z% or the ATG must be less than the expected MW output for 95% of the five-minute clock intervals in the month when the Resource or a member IRR of an IRR Group received a Base Point Dispatch Instruction in which the Base Point was two MW or more below the IRR’s HSL used by SCED. The expected MW output includes the Resource’s Base Point, Regulation Service instructions, and any expected Primary Frequency Response.*\* This is a summary of the current protocol and it not expected to be a perfect match.*  |

1. Post NPRR 863 implementation, only events wherein RRS is manually released fall under the purview of this language. [↑](#footnote-ref-1)
2. Post NPRR 863 implementation, both automatic and manual release FFR events that fall under the purview of this language. [↑](#footnote-ref-2)