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| NPRR Number | [1085](http://www.ercot.com/mktrules/issues/nprr1085) | NPRR Title | Ensuring Continuous Validity of Physical Responsive Capability (PRC) and Dispatch through Timely Changes to Resource Telemetry and Current Operating Plans (COPs) |
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| Date | | TBD | |
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| Submitter’s Information | | | |
| Name | |  | |
| E-mail Address | |  | |
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| Comments |

ERCOT appreciates the feedback from stakeholders on Nodal Protocol Revision Request (NPRR) 1085. ERCOT reiterates that the purpose of NPRR1085 is to ensure telemetry updates are sent to ERCOT following an event that affects the Resource’s capability / Forced Outage / derate so ERCOT’s computed Physical Responsive Capability (PRC) and Security-Constrained Economic Dispatch (SCED) have an accurate accounting of a Resource’s capability and availability as well as support ERCOT’s Real-Time monitoring, Real-Time assessments, operational planning analysis and other short-term future-looking reliability studies. The timeliness of this accurate accounting of a Resource’s capability and availability is even more critical during emergency operations such as Load shed actions and is necessary to support Real-Time situational awareness. ERCOT continues to stress that all of the timelines proposed in these comments are the maximum allowed timelines and that personnel, processes, and procedures should be put in place to maintain accuracy of this information as soon as practicable to support reliable operations and not to design to utilize the full flexibility in these timelines.

In response to the 9/15/21 Joint Commenters comments:

* ERCOT notes that timely telemetry updates following an event that affects the capability and/or availability of a Resource are key to ensuring SCED has accurate information for dispatch and ERCOT Operators have an accurate accounting of available reserves including PRC.
  + During the February 2021 winter storm as Resources started experiencing winter weather related equipment failures, if telemetry updates were made within ten minutes of an event occurring, calculated PRC would have reached 1,000 MW approximately 59 minutes earlier, giving Operators more appropriate situational awareness and time to make critical decisions and give instructions, including those related to Load shed.
* ERCOT recognizes that Qualified Scheduling Entities (QSEs) are reliant on notification from the Resource Entity to maintain awareness of changes to a Resource’s availability and/or capability. As a result, these comments:
  + Propose a framework that includes the Resource Entity notifying the associated QSE within five minutes after an event that affects a Resource’s Resource Status and that QSE’s make necessary updates to the Resource’s Resource Status within five minutes of the Resource Entity’s notification.
  + Propose that Resource Status ONHOLD be created and used as a mechanism to inform ERCOT that a Resource is On-Line but temporarily unavailable for SCED Dispatch or reserve provision.
    - Until Resource Status ONHOLD is implemented, ERCOT prefers that following an event that affects a Resource’s availability and/or capability, the Resource’s High Sustained Limit (HSL) be updated, setting HSL equal to current output i.e. MW is also an acceptable mechanism to show that an On-Line Resource is temporarily unavailable for SCED Dispatch or reserve provision.
* ERCOT recognizes the potential lack of value to updating Current Operating Plans (COPs) for Forced Outages or Forced Derates that are expected to last less than 60 minutes and has included additional language for this clarity. However, for Forced Outages and Forced Derates that are expected to last greater than 60 minutes, ERCOT proposes that the timeliness of COP updates for future Balancing Authority analysis and Real-Time assessments should be within 30 minutes for critical Resources such as Black Start Resources, Forced Outages, and larger Forced Derates. For smaller Forced Derates, ERCOT is proposing a 100 MW threshold wherein Forced Derates below 100 MW will have up to 60 minutes to update their COPs.
* Lastly, ERCOT is agreeable to adding capability into ERCOT’s Energy Management System (EMS) to track every Resource’s ability to follow expected set point and compute an adjusted PRC that will discount reserves for a Resource that has missed its Base Point over X SCED intervals. However, while this functionality may be able to identify resources that are struggling to follow Base Points, it is not a replacement to getting telemetry updates in a timely manner from Resources when there are issues that affect the Resources’ operational capability. ERCOT plans to submit a System Change Request (SCR) on this topic separate from NPRR1085.

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| Revised Cover Page Language |

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| Nodal Protocol Sections Requiring Revision | 3.1.4.4, Management of Resource or Transmission Forced Outages or Maintenance Outages  3.1.4.7, Reporting of Forced Derates  3.9, Current Operating Plan (COP)  3.9.1, Current Operating Plan (COP) Criteria  6.4.8, Notification of Forced Outage of a Resource  6.5.5.1, Changes in Resource Status  6.5.7.5, Ancillary Services Capacity Monitor |
| Revision Description | This Nodal Protocol Revision Request (NPRR) improves the validity of the Physical Responsive Capability (PRC) calculation and dispatch by requiring quicker updates by Qualified Scheduling Entities (QSEs) to the telemetered Resource Status, High Sustained Limit (HSL), and other relevant information. |
| Business Case | This NPRR addresses initiative #6 in the Emergency Conditions List posted on ercot.com. Following an evaluation of a system frequency excursion on February 15, 2021, it became clear that the value of PRC calculated from telemetry was incorrect; it is not feasible for PRC to actually be in the 1000 MW range and frequency to be far below 59.91 Hz for several minutes. ERCOT’s evaluation found that several elements of the calculated PRC were based on incorrect telemetered values. It is critical for ERCOT situational awareness to have an accurate value of PRC at all times as well as an accurate forecast of available generation capability and availability.  ERCOT utilizes Real-Time telemetry received from Resources for its Real-Time monitoring and as part of its emergency plans to mitigate emergencies as a measure of Generation Resources’ capability and availability. The timeliness and accuracy of this data are critical in having an accurate understanding of reserve levels on the system at all times. This NPRR proposes to modify Sections 3.1.4.4, 3.1.4.7, 6.1.4.8, and 6.5.5.1 to require that Real-Time telemetered status, HSL, and associated telemetry are updated within five minutes of an Outage, derate, or failure to start that caused the change. This will, in part, help ensure Security-Constrained Economic Dispatch (SCED) has accurate capability and availability information for dispatch and ERCOT system operators will have an accurate accounting of reserves, including PRC.  ERCOT utilizes forecasts of available generation capability and availability based on Current Operating Plans (COPs) to determine if sufficient generation capacity and reserves exist to meet demand needs and minimum reserve requirements. This NPRR also proposes to modify Sections 3.1.4.4, 3.1.4.7, 3.9, and 3.9.1 to require that each QSE that represents a Resource, Reliability Must-Run (RMR) Unit, or Black Start Resource must update its COP as soon as practicable but no longer than 30 minutes after the event that caused the changes, rather than the current 60 minute requirement. This will help to ensure timely and accurate forecast of generation capability and availability needed to prepare for and mitigate Emergency Conditions as well as support ERCOT’s operational planning analyses and Real-Time assessments. |

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| Revised Proposed Protocol Language |

**3.1.4.4 Management of Resource or Transmission Forced Outages or Maintenance Outages**

(1) In the event of a Forced Outage, after the affected equipment is removed from service, the Resource Entity or QSE, as appropriate, or TSP must notify ERCOT of its action by:

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| ***[NPRR857: Replace paragraph (1) above with the following upon system implementation:]***  (1) In the event of a Forced Outage, after the affected equipment is removed from service, the Resource Entity or QSE, as appropriate, TSP, or DCTO must notify ERCOT as soon as practicable of its action by: |

(a) For Resource Outages:

(i) Changing the telemetered Resource Status appropriately, as soon as practicable but no longer than five minutes after the QSE has been notified by the Resource Entity; and

(ii) Updating the COP as soon as practicable but no longer than 30 minutes after the affected equipment is removed from service if the expected duration of the Outage is greater than 60 minutes; and

(iii) Updating the Outage Scheduler, if necessary.

(b) For Transmission Facilities Forced Outages:

(i) Changing the telemetered status of the affected Transmission Elements; and

(ii) Updating the Outage Scheduler with the expected return-to-service time.

(2) Forced Outages may require ERCOT to review and withdraw approval of previously approved or accepted, as applicable, Planned Outage, Maintenance Outage, or Rescheduled Outage schedules to ensure reliability.

(3) For Maintenance Outages, the Resource Entity or QSE, as appropriate, or TSP shall notify ERCOT of any Resource or Transmission Facilities Maintenance Outage according to the Maintenance Outage Levels by updating the COP and Outage Scheduler. ERCOT shall coordinate the removal of facilities from service within the defined timeframes as specified by the TSP, QSE or Resource Entity in its notice to ERCOT.

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| ***[NPRR857: Replace paragraph (3) above with the following upon system implementation:]***  (3) For Maintenance Outages, the Resource Entity or QSE, as appropriate, TSP, or DCTO shall notify ERCOT of any Resource or Transmission Facilities Maintenance Outage according to the Maintenance Outage Levels by updating the COP and Outage Scheduler. ERCOT shall coordinate the removal of facilities from service within the defined timeframes as specified by the TSP, DCTO, QSE, or Resource Entity in its notice to ERCOT. |

(4) ERCOT may require supporting information describing Forced Outages and Maintenance Outages. ERCOT may reconsider and withdraw approvals of other previously approved Transmission Facilities Outage or an Outage of a Reliability Resource as a result of Forced Outages or Maintenance Outages, if necessary, in ERCOT’s determination to protect system reliability. When ERCOT approves a Maintenance Outage, ERCOT shall coordinate timing of the appropriate course of action under these Protocols.

(5) Removal of a Resource or Transmission Facilities from service under Maintenance Outages must be coordinated with ERCOT. To minimize harmful impacts to the system in urgent situations, the equipment may be removed immediately from service, provided notice is given immediately, by the Resource Entity or TSP, to ERCOT of such action.

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| ***[NPRR857: Replace paragraph (5) above with the following upon system implementation:]***  (5) Removal of a Resource or Transmission Facilities from service under Maintenance Outages must be coordinated with ERCOT. To minimize harmful impacts to the system in urgent situations, the equipment may be removed immediately from service, provided the Resource Entity, TSP, or DCTO immediately gives notice of such action to ERCOT. |

**3.1.4.7 Reporting of Forced Derates**

(1) The Resource Entity or its designee must enter Forced Derates that are expected to last more than 48 hours into the Outage Scheduler

(2) The QSE must update the telemetered High Sustained Limit (HSL) and any applicable telemetry as specified in paragraph (2) of Section 6.5.5.2 appropriately based on the Forced Derate, as soon as practicable but no longer than 15 minutes after the beginning of a Forced Derate that is greater than ten MW unless the Forced Derate is less than 2% of the Seasonal net max sustainable rating of the Resource and the expected or actual duration is less than 30 minutes.

(3) The QSE must update the COP as soon as practicable but no longer than 30 minutes after the beginning of a Forced Derate that is greater than 100 MW and the expected duration is greater than 60 minutes.

(4) The QSE must update the COP as soon as practicable but no longer than 60 minutes after the beginning of a Forced Derate that is greater than ten MW and less than 100 MW, unless the Forced Derate is less than 2% of the Seasonal net max sustainable rating of the Resource, and the expected duration is greater than 60 minutes.

**3.9 Current Operating Plan (COP)**

(1) Each Qualified Scheduling Entity (QSE) that represents a Resource must submit a Current Operating Plan (COP) under this Section.

(2) ERCOT shall use the information provided in the COP to calculate the High Ancillary Service Limit (HASL) and Low Ancillary Service Limit (LASL) for each Resource for the Reliability Unit Commitment (RUC) processes.

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| ***[NPRR1007: Replace paragraph (2) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]***  (2) ERCOT shall use the information provided in the COP to calculate operating limits and Ancillary Service capabilities for each Resource for the Reliability Unit Commitment (RUC) processes. |

(3) ERCOT shall monitor the accuracy of each QSE’s COP as outlined in Section 8, Performance Monitoring.

(4) A QSE must notify ERCOT that it plans to have a Resource On-Line by means of the COP using the Resource Status codes listed in paragraph (5)(b)(i) of Section 3.9.1, Current Operating Plan (COP) Criteria. The QSE must show the Resource as On-Line with a Resource Status of ONRUC, indicating a RUC process committed the Resource for all RUC-Committed Intervals. A QSE may only use a RUC-committed Resource during that Resource’s RUC-Committed Interval to meet the QSE’s Ancillary Service Supply Responsibility if the Resource has been committed by the RUC process to provide Ancillary Service.

(5) To reflect changes to a Resource’s capability, each QSE shall report by exception, changes to the COP for all hours after the Operating Period through the rest of the Operating Day.

(6) When a QSE updates its COP to show changes in Resource Status, the QSE shall update for each On-Line Resource, either an Energy Offer Curve under Section 4.4.9, Energy Offers and Bids, or Output Schedule under Section 6.4.2, Output Schedules.

(7) Each QSE, including QSEs representing Reliability Must-Run (RMR) Units, or Black Start Resources, shall submit a revised COP reflecting changes in Resource availability as soon as reasonably practicable, but in no event later than 30 minutes after the event that caused the change.

(8) Each QSE representing a Qualifying Facility (QF) must submit a Low Sustained Limit (LSL) that represents the minimum energy available, in MW, from the unit for economic dispatch based on the minimum stable steam delivery to the thermal host plus a justifiable reliability margin that accounts for changes in ambient conditions.

***3.9.1 Current Operating Plan (COP) Criteria***

(1) Each QSE that represents a Resource must submit a COP to ERCOT that reflects expected operating conditions for each Resource for each hour in the next seven Operating Days.

(2) Each QSE that represents a Resource shall update its COP reflecting changes in availability of any Resource as soon as reasonably practicable, but in no event later than 30 minutes after the event that caused the change.

(3) The Resource capacity in a QSE’s COP must be sufficient to supply the Ancillary Service Supply Responsibility of that QSE.

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| ***[NPRR1007, NPRR1014, and NPRR1029: Replace applicable portions of paragraph (3) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; or upon system implementation for NPRR1014 or NPRR1029:]***  (3) Each QSE that represents a Resource shall update its COP to reflect the ability of the Resource to provide each Ancillary Service by product and sub-type. |

(4) Load Resource COP values may be adjusted to reflect Distribution Losses in accordance with Section 8.1.1.2, General Capacity Testing Requirements.

(5) A COP must include the following for each Resource represented by the QSE:

(a) The name of the Resource;

(b) The expected Resource Status:

(i) Select one of the following for Generation Resources synchronized to the ERCOT System that best describes the Resource’s status. Unless otherwise provided below, these Resource Statuses are to be used for COP and/or Real-Time telemetry purposes, as appropriate.

(A) ONRUC – On-Line and the hour is a RUC-Committed Hour;

(B) ONREG – On-Line Resource with Energy Offer Curve providing Regulation Service;

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| ***[NPRR1007, NPRR1014, and NPRR1029: Delete item (B) above upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; or upon system implementation for NPRR1014 or NPRR1029; and renumber accordingly.]*** |

(C) ON – On-Line Resource with Energy Offer Curve;

(D) ONDSR – On-Line Dynamically Scheduled Resource (DSR);

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| ***[NPRR1000: Delete item (D) above upon system implementation and renumber accordingly.]*** |

(E) ONOS – On-Line Resource with Output Schedule;

(F) ONOSREG – On-Line Resource with Output Schedule providing Regulation Service;

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| ***[NPRR1007, NPRR1014, and NPRR1029: Delete item (F) above upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; or upon system implementation for NPRR1014 or NPRR1029; and renumber accordingly.]*** |

(G) ONDSRREG – On-Line DSR providing Regulation Service;

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| ***[NPRR1000, NPRR1007, NPRR1014, and NPRR1029: Delete item (G) above upon system implementation for NPRR1000, NPRR1014, or NPRR1029; or upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; and renumber accordingly.]*** |

(H) FRRSUP – Available for Dispatch of Fast Responding Regulation Service (FRRS). This Resource Status is only to be used for Real-Time telemetry purposes;

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| ***[NPRR1007, NPRR1014, and NPRR1029: Delete item (H) above upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; or upon system implementation for NPRR1014 and NPRR1029; and renumber accordingly.]*** |

(I) ONTEST – On-Line blocked from Security-Constrained Economic Dispatch (SCED) for operations testing (while ONTEST, a Generation Resource may be shown on Outage in the Outage Scheduler);

(J) ONEMR – On-Line EMR (available for commitment or dispatch only for ERCOT-declared Emergency Conditions; the QSE may appropriately set LSL and High Sustained Limit (HSL) to reflect operating limits);

(K) ONRR – On-Line as a synchronous condenser providing Responsive Reserve (RRS) but unavailable for Dispatch by SCED and available for commitment by RUC;

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| ***[NPRR1007, NPRR1014, and NPRR1029: Delete item (K) above upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; or upon system implementation for NPRR1014 or NPRR1029; and renumber accordingly.]*** |

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| ***[NPRR863: Insert paragraph (L) below upon system implementation and renumber accordingly:]***  (L) ONECRS – On-Line as a synchronous condenser providing ERCOT Contingency Response Service (ECRS) but unavailable for Dispatch by SCED and available for commitment by RUC; |

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| ***[NPRR1007, NPRR1014, and NPRR1029: Delete item (L) above upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; or upon system implementation for NPRR1014 or NPRR1029; and renumber accordingly.]*** |

(L) ONOPTOUT – On-Line and the hour is a RUC Buy-Back Hour;

(M) SHUTDOWN – The Resource is On-Line and in a shutdown sequence, and has no Ancillary Service Obligations other than Off-Line Non-Spinning Reserve (Non-Spin) which the Resource will provide following the shutdown. This Resource Status is only to be used for Real-Time telemetry purposes;

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| ***[NPRR1007, NPRR1014, and NPRR1029: Replace paragraph (M) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; or upon system implementation for NPRR1014 or NPRR1029:]***  (H) SHUTDOWN – The Resource is On-Line and in a shutdown sequence, and is not eligible for an Ancillary Service award. This Resource Status is only to be used for Real-Time telemetry purposes; |

(N) STARTUP – The Resource is On-Line and in a start-up sequence and has no Ancillary Service Obligations. This Resource Status is only to be used for Real-Time telemetry purposes;

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| ***[NPRR1007, NPRR1014, and NPRR1029: Replace paragraph (N) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; or upon system implementation for NPRR1014 or NPRR1029:]***  (I) STARTUP – The Resource is On-Line and in a start-up sequence and is not eligible for an Ancillary Service award, unless coming On-Line in response to a manual deployment of ERCOT Contingency Reserve Service (ECRS) or Non-Spinning Reserve (Non-Spin). This Resource Status is only to be used for Real-Time telemetry purposes; |

(O) OFFQS – Off-Line but available for SCED deployment. Only qualified Quick Start Generation Resources (QSGRs) may utilize this status;

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| ***[NPRR1007, NPRR1014, and NPRR1029: Replace paragraph (O) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; or upon system implementation for NPRR1014 or NPRR1029:]***  (J) OFFQS – Off-Line but available for SCED deployment and to provide ECRS and Non-Spin, if qualified and capable. Only qualified Quick Start Generation Resources (QSGRs) may utilize this status; |

(P) ONFFRRRS – Available for Dispatch of RRS providing Fast Frequency Response (FFR) from Generation Resources. This Resource Status is only to be used for Real-Time telemetry purposes; and

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| ***[NPRR1015: Replace paragraph (P) above with the following upon system implementation of NPRR863:]***  (P) ONFFRRRS – Available for Dispatch of RRS when providing Fast Frequency Response (FFR) from Generation Resources. This Resource Status is only to be used for Real-Time telemetry purposes. A Resource with this Resource Status may also be providing Ancillary Services other than FFR; |

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| ***[NPRR1007, NPRR1014, and NPRR1029: Delete item (P) above upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; or upon system implementation for NPRR1014 or NPRR1029; and renumber accordingly.]*** |

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| ***[NPRR1007, NPRR1014, and NPRR1029: Insert items (K) below upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; or upon system implementation for NPRR1014 or NPRR1029:]***  (K) ONSC – Resource is On-Line operating as a synchronous condenser and available to provide Responsive Reserve (RRS) and ECRS, if qualified and capable, and for commitment by RUC, but is unavailable for Dispatch by SCED. For SCED, Resource Base Points will be set equal to the telemetered net real power of the Resource available at the time of the SCED execution; |

(Q) ONHOLD – Resource is On-Line but temporarily unavailable for Dispatch by SCED or for participating in Ancillary Services. This Resource Status is only to be used for Real-Time telemetry purposes. For SCED, Resource Base Points will be set equal to the telemetered net real power of the Resource available at the time of the SCED execution.

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| ***[NPRR1007, NPRR1014, and NPRR1029: Replace item (Q) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; or upon system implementation for NPRR1014 or NPRR1029:]***  (Q) ONHOLD – Resource is On-Line but temporarily unavailable for Dispatch by SCED or Ancillary Service awards. This Resource Status is only to be used for Real-Time telemetry purposes. For SCED, Resource Base Points will be set equal to the telemetered net real power of the Resource available at the time of the SCED execution. |

(ii) Select one of the following for Off-Line Generation Resources not synchronized to the ERCOT System that best describes the Resource’s status. These Resource Statuses are to be used for COP and/or Real-Time telemetry purposes, as appropriate.

(A) OUT – Off-Line and unavailable;

(B) OFFNS – Off-Line but reserved for Non-Spin;

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| ***[NPRR1007, NPRR1014, and NPRR1029: Delete item (B) above upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; or upon system implementation for NPRR1014 or NPRR1029; and renumber accordingly.]*** |

(C) OFF – Off-Line but available for commitment in the Day-Ahead Market (DAM) and RUC;

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| ***[NPRR1007, NPRR1014, and NPRR1029: Replace item (C) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; or upon system implementation for NPRR1014 or NPRR1029:]***  (B) OFF – Off-Line but available for commitment in the Day-Ahead Market (DAM), RUC, and providing Non-Spin, if qualified and capable; |

(D) EMR – Available for commitment as a Resource contracted by ERCOT under Section 3.14.1, Reliability Must Run, or under paragraph (2) of Section 6.5.1.1, ERCOT Control Area Authority, or available for commitment only for ERCOT-declared Emergency Condition events; the QSE may appropriately set LSL and HSL to reflect operating limits; and

(E) EMRSWGR – Switchable Generation Resource (SWGR) operating in a non-ERCOT Control Area, or in the case of a Combined Cycle Train with one or more SWGRs, a configuration in which one or more of the physical units in that configuration are operating in a non-ERCOT Control Area; and

(iii) Select one of the following for Load Resources. Unless otherwise provided below, these Resource Statuses are to be used for COP and/or Real-Time telemetry purposes.

(A) ONRGL – Available for Dispatch of Regulation Service by Load Frequency Control (LFC) and, for any remaining Dispatchable capacity, by SCED with a Real-Time Market (RTM) Energy Bid;

(B) FRRSUP – Available for Dispatch of FRRS by LFC and not Dispatchable by SCED. This Resource Status is only to be used for Real-Time telemetry purposes;

(C) FRRSDN - Available for Dispatch of FRRS by LFC and not Dispatchable by SCED. This Resource Status is only to be used for Real-Time telemetry purposes;

(D) ONCLR – Available for Dispatch as a Controllable Load Resource by SCED with an RTM Energy Bid;

(E) ONRL – Available for Dispatch of RRS, excluding Controllable Load Resources;

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| ***[NPRR1007, NPRR1014, and NPRR1029: Delete items (A)-(E) above upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; or upon system implementation for NPRR1014 or NPRR1029; and renumber accordingly.]*** |

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| ***[NPRR863: Insert paragraph (F) below upon system implementation and renumber accordingly:]***  (F) ONECL – Available for Dispatch of ECRS, excluding Controllable Load Resources; |

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| ***[NPRR1007, NPRR1014, and NPRR1029: Delete item (F) above upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; or upon system implementation for NPRR1014 or NPRR1029; and renumber accordingly.]*** |

(F) OUTL – Not available;

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| ***[NPRR863 and NPRR1015: Insert applicable portions of paragraph (H) below upon system implementation of NPRR863:]***  (H) ONFFRRRSL – Available for Dispatch of RRS when providing FFR, excluding Controllable Load Resources. This Resource Status is only to be used for Real-Time telemetry purposes; |

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| ***[NPRR1007, NPRR1014, and NPRR1029: Delete item (H) above upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; or upon system implementation for NPRR1014 or NPRR1029.]*** |

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| ***[NPRR1007, NPRR1014, NPRR1029: Insert item (B) below upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; or upon system implementation for NPRR1014 or NPRR1029:]***  (B) ONL – On-Line and available for Dispatch by SCED or providing Ancillary Services. |

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| ***[NPRR1014 or NPRR1029: Insert applicable portions of paragraph (iv) below upon system implementation:]***  (iv) Select one of the following for Energy Storage Resources (ESRs). Unless otherwise provided below, these Resource Statuses are to be used for COP and Real-Time telemetry purposes:  (A) ON – On-Line Resource with Energy Bid/Offer Curve;  (B) ONOS – On-Line Resource with Output Schedule;  (C) ONTEST – On-Line blocked from SCED for operations testing (while ONTEST, an Energy Storage Resource (ESR) may be shown on Outage in the Outage Scheduler);  (D) ONEMR – On-Line EMR (available for commitment or dispatch only for ERCOT-declared Emergency Conditions; the QSE may appropriately set LSL and High Sustained Limit (HSL) to reflect operating limits);  (E) ONHOLD – Resource is On-Line but temporarily unavailable for Dispatch by SCED or Ancillary Service awards. ESRs shall not be discharging into or charging from the grid. This Resource Status is only to be used for Real-Time telemetry purposes;  (F) OUT – Off-Line and unavailable; and  (G) ONHOLD – Resource is On-Line but temporarily unavailable for Dispatch by SCED or for participating in Ancillary Services. This Resource Status is only to be used for Real-Time telemetry purposes. For SCED, Resource Base Points will be set equal to the telemetered net real power of the Resource available at the time of the SCED execution; and |

(c) The HSL;

(i) For Load Resources other than Controllable Load Resources, the HSL should equal the expected power consumption;

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| ***[NPRR1014 and NPRR1029: Insert applicable portions of paragraph (ii) below upon system implementation:]***  (ii) For ESRs, the HSL may be negative; |

(d) The LSL;

(i) For Load Resources other than Controllable Load Resources, the LSL should equal the expected Low Power Consumption (LPC);

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| ***[NPRR1014 and NPRR1029: Insert applicable portions of paragraph (ii) below upon system implementation:]***  (ii) For ESRs, the LSL may be positive; |

(e) The High Emergency Limit (HEL);

(f) The Low Emergency Limit (LEL); and

(g) Ancillary Service Resource Responsibility capacity in MW for:

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| ***[NPRR1007, NPRR1014, and NPRR1029: Replace applicable portions of item (g) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; or upon system implementation for NPRR1014 or NPRR1029:]***  (g) Ancillary Service capability in MW for each product and sub-type. |

(i) Regulation Up (Reg-Up);

(ii) Regulation Down (Reg-Down);

(iii) RRS; and

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| ***[NPRR863: Insert paragraph (iv) below upon system implementation and renumber accordingly:]***  (iv) ECRS; and |

(iv) Non-Spin.

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| ***[NPRR1007, NPRR1014, and NPRR1029: Delete items (i)-(iv) above upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; or upon system implementation for NPRR1014 or NPRR1029.]*** |

(6) For Combined Cycle Generation Resources, the above items are required for each operating configuration. In each hour only one Combined Cycle Generation Resource in a Combined Cycle Train may be assigned one of the On-Line Resource Status codes described above.

(a) During a RUC study period, if a QSE’s COP reports multiple Combined Cycle Generation Resources in a Combined Cycle Train to be On-Line for any hour, then until the QSE corrects its COP, the On-Line Combined Cycle Generation Resource with the largest HSL is considered to be On-Line and all other Combined Cycle Generation Resources in the Combined Cycle Train are considered to be Off-Line. Furthermore, until the QSE corrects its COP, the Off-Line Combined Cycle Generation Resources as designated through the application of this process are ineligible for RUC commitment or de-commitment Dispatch Instructions.

(b) For any hour in which QSE-submitted COP entries are used to determine the initial state of a Combined Cycle Generation Resource for a DAM or Day-Ahead Reliability Unit Commitment (DRUC) study and the COP shows multiple Combined Cycle Generation Resources in a Combined Cycle Train to be in an On-line Resource Status, then until the QSE corrects its COP, the On-Line Combined Cycle Generation Resource that has been On-Line for the longest time from the last recorded start by ERCOT systems, regardless of the reason for the start, combined with the COP Resource Status for the remaining hours of the current Operating Day, is considered to be On-Line at the start of the DRUC study period and all other COP-designated Combined Cycle Generation Resources in the Combined Cycle Train are considered to be Off-Line.

(c) ERCOT systems shall allow only one Combined Cycle Generation Resource in a Combined Cycle Train to offer Off-Line Non-Spin in the DAM or Supplemental Ancillary Services Market (SASM).

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| ***[NPRR1007, NPRR1014, and NPRR1029: Replace paragraph (c) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; or upon system implementation for NPRR1014 or NPRR1029:]***  (c) ERCOT systems shall allow only one Combined Cycle Generation Resource in a Combined Cycle Train to offer Off-Line Non-Spin in the DAM or SCED. |

(i) If there are multiple Non-Spin offers from different Combined Cycle Generation Resources in a Combined Cycle Train, then prior to execution of the DAM, ERCOT shall select the Non-Spin offer from the Combined Cycle Generation Resource with the highest HSL for consideration in the DAM and ignore the other offers.

(ii) Combined Cycle Generation Resources offering Off-Line Non-Spin must be able to transition from the shutdown state to the offered Combined Cycle Generation Resource On-Line state and be capable of ramping to the full amount of the Non-Spin offered.

(d) The DAM and RUC shall honor the registered hot, intermediate or cold Startup Costs for each Combined Cycle Generation Resource registered in a Combined Cycle Train when determining the transition costs for a Combined Cycle Generation Resource. In the DAM and RUC, the Startup Cost for a Combined Cycle Generation Resource shall be determined by the positive transition cost from the On-Line Combined Cycle Generation Resource within the Combine Cycle Train or from a shutdown condition, whichever ERCOT determines to be appropriate.

(7) ERCOT may accept COPs only from QSEs.

(8) For the first 168 hours of the COP, ERCOT will update the HSL values for Wind-powered Generation Resources (WGRs) with the most recently updated Short-Term Wind Power Forecast (STWPF), and the HSL values for PhotoVoltaic Generation Resources (PVGRs) with the most recently updated Short-Term PhotoVoltaic Power Forecast (STPPF). ERCOT will notify the QSE via an Extensible Markup Language (XML) message each time COP HSL values are updated with the forecast values. A QSE representing a WGR may override the STWPF HSL value but must submit an HSL value that is less than or equal to the amount for that Resource from the most recent STWPF provided by ERCOT; a QSE representing a PVGR may override the STPPF HSL value but must submit an HSL value that is less than or equal to the amount for that Resource from the most recent STPPF provided by ERCOT.

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| ***[NPRR1029: Replace paragraph (8) above with the following upon system implementation:]***  (8) For the first 168 hours of the COP, ERCOT will update the HSL values for Wind-powered Generation Resources (WGRs) with the most recently updated Short-Term Wind Power Forecast (STWPF), and the HSL values for PhotoVoltaic Generation Resources (PVGRs) with the most recently updated Short-Term PhotoVoltaic Power Forecast (STPPF). A QSE representing a DC-Coupled Resource shall provide the capacity value of the Energy Storage System (ESS) that is included in the HSL of the DC-Coupled Resource, and ERCOT will update the DC-Coupled Resource’s HSL with the sum of the forecasts of the intermittent renewable generation component and the QSE-submitted value for the ESS component. ERCOT will notify the QSE via an Extensible Markup Language (XML) message each time COP HSL values are updated with the forecast values. A QSE representing a WGR may override the STWPF HSL value but must submit an HSL value that is less than or equal to the amount for that Resource from the most recent STWPF provided by ERCOT; a QSE representing a PVGR may override the STPPF HSL value but must submit an HSL value that is less than or equal to the amount for that Resource from the most recent STPPF provided by ERCOT. A QSE representing a DC-Coupled Resource may override the COP HSL value with a value that is lower than the ERCOT-populated value, and may override with a value that is higher than the ERCOT-populated value if the ESS component of the DC-Coupled Resource can support the higher value. |

(9) A QSE representing a Generation Resource that is not actively providing Ancillary Services or is providing Off-Line Non-Spin that the Resource will provide following the shutdown, may only use a Resource Status of SHUTDOWN to indicate to ERCOT through telemetry that the Resource is operating in a shutdown sequence or a Resource Status of ONTEST to indicate in the COP and through telemetry that the Generation Resource is performing a test of its operations either manually dispatched by the QSE or by ERCOT as part of the test. A QSE representing a Generation Resource that is not actively providing Ancillary Services may only use a Resource Status of STARTUP to indicate to ERCOT through telemetry that the Resource is operating in a start-up sequence requiring manual control and is not available for Dispatch.

(10) If a QSE has not submitted a valid COP for any Generation Resource for any hour in the DAM or RUC Study Period, then the Generation Resource is considered to have a Resource Status as OUT thus not available for DAM awards or RUC commitments for those hours.

(11) If a COP is not available for any Resource for any hour from the current hour to the start of the DAM period or RUC study, then the Resource Status for those hours are considered equal to the last known Resource Status from a previous hour’s COP or from telemetry as appropriate for that Resource.

(12) A QSE representing a Resource may only use the Resource Status code of EMR for a Resource whose operation would have impacts that cannot be monetized and reflected through the Resource’s Energy Offer Curve or recovered through the RUC make-whole process or if the Resource has been contracted by ERCOT under Section 3.14.1 or under paragraph (2) of Section 6.5.1.1. If ERCOT chooses to commit an Off-Line unit with EMR Resource Status that has been contracted by ERCOT under Section 3.14.1 or under paragraph (2) of Section 6.5.1.1, the QSE shall change its Resource Status to ONRUC. Otherwise, the QSE shall change its Resource Status to ONEMR.

(13) A QSE representing a Resource may use the Resource Status code of ONEMR for a Resource that is:

(a) On-Line, but for equipment problems it must be held at its current output level until repair and/or replacement of equipment can be accomplished; or

(b) A hydro unit.

(14) A QSE operating a Resource with a Resource Status code of ONEMR may set the HSL and LSL of the unit to be equal to ensure that SCED does not send Base Points that would move the unit.

(15) A QSE representing a Resource may use the Resource Status code of EMRSWGR only for an SWGR.

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| ***[NPRR1026: Insert paragraph (16) below upon system implementation:]***  (16) A QSE representing a Self-Limiting Facility must ensure that the sum of the COP HSL/LSL and the sum of the telemetered HSL/LSL submitted for each Resource within the Self-Limiting Facility do not exceed either the limit on MW Injection or the limit on the MW Withdrawal established for the Self-Limiting Facility. |

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| ***[NPRR1029: Insert paragraph (16) below upon system implementation:]***  (16) A QSE representing a DC-Coupled Resource shall not submit an HSL that exceeds the inverter rating or the sum of the nameplate ratings of the generation component(s) of the Resource. |

6.4.8 Notification of Forced Outage of a Resource

(1) In the event of a Forced Outage of a Resource, the telemetered status of the Resource automatically notifies ERCOT of the event. In the event of a Forced Outage the telemetered Resource Status shall be changed as soon as practicable but no longer than five minutes after the QSE has been notified by the Resource Entity.

(2) In the event of a Forced Outage, an impending Forced Outage, or de-rating of a Resource, the Resource Entity or its designee shall inform ERCOT of the following in the Outage Scheduler:

(a) Time of expected change in Resource Status or rating;

(b) Text message describing the nature of the Forced Outage or de-rating updated as new information becomes available; and(c) The expected minimum and maximum duration of the Forced Outage or de-rating.

(3) In the event of a Forced Outage, the QSE must update the Resource’s COP as soon as practicable but no longer than 30 minutes after the affected equipment is removed from service;.

**6.5.5.1 Changes in Resource Status**

(1) When a Resource experiences an event that will affect its Resource Status, the Resource Entity shall notify its QSE as soon as practicable but no longer than five minutes after the event.

(2) Each QSE shall notify ERCOT of a change in Resource Status via telemetry as soon as practicable but no longer than five minutes after notification from the Resource Entity and through changes in the Current Operating Plan (COP) as soon as practicable but no longer than 60 minutes after the change in status of the Resource occurs.(3) When an On-Line Resource is experiencing an event that may affect its availability and/or capability that require further actions to stabilize the Resource and/or determine the impact of the event, the QSE may change the Resource Status to ONHOLD as soon as practicable but no longer than five minutes after being notified by the Resource Entity. Following this Resource Status change, the telemetered HSL and any other applicable telemetry of the Resource as specified in paragraph (2) of Section 6.5.5.2, Operational Data Requirements, shall be updated as soon as practicable but no longer than 15 minutes after the change in Resource Status to ONHOLD. After the QSE has determined the impact of the event, the QSE shall change the Resource Status to its correct status as soon as practicable but no longer than 60 consecutive minutes of being in the ONHOLD status.

(4) Each QSE shall promptly inform ERCOT when the operating mode of its Generation Resource’s Automatic Voltage Regulator (AVR) or Power System Stabilizer (PSS) is changed while the Resource is On-Line. The QSE shall also provide the Resource’s AVR or PSS status logs to ERCOT upon request.

(5) Each QSE shall immediately report to ERCOT and the TSP any inability of the QSE’s Generation Resource required to meet its reactive capability requirements in these Protocols.

**6.5.7.5 Ancillary Services Capacity Monitor**

(1) ERCOT shall calculate the following every ten seconds and provide Real-Time summaries to ERCOT Operators and all Market Participants using ICCP, giving updates of calculations every ten seconds, and posting on the ERCOT website, giving updates of calculations every five minutes, which show the Real-Time total system amount of:

(a) RRS capacity from:

(i) Generation Resources;

(ii) Load Resources excluding Controllable Load Resources;

(iii) Controllable Load Resources; and

(iv) Resources capable of Fast Frequency Response (FFR);

(b) Ancillary Service Resource Responsibility for RRS from:

(i) Generation Resources;

(ii) Load Resources excluding Controllable Load Resources;

(iii) Controllable Load Resources; and

(iv) Resources capable of FFR;

(c) RRS deployed to Generation and Controllable Load Resources;

(d) Non-Spin available from:

(i) On-Line Generation Resources with Energy Offer Curves;

(ii) Undeployed Load Resources;

(iii) Off-Line Generation Resources; and

(iv) Resources with Output Schedules;

(e) Ancillary Service Resource Responsibility for Non-Spin from:

(i) On-Line Generation Resources with Energy Offer Curves;

(ii) On-Line Generation Resources with Output Schedules;

(iii) Load Resources;

(iv) Off-Line Generation Resources excluding Quick Start Generation Resources (QSGRs); and

(v) QSGRs;

(f) Undeployed Reg-Up and Reg-Down;

(g) Ancillary Service Resource Responsibility for Reg-Up and Reg-Down;

(h) Deployed Reg-Up and Reg-Down;

(i) Available capacity:

(i) With Energy Offer Curves in the ERCOT System that can be used to increase Generation Resource Base Points in SCED;

(ii) With Energy Offer Curves in the ERCOT System that can be used to decrease Generation Resource Base Points in SCED;

(iii) Without Energy Offer Curves in the ERCOT System that can be used to increase Generation Resource Base Points in SCED;

(iv) Without Energy Offer Curves in the ERCOT System that can be used to decrease Generation Resource Base Points in SCED;

(v) With RTM Energy Bid curves from available Controllable Load Resources in the ERCOT System that can be used to decrease Base Points (energy consumption) in SCED;

(vi) With RTM Energy Bid curves from available Controllable Load Resources in the ERCOT System that can be used to increase Base Points (energy consumption) in SCED;

(vii) From Resources participating in SCED plus the Reg-Up and RRS from Load Resources and the Net Power Consumption minus the Low Power Consumption from Load Resources with a validated Real-Time RRS Schedule;

(viii) From Resources included in item (vii) above plus reserves from Resources that could be made available to SCED in 30 minutes;

(ix) In the ERCOT System that can be used to increase Generation Resource Base Points in the next five minutes in SCED; and

(x) In the ERCOT System that can be used to decrease Generation Resource Base Points in the next five minutes in SCED;

(j) Aggregate telemetered HSL capacity for Resources with a telemetered Resource Status of EMR;

(k) Aggregate telemetered HSL capacity for Resources with a telemetered Resource Status of OUT;

(l) Aggregate net telemetered consumption for Resources with a telemetered Resource Status of OUTL; and

(m) The ERCOT-wide PRC calculated as follows:

**PRC1 = Min(Max((RDF\*(HSL-NFRC) – Actual Net Telemetered Output)i , 0.0) , 0.2\*RDF\*(HSL-NFRC)i),**

where the included On-Line Generation Resources do not include WGRs, nuclear Generation

Resources, or Generation Resources with an output less than or equal to 95% of telemetered LSL or

with a telemetered status of ONTEST, ONHOLD, STARTUP, or SHUTDOWN.

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***WGRs***

***online***

***All***

***WGR***

***online***

***i***

**PRC2 = Min(Max((RDFW\*HSL – Actual Net Telemetered Output)i , 0.0) , 0.2\*RDFW\*HSLi),**

where the included On-Line WGRs only include WGRs that are Primary Frequency Response-capable.

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**PRC3 = ((Hydro-synchronous condenser output)i as qualified by item (8) of Operating Guide Section 2.3.1.2, Additional Operational Details for Responsive Reserve Providers))**

**PRC4 = (Min(Max((Actual Net Telemetered Consumption – LPC), 0.0), RRS Ancillary Service Resource Responsibility \* 1.5) from all Load Resources controlled by high-set under frequency relays carrying RRS Ancillary Service Resource Responsibility)i**

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***resources***

***load***

***online***

***All***

***resource***

***load***

***online***

***i***

**PRC5 = Min(Max((LRDF\_1\*Actual Net Telemetered Consumption – LPC)i, 0.0), (0.2 \* LRDF\_1 \* Actual Net Telemetered Consumption)) from all Controllable Load Resources active in SCED and carrying Ancillary Service Resource Responsibility**

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***resources***

***load***

***online***

***All***

***resource***

***load***

***online***

***i***

**PRC6 = Min(Max((LRDF\_2 \* Actual Net Telemetered Consumption – LPC)i, 0.0), (0.2 \* LRDF\_2 \* Actual Net Telemetered Consumption)) from all Controllable Load Resources active in SCED and not carrying Ancillary Service Resource Responsibility**

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***resourcesresources***

***FFRload***

***onlineonline***

***AllAll***

***resourceresource***

***FFRload***

***onlineonline***

***ii***

**PRC7 = (Capacity from Resources capable of providing FFR)i**

**PRC = PRC1 + PRC2 + PRC3+ PRC4 + PRC5 + PRC6 + PRC7**

The above variables are defined as follows:

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| **Variable** | **Unit** | **Description** |
| PRC1 | MW | Generation On-Line greater than 0 MW |
| PRC2 | MW | WGRs On-Line greater than 0 MW |
| PRC3 | MW | Hydro-synchronous condenser output |
| PRC4 | MW | Capacity from Load Resources controlled by high-set under-frequency relays carrying RRS Ancillary Service Resource Responsibility |
| PRC5 | MW | Capacity from Controllable Load Resources active in SCED and carrying Ancillary Service Resource Responsibility |
| PRC6 | MW | Capacity from Controllable Load Resources active in SCED and not carrying Ancillary Service Resource Responsibility |
| PRC7 | MW | Capacity from Resources capable of providing FFR |
|  | | |
| PRC | MW | Physical Responsive Capability |
| RDF |  | The currently approved Reserve Discount Factor |
| RDFW |  | The currently approved Reserve Discount Factor for WGRs |
| LRDF\_1 |  | The currently approved Load Resource Reserve Discount Factor for Controllable Load Resources carrying Ancillary Service Resource Responsibility |
| LRDF\_2 |  | The currently approved Load Resource Reserve Discount Factor for Controllable Load Resources not carrying Ancillary Service Resource Responsibility |
| NFRC | MW | Non-Frequency Responsive Capacity |

(2) Each QSE shall operate Resources providing Ancillary Service capacity to meet its obligations. If a QSE experiences temporary conditions where its total obligation for providing Ancillary Service cannot be met on the QSE’s Resources, then the QSE may add additional capability from other Resources that it represents. It adds that capability by changing the Resource Status and updating the Ancillary Service Schedules and Ancillary Services Resource Responsibility of the affected Resources and notifying ERCOT under Section 6.4.9.1, Evaluation and Maintenance of Ancillary Service Capacity Sufficiency. If the QSE is unable to meet its total obligations to provide committed Ancillary Services capacity, the QSE shall notify ERCOT immediately of the expected duration of the QSE’s inability to meet its obligations. ERCOT shall determine whether replacement Ancillary Services will be procured to account for the QSE’s shortfall according to Section 6.4.9.1.

(3) The Load Resource Reserve Discount Factors (RDFs) for Controllable Load Resources (LRDF\_1 and LRDF\_2) shall be subject to review and approval by TAC.

(4) The RDFs used in the PRC calculation shall be posted to the ERCOT website no later than three Business Days after approval.

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| ***[NPRR863, NPRR987, NPRR1010, NPRR1014, and NPRR1029: Replace applicable portions of Section 6.5.7.5 above with the following upon system implementation for NPRR863, NPRR987, NPRR1014, or NPRR1029; or upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1010:]***  **6.5.7.5 Ancillary Services Capacity Monitor**  (1) Every ten seconds, ERCOT shall calculate the following and provide Real-Time summaries to ERCOT Operators and all Market Participants using ICCP and postings on the ERCOT website showing the Real-Time total system amount of:  (a) RRS capability from:  (i) Generation Resources and ESRs in the form of PFR;  (ii) Load Resources, excluding Controllable Load Resources, capable of responding via under-frequency relay;  (iii) Controllable Load Resources in the form of PFR; and  (iv) Resources capable of Fast Frequency Response (FFR);  (b) Ancillary Service Resource awards for RRS to:  (i) Generation Resources and ESRs in the form of PFR;  (ii) Load Resources, excluding Controllable Load Resources, capable of responding by under-frequency relay;  (iii) Controllable Load Resources in the form of PFR; and  (iv) Resources providing FFR;  (c) ECRS capability from:  (i) Generation Resources;  (ii) Load Resources excluding Controllable Load Resources;  (iii) Controllable Load Resources;  (iv) Quick Start Generation Resources (QSGRs); and  (v) ESRs.  (d) Ancillary Service Resource awards for ECRS to:  (i) Generation Resources;  (ii) Load Resources excluding Controllable Load Resources; and  (iii) Controllable Load Resources;  (iv) QSGRs; and  (v) ESRs.  (e) ECRS manually deployed by Resources with a Resource Status of ONSC;  (f) Non-Spin available from:  (i) On-Line Generation Resources with Energy Offer Curves;  (ii) Undeployed Load Resources;  (iii) Off-Line Generation Resources and On-Line Generation Resources with power augmentation;  (iv) Resources with Output Schedules; and  (v) ESRs.  (g) Ancillary Service Resource awards for Non-Spin to:  (i) On-Line Generation Resources with Energy Offer Curves;  (ii) On-Line Generation Resources with Output Schedules;  (iii) Load Resources;  (iv) Off-Line Generation Resources excluding Quick Start Generation Resources (QSGRs), including Non-Spin awards on power augmentation capacity that is not active on On-Line Generation Resources;  (v) QSGRs; and  (vi) ESRs.  (h) Reg-Up and Reg-Down capability;  (i) Undeployed Reg-Up and Reg-Down;  (j) Ancillary Service Resource awards for Reg-Up and Reg-Down;  (k) Deployed Reg-Up and Reg-Down;  (l) Available capacity:  (i) With Energy Offer Curves in the ERCOT System that can be used to increase Generation Resource Base Points in SCED;  (ii) With Energy Offer Curves in the ERCOT System that can be used to decrease Generation Resource Base Points in SCED;  (iii) Without Energy Offer Curves in the ERCOT System that can be used to increase Generation Resource Base Points in SCED;  (iv) Without Energy Offer Curves in the ERCOT System that can be used to decrease Generation Resource Base Points in SCED;  (v) With RTM Energy Bid curves from available Controllable Load Resources in the ERCOT System that can be used to decrease Base Points (energy consumption) in SCED;  (vi) With RTM Energy Bid curves from available Controllable Load Resources in the ERCOT System that can be used to increase Base Points (energy consumption) in SCED;  (vii) From Resources participating in SCED plus the Reg-Up, RRS, and ECRS from Load Resources and the Net Power Consumption minus the Low Power Consumption from Load Resources with a validated Real-Time RRS and ECRS awards;  (viii) With Energy Bid/Offer Curves for ESRs in the ERCOT System that can be used to increase ESR Base Points in SCED;  (ix) With Energy Bid/Offer Curves for ESRs in the ERCOT System that can be used to decrease ESR Base Points in SCED;  (x) Without Energy Bid/Offer Curves for ESRs in the ERCOT System that can be used to increase ESR Base Points in SCED;  (xi) Without Energy Bid/Offer Curves for ESRs in the ERCOT System that can be used to decrease ESR Base Points in SCED;  (xii) From Resources included in item (vii) above plus reserves from Resources that could be made available to SCED in 30 minutes;  (xiii) In the ERCOT System that can be used to increase Generation Resource Base Points in the next five minutes in SCED; and  (xiv) In the ERCOT System that can be used to decrease Generation Resource Base Points in the next five minutes in SCED;  (xv) The total capability of Resources available to provide the following combinations of Ancillary Services, based on the Resource telemetry from the QSE and capped by the limits of the Resource:  (A) Capacity to provide Reg-Up, RRS, or both, irrespective of whether it is capable of providing ECRS or Non-Spin;  (B) Capacity to provide Reg-Up, RRS, ECRS, or any combination, irrespective of whether it is capable of providing Non-Spin; and  (C) Capacity to provide Reg-Up, RRS, ECRS, or Non-Spin, in any combination;  (m) Aggregate telemetered HSL capacity for Resources with a telemetered Resource Status of EMR;  (n) Aggregate telemetered HSL capacity for Resources with a telemetered Resource Status of OUT;  (o) Aggregate net telemetered consumption for Resources with a telemetered Resource Status of OUTL; and  (p) The ERCOT-wide PRC calculated as follows:  **PRC1 = Min(Max((RDF\*FRCHL – FRCO)i , 0.0) , 0.2\*RDF\*FRCHLi),**  where the included On-Line Generation Resources do not include WGRs, nuclear Generation  Resources, or Generation Resources with an output less than or equal to 95% of telemetered LSL or  with a telemetered status of ONTEST, ONHOLD, ONHOLD, STARTUP, or SHUTDOWN.      ***WGRs***  ***online***  ***All***  ***WGR***  ***online***  ***i***  **PRC2 = Min(Max((RDFW\*HSL – Actual Net Telemetered Output)i , 0.0) , 0.2\*RDFW\*HSLi),**  where the included On-Line WGRs only include WGRs that are Primary Frequency Response-capable.    **PRC3 = ((Synchronous condenser output)i as qualified by item (8) of Operating Guide Section 2.3.1.2, Additional Operational Details for Responsive Reserve and ERCOT Contingency Reserve Service Providers))**  **PRC4 = (Min(Max((Actual Net Telemetered Consumption – LPC), 0.0), ECRS and RRS Ancillary Service Resource award \* 1.5) from all Load Resources controlled by high-set under-frequency relays with an ECRS and/or RRS Ancillary Service Resource award)i**      ***resources***  ***load***  ***online***  ***All***  ***resource***  ***load***  ***online***  ***i***  **PRC5 = Min(Max((LRDF\_1\*Actual Net Telemetered Consumption – LPC)i, 0.0), (0.2 \* LRDF\_1 \* Actual Net Telemetered Consumption)) from all Controllable Load Resources active in SCED with an Ancillary Service Resource award**      ***resources***  ***load***  ***online***  ***All***  ***resource***  ***load***  ***online***  ***i***  **PRC6 = Min(Max((LRDF\_2 \* Actual Net Telemetered Consumption – LPC)i, 0.0), (0.2 \* LRDF\_2 \* Actual Net Telemetered Consumption)) from all Controllable Load Resources active in SCED without an Ancillary Service Resource award**      ***resources***  ***load***  ***online***  ***All***  ***resource***  ***load***  ***online***  ***i***  **PRC7 = (Capacity from Resources capable of providing FFR)i**      ***resources***  ***FFR***  ***online***  ***All***  ***resource***  ***FFR***  ***online***  ***i***  **PRC8 = (If discharging or idle, Min(X% of HSL based on droop, HSL-ESR-Gen “injection”, the capacity that can be sustained for 15 minutes per the State of Charge), else Min(X% of (HSL – LSL(ESR “charging”) based on droop, the capacity that can be sustained for 15 minutes per the State of Charge – LSL(ESR “charging”)))**      ***ESR***  ***online***  ***All***  ***ESR***  ***online***  ***i***  **Excludes ESR capacity used to provide FFR**  **PRC9 = (If discharging or idle, Min(X% of HSL based on droop, HSL-Gen “injection”, the sum of the MW headroom available from the intermittent renewable generation component and the MW capacity that can be sustained for 15 minutes per the ESS State of Charge), else Min(X% of Real-Time Total Capacity based on droop, the sum of the MW headroom available from the intermittent renewable generation component and the MW capacity that can be sustained for 15 minutes per the ESS State of Charge))**      ***DC-Coupled Resources***  ***online***  ***All***  ***ESR***  ***online***  ***i***  **Excludes DC-Coupled Resource capacity used to provide FFR**  **PRC = PRC1 + PRC2 + PRC3+ PRC4 + PRC5 + PRC6 + PRC7 + PRC8 + PRC9**  The above variables are defined as follows:   |  |  |  | | --- | --- | --- | | **Variable** | **Unit** | **Description** | | PRC1 | MW | Generation On-Line greater than 0 MW | | PRC2 | MW | WGRs On-Line greater than 0 MW | | PRC3 | MW | Synchronous condenser output | | PRC4 | MW | Capacity from Load Resources with an ECRS Ancillary Service Resource award | | PRC5 | MW | Capacity from Controllable Load Resources active in SCED with an Ancillary Service Resource award | | PRC6 | MW | Capacity from Controllable Load Resources active in SCED without an Ancillary Service Resource award | | PRC7 | MW | Capacity from Resources capable of providing FFR | | PRC8 | MW | ESR capacity capable of providing Primary Frequency Response | | PRC9 | MW | Capacity from DC-Coupled Resources capable of providing Primary Frequency Response | | PRC | MW | Physical Responsive Capability | | X | Percentage | Percent threshold based on the Governor droop setting of ESRs | | RDF |  | The currently approved Reserve Discount Factor | | RDFW |  | The currently approved Reserve Discount Factor for WGRs | | LRDF\_1 |  | The currently approved Load Resource Reserve Discount Factor for Controllable Load Resources awarded an Ancillary Service Resource award | | LRDF\_2 |  | The currently approved Load Resource Reserve Discount Factor for Controllable Load Resources not awarded an Ancillary Service Resource award | | FRCHL | MW | Telemetered High limit of the FRC for the Resource | | FRCO | MW | Telemetered output of FRC portion of the Resource |   (2) The Load Resource Reserve Discount Factors (RDFs) for Controllable Load Resources (LRDF\_1 and LRDF\_2) shall be subject to review and approval by TAC.  (3) The RDFs used in the PRC calculation shall be posted to the ERCOT website no later than three Business Days after approval.  (4) ERCOT shall display on the ERCOT website and update every ten seconds a rolling view of the ERCOT-wide PRC, as defined in paragraph (1)(p) above, for the current Operating Day. |