(ii) As submitted and extended with proxy Energy Offer Curve logic by ERCOT to fit to the operational HSL and LSL values that are available for dispatch by SCED;

(k) The following ESR data using a snapshot from each execution of SCED:

(i) The ESR name;

(ii) The ESR status;

(iii) The ESR HSL, LSL, High Dispatch Limit (HDL), and Low Dispatch Limit (LDL);

(iv) The ESR Base Point from SCED;

(v) The telemetered ESR net output used in SCED;

(vi) The Ancillary Service Resource awards for each Ancillary Service;

(vii) The telemetered Normal Ramp Rates;

(viii) The telemetered Ancillary Service capabilities;

(ix) The telemetered State of Charge in MWh;

(x) The telemetered Minimum State of Charge (MinSOC) in MWh; and

(xi) The telemetered Maximum State of Charge (MaxSOC) in MWh.

[NPRR1007: Insert paragraph (5) below upon system implementation of the Real-Time Co-Optimization (RTC) project and renumber accordingly:]

(5) ERCOT shall post on the ERCOT website for each Resource for each Operating Hour 60 days prior to the current Operating Day a count of the number of times for each Ancillary Service that the Resource's Ancillary Service Offer quantity or price was updated within the Operating Period. ERCOT shall post on the ERCOT website for each Resource for each Operating Hour 60 days prior to the current Operating Day, a count of the number of times a Resource's Energy Offer quantity or price was updated within the Operating Hour, including any reason accompanying the update.

(5) If any Real-Time Locational Marginal Price (LMP) exceeds 50 times the Fuel Index Price (FIP) during any 15-minute Settlement Interval for the applicable Operating Day, ERCOT shall post on the ERCOT website the portion of any Generation Resource's as-submitted and as-mitigated and extended Energy Offer Curve that is at or above 50 times the FIP for each 15-minute Settlement Interval seven days after the applicable Operating Day.

[NPRR1007 and NPRR1014: Replace applicable portions of paragraph (5) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; or upon system implementation for NPRR1014:]

(6) If any Real-Time Locational Marginal Price (LMP) exceeds 50 times the Fuel Index Price (FIP) during any SCED interval for the applicable Operating Day, ERCOT shall post on the ERCOT website the portion of any Generation Resource's as-submitted and as-mitigated and extended Energy Offer Curve or any ESR's as-submitted and as-mitigated and extended Energy Bid/Offer Curve that is at or above 50 times the FIP for that SCED interval seven days after the applicable Operating Day.

(6) If any Market Clearing Price for Capacity (MCPC) for an Ancillary Service exceeds 50 times the FIP for any Operating Hour in a DAM or Supplemental Ancillary Services Market (SASM) for the applicable Operating Day, ERCOT shall post on the ERCOT website the portion on any Resource's Ancillary Service Offer that is at or above 50 times the FIP for that Ancillary Service for each Operating Hour seven days after the applicable Operating Day.

[NPRR1007 and NPRR1014: Replace applicable portions of paragraph (6) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; or upon system implementation for NPRR1014:]

(7) If any Market Clearing Price for Capacity (MCPC) for an Ancillary Service exceeds 50 times the FIP for any Operating Hour in a DAM or any SCED interval in the RTM for the applicable Operating Day, ERCOT shall post on the ERCOT website the portion on any Resource's Ancillary Service Offer that is at or above 50 times the FIP for that Ancillary Service for that Operating Hour for the DAM or SCED interval for the RTM seven days after the applicable Operating Day.

(7) ERCOT shall post on the ERCOT website the offer price and the name of the Entity submitting the offer for the highest-priced offer selected or Dispatched by SCED three days after the end of the applicable Operating Day. If multiple Entities submitted the highest-priced offers selected, all Entities shall be identified on the ERCOT website.

(8) ERCOT shall post on the ERCOT website the bid price and the name of the Entity submitting the bid for the highest-priced bid selected or Dispatched by SCED three days after the end of the applicable Operating Day. If multiple Entities submitted the highest-priced bids selected, all Entities shall be identified on the ERCOT website.

(9) ERCOT shall post on the ERCOT website the offer price and the name of the Entity submitting the offer for the highest-priced Ancillary Service Offer selected in the DAM for each Ancillary Service three days after the end of the applicable Operating Day. This same report shall also include the highest-priced Ancillary Service Offer selected for any SASMs cleared for that same Operating Day. If multiple Entities submitted the highest-

priced offers selected, all Entities shall be identified on the ERCOT website. The report shall specify whether the Ancillary Service Offer was selected in a DAM or a SASM.

[NPRR1007 and NPRR1014: Replace applicable portions of paragraph (9) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; or upon system implementation for NPRR1014:]

(10) ERCOT shall post on the ERCOT website the offer price and the name of the Entity submitting the offer for the highest-priced Ancillary Service Offer selected in the DAM or RTM for each Ancillary Service three days after the end of the applicable Operating Day. If multiple Entities submitted the highest-priced offers selected, all Entities shall be identified on the ERCOT website. The report shall specify whether the Ancillary Service Offer was selected in a DAM or RTM.

(10) ERCOT shall post on the ERCOT website for each Operating Day the following information for each Resource:

(a) The Resource name;

(b) The name of the Resource Entity;

(c) Except for Load Resources that are not SCED qualified, the name of the Decision Making Entity (DME) controlling the Resource, as reflected in the Managed Capacity Declaration submitted by the Resource Entity in accordance with Section 3.6.2, Decision Making Entity for a Resource; and

(d) Flag for Reliability Must-Run (RMR) Resources.

(11) ERCOT shall post on the ERCOT website the following information from the DAM for each hourly Settlement Interval for the applicable Operating Day 60 days prior to the current Operating Day:

(a) The Generation Resource name and the Generation Resource's Three-Part Supply Offer (prices and quantities), including Startup Offer and Minimum-Energy Offer, available for the DAM;

(b) For each Settlement Point, individual DAM Energy-Only Offer Curves available for the DAM and the name of the QSE submitting the offer;

(c) The Resource name and the Resource's Ancillary Service Offers available for the DAM;

[NPRR1007 and NPRR1014: Insert applicable portions of paragraph (d) below upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1007; or upon system implementation for NPRR1014; and renumber accordingly:]

(d) The Ancillary Service Only Offer for each Ancillary Service and the name of the QSE submitting the offer;

(d) For each Settlement Point, individual DAM Energy Bids available for the DAM and the name of the QSE submitting the bid;

(e) For each Settlement Point, individual PTP Obligation bids available to the DAM that sink at the Settlement Point and the QSE submitting the bid;

(f) The awards for each Ancillary Service from DAM for each Generation Resource;

(g) The awards for each Ancillary Service from DAM for each Load Resource;

(h) The award of each Three-Part Supply Offer from the DAM and the name of the QSE receiving the award;

(i) For each Settlement Point, the award of each DAM Energy-Only Offer from the DAM and the name of the QSE receiving the award;

(j) For each Settlement Point, the award of each DAM Energy Bid from the DAM and the name of the QSE receiving the award; and

(k) For each Settlement Point, the award of each PTP Obligation bid from the DAM that sinks at the Settlement Point, including whether or not the PTP Obligation bid was linked to an Option, and the QSE submitting the bid.

[NPRR1188: Insert items (l) and (m) below upon system implementation and renumber accordingly:]

(l) The CLR name and the CLR's Energy Bid Curve (prices and quantities) available for the DAM; and

(m) The award for each CLR's Energy Bid Curve from the DAM and the name of the QSE receiving the award.

[NPRR1014: Insert items (m)-(o) below upon system implementation:]

(m) The ESR name and the ESR's Energy Bid/Offer Curve (prices and quantities), available for the DAM;

(n) The awards for each Ancillary Service from the DAM for each ESR; and

(o) The award of each Energy Bid/Offer Curve from the DAM and the name of the QSE receiving the award.

(12) ERCOT shall post on the ERCOT website the following information from any applicable SASMs for each hourly Settlement Interval for the applicable Operating Day 60 days prior to the current Operating Day:

(a) The Resource name and the Resource's Ancillary Service Offers available for any applicable SASMs;

(b) The awards for each Ancillary Service from any applicable SASMs for each Generation Resource; and

(c) The awards for each Ancillary Service from any applicable SASMs for each Load Resource.

[NPRR1007: Delete paragraph (12) above upon system implementation of the Real-Time Co-Optimization (RTC) project.]

4.2.1.2 Ancillary Service Obligation Assignment and Notice

(1) ERCOT shall assign part of the Ancillary Service Plan quantity, by service, by hour, to each Qualified Scheduling Entity (QSE) based on its Load Serving Entity (LSE) Load Ratio Shares (LRSs) (including the shares for Direct Current Tie (DC Tie) exports) aggregated by hour to the QSE level. If the resultant QSE-level share is negative, the QSE's share will be set to zero and all other QSE shares will be adjusted on a pro rata basis such that the sum of all shares is equal to one. The resulting Ancillary Service quantity for each QSE, by service, by hour, is called its Ancillary Service Obligation. ERCOT shall base the QSE Ancillary Service allocation on the QSE to LSE relationships for the operating date and on the hourly LSE LRSs from the Real-Time Market (RTM) data used for Initial Settlement for the same hour and day of the week, for the most recent day for which Initial Settlement data is available, multiplied by the quantity of that service required in the Day-Ahead Ancillary Service Plan. The Ancillary Service Obligation defined shall be adjusted based on the most current real time settlement and resettlement data for the Operating Day for which the Ancillary Service was procured.

(2) By 0600 of the Day-Ahead, ERCOT shall notify each QSE of its Ancillary Service Obligation for each service and for each hour of the Operating Day.

(3) By 0600 of the Day-Ahead, ERCOT shall post on the Market Information System (MIS) Certified Area each QSE's LRS used for the Ancillary Service Obligation calculation.

[NPRR1008: Replace Section 4.2.1.2 above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]

4.2.1.2 Ancillary Service Obligation Assignment and Notice

(1) ERCOT shall assign part of the Ancillary Service Plan quantity, or total Ancillary Service procurement quantity, if different, by service, by hour, to each Qualified Scheduling Entity (QSE) based on its Load Serving Entity (LSE) Load Ratio Shares (LRSs) (including the shares for Direct Current Tie (DC Tie) exports) aggregated by hour to the QSE level. If the resultant QSE-level share is negative, the QSE's share will be set to zero and all other QSE shares will be adjusted on a pro rata basis such that the sum of all shares is equal to one. The resulting Ancillary Service quantity for each QSE, by service, by hour, is called its Ancillary Service Obligation. ERCOT shall base the QSE Ancillary Service allocation on the QSE to LSE relationships for the operating date and on the hourly LSE LRSs from the Real-Time Market (RTM) data used for Initial Settlement for the same hour and day of the week, for the most recent day for which Initial Settlement data is available, multiplied by the quantity of that service required in the Day-Ahead Ancillary Service Plan. The Ancillary Service Obligation defined shall be adjusted based on the most current real time settlement and resettlement data for the Operating Day for which the Ancillary Service was procured.

(2) By 0600 of the Day-Ahead, ERCOT shall notify each QSE of its advisory Ancillary Service Obligation for each service and for each hour of the Operating Day, based on the Ancillary Service Plan, as well as that QSE's proportional limit for any Self-Arranged Ancillary Services as set forth in Section 3.16, Standards for Determining Ancillary Service Quantities.

(3) By 0600 of the Day-Ahead, ERCOT shall post on the Market Information System (MIS) Certified Area each QSE's LRS used for both the advisory and final Ancillary Service Obligation calculations.

~~(4) The minimum Ancillary Service Obligation quantity will be 0.1 MW and will apply to both advisory and final values.~~

(4~~5~~) After DAM has published, ERCOT shall notify each QSE of its final Ancillary Service Obligation based on the total DAM Ancillary Service procurement quantity, comprised of DAM Ancillary Service awards and Self-Arranged Ancillary Service Quantities for each service and for each hour of the Operating Day.

4.4.7.2 Ancillary Service Offers

Commented [CP1]: Please note NPRR1235 also proposes revisions to this section.

(1) By 1000 in the Day-Ahead, a QSE may submit Generation Resource-specific Ancillary Service Offers to ERCOT for the DAM and may offer the same Generation Resource capacity for any or all of the Ancillary Service products simultaneously with any Energy Offer Curves from that Generation Resource in the DAM. A QSE may also submit Ancillary Service Offers in a SASM. Offers of more than one Ancillary Service product from one Generation Resource may be inclusive or exclusive of each other and of any Energy Offer Curves, as specified according to a procedure developed by ERCOT.

[NPRR1008, NPRR1014, and NPRR1188: Replace applicable portions of paragraph (1) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1008; or upon system implementation for NPRR1014 or NPRR1188:]

(1) By 1000 in the Day-Ahead, a QSE may submit Resource-Specific Ancillary Service Offers from Generation Resources, Controllable Load Resources (CLRs), and ESRs to ERCOT for the DAM and may offer the same Generation Resource, CLR, or ESR capacity for any or all of the Ancillary Service products simultaneously with any Energy Offer Curves from that Generation Resource, Energy Bid Curves from that CLR, or Energy Bid/Offer Curves from that ESR in the DAM. Offers of more than one Ancillary Service product from one Generation Resource may be inclusive or exclusive of each other and of any Energy Offer Curves, as specified according to a procedure developed by ERCOT. Offers of more than one Ancillary Service product from one CLR may be inclusive or exclusive of each other but considered inclusive of any Energy Bid Curve, as specified according to a procedure developed by ERCOT. Offers of more than one Ancillary Service product from one ESR may be inclusive or exclusive of each other, as specified according to a procedure developed by ERCOT.

(2) By 1000 in the Day-Ahead, a QSE may submit Load Resource-specific Ancillary Service Offers for Regulation Service, Non-Spin, RRS, and ECRS to ERCOT and may offer the same Load Resource capacity for any or all of those Ancillary Service products simultaneously. Offers of more than one Ancillary Service product from one Load Resource may be inclusive or exclusive of each other, as specified according to a procedure developed by ERCOT.

[NPRR1008 and NPRR1014: Replace applicable portions of paragraph (2) above with the following upon system implementation for NPRR1014; or upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1008:]

(2) By 1000 in the Day-Ahead, a QSE may submit Load Resource-Specific Ancillary Service Offers for Regulation Service, Non-Spin, RRS, and ECRS to ERCOT and may offer the same Load Resource capacity for any or all of those Ancillary Service products simultaneously. Offers of more than one Ancillary Service product from one Load Resource may be inclusive or exclusive of each other, as specified according to a procedure developed by ERCOT.

(3) By 1000 in the Day-Ahead, a QSE may submit Resource-specific Ancillary Service Offers to ERCOT for FFR Resources, and may offer the same capacity for any or all of the Ancillary Service products simultaneously with any Energy Offer Curves from that Resource in the DAM. A QSE may also submit Ancillary Service Offers in a SASM. Offers of more than one Ancillary Service product may be inclusive or exclusive of each

other and of any Energy Offer Curves, as specified according to a procedure developed by ERCOT.

[NPRR1008 and NPRR1014: Replace applicable portions of paragraph (3) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1008; or upon system implementation for NPRR1014:]

(3) By 1000 in the Day-Ahead, a QSE may submit Resource-Specific Ancillary Service Offers to ERCOT for FFR Resources, and may offer the same capacity for any or all of the Ancillary Service products simultaneously with any Energy Offer Curves from that Resource in the DAM. Offers of more than one Ancillary Service product may be inclusive or exclusive of each other and of any Energy Offer Curves, as specified according to a procedure developed by ERCOT.

[NPRR1008 and NPRR1014: Insert applicable portions of paragraph (4) below upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1008; or upon system implementation for NPRR1014; and renumber accordingly:]

(4) By 1000 in the Day-Ahead, a QSE may submit an Ancillary Service Only Offer to ERCOT for the DAM. An individual Ancillary Service Only Offer must be exclusive to a single Ancillary Service product. For purposes of Ancillary Service sub-category limitations and validations, an Ancillary Service Only Offer for RRS will be treated as if it was an offer for RRS from an On-Line Generation Resource. Likewise, an Ancillary Service Only Offer for ECRS or Non-Spin will be treated as if it was an offer for ECRS or Non-Spin from an On-Line Generation Resource.

(4) Ancillary Service Offers remain active for the offered period until:

(a) Selected by ERCOT;

(b) Automatically inactivated by the software at the offer expiration time specified by the QSE when the offer is submitted; or

(c) Withdrawn by the QSE, but a withdrawal is not effective if the deadline for submitting offers has already passed.

[NPRR1008 and NPRR1014: Replace applicable portions of paragraph (4) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1008; or upon system implementation for NPRR1014:]

(4) Ancillary Service Offers remain active for the offered period unless the offer is:

(a) Effective after DAM and is higher than the Real-Time System-Wide Offer Cap (RTSWCAP);

(b) Automatically inactivated by the software at the offer expiration time specified by the QSE when the offer is submitted; or

(c) Withdrawn by the QSE, but a withdrawal is not effective if the deadline for submitting offers has already passed.

(5) A Load Resource that is not a Controllable Load Resource may specify whether its Ancillary Service Offer for RRS or Non-Spin may only be procured by ERCOT as a block.

[NPRR1008 and NPRR1014: Replace applicable portions of paragraph (5) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1008; or upon system implementation for NPRR1014:]

(5) A Load Resource that is not a Controllable Load Resource may specify whether its Resource-Specific Ancillary Service Offer for RRS or Non-Spin may only be procured by ERCOT as a block.

(6) A Load Resource that is not a Controllable Load Resource may specify whether its Ancillary Service Offer for ECRS may only be procured by ERCOT as a block.

[NPRR1014: Replace paragraph (6) above with the following upon system implementation:]

(6) A Load Resource that is not a Controllable Load Resource may specify whether its Resource-Specific Ancillary Service Offer for ECRS may only be procured by ERCOT as a block.

(7) A QSE that submits an On-Line Ancillary Service Offer without also submitting a Three-Part Supply Offer for the DAM for any given hour will be considered by the DAM to be self-committed for that hour, as long as an Ancillary Service Offer for Off-Line Non-Spin was not also submitted for that hour. When the DAM considers a self-committed offer for clearing, the Resource constraints identified in paragraph (4)(c)(ii) of Section 4.5.1, DAM Clearing Process, other than HSL, are ignored. A Combined Cycle Generation Resource will be considered by the DAM to be self-committed based on an On-Line Ancillary Service Offer submittal if:

(a) Its QSE submits an On-Line Ancillary Service Offer without also submitting a Three-Part Supply Offer for the DAM for any Combined Cycle Generation Resource within the Combined Cycle Train for that hour;

(b) No Ancillary Service Offer for Off-Line Non-Spin for any Combined Cycle Generation Resource within the Combined Cycle Train is submitted for that hour; and

(c) No On-Line Ancillary Service Offer for any other Combined Cycle Generation Resource within the Combined Cycled Train is submitted for that hour.

[NPRR1008 and NPRR1014: Replace applicable portions of paragraph (7) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1008; or upon system implementation for NPRR1014:]

(7) A QSE that submits an On-Line Resource-Specific Ancillary Service Offer without also submitting a Three-Part Supply Offer for the DAM for any given hour will be considered by the DAM to be self-committed for that hour, as long as a Resource-Specific Ancillary Service Offer for Off-Line Non-Spin was not also submitted for that hour. A QSE that submits an On-Line ESR-specific Ancillary Service Offer or Energy Bid/Offer Curve for the DAM will be considered to be On-Line. A QSE may not submit an Off-Line Ancillary Service Offer for an ESR. When the DAM considers a self-committed offer for clearing, the Resource constraints identified in paragraph (4)(c)(ii) of Section 4.5.1, DAM Clearing Process, other than HSL, are ignored; however, for an ESR, the DAM will consider LSL and HSL. A Combined Cycle Generation Resource will be considered by the DAM to be self-committed based on an On-Line Resource-Specific Ancillary Service Offer submittal if:

(a) Its QSE submits an On-Line Resource-Specific Ancillary Service Offer without also submitting a Three-Part Supply Offer for the DAM for any Combined Cycle Generation Resource within the Combined Cycle Train for that hour;

(b) No Resource-Specific Ancillary Service Offer for Off-Line Non-Spin for any Combined Cycle Generation Resource within the Combined Cycle Train is submitted for that hour; and

(c) No On-Line Resource-Specific Ancillary Service Offer for any other Combined Cycle Generation Resource within the Combined Cycled Train is submitted for that hour.

(8) ERCOT will attempt to procure the quantity from its Ancillary Service Plan from Resource-Specific Ancillary Service Offers as well as Ancillary Service Only Offers against respective ASDCs.

4.4.7.2.1 Ancillary Service Offer Criteria

(1) Each Ancillary Service Offer must be submitted by a QSE and must include the following information:

(a) The selling QSE;

(b) The Resource represented by the QSE from which the offer would be supplied;

(c) The quantity in MW and Ancillary Service type from that Resource for this specific offer and the specific quantity in MW and Ancillary Service type of any other Ancillary Service offered from this same capacity;

(d) An Ancillary Service Offer linked to a Three-Part Supply Offer from a Resource designated to be Off-Line for the offer period in its COP may only be struck if the Three-Part Supply Offer is struck. The total capacity struck must be within limits as defined in item (4)(c)(iii) of Section 4.5.1, DAM Clearing Process;

(e) An Ancillary Service Offer linked to other Ancillary Service Offers or an Energy Offer Curve from a Resource designated to be On-Line for the offer period in its COP may only be struck if the total capacity struck is within limits as defined in item (4)(c)(iii) of Section 4.5.1;

(f) The first and last hour of the offer;

(g) A fixed quantity block, or variable quantity block indicator for the offer:

(i) If a fixed quantity block, not to exceed 150 MW, which may only be offered by a Load Resource that is not a Controllable Load Resource and that is offering to provide RRS, ECRS, or Non-Spin, and which may clear at a Market Clearing Price for Capacity (MCPC) below the Ancillary Service Offer price for that block, the single price (in $/MW) and single quantity (in MW) for all hours offered in that block; or

(ii) If a variable quantity block, which may be offered by a Generation Resource or a Load Resource, the single price (in $/MW) and single "up to" quantity (in MW) contingent on the purchase of all hours offered in that block; and

(h) The expiration time and date of the offer.

(2) A valid Ancillary Service Offer in the DAM must be received before 1000 for the effective DAM. A valid Ancillary Service Offer in an SASM must be received before the applicable deadline for that SASM.

(3) No Ancillary Service Offer price may exceed the System-Wide Offer Cap (SWCAP) (in $/MW). No Ancillary Service Offer price may be less than $0 per MW.

(4) The minimum amount per Resource for each Ancillary Service product that may be offered is one-tenth (0.1) MW.

(5) A Resource may offer more than one Ancillary Service.

(6) A Load Resource that is not a Controllable Load Resource, may simultaneously offer RRS, ECRS, and Non-Spin in a DAM or SASM and be awarded RRS, ECRS, and Non-Spin for the same Operating Hour but will not be allowed to provide RRS and Non-Spin or ECRS and Non-Spin on the same Load Resource simultaneously in Real-Time.

(7) Offers for Load Resources may be adjusted to reflect Distribution Losses in accordance with Section 8.1.1.2, General Capacity Testing Requirements.

(8) A Load Resource that is qualified to perform as a Controllable Load Resource may not offer to provide Ancillary Services as a Controllable Load Resource and a Load Resource controlled by high-set under-frequency relay simultaneously behind a common breaker.

[NPRR1008, NPRR1014, and NPRR1128: Replace applicable portions of Section 4.4.7.2.1 above with the following upon system implementation for NPRR1014 and NPRR1128; or upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1008:]

4.4.7.2.1 Resource-Specific Ancillary Service Offer Criteria

(1) Each Resource-Specific Ancillary Service Offer must be submitted by a QSE and must include the following information:

(a) The selling QSE;

(b) The Resource represented by the QSE from which the offer would be supplied;

(c) The quantity in MW and Ancillary Service type from that Resource for this specific offer and the specific quantity in MW and Ancillary Service type of any other Ancillary Service offered from this same capacity;

(d) A Resource-Specific Ancillary Service Offer linked to a Three-Part Supply Offer from a Resource designated to be Off-Line for the offer period in its COP may only be struck if the Three-Part Supply Offer is struck. The total capacity struck must be within limits as defined in item (4)(c)(iii) of Section 4.5.1, DAM Clearing Process;

(e) A Resource-Specific Ancillary Service Offer linked to other Resource-Specific Ancillary Service Offers or an Energy Offer Curve or Energy Bid/Offer Curve from a Resource designated to be On-Line for the offer period in its COP may only be struck if the total capacity struck is within limits as defined in item (4)(c)(iii) of Section 4.5.1;

(f) The first and last hour of the offer;

(g) A fixed quantity block or variable quantity block indicator for the offer:

(i) If a fixed quantity block, not to exceed 150 MW, which may only be offered by a Load Resource that is not a Controllable Load Resource and that is offering to provide RRS, ECRS, or Non-Spin, and which may clear at a Market Clearing Price for Capacity (MCPC) below the Resource-Specific Ancillary Service Offer price for that block, the single price (in $/MW) and single quantity (in MW) for all hours offered in that block. This fixed quantity block indicator will only be considered in the DAM and will be ignored for awarding of Ancillary Services in the Real-Time Market (RTM); or

(ii) If a variable quantity block, which may be offered by a Generation Resource, an ESR, or a Load Resource, the single price (in $/MW) and single "up to" quantity (in MW) contingent on the purchase of all hours offered in that block. This variable quantity block indicator will only be considered in the DAM and will be ignored for awarding of Ancillary Services in the RTM; and

(h) The expiration time and date of the offer.

(2) A valid Resource-Specific Ancillary Service Offer in the DAM must be received before 1000 for the effective DAM.

(3) No Resource-Specific Ancillary Service Offer received before 1000 in the Day-Ahead may contain a price exceeding the Day-Ahead System-Wide Offer Cap (DASWCAP) (in $/MW). No Resource-Specific Ancillary Service Offer received after 1430 in the Day-Ahead may contain a price exceeding the Real-Time System-Wide Offer Cap (RTSWCAP) (in $/MW). After 1430 in the Day-Ahead, ERCOT shall cancel any Resource-Specific Ancillary Service Offer containing a price exceeding the RTSWCAP and notify the QSE of the expiration via an electronic message. During the Operating Hours in which prioritizing the procurement of FFR up to the maximum FFR amount is in effect, an FFR Ancillary Service Offer price may not be less than -$0.01 per MW. FFR Ancillary Service Offer prices at all other times and any other Ancillary Service Offer prices may not be less than $0 per MW.

(4) The minimum amount per Resource for each Ancillary Service product that may be offered is one-tenth (0.1) MW.

(5) A Resource may offer more than one Ancillary Service.

(6) A Load Resource, that is not a Controllable Load Resource, may simultaneously offer RRS, ECRS, and Non-Spin in a DAM and be awarded RRS, ECRS, and Non-Spin for the same Operating Hour in the DAM, but will not be awarded Non-Spin and RRS or Non-Spin and ECRS on the same Load Resource simultaneously in Real-Time.

(7) Offers for Load Resources may be adjusted to reflect Distribution Losses in accordance with Section 8.1.1.2, General Capacity Testing Requirements.

(8) A Load Resource that is qualified to perform as a Controllable Load Resource may not offer to provide Ancillary Services as a Controllable Load Resource and a Load Resource controlled by high-set under-frequency relay simultaneously behind a common breaker.

4.4.9.3.1 Energy Offer Curve Criteria

(1) Each Energy Offer Curve must be reported by a QSE and must include the following information:

(a) The selling QSE;

(b) The Resource represented by the QSE from which the offer would be supplied;

(c) A monotonically increasing offer curve for both price (in $/MWh) and quantity (in MW) with no more than ten price/quantity pairs;

(d) The first and last hour of the Offer;

(e) The expiration time and date of the offer;

(f) List of Ancillary Service Offers from the same Resource;

(g) Inclusive or exclusive designation relative to other DAM offers;

(h) Percentage of FIP and percentage of FOP for generation above LSL subject to the sum of the percentages not exceeding 100%; and

(i) Reason for update of the offer, if submitting after the end of the Adjustment Period.

[NPRR1008: Replace paragraph (1) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]

(1) Each Energy Offer Curve must be reported by a QSE and must include the following information:

(a) The selling QSE;

(b) The Resource represented by the QSE from which the offer would be supplied;

(c) A monotonically increasing offer curve for both price (in $/MWh) and quantity (in MW) with no more than ten price/quantity pairs;

(d) The first and last hour of the Offer;

(e) The expiration time and date of the offer;

(f) Inclusive or exclusive designation relative to other DAM offers (for Real-Time, Energy Offer Curves are always considered to be inclusive with Ancillary Service Offers);

(g) Percentage of FIP and percentage of FOP for generation above LSL subject to the sum of the percentages not exceeding 100%; and

(h) Reason for update of the offer, if submitting after the end of the Adjustment Period.

(2) An Energy Offer Curve must be within the range of -$250.00 per MWh and the SWCAP in dollars per MWh. The software systems must be able to provide ERCOT with the ability to enter Resource-specific Energy Offer Curve floors and caps.

[NPRR1008: Replace paragraph (2) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]

(2) An Energy Offer Curve must be within the range of -$250.00 per MWh and either the DASWCAP or RTSWCAP, depending on the timing of the submission, in dollars per MWh. No Energy Offer Curve received after 1430 in the Day-Ahead may contain a price exceeding the RTSWCAP. After 1430 in the Day-Ahead, ERCOT shall cancel any Energy Offer Curve containing a price exceeding the RTSWCAP and notify the QSE of the expiration via an electronic message.

(3) The minimum amount per Resource for each Energy Offer Curve that may be offered is one MW.

4.4.9.4.1 Mitigated Offer Cap

Commented [CP2]: Please note NPRRs 1239 and 1255 also propose revisions to this section.

(1) Energy Offer Curves may be subject to mitigation in Real-Time operations under Section 6.5.7.3, Security Constrained Economic Dispatch, using a Mitigated Offer Cap (MOC). ERCOT shall construct an incremental MOC curve in accordance with Section 6.5.7.3 such that each point on the MOC curve is calculated as follows:

[NPRR1014: Replace paragraph (1) above with the following upon system implementation:]

(1) Energy Offer Curves and Energy Bid/Offer Curves may be subject to mitigation in Real-Time operations under Section 6.5.7.3, Security Constrained Economic Dispatch,

using a Mitigated Offer Cap (MOC). For Generation Resources, ERCOT shall construct an incremental MOC curve in accordance with Section 6.5.7.3 such that each point on the MOC curve is calculated as follows:

$$MOC_{q,r,h} = Max\ [GIHR_{q,r} * Max(FIP, WAFP_{q,r,h}), (IHR_{q,r} * FPRC_{q,r} + OM_{q,r})]$$

Where,

If a QSE has submitted an Energy Offer Curve on behalf of a Generation Resource and the Generation Resource has approved verifiable costs, then

$$FPRC_{q,r} = Max(WAFP_{q,r,h}, FIP + FA_{q,r}) * RTPERFIP_{q,r} / 100 + FOP * RTPERFOP_{q,r} / 100$$

If a QSE has not submitted an Energy Offer Curve on behalf of a Generation Resource and the Generation Resource has approved verifiable costs, then

$$FPRC_{q,r} = Max(WAFP_{q,r,h}, FIP + FA_{q,r}) * GASPEROL_{q,r} / 100 + FOP * OILPEROL_{q,r} / 100 + (SFP + FA_{q,r}) * SFPEROL_{q,r} / 100$$

The above variables are defined as follows:

Variable	Unit	Definition
$MOC_{q,r,h}$	$/MWh	*Mitigated Offer Cap per Resource*—The MOC for Resource *r*, for the hour. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
$GIHR_{q,r}$	MMBtu/MWh	*Generic Incremental Heat Rate*—The generic, single-value, incremental heat rate. For Generation Resources with a Commercial Operations Date on or before January 1, 2004, the generic incremental heat rate shall be set to 10.5. For Generation Resources that have a Commercial Operations Date after January 1, 2004, this value shall be set to 14.5. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
$IHR_{q,r}$	MMBtu/MWh	*Verifiable Incremental Heat Rate per Resource*—The verifiable incremental heat rate curve for Resource *r*, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
FIP	$/MMBtu	*Fuel Index Price*—The natural gas index price as defined in Section 2.1, Definitions.
$RTPERFIP_{q,r}$	none	*Fuel Index Price Percentage*—The percentage of natural gas used by Resource *r* to operate above LSL, as submitted with the energy offer curve.
FOP	$/MMBtu	*Fuel Oil Price*—The fuel oil index price as defined in Section 2.1.
$RTPERFOP_{q,r}$	none	*Fuel Oil Price Percentage*—The percentage of fuel oil used by Resource *r* to operate above LSL, as submitted with the energy offer curve.
SFP	$/MMBtu	*Solid Fuel Price*—The solid fuel index price is $1.50.
$FPRC_{q,r}$	$/MMBtu	*Fuel Price Calculated per Resource*—The calculated index price for fuel for the Resource based on the Resources fuel mix. Where for a Combined Cycle Train, the Resource r is a Combined Cycle Generation Resource within the Combined Cycle Train.

Variable	Unit	Definition
GASPEROL $_{q, r}$	none	*Percent of Natural Gas to Operate Above LSL*—The percentage of natural gas used by Resource *r* to operate above LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource r is a Combined Cycle Generation Resource within the Combined Cycle Train.
OILPEROL $_{q, r}$	none	*Percent of Oil to Operate Above LSL*—The percentage of fuel oil used by Resource *r* to operate above LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource r is a Combined Cycle Generation Resource within the Combined Cycle Train.
SFPEROL $_{q, r}$	none	*Percent of Solid Fuel to Operate Above LSL*—The percentage of solid fuel used by Resource *r* to operate above LSL, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource r is a Combined Cycle Generation Resource within the Combined Cycle Train.
FA $_{q, r}$	$/MMBtu	*Fuel Adder*—The fuel adder is the average cost above the index price Resource *r* has paid to obtain fuel. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train. See the Verifiable Cost Manual for additional information.
OM $_{q, r}$	$/MWh	*Variable Operations and Maintenance Cost above LSL*—The O&M cost for Resource *r* to operate above LSL, including an adjustment for emissions costs, as approved in the verifiable cost process. Where for a Combined Cycle Train, the Resource r is a Combined Cycle Generation Resource within the Combined Cycle Train. See the Verifiable Cost Manual for additional information.
WAFP $_{q, r, h}$	$/MMBtu	*Weighted Average Fuel Price*—The volume-weighted average intraday, same-day and spot fuel price, the projected incremental fuel consistent with a fuel supply contract(s), or a combination of these two prices, submitted to ERCOT during the Adjustment Period for a specific Resource and specific hour within the Operating Day, as described in paragraph (1)(d) below. ***[NPRR1177: Replace the definition above with the following on January 1, 2025:]*** *Weighted Average Fuel Price*—The volume-weighted average intraday, same-day and spot price of fuel submitted to ERCOT during the Adjustment Period for a specific Resource and specific hour within the Operating Day, as described in paragraph (1)(d) below.
q	none	A QSE.
r	none	A Generation Resource.
h	none	The Operating Hour.

(a) For a Resource contracted by ERCOT under paragraph (4) of Section 6.5.1.1, ERCOT Control Area Authority, ERCOT shall increase the O&M cost such that every point on the MOC curve is greater than the SWCAP in $/MWh.

[NPRR1008 and NPRR1014: Replace applicable portions of paragraph (a) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1008; or upon system implementation for NPRR1014:]

(a) For a Resource contracted by ERCOT under paragraph (4) of Section 6.5.1.1, ERCOT Control Area Authority, ERCOT shall increase the O&M cost such

that every point on the MOC curve is greater than the effective Value of Lost Load (VOLL) in $/MWh.

(b) Notwithstanding the MOC calculation described in paragraph (1) above, the MOC for ESRs shall be set at the SWCAP. No later than December 31, 2023, ERCOT and stakeholders shall submit a report to TAC that includes a recommendation to continue the existing approach or a proposal to implement an alternative approach to determine the MOC for ESRs.

[NPRR1008 and NPRR1014: Replace applicable portions of paragraph (b) above with the following upon the system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1008; or upon system implementation for NPRR1014:]

(b) Notwithstanding the MOC calculation described in paragraph (1) above, the MOC for ESRs shall be set at the RTSWCAP. No later than December 31, 2023, ERCOT and stakeholders shall submit a report to TAC that includes a recommendation to continue the existing approach or a proposal to implement an alternative approach to determine the MOC for ESRs.

(c) For Quick Start Generation Resources (QSGRs) the MOC shall be adjusted in accordance with Verifiable Cost Manual Appendix 7, Calculation of the Variable O&M Value and Incremental Heat Rate used in Real Time Mitigation for Quick Start Generation Resources (QSGRs).

[NPRR1008 and NPRR1014: Insert applicable portions of paragraph (d) below upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1008; or upon system implementation for NPRR1014; and renumber accordingly:]

(d) For ~~On-line~~ hydro Generation Resources ~~not operating in Synchronous Condenser Fast-Response mode~~, the MOC shall be adjusted in accordance with Verifiable Cost Manual, Appendix 10~~2~~, Setting the variables used in Mitigated Offer Cap for Hydro Generating Resources~~Calculation of the Variable O&M Value and Incremental Heat Rate used in Real-Time Mitigation for On-Line Hydro Generation Resources not operating in Synchronous Condenser Fast-Response mode~~.

(d) During the Adjustment Period, a QSE representing a Resource may submit Exceptional Fuel Cost as a volume-weighted average fuel price for use in the MOC calculation for that Resource. To qualify as Exceptional Fuel Cost, the submission must meet the following conditions:

(i) For all Resources, the weighted average fuel price must exceed FIP for the applicable Operating Day, plus a threshold parameter value of $1/MMBtu, plus the applicable fuel adder. For Resources without approved verifiable costs, the fuel adder will be set to the default value assigned to Resources with approved verifiable costs, as defined in the Verifiable Cost Manual. The threshold parameter value in this paragraph shall be recommended by the Wholesale Market Subcommittee (WMS) and approved by the Technical Advisory Committee (TAC). ERCOT shall update the threshold value on the first day of the month following TAC approval unless otherwise directed by the TAC. ERCOT shall provide a Market Notice prior to implementation of a revised parameter value.

(ii) Fixed cost (fees, penalties and similar non-gas costs) may not be included in the calculation of the weighted average fuel price.

(iii) The weighted average fuel price in paragraph (1) above must be a single value and based on the following fuel price options:

(A) A volume-weighted price considering all intra-day, same day, and spot fuel purchases for the Resource; or

(B) A projected fuel price for a Resource with a fuel supply contract(s) that also has submitted an Energy Offer Curve for the Operating Hour where the Energy Offer Curve is calculated as the incremental heat rate times the incremental fuel price plus Operations and Maintenance (O&M) cost; or

(C) A combination of the above two options.

A weighted average fuel price based on actual fuel purchases must be included in the calculation of the weighted average fuel price in paragraph (1) above. These must account for at least 10% of the total fuel volume burned by the applicable Resource for the hour for which the weighted average fuel price is computed. A projected incremental fuel price must be consistent with the terms of the fuel supply contract(s). A weighted average fuel price based on a combination of these options must meet the requirements described for each of the options. As noted in paragraph (j) below, the methodology used in the allocation of the cost and volume of fuel to the Resource for the hour is subject to validation by ERCOT.

[NPRR1177: Replace paragraph (iii) above with the following on January 1, 2025:]

(iii) All intra-day, same day, and spot fuel purchases must be included in the calculation of the weighted average fuel price in paragraph (1) above. These must account for at least 10% of the total fuel volume burned by the applicable Resource for the hour for which the weighted average fuel

price is computed. As noted in paragraph (j) below, the methodology used in the allocation of the cost and volume of purchased fuel to the Resource for the hour is subject to validation by ERCOT.

(iv) Weighted average fuel prices must be submitted individually for each Operating Hour for which they are applicable. Values submitted outside of the Adjustment Period will be rejected and not used in the calculation of the MOC for the designated Operating Hour.

(v) A projected volume-weighted average fuel price must be consistent with the Energy Offer Curve for each Operating Hour for which they are applicable, and consistent with the signed and executed fuel supply contract(s) for each Resource.

(vi) An Exceptional Fuel Cost submitted based on projected fuel prices may not match with the actual volume-weighted average fuel price due to prospective costs and/or contractual costs.

[NPRR1177: Delete paragraphs (v) and (vi) above on January 1, 2025.]

(e) ERCOT may notify the Independent Market Monitor (IMM) if a QSE submits an Exceptional Fuel Cost.

(f) The day following an Operating Day for which an Exceptional Fuel Cost is submitted, ERCOT shall post a report on the ERCOT website indicating the affected Operating Hours and the number of Resources for which a QSE submitted Exceptional Fuel Cost for a particular Operating Day.

(g) No later than 1700 Central Prevailing Time (CPT) on the 15th day following an Exceptional Fuel Cost submission, the submitting QSE shall provide ERCOT with the calculation of the weighted average fuel price, intraday or same-day fuel purchases, if applicable, and any available supporting documentation. Such information may include, but is not limited to, documents of the following nature: relevant contracts between the QSE or Resource Entity and fuel supplier, trade logs, transportation, storage, balancing and distribution agreements, calculation of the weighted average fuel price, or any other documentation necessary to support the Exceptional Fuel Cost price and volume for the applicable period(s).

(h) No later than 1700 Central Prevailing Time (CPT) on the 60th day following an Exceptional Fuel Cost submission, the submitting QSE shall provide ERCOT with all supporting documentation not previously provided to ERCOT. No supporting documentation will be accepted after the 60th day.

(i) The accuracy of submitted Exceptional Fuel Cost and the need for purchasing intraday or same-day gas must be attested to by a duly authorized officer or agent of the QSE representing the Resource. The attestation must be provided in a standardized format acceptable to ERCOT and submitted with the other documentation described in paragraph (g) above. An attestation for Exceptional Fuel Costs must state that the costs are accurate and variable, based on the dispatch of the Resource.

[NPRR1177: Replace paragraph (i) above with the following on January 1, 2025:]

(i) The accuracy of submitted Exceptional Fuel Cost and the need for purchasing intraday or same-day gas must be attested to by a duly authorized officer or agent of the QSE representing the Resource. The attestation must be provided in a standardized format acceptable to ERCOT and submitted with the other documentation described in paragraph (g) above.

(j) ERCOT will use the supporting documentation to validate the Exceptional Fuel Cost for the applicable period. Validation will include, but not be limited to, the cost and the quantity of purchased fuel, Resource-specific heat rates, and the methodology used in the allocation of the cost and volume of purchased fuel, if applicable, to the Resource for the applicable hour used in the weighted average fuel price calculation. In connection with the validation process ERCOT may request additional documentation or clarification of previously submitted documentation. Such requests must be honored within ten Business Days.

(k) At ERCOT's sole discretion, submission and follow-up information deadlines may be extended on a case-by-case basis.

(l) The documentation described in paragraphs (g) through (j) above is only required for the hours for which Exceptional Fuel Costs were submitted and the Resource was subject to mitigation.

(m) For Resources submitting Exceptional Fuel Costs based on projected incremental fuel prices based on a contract(s) the QSE must submit to ERCOT all applicable fuel supply contracts at least ten Business Days in advance of submitting Exceptional Fuel Costs. ERCOT may, at any time, notify the QSE of any cost identified in the contract that is ineligible for inclusion in any Exceptional Fuel Cost submission. Upon receiving such notification, the QSE shall ensure that such cost is not included in any Exceptional Fuel Cost submission or in any Energy Offer Curve submission for any hours for which Exceptional Fuel Costs are submitted. The absence of any such notification shall not imply that such cost is eligible for inclusion in any Exceptional Fuel Cost submission or in any Energy Offer Curve submission.

[NPRR1177: Delete paragraphs (l) and (m) above on January 1, 2025.]

[NPRR1008 and NPRR1216: Insert applicable portions of Section 4.4.12 below upon system implementation of NPRR1216; or upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1008:]

4.4.12 Determination of Ancillary Service Demand Curves for the Day-Ahead Market and Real-Time Market

Commented [CP3]: Please note NPRR1235 also proposes revisions to this section.

(1) This Section describes the process for determining ASDCs for Regulation Up Service (Reg-Up), Regulation Down Service (Reg-Down), Responsive Reserve (RRS), ERCOT Contingency Reserve Service (ECRS), and Non-Spinning Reserve (Non-Spin) for the Day-Ahead Market (DAM) and Real-Time Market (RTM). This section does not apply to ASDCs used in the Reliability Unit Commitment (RUC) process.

(2) The DAM shall use the same ASDCs as the RTM, as an initial condition. Specific to the DAM, the ASDCs will be adjusted, as needed, to account for negative Self-Arranged Ancillary Service Quantities.

(3) For Reg-Down, the ASDC shall be a constant value equal to VOLL for the full range of the Ancillary Service Plan for Reg-Down.

(4) To determine the individual ASDCs for Reg-Up, RRS, ECRS, and Non-Spin, an Aggregate ORDC (AORDC) will be created and then disaggregated into individual curves for the different Ancillary Services.

(5) ERCOT shall develop the AORDC from historical data from the period of June 1, 2014 through August 31~~December 31~~, 202~~53~~ as follows:

(a) For all SCED intervals where the sum of RTOLCAP and RTOFFCAP is less than 10,000 MW, use the RTOLCAP and RTOFFCAP values to calculate the AORDC as follows:

$$AORDC = \left(0.5 * \left(1 - pnorm(RTOLCAP - 3\text{~~2~~}000,\ 0.5 * \mu,\ 0.707 * \sigma)\right) + 0.5 * \left(1 - pnorm(RTOLCAP + RTOFFCAP - 3\text{~~2~~}000,\ \mu,\ \sigma)\right)\right) * \left(VOLL - min(System\ Lambda, 250)\right)$$

The above variables are defined as follows:

Variable	Unit	Definition
RTOLCAP	MWh	*Real-Time On-Line Reserve Capacity* – The Real-Time reserve capacity of On-Line Resources available for the SCED intervals beginning June 1, 2014 through August 31~~December 31~~, 202~~53~~

RTOFFCAP	MWh	*Real-Time Off-Line Reserve Capacity* – The Real-Time reserve capacity of Off-Line Resources available for the SCED intervals beginning June 1, 2014 through August 31~~December 31~~, 2025~~3~~.
μ	None	The mean value of the shifted LOLP distribution as published for Summer~~Fall~~ 2026~~4~~
σ	None	The standard deviation of the shifted LOLP distribution as published for Summer~~Fall~~ 2026~~4~~

(b) Using the results of step (a) above, use regression methods to fit a curve to the average reserve pricing outcomes for the various MW reserve levels.

(c) Calculate points on the regression curve in 1 MW increments for any observed reserve level >= 3~~2~~,000 MW and price >$0.01/MWh. These points form the AORDC.

(6) ERCOT shall disaggregate the AORDC developed pursuant to paragraph (5) above into individual ASDCs for each Ancillary Service product as follows:

(a) The ASDC for all Reg-Up in the Ancillary Service Plan shall use the highest price portion of the AORDC;

(b) The ASDC for all RRS in the Ancillary Service Plan shall use the highest price portion of the remaining AORDC after removing the portion of the AORDC that was used for the Reg-Up ASDC;

(c) The ASDC for all ECRS in the Ancillary Service Plan shall use the highest price portion of the remaining AORDC after removing the portions of the AORDC that were used for the Reg-Up and RRS ASDCs;

(d) The ASDC for Non-Spin shall use the remaining portion of the remaining AORDC after removing the portions of the AORDC that were used for the Reg-Up, RRS, and ECRS ASDCs.

(7) Each ASDC will be represented by a 100-point linear approximation to the corresponding part of the AORDC. Fewer points may be used for cases where it would not result in decreased accuracy in representing the corresponding part of the AORDC.

(8) The AORDC used in determining the individual ASDCs will be adjusted to reflect any updates to the value of VOLL, as described in Section 4.4.11, Day-Ahead and Real-Time System-Wide Offer Caps, and Section 4.4.11.1, Scarcity Pricing Mechanism.

4.6.4.1.3 Responsive Reserve Payment

(1) ERCOT shall pay each QSE whose Ancillary Service Offers to provide RRS to ERCOT were cleared in the DAM, for each hour as follows:

$$PCRRAMT_q = (-1) * MCPCRR_{DAM} * PCRR_q$$

Where:

$$PCRR_q = \sum_r PCRRR_{r, q, DAM}$$

The above variables are defined as follows:

Variable	Unit	Definition
$PCRRAMT_q$	$	*Procured Capacity for Responsive Reserve Amount per QSE in DAM*—The DAM RRS payment for QSE *q* for the hour.
$PCRR_q$	MW	*Procured Capacity for Responsive Reserve per QSE in DAM*—The total RRS capacity quantity awarded to QSE *q* in the DAM for all the Resources represented by this QSE for the hour.
$PCRRR_{r, q, DAM}$	MW	*Procured Capacity for Responsive Reserve from Resource per Resource per QSE in DAM*—The RRS capacity quantity awarded to QSE *q* in the DAM for Resource *r* for the hour. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
$MCPCRR_{DAM}$	$/MW ~~per hour~~	*Market Clearing Price for Capacity for Responsive Reserve in DAM*—The DAM MCPC for RRS for the hour.
r	none	A Resource.
q	none	A QSE.

[NPRR1008: Replace paragraph (1) above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]

(1) ERCOT shall pay each QSE whose Resource-Specific Ancillary Service Offers to provide RRS to ERCOT were cleared in the DAM, for each hour as follows:

$$PCRRAMT_q = (-1) * MCPCRR_{DAM} * PCRR_q$$

Where:

$$PCRR_q = \sum_r PCRRR_{r, q, DAM}$$

(2) ERCOT shall pay each QSE whose Ancillary Service Only Offers to provide RRS to ERCOT were cleared in the DAM, for each hour as follows:

$$DAPCRROAMT_q = (-1) * MCPCRR_{DAM} * DARROAWD_q$$

The above variables are defined as follows:

Variable	Unit	Definition
$PCRRAMT_q$	$	*Procured Capacity for Responsive Reserve Amount per QSE in DAM*—The DAM RRS payment for QSE *q* for the hour.
$DAPCRROAMT_q$	$	*Day-Ahead Procured Capacity for Responsive Reserve Only Amount per QSE*— The payment to QSE *q* for all RRS only awards in DAM for the hour.

$PCRR_q$	MW	*Procured Capacity for Responsive Reserve per QSE in DAM*—The total RRS capacity quantity awarded to QSE *q* in the DAM for all the Resources represented by this QSE for the hour.
$PCRRR_{r, q, DAM}$	MW	*Procured Capacity for Responsive Reserve from Resource per Resource per QSE in DAM*—The RRS capacity quantity awarded to QSE *q* in the DAM for Resource *r* for the hour. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
$MCPCRR_{DAM}$	$/MW ~~per hour~~	*Market Clearing Price for Capacity for Responsive Reserve in DAM*—The DAM MCPC for RRS for the hour.
$DARROAWD_q$	MW	*Day-Ahead Responsive Reserve Only Award per QSE* —The RRS only capacity quantity awarded in DAM to QSE *q* for the hour.
r	none	A Resource.
q	none	A QSE.

5.5.2 Reliability Unit Commitment (RUC) Process

Commented [CP4]: Please note NPRRs 1235 and 1239 also propose revisions to this section.

(1) The RUC process recommends commitment of Generation Resources, to match ERCOT's forecasted Load including Direct Current Tie (DC Tie) Schedules, subject to all transmission constraints and Resource performance characteristics. The RUC process takes into account Resources already committed in the Current Operating Plans (COPs), Resources already committed in previous RUCs, Off-Line Available Resources having a start-up time of one hour or less, and Resource capacity already committed to provide Ancillary Service. The formulation of the RUC objective function must employ penalty factors on violations of security constraints. The objective of the RUC process is to minimize costs based on the Resource costs described in paragraphs (5) through (9) below. For all hours of the RUC Study Period within the RUC process, Quick Start Generation Resources (QSGRs) with a COP Resource Status of OFFQS shall be considered as On-Line with Low Sustained Limit (LSL) at zero MW. QSGRs with a Resource Status of OFFQS shall only be committed by ERCOT through a RUC instruction in instances when a reliability issue would not otherwise be managed through Dispatch Instructions from Security-Constrained Economic Dispatch (SCED). For On-Line ESRs, the Hour Beginning Planned State of Charge (SOC) values provided in the COP for a given hour are discounted to ensure sufficient SOC is preserved to meet Ancillary Service Resource Responsibilities, as reflected in the COP. Any remaining SOC on the ESR will be considered available for energy dispatch by RUC while respecting the Minimum State of Charge (MinSOC) and Maximum State of Charge (MaxSOC) values provided in the COP.

(2) The RUC process can recommend Resource decommitment. ERCOT may only decommit a Resource to resolve transmission constraints that are otherwise unresolvable. Qualifying Facilities (QFs) may be decommitted only after all other types of Resources have been assessed for decommitment. In addition, the HRUC process provides decision support to ERCOT regarding a Resource decommitment requested by a Qualified Scheduling Entity (QSE).

(3) ERCOT shall review the RUC-recommended Resource commitments and the list of Off-Line Available Resources having a start-up time of one hour or less to assess feasibility

and shall make any changes that it considers necessary, in its sole discretion. During the RUC process, ERCOT may also review and commit, through a RUC instruction, Combined Cycle Generation Resources that are currently planned to be On-Line but are capable of transitioning to a configuration with additional capacity. ERCOT may deselect Resources recommended in DRUC and in all HRUC processes if in ERCOT's sole discretion there is enough time to commit those Resources in the future HRUC processes, taking into account the Resources' start-up times, to meet ERCOT System reliability. After each RUC run, ERCOT shall post the amount of capacity deselected per hour in the RUC Study Period to the MIS Secure Area. A Generation Resource shown as On-Line and available for SCED dispatch for an hour in its COP prior to a DRUC or HRUC process execution, according to Section 5.3, ERCOT Security Sequence Responsibilities, will be considered self-committed for that hour. For purpose of Settlement, snapshot data will be used as specified in paragraph (2) of Section 5.3. ERCOT shall issue RUC instructions to each QSE specifying its Resources that have been committed as a result of the RUC process. ERCOT shall, within one day after making any changes to the RUC-recommended commitments, post to the MIS Secure Area any changes that ERCOT made to the RUC-recommended commitments with an explanation of the changes.

(4) A QSE shall notify the ERCOT Operator of any physical limitation that impacts its Resource's ability to start that is not reflected in the Resource's COP or the Resource's startup time, minimum On-Line time, or minimum Off-Line time. The following shall apply:

(a) If a Resource receives a RUC Dispatch Instruction that it cannot meet due to a physical limitation described in paragraph (4) above, the QSE representing the Resource shall notify the ERCOT Operator of the inability to fully comply with the instruction and shall comply with the instruction to the best of the Resource's ability. If the QSE has provided the ERCOT Operator notice of that limitation at least seven days prior to the Operating Day in which the instruction occurs, the QSE shall be excused from complying with the portion of the RUC Dispatch Instruction that it could not meet due to the identified limitation.

(b) If a QSE provides notice pursuant to paragraph (a) above of a physical limitation that will delay the RUC-committed Resource's ability to reach its LSL in accordance with a RUC Dispatch Instruction, ERCOT shall extend the RUC Dispatch Instruction so that the Resource's minimum run time is respected. However, if the Resource will not be available in time to address the issue for which it received the RUC instruction, ERCOT may instead cancel the RUC Dispatch Instruction.

(5) A QSE shall be excused from complying with any portion of a RUC Dispatch Instruction that it could not meet due to a physical limitation that was reflected, at the time of the RUC Dispatch Instruction, in the Resource's COP, startup time, minimum On-Line time, or minimum Off-Line time.

(6) To determine the projected energy output level of each Resource and to project potential congestion patterns for each hour of the RUC, ERCOT shall calculate proxy Energy Offer Curves based on the Mitigated Offer Caps (MOCs) for the type of Resource as specified in Section 4.4.9.4, Mitigated Offer Cap and Mitigated Offer Floor, for use in the RUC. Proxy Energy Offer Curves are calculated by multiplying the MOC by a constant selected by ERCOT from time to time that is no more than 0.10% and applying the cost for all Generation Resource output between High Sustained Limit (HSL) and LSL. The intent of this process is to minimize the effect of the proxy Energy Offer Curves on optimization.

(7) ERCOT shall use the RUC process to evaluate the need to commit Resources for which a QSE has submitted Three-Part Supply Offers and other available Off-Line Resources in addition to Resources that are planned to be On-Line during the RUC Study Period. All of the above commitment information must be as specified in the QSE's COP. For available Off-Line Resources with a cold start time of one hour or less that have not been removed from special consideration under paragraph (9) below pursuant to paragraph (4) of Section 8.1.2, Current Operating Plan (COP) Performance Requirements, the Startup Offers and Minimum-Energy Offer from a Resource's Three-Part Supply Offer shall not be used in the RUC process.

(8) ERCOT shall create Three-Part Supply Offers for all Resources that did not submit a Three-Part Supply Offer, but are specified as available but Off-Line, excluding Resources with a Resource Status of EMR, in a QSE's COP. For such Resources, excluding available Off-Line Resources with a cold start time of one hour or less that have not been removed from special consideration under paragraph (9) below pursuant to paragraph (4) of Section 8.1.2, ERCOT shall use in the RUC process 100% of any approved verifiable Startup Cost and verifiable minimum-energy cost or if verifiable costs have not been approved, the applicable Resource Category Generic Startup Offer Cost and the applicable Resource Category Generic Minimum-Energy Offer Cost as described specified in Section 4.4.9.2.3, Startup Offer and Minimum-Energy Offer Generic Caps, registered with ERCOT. Also, for Settlement purposes, ERCOT shall use any approved verifiable Startup Costs and verifiable minimum-energy cost for such Resources, or if verifiable costs have not been approved, the applicable Resource Category Generic Startup Offer Cost and Generic Minimum-Energy Offer Cost.

(9) For all available Off-Line Resources having a cold start time of one hour or less and not removed from special consideration pursuant to paragraph (4) of Section 8.1.2, ERCOT shall scale any approved verifiable Startup Cost and verifiable minimum-energy cost or if verifiable costs have not been approved, the applicable Resource Category Generic Startup Offer Cost and the applicable Resource Category Generic Minimum-Energy Offer Cost as specified in Section 4.4.9.2.3 for use in the RUC process.

The above parameter is defined as follows:

Parameter	Unit	Current Value*
1HRLESSCOSTSCALING	Percentage	Maximum value of 100%

* The current value for the parameter(s) referenced in this table above will be recommended by the Technical Advisory Committee (TAC) and approved by the ERCOT Board. ERCOT shall update parameter value(s) on the first day of the month following ERCOT Board approval unless otherwise directed by the ERCOT Board. ERCOT shall provide a Market Notice prior to implementation of a revised parameter value.

(10) The RUC process must treat all Resource capacity providing Ancillary Service as unavailable for the RUC Study Period, unless that treatment leads to infeasibility (i.e., that capacity is needed to resolve some local transmission problem that cannot be resolved by any other means). If an ERCOT Operator decides that the Ancillary Service capacity allocated to that Resource is infeasible based on ERCOT System conditions, then, ERCOT shall inform each affected QSE of the amount of its Resource capacity that does not qualify to provide Ancillary Service, and the projected hours for which this is the case. In that event, the affected QSE may, under Section 6.4.9.1.2, Replacement of Infeasible Ancillary Service Due to Transmission Constraints, either:

(a) Substitute capacity from Resources represented by that QSE;

(b) Substitute capacity from other QSEs using Ancillary Service Trades; or

(c) Ask ERCOT to replace the capacity.

(11) Factors included in the RUC process are:

(a) ERCOT System-wide hourly Load forecast allocated appropriately over Load buses;

(b) Transmission constraints – Transfer limits on energy flows through the electricity network;

(i) Thermal constraints – protect transmission facilities against thermal overload;

(ii) Generic constraints – protect the transmission system against transient instability, dynamic instability or voltage collapse;

(c) Planned transmission topology;

(d) Energy sufficiency constraints;

(e) Inputs from the COP, as appropriate;

(f) Inputs from Resource Parameters, including a list of Off-Line Available Resources having a start-up time of one hour or less, as appropriate;

(g) Each Generation Resource's Minimum-Energy Offer and Startup Offer, from its Three-Part Supply Offer;

(h) Any Generation Resource that is Off-Line and available but does not have a Three-Part Supply Offer;

(i) Forced Outage information; and

(j) Inputs from the eight-day look ahead planning tool, which may potentially keep a unit On-Line (or start a unit for the next day) so that a unit minimum duration between starts does not limit the availability of the unit (for security reasons).

(12) The HRUC process and the DRUC process are as follows:

(a) The HRUC process uses current Resource Status for the initial condition for the first hour of the RUC Study Period. All HRUC processes use the projected status of transmission breakers and switches starting with current status and updated for each remaining hour in the study as indicated in the COP for Resources and in the Outage Scheduler for transmission elements.

(b) The DRUC process uses the Day-Ahead forecast of total ERCOT Load including DC Tie Schedules for each hour of the Operating Day. The HRUC process uses the current hourly forecast of total ERCOT Load including DC Tie Schedules for each hour in the RUC Study Period.

(c) The DRUC process uses the Day-Ahead weather forecast for each hour of the Operating Day. The HRUC process uses the weather forecast information for each hour of the balance of the RUC Study Period.

(13) A QSE that has one or more of its Resources RUC-committed to provide Ancillary Services must increase its Ancillary Service Supply Responsibility by the total amount of RUC-committed Ancillary Service quantities. The QSE may only use a RUC-committed Resource to meet its Ancillary Service Supply Responsibility during that Resource's RUC-Committed Interval if the Resource has been committed by the RUC process to provide Ancillary Service, or the Resource is a Combined Cycle Generation Resource that was RUC-committed to transition from one On-Line configuration to a different configuration with additional capacity. For cases in which the commitment was to provide Ancillary Service, the QSE shall indicate the exact amount and type of Ancillary Service for which it was committed as the Resource's Ancillary Service Resource Responsibility and Ancillary Services Schedule for the RUC-Committed Intervals for both telemetry and COP information provided to ERCOT. Upon deployment of the Ancillary Services, the QSE shall adjust its Ancillary Services Schedule to reflect the amounts requested in the deployment.

(14) A QSE with a Resource that is not a Reliability Must-Run (RMR) Unit or has not received an Outage Schedule Adjustment (OSA) that has been committed in a DRUC or HRUC process may opt out of the RUC Settlement (or "buy back" the commitment) by setting the COP status of the RUC-committed Resource to ONOPTOUT for the first hour of a contiguous block of RUC-Committed Hours in the Opt Out Snapshot. All the configurations of the same Combined Cycle Train shall be treated as the same Resource for the purpose of creating the block of RUC-Committed Hours. A RUC-committed

Combined Cycle Generation Resource may opt out of the RUC Settlement by setting the COP status of any Combined Cycle Generation Resource within the same Combined Cycle Train as the RUC-committed Resource to ONOPTOUT for the first hour of a contiguous block of RUC-Committed Hours in the Opt Out Snapshot. A Combined Cycle Generation Resource that is RUC-committed from one On-Line configuration in order to transition to a different configuration with additional capacity may opt out of the RUC Settlement following the same rule for RUC-committed Combined Cycle Generation Resources described above. A QSE that opts out of RUC Settlement forfeits RUC Settlement for the affected Resource for a given block of RUC Buy-Back Hours. A QSE that opts out of RUC Settlement treatment must make the Resource available to SCED for all RUC Buy-Back Hours. All hours in a contiguous block of RUC-Committed Hours that includes the RUC Buy-Back Hour shall be considered RUC Buy-Back Hours. If a contiguous block of RUC-Committed Hours spans more than one Operating Day and a QSE wishes to opt out of RUC Settlement for the RUC-Committed Hours in the second or subsequent Operating Day, the QSE must set its COP status to ONOPTOUT for the first hour of the first Operating Day in the Opt Out Snapshot of the first Operating Day.

(15) ERCOT shall, as soon as practicable, post to the MIS Secure Area a report identifying those hours that were considered RUC Buy-Back Hours, along with the name of each RUC-committed Resource whose QSE opted out of RUC Settlement.

(16) A Resource that has a Three-Part Supply Offer cleared in the Day-Ahead Market (DAM) and subsequently receives a RUC commitment for the Operating Hour for which it was awarded will be treated as if the telemetered Resource Status was ONOPTOUT for purposes of Section 6.5.7.3, Security Constrained Economic Dispatch, and Section 6.5.7.3.1, Determination of Real-Time On-Line Reliability Deployment Price Adder.

(17) A Resource that has self-committed for an Operating Hour after the RUC Snapshot was taken but before the RUC commitment has been communicated through an XML message for that RUC process and that Operating Hour is included in a block of RUC-committed hours for that RUC process will be treated as if the Resource Status was ONOPTOUT for purposes of Section 6.5.7.3, Section 6.5.7.3.1, Operating Reserve Demand Curve (ORDC) calculations, and RUC Settlement for the entire block of RUC-committed hours. A QSE that has a Resource that meets these conditions must make the Resource available to SCED for the entire block of RUC-committed hours. ERCOT will send the QSE a notification stating the Operating Day and block of hours for which this occurred.

[NPRR1009, NPRR1032, and NPRR1204: Replace applicable portions of Section 5.5.2 above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1009 and NPRR1204; or upon system implementation for NPRR1032:]

Board Report

5.5.2 Reliability Unit Commitment (RUC) Process

(1) The RUC process recommends commitment of Generation Resources, to match ERCOT's forecasted Load including Direct Current Tie (DC Tie) Schedules and RUC Ancillary Service Demand Curves (ASDCs), subject to all transmission constraints and Resource performance characteristics. The RUC process takes into account Resources already committed in the Current Operating Plans (COPs), Resources already committed in previous RUCs, and Off-Line Available Resources having a start-up time of one hour or less. For On-Line Energy Storage Resources (ESRs), using RUC duration requirements for energy and Ancillary Services, RUC-projected dispatch for energy and Ancillary Service in one interval shall respect the ESR's minimum and maximum State of Charge (SOC) values from the COP, while incorporating any adjustments under paragraph (18)(d) below. In addition, using the Ancillary Service Deployment Factors and their respective deployment duration requirements, the SOC required to support these dispatch levels for energy and Ancillary Services will match as closely as possible the difference between the adjusted COP values of the next interval's Hour Beginning Planned SOC and the current interval's Hour Beginning Planned SOC. The formulation of the RUC objective function must employ penalty factors on violations of security constraints and violations of ESR COP Hour Beginning Planned SOC. The objective of the RUC process is to minimize costs based on the Resource costs described in paragraphs (10) through (14) below. ESR energy dispatch costs and Ancillary Service Offer costs are not included in the RUC objective function.

(2) ERCOT shall create an ASDC for each Ancillary Service for use in RUC. ERCOT shall post the ASDCs to the ERCOT website as soon as practicable after any change to the ASDCs.

(3) ERCOT shall post the following Ancillary Service Deployment Factor data on the ERCOT website:

(a) Following each execution of RUC, ERCOT shall post the Ancillary Service Deployment Factors used by that RUC process for each hour in the RUC Study Period;

(b) No later than 0600 in the Day-Ahead for each Operating Day, ERCOT shall post the Ancillary Service Deployments Factors that are projected to be used in the RUC process for that Operating Day; and

(c) Following each month, ERCOT shall post the average, minimum, and maximum Ancillary Service Deployment Factors used in the RUC process by type of Ancillary Service and hour of the day for the month.

(4) For all hours of the RUC Study Period within the RUC process, Quick Start Generation Resources (QSGRs) with a COP Resource Status of OFFQS shall be considered as On-Line with Low Sustained Limit (LSL) at zero MW. QSGRs with a Resource Status of OFFQS shall only be committed by ERCOT through a RUC instruction in instances

when a reliability issue would not otherwise be managed through Dispatch Instructions from Security-Constrained Economic Dispatch (SCED).

(5) In addition to On-Line qualified Generation Resources and Energy Storage Resources (ESRs), the RUC engine shall consider a COP Resource status of OFFQS for QSGRs that are qualified for ERCOT Contingency Reserve Service (ECRS), as being eligible to provide ECRS constrained by the Ancillary Service capability in the COP.

(6) In addition to On-Line qualified Generation Resources and ESRs, the RUC engine shall consider a COP Resource Status of OFFQS for QSGRs that are qualified for Non-Spinning Reserve (Non-Spin), as being eligible to provide Non-Spin constrained by the Ancillary Service Capability in the COP. The RUC engine shall also consider a COP Resource Status of OFF (Off-Line but available for commitment in the DAM and RUC) for a Resource that is qualified for Non-Spin, as being eligible to provide Non-Spin constrained by the Ancillary Service capability in the COP.

(7) In addition to On-Line qualified Generation Resources and ESRs, the RUC engine shall consider a COP Resource Status of ONL for Load Resources that are qualified for Ancillary Services, as being eligible to provide Ancillary Services constrained by the Ancillary Service Capability in the COP. The RUC engine will not consider any Load Resources for dispatch of energy.

(8) The RUC process can recommend Resource decommitment. ERCOT may only decommit a Resource to resolve transmission constraints that are otherwise unresolvable. Qualifying Facilities (QFs) may be decommitted only after all other types of Resources have been assessed for decommitment. In addition, the HRUC process provides decision support to ERCOT regarding a Resource decommitment requested by a Qualified Scheduling Entity (QSE).

(9~~8~~) ERCOT shall review the RUC-recommended Resource commitments and the list of Off-Line Available Resources having a start-up time of one hour or less to assess feasibility and shall make any changes that it considers necessary, in its sole discretion. During the RUC process, ERCOT may also review and commit, through a RUC instruction, Combined Cycle Generation Resources that are currently planned to be On-Line but are capable of transitioning to a configuration with additional capacity. ERCOT may deselect Resources recommended in DRUC and in all HRUC processes if in ERCOT's sole discretion there is enough time to commit those Resources in the future HRUC processes, taking into account the Resources' start-up times, to meet ERCOT System reliability. After each RUC run, ERCOT shall post the amount of capacity deselected per hour in the RUC Study Period to the MIS Secure Area. A Generation Resource shown as On-Line and available for SCED dispatch for an hour in its COP prior to a DRUC or HRUC process execution, according to Section 5.3, ERCOT Security Sequence Responsibilities, will be considered self-committed for that hour. For purpose of Settlement, snapshot data will be used as specified in paragraph (2) of Section 5.3.

(10~~9~~) ERCOT shall issue RUC instructions to each QSE specifying its Resources that have been committed as a result of the RUC process. ERCOT shall, within one day after making any changes to the RUC-recommended commitments, post to the MIS Secure Area any changes that ERCOT made to the RUC-recommended commitments with an explanation of the changes.

(11~~0~~) ERCOT shall use the RUC process to evaluate the need to commit Resources for which a QSE has submitted Three-Part Supply Offers and other available Off-Line Resources in addition to Resources that are planned to be On-Line during the RUC Study Period. All of the above commitment information must be as specified in the QSE's COP. For available Off-Line Resources with a cold start time of one hour or less that have not been removed from special consideration under paragraph (16) below pursuant to paragraph (4) of Section 8.1.2, Current Operating Plan (COP) Performance Requirements, the Startup Offers and Minimum-Energy Offer from a Resource's Three-Part Supply Offer shall not be used in the RUC process.

(12~~1~~) ERCOT shall create Three-Part Supply Offers for all Resources that did not submit a Three-Part Supply Offer, but are specified as available but Off-Line, excluding Resources with a Resource Status of EMR, in a QSE's COP. For such Resources, excluding available Off-Line Resources with a cold start time of one hour or less that have not been removed from special consideration under paragraph (14) below pursuant to paragraph (4) of Section 8.1.2, ERCOT shall use in the RUC process 100% of any approved verifiable Startup Cost and verifiable minimum-energy cost or if verifiable costs have not been approved, the applicable Resource Category Generic Startup Offer Cost and the applicable Resource Category Generic Minimum-Energy Offer Cost as described specified in Section 4.4.9.2.3, Startup Offer and Minimum-Energy Offer Generic Caps, registered with ERCOT. Also, for Settlement purposes, ERCOT shall use any approved verifiable Startup Costs and verifiable minimum-energy cost for such Resources, or if verifiable costs have not been approved, the applicable Resource Category Generic Startup Offer Cost and Generic Minimum-Energy Offer Cost.

(13~~2~~) A QSE shall notify the ERCOT Operator of any physical limitation that impacts its Resource's ability to start that is not reflected in the Resource's COP or the Resource's startup time, minimum On-Line time, or minimum Off-Line time. The following shall apply:

(a) If a Resource receives a RUC Dispatch Instruction that it cannot meet due to a physical limitation described in paragraph (5) above, the QSE representing the Resource shall notify the ERCOT Operator of the inability to fully comply with the instruction and shall comply with the instruction to the best of the Resource's ability. If the QSE has provided the ERCOT Operator notice of that limitation at least seven days prior to the Operating Day in which the instruction occurs, the QSE shall be excused from complying with the portion of the RUC Dispatch Instruction that it could not meet due to the identified limitation.

(b) If a QSE provides notice pursuant to paragraph (a) above of a physical limitation that will delay the RUC-committed Resource's ability to reach its LSL in

accordance with a RUC Dispatch Instruction, ERCOT shall extend the RUC Dispatch Instruction so that the Resource's minimum run time is respected. However, if the Resource will not be available in time to address the issue for which it received the RUC instruction, ERCOT may instead cancel the RUC Dispatch Instruction.

(143) A QSE shall be excused from complying with any portion of a RUC Dispatch Instruction that it could not meet due to a physical limitation that was reflected, at the time of the RUC Dispatch Instruction, in the Resource's COP, startup time, minimum On-Line time, or minimum Off-Line time.

(154) To determine the projected energy output level of each Resource and to project potential congestion patterns for each hour of the RUC, ERCOT shall calculate proxy Energy Offer Curves based on the Mitigated Offer Caps (MOCs) for the type of Resource as specified in Section 4.4.9.4, Mitigated Offer Cap and Mitigated Offer Floor, for use in the RUC. Proxy Energy Offer Curves are calculated by multiplying the MOC by a constant selected by ERCOT from time to time that is no more than 0.10% and applying the cost for all Generation Resource output between High Sustained Limit (HSL) and LSL. The intent of this process is to minimize the effect of the proxy Energy Offer Curves on optimization. For ESRs, energy dispatch costs are not considered in determining projected energy output levels.

(165) ERCOT shall calculate proxy Ancillary Service Offer Curves for use in RUC based on validated Ancillary Service Offers as specified in Section 4.4.7.2, Ancillary Service Offers. For all Resources that do not have a valid Ancillary Service Offer but are qualified to provide an Ancillary Service, ERCOT shall create an Ancillary Service Offer Curve for use in RUC as described in Section 6.5.7.3, Security Constrained Economic Dispatch. Proxy Ancillary Service Offer Curves for use in RUC are calculated by multiplying the Ancillary Service Offer by a constant selected by ERCOT from time to time that is no more than 0.1%, and are extended between the HSL and LSL. Notwithstanding the presence or absence of a proxy Ancillary Service Offer, Ancillary Service provision in RUC shall be limited by the Resource's Ancillary Service capabilities as reflected in the COP. For ESRs, Ancillary Service Offer costs are not considered in determining projected Ancillary Service awards.

(176) For all available Off-Line Resources having a cold start time of one hour or less and not removed from special consideration pursuant to paragraph (4) of Section 8.1.2, ERCOT shall scale any approved verifiable Startup Cost and verifiable minimum-energy cost or if verifiable costs have not been approved, the applicable Resource Category Generic Startup Offer Cost and the applicable Resource Category Generic Minimum-Energy Offer Cost as specified in Section 4.4.9.2.3 for use in the RUC process.

The above parameter is defined as follows:

Parameter	Unit	Current Value*
1HRLESSCOSTSCALING	Percentage	Maximum value of 100%

* The current value for the parameter(s) referenced in this table above will be recommended by the Technical Advisory Committee (TAC) and approved by the ERCOT Board. ERCOT shall update parameter value(s) on the first day of the month following ERCOT Board approval unless otherwise directed by the ERCOT Board. ERCOT shall provide a Market Notice prior to implementation of a revised parameter value.

(187) Factors included in the RUC process are:

(a) ERCOT System-wide hourly Load forecast allocated appropriately over Load buses;

(b) ERCOT's Ancillary Service Plans in the form of ASDCs;

(c) Transmission constraints – Transfer limits on energy flows through the electricity network;

(i) Thermal constraints – protect transmission facilities against thermal overload;

(ii) Generic constraints – protect the transmission system against transient instability, dynamic instability or voltage collapse;

(d) Planned transmission topology;

(e) Energy sufficiency constraints, including RUC duration requirements for energy and Ancillary Services;

(f) Inputs from the COP, as appropriate;

(g) Inputs from Resource Parameters, including a list of Off-Line Available Resources having a start-up time of one hour or less, as appropriate;

(h) Each Generation Resource's Minimum-Energy Offer and Startup Offer, from its Three-Part Supply Offer;

(i) Any Generation Resource that is Off-Line and available but does not have a Three-Part Supply Offer;

(j) Forced Outage information;

(k) Inputs from the eight-day look ahead planning tool, which may potentially keep a unit On-Line (or start a unit for the next day) so that a unit minimum duration between starts does not limit the availability of the unit (for security reasons); and

(l) Ancillary Service Deployment Factors.

(198) The HRUC process and the DRUC process are as follows:

(a) The HRUC process uses current Resource Status for the initial condition for the first hour of the RUC Study Period. All HRUC processes use the projected status of transmission breakers and switches starting with current status and updated for each remaining hour in the study as indicated in the COP for Resources and in the Outage Scheduler for transmission elements.

(b) The DRUC process uses the current hourly forecast of total ERCOT Load including DC Tie Schedules up to the physical rating of the DC Tie for each hour of the Operating Day. The HRUC process uses the current hourly forecast of total ERCOT Load including DC Tie Schedules up to the physical rating of the DC Tie for each hour in the RUC Study Period.

(c) The DRUC process uses the Day-Ahead weather forecast for each hour of the Operating Day. The HRUC process uses the weather forecast information for each hour of the balance of the RUC Study Period.

(d) For the HRUC, DRUC, and Weekly Reliability Unit Commitment (WRUC) processes, a feasibility check on the COP submitted Hour Beginning Planned SOC will be performed. This check may adjust the Hour Beginning Planned SOC used in the RUC process. The feasibility check looks sequentially across all intervals in the RUC Study Period to validate whether a particular interval's COP Hour Beginning Planned SOC is achievable from the previous interval. If it is not feasible, then RUC will adjust the Hour Beginning Planned SOC to the closest achievable value.

(2019) A QSE with a Resource that is not a Reliability Must-Run (RMR) Unit or has not received an Outage Schedule Adjustment (OSA) that has been committed in a DRUC or HRUC process may opt out of the RUC Settlement (or "buy back" the commitment) by setting the COP status of the RUC-committed Resource to ONOPTOUT for the first hour of a contiguous block of RUC-Committed Hours in the Opt Out Snapshot. All the configurations of the same Combined Cycle Train shall be treated as the same Resource for the purpose of creating the block of RUC-Committed Hours. A RUC-committed Combined Cycle Generation Resource may opt out of the RUC Settlement by setting the COP status of any Combined Cycle Generation Resource within the same Combined Cycle Train as the RUC-committed Resource to ONOPTOUT for the first hour of a contiguous block of RUC-Committed Hours in the Opt Out Snapshot. A Combined Cycle Generation Resource that is RUC-committed from one On-Line configuration in order to transition to a different configuration with additional capacity may opt out of the RUC Settlement following the same rule for RUC-committed Combined Cycle Generation Resources described above. A QSE that opts out of RUC Settlement forfeits RUC Settlement for the affected Resource for a given block of RUC Buy-Back Hours. A QSE that opts out of RUC Settlement treatment must make the Resource available to SCED for all RUC Buy-Back Hours. All hours in a contiguous block of RUC-Committed Hours that includes the RUC Buy-Back Hour shall be considered RUC Buy-Back Hours. If a contiguous block of RUC-Committed Hours spans more than one Operating Day and a QSE wishes to opt out of RUC Settlement for the RUC-

Committed Hours in the second or subsequent Operating Day, the QSE must set its COP status to ONOPTOUT for the first hour of that the first Operating Day in the Opt Out Snapshot of the first Operating Day.

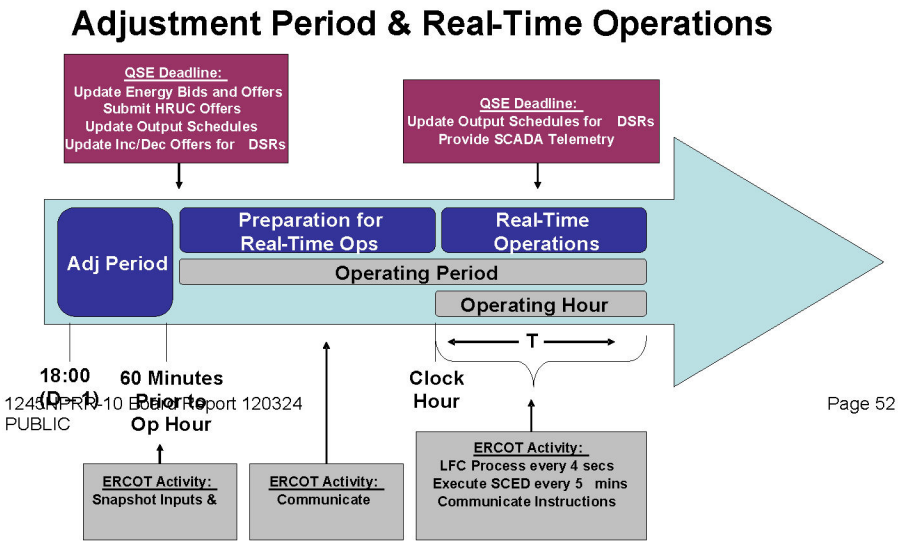
(2~~1~~0) ERCOT shall, as soon as practicable, post to the MIS Secure Area a report identifying those hours that were considered RUC Buy-Back Hours, along with the name of each RUC-committed Resource whose QSE opted out of RUC Settlement.

(2~~2~~1) A Resource that has a Three-Part Supply Offer cleared in the Day-Ahead Market (DAM) and subsequently receives a RUC commitment for the Operating Hour for which it was awarded will be treated as if the Resource Status was ONOPTOUT for purposes of Section 6.5.7.3 and Section 6.5.7.3.1, Determination of Real-Time Reliability Deployment Price Adders.

(2~~3~~2) A Resource that has self-committed for an Operating Hour after the RUC Snapshot was taken but before the RUC commitment has been communicated through an XML message for that RUC process and that Operating Hour is included in a block of RUC-committed hours for that RUC process will be treated as if the Resource Status was ONOPTOUT for purposes of Section 6.5.7.3, Section 6.5.7.3.1~~, Operating Reserve Demand Curve (ORDC) calculations~~, and RUC Settlement for the entire block of RUC-committed hours. A QSE that has a Resource that meets these conditions must make the Resource available to SCED for the entire block of RUC-committed hours. ERCOT will send the QSE a notification stating the Operating Day and block of hours for which this occurred.

6.3 Adjustment Period and Real-Time Operations Timeline

(1) The figure below highlights the major activities that occur in the Adjustment Period and Real-Time operations:



(2) Activities for the Adjustment Period begin at 1800 in the Day-Ahead and end one full hour before the start of the Operating Hour. The figure above is intended to be only a general guide and not controlling language, and any conflict between this figure and another section of the Protocols is controlled by the other section.

(3) ERCOT shall monitor Real-Time Locational Marginal Prices (LMPs), Supplemental Ancillary Services Market (SASM) Market Clearing Prices for Capacity (MCPCs), and Real-Time Settlement Point Prices, including Real-Time prices for energy metered, Real-Time On-Line Reliability Deployment Price Adders, Real-Time On-Line Reliability Deployment Prices, Real-Time Off-Line Reserve Price Adders, Real-Time On-Line Reserve Price Adders, Real-Time Reserve Prices for On-Line Reserves and Real-Time Reserve Prices for Off-Line Reserves, for errors and if there are conditions that cause the price to be questionable, ERCOT shall notify all Market Participants that the Real-Time LMPs, SASM MCPCs, and Real-Time Settlement Point Prices are under investigation as soon as practicable.

(4) ERCOT shall correct prices for an Operating Day when accurate prices can be determined, the impact of the price correction is determined to be significant, and one of the following conditions has been met: a market solution is determined to be invalid, invalid prices are identified in an otherwise valid market solution, the Base Points received by Market Participants are inconsistent with the Base Points of a valid market solution, or the Security-Constrained Economic Dispatch (SCED) process experiences a failure as described in Section 6.5.9.2, Failure of the SCED Process. The following are some reasons that may cause these conditions:

(a) Data Input error: Missing, incomplete, stale, or incorrect versions of one or more data elements input to the market applications may result in an invalid market solution and/or prices.

(b) Data Output error: These include: incorrect or incomplete data transfer, price recalculation error in post-processing, and Base Points inconsistent with prices due to the Emergency Base Point flag remaining activated even when the SCED solution is valid.

(c) Hardware/Software error: These include unpredicted hardware or software failures, planned market system or database outages, planned application or database upgrades, software implementation errors, and failure of the market run to complete.

(d) Inconsistency with the Protocols or Public Utility Commission of Texas (PUCT) Substantive Rules: Pricing errors may occur when specific circumstances result in prices that are in conflict with such Protocol language or the PUCT Substantive Rules.

(5) For purposes of a price correction performed prior to 1600 on the second Business Day after the Operating Day, the impact of a price correction shall be considered significant, as that term is used in paragraph (4) above, for the Operating Day when:

(a) The absolute value change to any single Real-Time Settlement Point Price at a Resource Node is greater than $0.05/MWh;

(b) The price correction would require ERCOT to change more than 50 Real-Time Settlement Point Prices;

(c) The absolute value change to any Real-Time Settlement Point Price at a Load Zone or Hub is greater than $0.02/MWh;

(d) The estimated absolute total dollar impact for changes to Real-Time prices for energy metered is greater than $500; or

(e) The absolute total dollar impact for changes to SASM MCPCs is greater than $500.

(6) If it is determined that any Real-Time Settlement Point Prices, Settlement Point LMPs, Electrical Bus LMPs, Real-Time prices for energy metered, Real-Time On-Line Reliability Deployment Price Adders, Real-Time On-Line Reliability Deployment Prices, Real-Time On-Line Reserve Price Adders, Real-Time Off-Line Reserve Price Adders, Real-Time Reserve Prices for On-Line Reserves, Real-Time Reserve Prices for Off-Line Reserves, and/or constraint Shadow Prices are erroneous, ERCOT shall correct the prices before the prices are considered final in paragraph (7) below. Specifically:

(a) If it is determined that correcting the Real-Time Settlement Point Prices will not affect the Base Points that were received by Qualified Scheduling Entities (QSEs), then ERCOT shall correct the prices before the prices are considered final in paragraph (7) below.

(b) If it is determined that correcting the Real-Time Settlement Point Prices will affect the Base Points that were received by QSEs, then ERCOT shall correct the prices before the prices are considered final and settle the SCED executions as failed in accordance with Section 6.5.9.2.

(c) If the Base Points received by QSEs are inconsistent with the Real-Time Settlement Point Prices reduced by the sum of the Real-Time On-Line Reliability Deployment Prices and the Real-Time Reserve Prices for On-Line Reserves averaged over the 15-minute Settlement Interval, then ERCOT shall consider those Base Points as due to manual override from the ERCOT Operator and settle the relevant Settlement Interval(s) in accordance with Section 6.6.9, Emergency Operations Settlement.

(7) All Real-Time LMPs, Real-Time Settlement Point Prices, Real-Time prices for energy metered, Real-Time On-Line Reliability Deployment Price Adders, Real-Time On-Line Reliability Deployment Prices, Real-Time Reserve Prices for On-Line Reserves, Real-Time Reserve Prices for Off-Line Reserves, Real-Time On-Line Reserve Price Adders, Real-Time Off-Line Reserve Price Adders and SASM MCPCs are final at 1600 of the second Business Day after the Operating Day.

(a) However, after Real-Time LMPs, Real Time Settlement Point Prices, Real-Time prices for energy metered, Real-Time On-Line Reliability Deployment Price Adders, Real-Time On-Line Reliability Deployment Prices, Real-Time Reserve Prices for On-Line Reserves, Real-Time Reserve Prices for Off-Line Reserves, Real-Time On-Line Reserve Price Adders, Real-Time Off-Line Reserve Price Adders and SASM MCPCs are final, if ERCOT determines that prices qualify for a price correction pursuant to paragraph (4) above and that ERCOT will seek ERCOT Board review of such prices, it shall notify Market Participants and describe the need for such correction as soon as practicable but no later than 30 days after the Operating Day. Failure to notify Market Participants within this timeline precludes the ERCOT Board from reviewing such prices. However, nothing in this section shall be understood to limit or otherwise inhibit any of the following:

(i) ERCOT's duty to inform the PUCT of potential or actual violations of the ERCOT Protocols or PUCT Rules and its right to request that the PUCT authorize correction of any prices that may have been affected by such potential or actual violations;

(ii) The PUCT's authority to order price corrections when permitted to do so under other law; or

(iii) ERCOT's authority to grant relief to a Market Participant pursuant to the timelines specified in Section 20, Alternative Dispute Resolution Procedure and Procedure for Return of Settlement Funds.

(b) Before seeking ERCOT Board review of prices, ERCOT will determine if the impact of the price correction is significant, as that term is used in paragraph (4) above, by calculating the potential changes to the Real-Time Market (RTM) Settlement Statement(s) of any Counter-Party on a given Operating Day. ERCOT shall seek ERCOT Board review of prices if the change in RTM Settlement Statement(s) would result in the absolute value impact to any single Counter-Party, based on the sum of all original RTM Settlement Statement amounts of Market Participants assigned to the Counter-Party, to be greater than:

(i) 2% and also greater than $20,000; or

(ii) 20% and also greater than $2,000.

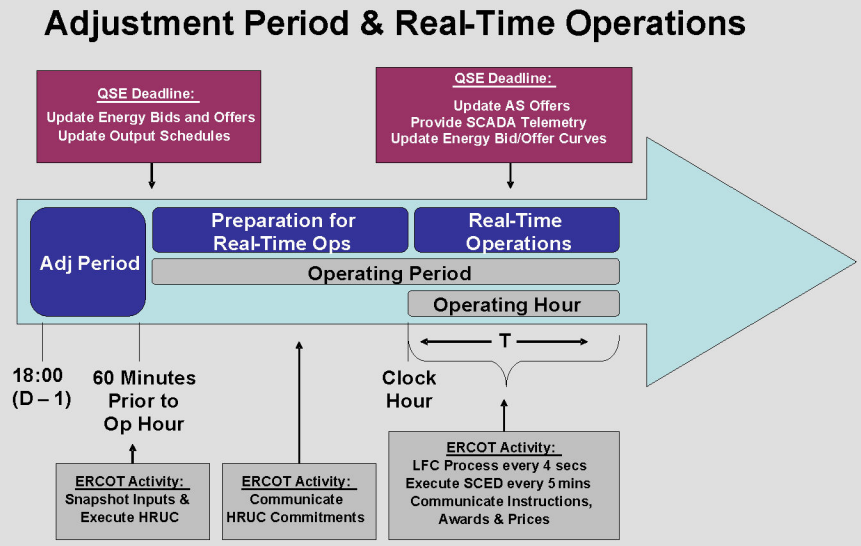
(c) The ERCOT Board may review and change Real-Time LMPs, Real-Time Settlement Point Prices, Real-Time prices for energy metered, Real-Time On-Line Reliability Deployment Price Adders, Real-Time On-Line Reliability Deployment Prices, Real-Time Reserve Prices for On-Line Reserves, Real-Time Reserve Prices for Off-Line Reserves, Real-Time On-Line Reserve Price Adders, Real-Time Off-Line Reserve Price Adders and SASM MCPCs if ERCOT gave timely notice to Market Participants and the ERCOT Board finds that such prices should be corrected for an Operating Day.

(d) In review of Real-Time LMPs, Real Time Settlement Point Prices, Real-Time prices for energy metered, Real-Time On-Line Reliability Deployment Price Adders, Real-Time On-Line Reliability Deployment Prices, Real-Time Reserve Prices for On-Line Reserves, Real-Time Reserve Prices for Off-Line Reserves, Real-Time On-Line Reserve Price Adders, Real-Time Off-Line Reserve Price Adders and SASM MCPCs, the ERCOT Board may rely on the same reasons identified in paragraph (4) above to find that the prices should be corrected for an Operating Day.

[NPRR1000, NPRR1010, and NPRR1014: Replace applicable portions of Section 6.3 above with the following upon system implementation for NPRR1000 or NPRR1014; or upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1010:]

6.3 Adjustment Period and Real-Time Operations Timeline

(1) The figure below highlights the major activities that occur in the Adjustment Period and Real-Time operations:



(2) Activities for the Adjustment Period begin at 1800 in the Day-Ahead and end one full hour before the start of the Operating Hour. The figure above is intended to be only a general guide and not controlling language, and any conflict between this figure and another section of the Protocols is controlled by the other section.

(3) ERCOT shall monitor Real-Time Locational Marginal Prices (LMPs), Real-Time Market Clearing Prices for Capacity (MCPCs), and Real-Time Settlement Point Prices, including Real-Time prices for energy metered, Real-Time Reliability Deployment Price Adders for Energy, and Real-Time Reliability Deployment Price Adders for Ancillary Service, for errors and if there are conditions that cause the price to be questionable, as soon as practicable, ERCOT shall notify all Market Participants that the Real-Time LMPs, Real-Time MCPCs, and Real-Time Settlement Point Prices are under investigation.

(4) ERCOT shall correct prices for an Operating Day when accurate prices can be determined, the impact of the price correction is determined to be significant, and one of the following conditions has been met: a market solution is determined to be invalid, invalid prices are identified in an otherwise valid market solution, the Base Points or Ancillary Service awards received by Market Participants are inconsistent with the Base Points or Ancillary Service awards of a valid market solution, or the Security-Constrained Economic Dispatch (SCED) process experiences a failure as described in Section 6.5.9.2, Failure of the SCED Process. The following are some reasons that may cause these conditions.

(a) Data Input error: Missing, incomplete, stale, or incorrect versions of one or more data elements input to the market applications may result in an invalid market solution and/or prices.

(b) Data Output error: These include: incorrect or incomplete data transfer, price recalculation error in post-processing, and Base Points inconsistent with prices due to the Emergency Base Point flag remaining activated even when the SCED solution is valid.

(c) Hardware/Software error: These include unpredicted hardware or software failures, planned market system or database outages, planned application or database upgrades, software implementation errors, and failure of the market run to complete.

(d) Inconsistency with the Protocols or Public Utility Commission of Texas (PUCT) Substantive Rules: Pricing errors may occur when specific circumstances result in prices that are in conflict with such Protocol language or the PUCT Substantive Rules.

(5) For purposes of a price correction performed prior to 1600 on the second Business Day after the Operating Day, the impact of a price correction shall be considered significant, as that term is used in paragraph (4) above, for the Operating Day when:

(a) The absolute value change to any single Real-Time Settlement Point Price at a Resource Node or Real-Time MCPC is greater than $0.05/MWh;

(b) The price correction would require ERCOT to change more than 50 Real-Time Settlement Point Prices and/or Real-Time MCPCs;

(c) The absolute value change to any Real-Time Settlement Point Price at a Load Zone or Hub is greater than $0.02/MWh; or

(d) The estimated absolute total dollar impact for changes to Real-Time prices for energy metered is greater than $500.; ~~or~~

~~(e) The absolute total dollar impact for changes to SASM MCPCs is greater than $500.~~

(6) If it is determined that any Real-Time Settlement Point Prices, Settlement Point LMPs, Electrical Bus LMPs, Real-Time prices for energy metered, Real-Time Reliability Deployment Price Adders for Energy, Real-Time MCPCs, Real-Time Reliability Deployment Price Adders for Ancillary Service, and/or constraint Shadow Prices are erroneous, ERCOT shall correct the prices before the prices are considered final in paragraph (7) below. Specifically:

(a) If it is determined that correcting the Real-Time Settlement Point Prices will not affect the Base Points, and correcting Real-Time MCPCs will not affect Ancillary Service awards, then ERCOT shall correct the prices before the prices are considered final in paragraph (7) below.

(b) If it is determined that correcting the Real-Time Settlement Point Prices will affect the Base Points, or correcting Real-Time MCPCs will affect Ancillary Service awards, then ERCOT shall correct the prices before the prices are considered final and settle the SCED executions as failed in accordance with Section 6.5.9.2.

(c) For Settlement purposes, if the Base Points are inconsistent with the Real-Time Settlement Point Prices, reduced by the Real-Time Reliability Deployment Price Adder for Energy, or Ancillary Service awards are inconsistent with the Real-Time MCPCs, reduced by the Real-Time Reliability Deployment Price Adder for Ancillary Service, averaged over the 15-minute Settlement Interval, then ERCOT shall consider the relevant Settlement Interval(s) in accordance with Section 6.6.9, Emergency Operations Settlement.

(7) All Real-Time LMPs, Real-Time Settlement Point Prices, Real-Time prices for energy metered, Real-Time Reliability Deployment Price Adders for Energy, Real-Time MCPCs, and Real-Time Reliability Deployment Price Adders for Ancillary Service are final at 1600 of the second Business Day after the Operating Day.

(a) However, after Real-Time LMPs, Real-Time Settlement Point Prices, Real-Time prices for energy metered, Real-Time Reliability Deployment Price Adders for Energy, Real-Time MCPCs, and Real-Time Reliability Deployment Price Adders for Ancillary Service are final, if ERCOT determines that prices

qualify for a price correction pursuant to paragraph (4) above and that ERCOT will seek ERCOT Board review of such prices, it shall notify Market Participants and describe the need for such correction as soon as practicable but no later than 30 days after the Operating Day. Failure to notify Market Participants within this timeline precludes the ERCOT Board from reviewing such prices. However, nothing in this section shall be understood to limit or otherwise inhibit any of the following:

(i) ERCOT's duty to inform the PUCT of potential or actual violations of the ERCOT Protocols or PUCT Rules and its right to request that the PUCT authorize correction of any prices that may have been affected by such potential or actual violations;

(ii) The PUCT's authority to order price corrections when permitted to do so under other law; or

(iii) ERCOT's authority to grant relief to a Market Participant pursuant to the timelines specified in Section 20, Alternative Dispute Resolution Procedure and Procedure for Return of Settlement Funds.

(b) Before seeking ERCOT Board review of prices, ERCOT will determine if the impact of the price correction is significant, as that term is used in paragraph (4) above, by calculating the potential changes to the RTM Settlement Statement(s) of any Counter-Party on a given Operating Day. ERCOT shall seek ERCOT Board review of prices if the change in RTM Settlement Statement(s) would result in the absolute value impact to any single Counter-Party, based on the sum of all original RTM Settlement Statement amounts of Market Participants assigned to the Counter-Party, to be greater than:

(i) 2% and also greater than $20,000; or

(ii) 20% and also greater than $2,000.

(c) The ERCOT Board may review and change Real-Time LMPs, Real-Time Settlement Point Prices, Real-Time prices for energy metered, Real-Time Reliability Deployment Price Adders for Energy, Real-Time MCPCs, and Real-Time Reliability Deployment Price Adders for Ancillary Service if ERCOT gave timely notice to Market Participants and the ERCOT Board finds that such prices should be corrected for an Operating Day.

(d) In review of Real-Time LMPs, Real-Time Settlement Point Prices, Real-Time prices for energy metered, Real-Time Reliability Deployment Price Adders for Energy, Real-Time MCPCs, and Real-Time Reliability Deployment Price Adders for Ancillary Service, the ERCOT Board may rely on the same reasons identified in paragraph (4) above to find that the prices should be corrected for an Operating Day.

6.4.1 Capacity Trade, Energy Trade, Self-Schedule, and Ancillary Service Trades

(1) A detailed explanation of Capacity Trade criteria and validations performed by ERCOT is provided in Section 4.4.1, Capacity Trades. A Qualified Scheduling Entity (QSE) may submit and update Capacity Trades during the Adjustment Period.

(2) A detailed explanation of Energy Trade criteria and validations performed by ERCOT is provided in Section 4.4.2, Energy Trades. A QSE may submit and update Energy Trades during the Adjustment Period and through 1430 on the day following the Operating Day for Settlement.

(3) A detailed explanation of Self-Schedule criteria and validations performed by ERCOT is provided in Section 4.4.3, Self-Schedules. A QSE may submit and update Self-Schedules during the Adjustment Period.

(4) A detailed explanation of Ancillary Service Trade criteria and validations performed by ERCOT is provided in Section 4.4.7.3, Ancillary Service Trades. A QSE may submit and update Ancillary Service Trades during the Adjustment Period ~~and through the Operating Period for Settlement~~.

6.5.7.3.1 Determination of Real-Time On-Line Reliability Deployment Price Adder

Commented [CP5]: Please note NPRRs 1214, 1235, and 1238 also propose revisions to this section.

(1) The following categories of reliability deployments are considered in the determination of the Real-Time On-Line Reliability Deployment Price Adder:

(a) RUC-committed Resources, except for those whose QSEs have opted out of RUC Settlement in accordance with paragraph (14) of Section 5.5.2, Reliability Unit Commitment (RUC) Process;

(b) RMR Resources that are On-Line, including capacity secured to prevent an Emergency Condition pursuant to paragraph (4) of Section 6.5.1.1, ERCOT Control Area Authority;

(c) Deployed Load Resources other than CLRs;

(d) Deployed ERS;

(e) Real-Time DC Tie imports during an EEA where the total adjustment shall not exceed 1,250 MW in a single interval;

(f) Real-Time DC Tie exports to address emergency conditions in the receiving electric grid;

(g) Energy delivered to ERCOT through registered Block Load Transfers (BLTs) during an EEA;

(h) Energy delivered from ERCOT to another power pool through registered BLTs during emergency conditions in the receiving electric grid; and

(i) ERCOT-directed firm Load shed during EEA Level 3, as described in paragraph (3) of Section 6.5.9.4.2, EEA Levels.

(2) The Real-Time On-Line Reliability Deployment Price Adder is an estimation of the impact to energy prices due to the above categories of reliability deployments. For intervals where there are reliability deployments as described in paragraph (1) above, after the two-step SCED process and also after the Real-Time On-Line Reserve Price Adder and Real-Time Off-Line Reserve Price Adder have been determined, the Real-Time On-Line Reliability Deployment Price Adder is determined as follows:

(a) For RUC-committed Resources with a telemetered Resource Status of ONRUC and for RMR Resources that are On-Line, set the LSL, LASL, and LDL to zero.

(b) Notwithstanding item (a) above, for RUC-committed Combined Cycle Generation Resources with a telemetered Resource Status of ONRUC that were instructed by ERCOT to transition to a different configuration to provide additional capacity, set the LSL, LASL, and LDL equal to the minimum of their current value and the COP HSL of the QSE-committed configuration for the RUC hour at the snapshot time of the RUC instruction.

(c) For all other Generation Resources excluding ones with a telemetered status of ONRUC, ONTEST, STARTUP, SHUTDOWN, and also excluding RMR Resources that are On-Line and excluding Generation Resources with a telemetered output less than 95% of LSL:

(i) Set LDL to the greater of Aggregated Resource Output - (60 minutes * SCED Down Ramp Rate), or LASL; and

(ii) Set HDL to the lesser of Aggregated Resource Output + (60 minutes*SCED Up Ramp Rate), or HASL.

(d) For all CLRs excluding ones with a telemetered status of OUTL:

(i) Set LDL to the greater of Aggregated Resource Output - (60 minutes * SCED Up Ramp Rate), or LASL; and

(ii) Set HDL to the lesser of Aggregated Resource Output + (60 minutes*SCED Down Ramp Rate), or HASL.

(e) Add the deployed MW from Load Resources that are not CLRs and that are providing RRS or ECRS to GTBD linearly ramped over the ten-minute ramp period and add the deployed MW from Load Resources that are not CLRs providing Non-Spin to GTBD linearly ramped over the 30-minute ramp period. The amount of deployed MW is calculated from the Resource telemetry and from applicable deployment instructions in Extensible Markup Language (XML)

messages. ERCOT shall generate a linear bid curve defined by a price/quantity pair of $300/MWh for the first MW of Load Resources deployed and a price/quantity pair of $700/MWh for the last MW of Load Resources deployed in each SCED execution. After recall instruction, the restoration period length and amount of MW added to GTBD during the restoration period will be determined by validated telemetry and the type of Ancillary Service deployed from the Resource. The TAC shall review the validity of the prices for the bid curve at least annually.

(f) Add the deployed MW from ERS to GTBD. The amount of deployed MW is determined from the XML messages and ERS contracted capacities for the ERS Time Periods when ERS is deployed. After recall, an approximation of the amount of un-restored ERS shall be used. After ERCOT recalls each group, GTBD shall be adjusted to reflect restoration on a linear curve over the assumed restoration period ("RHours").

The above parameter is defined as follows:

Parameter	Unit	Current Value*
RHours	Hours	4.5
* Changes to the current value of the parameter(s) referenced in this table above may be recommended by TAC and approved by the ERCOT Board. ERCOT shall update parameter values on the first day of the month following ERCOT Board approval unless otherwise directed by the ERCOT Board. ERCOT shall provide a Market Notice prior to implementation of a revised parameter value.		

(g) Add the MW from Real-Time DC Tie imports during an EEA to GTBD. The amount of MW is determined from the Dispatch Instruction and should continue over the duration of time specified by the ERCOT Operator.

(h) Subtract the MW from Real-Time DC Tie exports to address emergency conditions in the receiving electric grid from GTBD. The amount of MW is determined from the Dispatch Instruction and should continue over the duration of time specified by the receiving grid operator.

(i) Add the MW from energy delivered to ERCOT through registered BLTs during an EEA to GTBD. The amount of MW is determined from the Dispatch Instruction and should continue over the duration of time specified by the ERCOT Operator.

(j) Subtract the MW from energy delivered from ERCOT to another power pool through registered BLTs during emergency conditions in the receiving electric grid from GTBD. The amount of MW is determined from the Dispatch Instruction and should continue over the duration of time specified by the receiving grid operator.

(k) Perform a SCED with changes to the inputs in items (a) through (j) above, considering only Competitive Constraints and the non-mitigated Energy Offer Curves.

(l) Perform mitigation on the submitted Energy Offer Curves using the LMPs from the previous step as the reference LMP.

(m) Perform a SCED with the changes to the inputs in items (a) through (j) above, considering both Competitive and Non-Competitive Constraints and the mitigated Energy Offer Curves.

(n) Determine the positive difference between the System Lambda from item (m) above and the System Lambda of the second step in the two-step SCED process described in paragraph (10)(b) of Section 6.5.7.3, Security Constrained Economic Dispatch.

(o) Determine the amount given by the Value of Lost Load (VOLL) minus the sum of the System Lambda of the second step in the two step SCED process described in paragraph (10)(b) of Section 6.5.7.3 and the Real-Time On-Line Reserve Price Adder.

(p) The Real-Time On-Line Reliability Deployment Price Adder is the minimum of items (n) and (o) above except when ERCOT is directing firm Load shed during EEA Level 3. When ERCOT is directing firm Load shed during EEA Level 3 to either maintain sufficient PRC or stabilize grid frequency, as described in paragraph (3) of Section 6.5.9.4.2, the Real-Time On-Line Reliability Deployment Price Adder is the VOLL minus the sum of the System Lambda of the second step in the two-step SCED process described in paragraph (10)(b) of Section 6.5.7.3 and the Real-Time On-Line Reserve Price Adder. Once ERCOT is no longer directing firm Load shed, as described above, the Real-Time On-Line Reliability Deployment Price Adder will again be set as the minimum of items (n) and (o) above.

[NPRR904, NPRR1006, NPRR1010, NPRR1014, NPRR1091, NPRR1105, and NPRR1188: Replace applicable portions of Section 6.5.7.3.1 above with the following upon system implementation for NPRR904, NPRR1006, NPRR1014, NPRR1091, NPRR1105, or NPRR1188; or upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1010:]

6.5.7.3.1 Determination of Real-Time Reliability Deployment Price Adder

(1) The following categories of reliability deployments are considered in the determination of the Real-Time Reliability Deployment Price Adder for Energy, and the Real-Time Reliability Deployment Price Adders for Ancillary Services:

(a) RUC-committed Resources, except for those whose QSEs have opted out of RUC Settlement in accordance with paragraph (14) of Section 5.5.2, Reliability Unit Commitment (RUC) Process;

(b) RMR Resources that are On-Line, including capacity secured to prevent an Emergency Condition pursuant to paragraph (4) of Section 6.5.1.1, ERCOT Control Area Authority;

(c) Deployed Load Resources other than CLRs;

(d) Deployed ERS;

(e) ERCOT-directed DC Tie imports during an EEA or transmission emergency where the total adjustment shall not exceed 1,250 MW in a single interval;

(f) ERCOT-directed curtailment of DC Tie imports below the higher of DC Tie advisory import limit as of 0600 in the Day-Ahead or subsequent advisory import limit to address local transmission system limitations where the total adjustment shall not exceed 1,250 MW in a single interval;

(g) ERCOT-directed curtailment of DC Tie imports below the higher of DC Tie advisory import limit as of 0600 in the Day-Ahead or subsequent advisory import limit due to an emergency action by a neighboring system operator during an emergency that is accommodated by ERCOT where the total adjustment shall not exceed 1,250 MW in a single interval;

(h) ERCOT-directed DC Tie exports to address emergency conditions in the receiving electric grid where the total adjustment shall not exceed 1,250 MW in a single interval;

(i) ERCOT-directed curtailment of DC Tie exports below the DC Tie advisory export limit as of 0600 in the Day-Ahead or subsequent advisory export limit during EEA, a transmission emergency, or to address local transmission system limitations where the total adjustment shall not exceed 1,250 MW in a single interval;

(j) Energy delivered to ERCOT through registered Block Load Transfers (BLTs) during an EEA;

(k) Energy delivered from ERCOT to another power pool through registered BLTs during emergency conditions in the receiving electric grid;

(l) ERCOT-directed deployment of TDSP standard offer Load management programs;

(m) ERCOT-directed deployment of distribution voltage reduction measures; ~~and~~

(n) ERCOT-directed deployment of Off-Line Non-Spin; and-

(o) ERCOT-directed firm Load shed during EEA Level 3, as described in paragraph (3) of Section 6.5.9.4.2, EEA Levels.

(2) The Real-Time Reliability Deployment Price Adder for Energy, and Real-Time Reliability Deployment Price Adders for Ancillary Services are estimations of the impact to energy prices and Real-Time MCPCs due to the above categories of reliability deployments. For intervals where there are reliability deployments as described in paragraph (1) above, the Real-Time Reliability Deployment Price Adder for Energy and Real-Time Reliability Deployment Price Adders for Ancillary Services are determined as follows:

(a) For Off-Line Non-Spin Resources that are brought On-Line by ERCOT deployment instruction, RUC-committed Resources with a telemetered Resource Status of ONRUC and for RMR Resources that are On-Line:

(i) Set the LSL and LDL to zero;

(ii) Remove all Ancillary Service Offers; and

(iii) For the first step of SCED, administratively set the Energy Offer Curve for the Resource at a value equal to the power balance penalty price for all capacity between 0 MW and the HSL of the Resource.

(b) Notwithstanding item (a) above, for RUC-committed Combined Cycle Generation Resources with a telemetered Resource Status of ONRUC that were instructed by ERCOT to transition to a different configuration to provide additional capacity:

(i) Set the LSL and LDL equal to the minimum of their current value and the COP HSL of the QSE-committed configuration for the RUC hour at the snapshot time of the RUC instruction;

(ii) Set the maximum Ancillary Service capabilities of the Resource equal to the minimum of their current value and COP Ancillary Service capabilities of the QSE-committed configuration for the RUC hour at the snapshot time of the RUC instruction; and

(iii) For the first step of SCED, administratively set the Energy Offer Curve for the Resource at a value equal to the power balance penalty price for the additional capacity of the Resource, defined as the positive difference between the Resource's current telemetered HSL and the COP HSL of the QSE-committed configuration for the RUC hour at the snapshot time of the RUC instruction.

(c) For all other Generation Resources excluding ones with a telemetered status of ONRUC, ONTEST, STARTUP, SHUTDOWN, and also excluding RMR Resources that are On-Line and excluding Generation Resources with a telemetered output less than 95% of LSL:

(i) If the Generation Resource SCED Base Point is not at LDL, set LDL to the greater of Aggregated Resource Output - (60 minutes * Normal Ramp Rate down), or LSL; and

(ii) If the Generation Resource SCED Base Point is not at HDL, set HDL to the lesser of Aggregated Resource Output + (60 minutes * Normal Ramp Rate up), or HSL.

(d) For all On-Line ESRs:

(i) If the ESR SCED Base Point is not at LDL, set LDL to the greater of Aggregated Resource Output - (60 minutes * Normal Ramp Rate down), or LSL; and

(ii) If the ESR SCED Base Point is not at HDL, set HDL to the lesser of Aggregated Resource Output + (60 minutes * Normal Ramp Rate up), or HSL.

(e) For all CLRs excluding ones with a telemetered status of OUTL, ONTEST, or ONHOLD:

(i) If the CLR SCED Base Point is not at LDL, set LDL to the greater of Aggregated Resource Output - (60 minutes * Normal Ramp Rate down), or LSL; and

(ii) If the CLR SCED Base Point is not at HDL, set HDL to the lesser of Aggregated Resource Output + (60 minutes * Normal Ramp Rate up), or HSL.

(f) Add the deployed MW from Load Resources that are not CLRs and that are providing RRS or ECRS to GTBD linearly ramped over the ten-minute ramp period and add the deployed MW from Load Resources that are not CLRs providing Non-Spin to GTBD linearly ramped over the 30-minute ramp period. The amount of deployed MW is calculated from the Resource telemetry and from applicable deployment instructions in Extensible Markup Language (XML) messages. ERCOT shall generate a linear bid curve defined by a price/quantity pair of $300/MWh for the first MW of Load Resources deployed and a price/quantity pair of $700/MWh for the last MW of Load Resources deployed in each SCED execution. After recall instruction, the restoration period length and amount of MW added to GTBD during the restoration period will be determined by validated telemetry and the type of Ancillary Service

deployed from the Resource. The TAC shall review the validity of the prices for the bid curve at least annually.

(g) Add the deployed MW from ERS to GTBD. The amount of deployed MW is determined from the XML messages and ERS contracted capacities for the ERS Time Periods when ERS is deployed. After recall, an approximation of the amount of un-restored ERS shall be used. After ERCOT recalls each group, GTBD shall be adjusted to reflect restoration on a linear curve over the assumed restoration period ("RHours").

The above parameter is defined as follows:

Parameter	Unit	Current Value*
RHours	Hours	4.5

* Changes to the current value of the parameter(s) referenced in this table above may be recommended by TAC and approved by the ERCOT Board. ERCOT shall update parameter values on the first day of the month following ERCOT Board approval unless otherwise directed by the ERCOT Board. ERCOT shall provide a Market Notice prior to implementation of a revised parameter value.

(h) Add the MW from DC Tie imports during an EEA or transmission emergency, to address local transmission system limitations, or due to an emergency action by a neighboring system operator during an emergency that is accommodated by ERCOT to GTBD. The amount of MW is determined from the Dispatch Instruction and should continue over the duration of time specified by the ERCOT Operator.

(i) Add the MW from DC Tie export curtailments during an EEA or transmission emergency, to address local transmission system limitations, or due to an emergency action by a neighboring system operator during an emergency that is accommodated by ERCOT to GTBD. The amount of MW is determined from the Dispatch Instruction and should continue over the duration of time specified by the ERCOT Operator. The MW added to GTBD associated with any individual DC Tie shall not exceed the higher of DC Tie advisory limit for exports on that tie as of 0600 in the Day-Ahead or subsequent advisory export limit minus the aggregate export on the DC Tie that remained scheduled following the Dispatch Instruction from the ERCOT Operator.

(j) Subtract the MW from DC Tie exports to address emergency conditions in the receiving electric grid from GTBD. The amount of MW is determined from the Dispatch Instruction and should continue over the duration of time specified by the receiving grid operator.

(k) Subtract the MW from DC Tie import curtailments to address local transmission system limitations or emergency conditions in the receiving electric grid from GTBD. The amount of MW is determined from the Dispatch Instruction and should continue over the duration of time specified by the receiving grid

operator. The MW subtracted from GTBD associated with any individual DC Tie shall not exceed the higher of DC Tie advisory limit for imports on that tie as of 0600 in the Day-Ahead or subsequent advisory import limit minus the aggregate import on the DC Tie that remained scheduled following the Dispatch Instruction from the ERCOT Operator.

(l) Add the MW from energy delivered to ERCOT through registered BLTs during an EEA to GTBD. The amount of MW is determined from the Dispatch Instruction and should continue over the duration of time specified by the ERCOT Operator.

(m) Subtract the MW from energy delivered from ERCOT to another power pool through registered BLTs during emergency conditions in the receiving electric grid from GTBD. The amount of MW is determined from the Dispatch Instruction and should continue over the duration of time specified by the receiving grid operator.

(n) Add the deployed MWs from TDSP standard offer Load management programs to GTBD, if ERCOT instructs TDSPs to deploy their standard offer Load management programs. The amount of deployed MW is the value ERCOT provided for all TDSP standard offer Load management programs in the most current May Report on Capacity, Demand and Reserves in the ERCOT Region, unless modified as specified in this paragraph. If ERCOT is informed that all or a portion of a TDSP's standard offer Load management program has been fully exhausted, or has been expanded as the result of a Public Utility Commission of Texas (PUCT) proceeding, ERCOT will remove the associated MW value of any exhausted capacity from the amount of deployed MW or, in the case of an expansion, ERCOT will request an updated MW value from the relevant TDSPs to use in place of the May Report on Capacity, Demand and Reserves in the ERCOT Region value for that year. The initial value ERCOT will use for deployed MW under this paragraph for each calendar year, as well as any subsequent changes to this value, will be communicated to Market Participants in a Market Notice. After recall, an approximation of the amount of un-restored TDSP standard offer Load management programs shall be used. GTBD shall be adjusted to reflect restoration on a linear curve over the assumed restoration period ("RHours") defined by item (g) above.

(o) Perform a SCED with changes to the inputs in items (a) through (m) above, considering only Competitive Constraints and the non-mitigated Energy Offer Curves.

(p) Perform mitigation on the submitted Energy Offer Curves using the LMPs from the previous step as the reference LMP.

(q) Perform a SCED with the changes to the inputs in items (a) through (m) above, considering both Competitive and Non-Competitive Constraints and the mitigated Energy Offer Curves.

(r) The Real-Time Reliability Deployment Price Adder for Energy is equal to the positive difference between the System Lambda from item (q) above and the System Lambda of the second step in the two-step SCED process described in paragraph (10)(b) of Section 6.5.7.3, Security Constrained Economic Dispatch, except when ERCOT is directing firm Load shed during EEA Level 3. When ERCOT is directing firm Load shed during EEA Level 3 to either maintain sufficient PRC or stabilize grid frequency, as described in paragraph (3) of Section 6.5.9.4.2, the Real-Time Reliability Deployment Price Adder for Energy is the VOLL used to determine the Ancillary Service Demand Curves (ASDCs) for the Real-Time Market (RTM) minus the System Lambda of the second step in the two-step SCED process described in paragraph (10)(b) of Section 6.5.7.3.

(s) For each individual Ancillary Service, the Real-Time Reliability Deployment Price Adder for Ancillary Service is equal to the positive difference between the MCPC for that Ancillary Service from item (q) above and the MCPC for that Ancillary Service, except when ERCOT is directing firm Load shed during EEA Level 3. When ERCOT is directing firm Load shed during EEA Level 3 to either maintain sufficient PRC or stabilize grid frequency, as described in paragraph (3) of Section 6.5.9.4.2, the Real-Time Reliability Deployment Price Adder for Ancillary Service is the maximum value on the ASDC for the Ancillary Service minus the MCPC for that Ancillary Service.

6.6.5.3 Resources Exempt from Deviation Charges

(1) Resource Base Point Deviation Charges do not apply to the following:

(a) Reliability Must-Run (RMR) Units;

(b) Dynamically Scheduled Resources (DSRs) (except as described in Section 6.4.2.2, Output Schedules for Dynamically Scheduled Resources);

(c) Qualifying Facilities (QFs) that do not submit an Energy Offer Curve for the Settlement Interval;

(d) Quick Start Generation Resources (QSGRs) during the 15-minute Settlement Interval after the start of the first SCED interval in which the QSGR is deployed; or

(e) Settlement Intervals in which Emergency Base Points were issued to the Resource.

[NPRR863, NPRR963, NPRR1000, NPRR1010, NPRR1014, NPRR1046, and NPRR1188: Replace applicable portions of Section 6.6.5.3 above with the following upon system implementation for NPRR863, NPRR963, NPRR1014, or NPRR1188; upon system implementation of NPRR1000 for NPRR1000 and NPRR1046; or upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1010:]

6.6.5.6 Resources Exempt from Deviation Charges

(1) Set Point Deviation Charges do not apply to any QSE for the 15-minute Settlement Interval during the following events:

(a) Responsive Reserve (RRS) was manually deployed by ERCOT;

(b) ERCOT Contingency Reserve Service (ECRS) was deployed; or

(c) ERCOT System Frequency deviation is both greater than +0.05 Hz and less than -0.05 Hz within the same Settlement Interval.

(2) Set Point Deviation Charges do not apply to the QSE for the Resource for the 15-minute Interval for the following:

(a) The deviation of the Resource over the 15-minute Settlement Interval is in a direction that contributes to frequency corrections that resolve an ERCOT System frequency deviation and ERCOT System frequency deviation is greater than +/-0.05 Hz at any time during the 15-minute Settlement Interval;

(b) The Resource is a Reliability Must-Run (RMR) Unit;

(c) Emergency Base Points were issued to the Resource; or

(d) Resource is operating in Constant Frequency Control (CFC) mode.

(3) In addition to the exemptions listed in paragraph (1) and (2) of this Section, Set Point Deviation Charges do not apply to the QSE for a Generation Resource for the 15-minute Settlement Interval for the following:

(a) AASP is less than the Resource's average telemetered LSL;

(b) The Generation Resource is telemetering a status of ONTEST or STARTUP anytime during the Settlement Interval;

(c) Qualifying Facilities (QFs) that do not submit an Energy Offer Curve prior to the end of the Adjustment Period for the Settlement Interval;

(d) Quick Start Generation Resources (QSGRs) during the 15-minute Settlement Interval after the start of the first SCED interval in which the QSGR is deployed; or

(e) The flag signifying that an IRR has received a Base Point below the HDL used by SCED or the IRR has been instructed not to exceed its Base Point is not set in all SCED intervals within the 15-minute Settlement Interval. For IRR Groups, the flag signifying that an IRR has received a Base Point below the HDL used by SCED or the IRR has been instructed not to exceed its Base Point is not set in all SCED intervals within the 15-minute Settlement Interval for any of the IRRs within the IRR Group.

(4) In addition to the exemptions listed in paragraph (1) and (2) of this Section, Set Point Deviation Charges do not apply to the QSE for the Controllable Load Resource for the 15-minute Settlement Interval if the following occur:

(a) The computed Base Point~~UDSP~~ is equal to the snapshot of its telemetered power consumption for all SCED runs during the Settlement Interval; or

(b) The Controllable Load Resource is telemetering a status of OUTL or ONTEST anytime during the Settlement Interval.

(5) In addition to the exemptions listed in paragraph (1) and (2) of this Section, Set Point Deviation Charges do not apply to the QSE for the ESR for the 15-minute Settlement Interval if the following occur:

(a) The ESR is telemetering a status of ONTEST anytime during the Settlement Interval; or

(b) The AASP is less than its average telemetered LSL.

6.6.9.1 Payment for Emergency Power Increase Directed by ERCOT

(1) If the Emergency Base Point issued to a Generation Resource is higher than the SCED Base Point immediately before the Emergency Condition or Watch, then ERCOT shall pay the QSE an additional compensation for the Resource at its Resource Node Settlement Point. The payment for a given 15-minute Settlement Interval is calculated as follows:

$$\mathbf{EMREAMT}_{q,r,p} = \mathbf{(-1)} * \mathbf{EMREPR}_{q,r,p} * \mathbf{EMRE}_{q,r,p}$$

Where:

$$EMREPR_{q,r,p} = Max(0, EBPWAPR_{q,r,p} - RTSPP_{p})$$

$$EBPWAPR_{q,r,p} = \sum_{y}(EBPPR_{q,r,p,y} * EBP_{q,r,p,y} * TLMP_{y}) / \sum_{y}(EBP_{q,r,p,y} * TLMP_{y})$$

$$EMRE_{q,r,p} = Max(0, Min(AEBP_{q,r,p}, RTMG_{q,r,p}) - \tfrac{1}{4} * BP_{q,r,p})$$

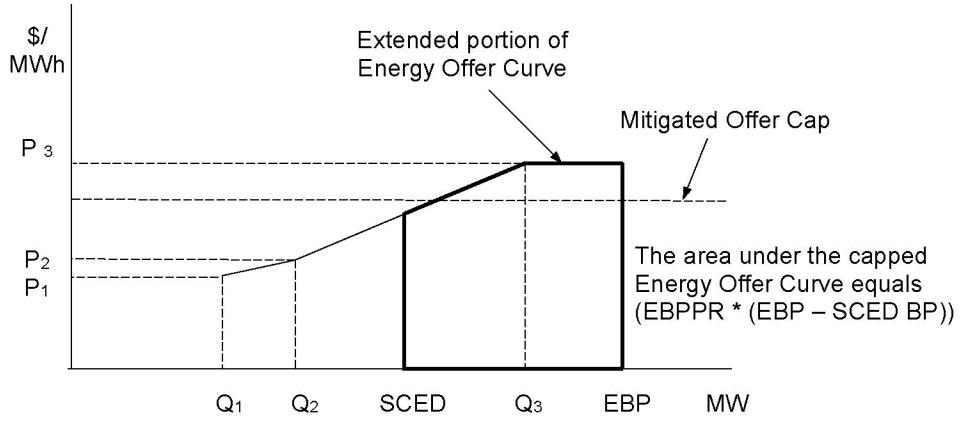
$$AEBP_{q,r,p} = \sum_{y} (EBP_{q,r,p,y} * TLMP_{y} / 3600)$$

The above variables are defined as follows:

Variable	Unit	Definition
$EMREAMT_{q,r,p}$	$	*Emergency Energy Amount per QSE per Settlement Point per Resource*—The payment to QSE *q* as additional compensation for the additional energy produced by Generation Resource *r* at Resource Node *p* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$EMREPR_{q,r,p}$	$/MWh	*Emergency Energy Price per QSE per Settlement Point per Resource*—The compensation rate for the additional energy produced by Generation Resource *r* at Resource Node *p* represented by QSE *q* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$EMRE_{q,r,p}$	MWh	*Emergency Energy per QSE per Settlement Point per Resource*—The additional energy produced by Generation Resource *r* at Resource Node *p* represented by QSE *q* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$EBPWAPR_{q,r,p}$	$/MWh	*Emergency Base Point Weighted Average Price per QSE per Settlement Point per Resource*—The weighted average of the energy prices corresponding with the Emergency Base Points on the Energy Offer Curve for Resource *r* at Resource Node *p* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$BP_{q,r,p}$	MW	*Base Point per QSE per Settlement Point per Resource*—The Base Point of Resource *r* at Resource Node *p* represented by QSE *q* from the SCED prior to the Emergency Condition or Watch. For a Combined Cycle Train, the Resource *r* must be one of the registered Combined Cycle Generation Resources within the Combined Cycle Train.
$AEBP_{q,r,p}$	MWh	*Aggregated Emergency Base Point*—The Generation Resource's aggregated Emergency Base Point, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, AEBP is calculated for the Combined Cycle Train considering all emergency Dispatch Instructions to any Combined Cycle Generation Resources within the Combined Cycle Train.
$EBP_{q,r,p,y}$	MW	*Emergency Base Point per QSE per Settlement Point per Resource by interval*—The Emergency Base Point of Resource *r* at Resource Node *p* represented by QSE *q* for the Emergency Base Point interval or SCED interval *y*. If a Base Point instead of an Emergency Base Point is effective during the interval *y*, its value equals the Base Point. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
$EBPPR_{q,r,p,y}$	$/MWh	*Emergency Base Point Price per QSE per Settlement Point per Resource by interval*—The average incremental energy cost calculated per the Energy Offer Curve, capped by the MOC pursuant to Section 4.4.9.4.1, Mitigated Offer Cap, for the output levels between the SCED Base Point immediately before the Emergency Condition or Watch and the Emergency Base Point of Resource *r* at Resource Node *p* represented by QSE *q* for the Emergency Base Point interval or SCED interval *y*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.

Variable	Unit	Definition
$RTSPP_p$	$/MWh	*Real-Time Settlement Point Price per Settlement Point*—The Real-Time Settlement Point Price at Settlement Point *p*, for the 15-minute Settlement Interval.
$RTMG_{q, r, p}$	MWh	*Real-Time Metered Generation per QSE per Settlement Point per Resource*—The metered generation of Resource *r* at Resource Node *p* represented by QSE *q* in Real-Time for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$TLMP_y$	second	*Duration of Emergency Base Point interval or SCED interval per interval*—The duration of the portion of the Emergency Base Point interval or SCED interval *y* within the 15-minute Settlement Interval.
q	none	A QSE.
p	none	A Resource Node Settlement Point.
r	none	A Generation Resource.
y	none	An Emergency Base Point interval or SCED interval that overlaps the 15-minute Settlement Interval.
3600	none	The number of seconds in one hour.

(2) The extension of the Energy Offer Curve is used to calculate the Emergency Base Point Price. If the Emergency Base Point MW value is greater than the largest MW value on the Energy Offer Curve submitted by the QSE for the Resource, then the Energy Offer Curve is extended to the Emergency Base Point MW value with a $/MWh value that is the MOC (pursuant to Section 4.4.9.4.1) for the highest MW output on the Energy Offer Curve submitted by the QSE for the Resource.



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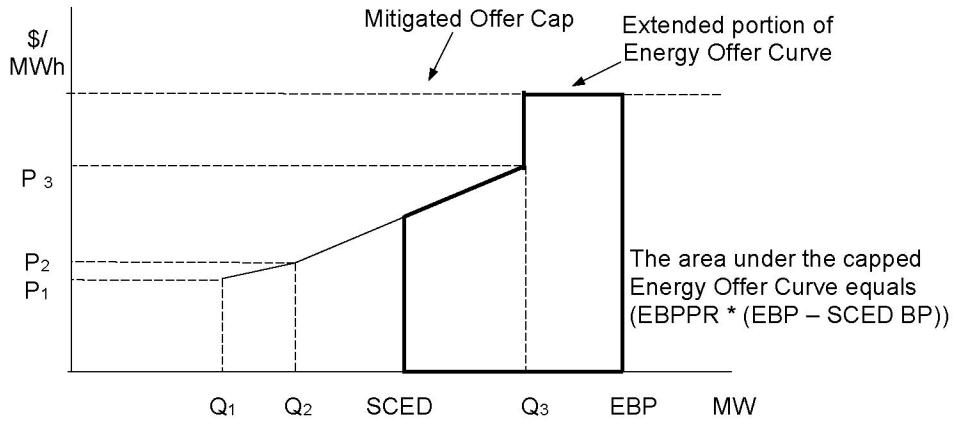

(3) The total additional compensation to each QSE for emergency power increases of Generation Resources for the 15-minute Settlement Interval is calculated as follows:

$$\mathbf{EMREAMTQSETOT}_{q} = \sum_{r}\sum_{p}\mathbf{EMREAMT}_{q,r,p}$$

The above variables are defined as follows:

Variable	Unit	Definition
EMREAMTQSETOT $_q$	$	*Emergency Energy Amount QSE Total per QSE*—The total of the payments to QSE *q* as additional compensation for emergency power increases of the Generation Resources represented by this QSE for the 15-minute Settlement Interval.
EMREAMT $_{q, r, p}$	$	*Emergency Energy Amount per QSE per Settlement Point per Resource*—The payment to QSE *q* as additional compensation for the additional energy produced by Generation Resource *r* at Resource Node *p* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
q	none	A QSE.
p	none	A Resource Node Settlement Point.
r	none	A Generation Resource.

[NPRR1010 and NPRR1014: Replace applicable portions of Section 6.6.9.1 above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project for NPRR1010; or upon system implementation for NPRR1014:]

6.6.9.1 Payment for Emergency Operations Settlement

(1) ERCOT shall pay the QSE additional compensation for the Resource at its Resource Node Settlement Point during the Settlement Intervals that qualify for emergency Settlement as described in Section 6.6.9, Emergency Operations Settlement. The payment for a given 15-minute Settlement Interval is calculated as follows:

$$\mathbf{EMREAMT}_{q,r,p} = (-1) * (\mathbf{EMREPRGEN}_{q,r,p} * \mathbf{EMREGEN}_{q,r,p}) + (\mathbf{EMREPRLOAD}_{q,r,p} * \mathbf{EMRELOAD}_{q,r,p})$$

Where:

If any EBP > 0 then:

$$EMREPRGEN_{q,r,p} = Max(0, EBPWAPRGEN_{q,r,p} - RTSPP_{p})$$

$$EBPWAPRGEN_{q,r,p} = \sum_{y}(EBPPR_{q,r,p,y} * Max(0.001, EBP_{q,r,p,y}) * TLMP_{y}) / \sum_{y}(Max(0.001, EBP_{q,r,p,y}) * TLMP_{y})$$

$$EMREGEN_{q,r,p} = Max(0, Min(AEBPGEN_{q,r,p}, RTMG_{q,r,p}) - \tfrac{1}{4} * Max(0, BP_{q,r,p}))$$

$$AEBPGEN_{q,r,p} = \sum_{y}(Max(0, EBP_{q,r,p,y}) * TLMP_{y} / 3600)$$

If any EBP < 0 then:

$$EMREPRLOAD_{q,r,p} = Max(0, RTSPP_{p} - EBPWAPRLOAD_{q,r,p})$$

$$EBPWAPRLOAD_{q,r,p} = \sum_{y}(EBPPR_{q,r,p,y} * Min(-0.001, EBP_{q,r,p,y}) * TLMP_{y}) / \sum_{y}(Min(-0.001, EBP_{q,r,p,y}) * TLMP_{y})$$

$$EMRELOAD_{q,r,p} = Min(0, Max(AEBPLOAD_{q,r,p}, RTCL_{q,r,p}) - \tfrac{1}{4} * Min(0, BP_{q,r,p}))$$

$$AEBPLOAD_{q,r,p} = \sum_{y}(Min(0, EBP_{q,r,p,y}) * TLMP_{y} / 3600)$$

The above variables are defined as follows:

Variable	Unit	Definition
EMREAMT $_{q, r, p}$	$	*Emergency Energy Amount per QSE per Settlement Point per Resource*—The payment to QSE *q* as additional compensation for the additional energy or Ancillary Services produced or consumed by Resource *r* at Resource Node *p* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
EMREPRGEN $_{q, r, p}$	$/MWh	*Emergency Energy Price for Generation per QSE per Settlement Point per Resource*—The compensation rate for the generation produced by Resource *r* at Resource Node *p* represented by QSE *q* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
EMREPRLOAD $_{q, r, p}$	$/MWh	*Emergency Energy Price for Charging Load per QSE per Settlement Point per Resource*—The compensation rate for the charging load for Resource *r* at Resource Node *p* represented by QSE *q* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement Interval. ~~Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.~~
EMREGEN $_{q, r, p}$	MWh	*Emergency Energy for Generation per QSE per Settlement Point per Resource*—The generation produced by Resource *r* at Resource Node *p* represented by QSE *q* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
EMRELOAD $_{q, r, p}$	MWh	*Emergency Energy for Charging Load per QSE per Settlement Point per Resource*—The charging load for Resource *r* at Resource Node *p* represented by QSE *q* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement Interval. ~~Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.~~
EBPWAPRGEN $_{q, r, p}$	$/MWh	*Emergency Base Point Weighted Average Price for Generation per QSE per Settlement Point per Resource*—The weighted average of the Emergency Base Point Prices corresponding with the positive Emergency Base Points, for Resource *r* at Resource Node *p* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
EBPWAPRLOAD $_{q, r, p}$	$/MWh	*Emergency Base Point Weighted Average Price for Charging Load per QSE per Settlement Point per Resource*—The weighted average of the Emergency Base Point Prices corresponding with the negative Emergency Base Points, for Resource *r* at Resource Node *p* represented by QSE *q*, for the 15-minute Settlement Interval. ~~Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.~~
BP $_{q, r, p}$	MW	*Base Point per QSE per Settlement Point per Resource*—The Base Point of Resource *r* at Resource Node *p* represented by QSE *q* from the SCED prior to the Emergency Condition or Watch. For a Combined Cycle Train, the Resource *r* must be one of the registered Combined Cycle Generation Resources within the Combined Cycle Train.
AEBPGEN $_{q, r, p}$	MWh	*Aggregated Emergency Base Point for Generation*—The aggregation of the positive Emergency Base Points for the Resource *r* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, AEBP is calculated for the Combined Cycle Train considering all emergency Dispatch Instructions to any Combined Cycle Generation Resources within the Combined Cycle Train.

AEBPLOAD $_{q, r, p}$	MWh	*Aggregated Emergency Base Point for Charging Load*—The aggregation of the negative Emergency Base Points for the Resource *r* represented by QSE *q*, for the 15-minute Settlement Interval.
EBP $_{q, r, p, y}$	MW	*Emergency Base Point per QSE per Settlement Point per Resource by interval*—The Emergency Base Point of Resource *r* at Resource Node *p* represented by QSE *q* for the Emergency Base Point interval or SCED interval *y*. If a Base Point instead of an Emergency Base Point is effective during the interval *y*, its value equals the Base Point. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
EBPPR $_{q, r, p, y}$	$/MWh	*Emergency Base Point Price per QSE per Settlement Point per Resource by interval*—The ~~average incremental energy cost calculated per~~price on the Energy Offer Curve or Energy Bid/Offer Curve corresponding to the Emergency Base Point for Resource *r* at Resource Node *p* represented by QSE *q* for the Emergency Base Point interval or SCED interval *y*. The Energy Offer Curve shall be capped by the MOC pursuant to Section 4.4.9.4.1, Mitigated Offer Cap and the Energy Bid/Offer Curve shall be capped by the maximum RTSPP at the Settlement Point for the Operating Day, per paragraph (10)(b) of Section 6.6.9. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
RTSPP $_{p}$	$/MWh	*Real-Time Settlement Point Price per Settlement Point*—The Real-Time Settlement Point Price at Settlement Point *p*, for the 15-minute Settlement Interval.
RTMG $_{q, r, p}$	MWh	*Real-Time Metered Generation per QSE per Settlement Point per Resource*—The metered generation of Resource *r* at Resource Node *p* represented by QSE *q* in Real-Time for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTCL $_{q, r, p}$	MWh	*Real-Time Charging Load per QSE per Resource per Settlement Point* —The charging load for Resource *r* at Resource Node *p* represented by the QSE *q*, represented as a negative value, for the 15-minute Settlement Interval.
TLMP $_{y}$	second	*Duration of Emergency Base Point interval or SCED interval per interval*—The duration of the portion of the Emergency Base Point interval or SCED interval *y* within the 15-minute Settlement Interval.
q	none	A QSE.
p	none	A Resource Node Settlement Point.
r	none	A Generation Resource or ESR.
y	none	An Emergency Base Point interval or SCED interval that overlaps the 15-minute Settlement Interval.
3600	none	The number of seconds in one hour.

(2) ERCOT shall pay the QSE additional compensation for the Resource at its Resource Node Settlement Point during the Settlement Intervals that qualify for emergency Settlement as described in Section 6.6.9, Emergency Operations Settlement. The payment for a given 15-minute Settlement Interval is calculated as follows:

EMREAMT $_{q, r, p}$ = **Min (0, RTENET** $_{q, r, p}$ **+ RTASNET** $_{q, r, p}$**)**

(a) Where the Real-Time Energy Net Revenue is calculated as follows:

$RTENET_{q,r,p}$ = $RTEREV_{q,r,p}$ - $RTEREVT_{q,r,p}$

Where:

$RTEREV_{q,r,p}$ = $RTSPP_{q,r,p}$ * ($EMREGEN_{q,r,p}$ + $EMRELOAD_{q,r,p}$)

$RTEREVT_{q,r,p}$ = $EBPWAPRGEN_{q,r,p}$ * $EMREGEN_{q,r,p}$ +

$EBPWAPRLOAD_{q,r,p}$ * $EMRELOAD_{q,r,p}$

If any EBP > 0 then:

$EBPWAPRGEN_{q,r,p}$ = $\sum_y$ ($EBPPR_{q,r,p,y}$ * Max (0.001, $EBP_{q,r,p,y}$)* $TLMP_y$) /

$\sum_y$ (Max (0.001, $EBP_{q,r,p,y}$) * $TLMP_y$)

$EMREGEN_{q,r,p}$ = Max (0, Min ($AEBPGEN_{q,r,p}$, $RTMG_{q,r,p}$))

$AEBPGEN_{q,r,p}$ = $\sum_y$ (Max (0, $EBP_{q,r,p,y}$) * $TLMP_y$ / 3600)

If any EBP < 0 then:

$EBPWAPRLOAD_{q,r,p}$ = $\sum_y$ ($EBPPR_{q,r,p,y}$ * Min (-0.001, $EBP_{q,r,p,y}$) * $TLMP_y$) /

$\sum_y$ (Min (-0.001, $EBP_{q,r,p,y}$) * $TLMP_y$)

$EMRELOAD_{q,r,p}$ = Min (0, Max ($AEBPLOAD_{q,r,p}$, $RTCL_{q,r,p}$))

$AEBPLOAD_{q,r,p}$ = $\sum_y$ (Min (0, $EBP_{q,r,p,y}$) * $TLMP_y$ / 3600)

(b) Where the Real-Time Ancillary Services Net Revenue is calculated as follows:

$RTASNET_{q,r}$ = $RTRUNET_{q,r}$ + $RTRDNET_{q,r}$ + $RTNSNET_{q,r}$ + $RTRRNET_{q,r}$ + $RTECRNET_{q,r}$

Where for Reg-Up:

$RTRUNET_{q,r}$ = $RTRUREV_{q,r}$ - (¼)* $RTRUREVT_{q,r,p}$

$RTRUREVT_{q,r,p}$ = $RTRUWAPR_{q,r,p}$ * $RTRUAWD_{q,r}$

$$RTRUWAPR_{q,r,p} = \sum_{y} (RTRUOPR_{q,r,p,y} * \text{Max}(0.001, RTRUAWDS_{q,r,p,y}) * TLMP_{y}) / \sum_{y} (\text{Max}(0.001, RTRUAWDS_{q,r,p,y}) * TLMP_{y})$$

Where for Reg-Down:

$$RTRDNET_{q,r} = RTRDREV_{q,r} - (¼) * RTRDREVT_{q,r,p}$$

$$RTRDREVT_{q,r,p} = RTRDWAPR_{q,r,p} * RTRDAWD_{q,r}$$

$$RTRDWAPR_{q,r,p} = \sum_{y} (RTRDOPR_{q,r,p,y} * \text{Max}(0.001, RTRDAWDS_{q,r,p,y}) * TLMP_{y}) / \sum_{y} (\text{Max}(0.001, RTRDAWDS_{q,r,p,y}) * TLMP_{y})$$

Where for RRS:

$$RTRRNET_{q,r} = RTRREV_{q,r} - (¼) * RTRREVT_{q,r,p}$$

$$RTRREVT_{q,r,p} = RTRRWAPR_{q,r,p} * RTRRAWD_{q,r}$$

$$RTRRWAPR_{q,r,p} = \sum_{y} (RTRROPR_{q,r,p,y} * \text{Max}(0.001, RTRRAWDS_{q,r,p,y}) * TLMP_{y}) / \sum_{y} (\text{Max}(0.001, RTRRAWDS_{q,r,p,y}) * TLMP_{y})$$

Where for Non-Spin:

$$RTNSNET_{q,r} = RTNSREV_{q,r} - (¼) * RTNSREVT_{q,r,p}$$

$$RTNSREVT_{q,r,p} = RTNSWAPR_{q,r,p} * RTNSAWD_{q,r}$$

$$RTNSWAPR_{q,r,p} = \sum_{y} (RTNSOPR_{q,r,p,y} * \text{Max}(0.001, RTNSAWDS_{q,r,p,y}) * TLMP_{y}) / \sum_{y} (\text{Max}(0.001, RTNSAWDS_{q,r,p,y}) * TLMP_{y})$$

Where for ERCOT Contingency Reserve (ECRS):

$$RTECRNET_{q,r} = RTECRREV_{q,r} - (¼) * RTECRREVT_{q,r,p}$$

$$RTECRREVT_{q,r,p} = RTECRWAPR_{q,r,p} * RTECRAWD_{q,r}$$

$$RTECRWAPR_{q,r,p} = \sum_{y} (RTECROPR_{q,r,\sout{p,}y} * Max(0.001, RTECRAWDS_{q,r,\sout{p,}y}) * TLMP_{y}) / \sum_{y} (Max(0.001, RTECRAWDS_{q,r,\sout{p,}y}) * TLMP_{y})$$

The above variables are defined as follows:

Variable	Unit	Definition
$EMREAMT_{q,r,p}$	$	*Emergency Energy Amount per QSE per Settlement Point per Resource*—The payment to QSE *q* as additional compensation for the additional energy or Ancillary Services produced or consumed by Resource *r* at Resource Node *p* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$RTENET_{q,r,p}$	$	*Real-Time Energy Net Revenue*– The net difference between the Real-Time Energy Revenue and the Real-Time Energy Revenue Target for QSE *q* for Resource *r* at Resource node *p* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$RTASNET_{q,r,}$	$	*Real-Time Ancillary Service Net Revenue* – The sum of the Ancillary Service net revenues for QSE *q* for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$RTEREV_{q,r,p}$	$	*Real-Time Energy Revenue*— The calculated Real-Time energy revenue at the RTSPP for QSE *q* calculated for Resource *r* at Resource node *p* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$EMREGEN_{q,r,p}$	MWh	*Emergency Energy for Generation per QSE per Settlement Point per Resource*—The generation produced by Resource *r* at Resource Node *p* represented by QSE *q* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$EMRELOAD_{q,r,p}$	MWh	*Emergency Energy for Charging Load per QSE per Settlement Point per Resource*—The charging load for Resource *r* at Resource Node *p* represented by QSE *q* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement Interval. ~~Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.~~
$RTEREVT_{q,r,p}$	$	*Real-Time Energy Revenue Target* – The energy revenue target at the EBPWAPRGEN and EBPWAPRLOAD of the Resource *r* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$EBPWAPRGEN_{q,r,p}$	$/MWh	*Emergency Base Point Weighted Average Price for Generation per QSE per Settlement Point per Resource*—The weighted average of the Emergency Base Point Prices corresponding with the positive Emergency Base Points for Resource *r* at Resource Node *p* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
$EBPWAPRLOAD_{q,r,p}$	$/MWh	*Emergency Base Point Weighted Average Price for Charging Load per QSE per Settlement Point per Resource*—The weighted average of the Emergency Base Point Prices corresponding with the negative Emergency Base Points, for Resource *r* at Resource Node *p* represented by QSE *q*, for the 15-minute Settlement Interval. ~~Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.~~

AEBPGEN $_{q, r, p}$	MWh	*Aggregated Emergency Base Point for Generation*—The aggregation of the positive Emergency Base Points for the Resource *r* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, AEBP is calculated for the Combined Cycle Train considering all emergency Dispatch Instructions to any Combined Cycle Generation Resources within the Combined Cycle Train.
AEBPLOAD $_{q, r, p}$	MWh	*Aggregated Emergency Base Point for Charging Load*—The aggregation of the negative Emergency Base Points for the Resource *r* represented by QSE *q*, for the 15-minute Settlement Interval.
EBP $_{q, r, p, y}$	MW	*Emergency Base Point per QSE per Settlement Point per Resource by interval*—The Emergency Base Point of Resource *r* at Resource Node *p* represented by QSE *q* for the Emergency Base Point interval or SCED interval *y*. If a Base Point instead of an Emergency Base Point is effective during the interval *y*, its value equals the Base Point. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
EBPPR $_{q, r, p, y}$	$/MWh	*Emergency Base Point Price per QSE per Settlement Point per Resource by interval*—The ~~average incremental energy cost calculated per~~price on the Energy Offer Curve or Energy Bid/Offer Curve corresponding to the Emergency Base Point for Resource *r* at Resource Node *p* represented by QSE *q* for the Emergency Base Point interval or SCED interval *y*. The Energy Offer Curve shall be capped by the MOC pursuant to Section 4.4.9.4.1, Mitigated Offer Cap, and the Energy Bid/Offer Curve shall be capped by the maximum RTSPP at the Settlement Point for the Operating Day, per paragraph (10)(b) of Section 6.6.9. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
RTSPP $_{p}$	$/MWh	*Real-Time Settlement Point Price per Settlement Point*—The Real-Time Settlement Point Price at Settlement Point *p*, for the 15-minute Settlement Interval.
RTMG $_{q, r, p}$	MWh	*Real-Time Metered Generation per QSE per Settlement Point per Resource*—The metered generation of Resource *r* at Resource Node *p* represented by QSE *q* in Real-Time for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTCL $_{q, r, p}$	MWh	*Real-Time Charging Load per QSE per Resource per Settlement Point* —The charging load for Resource *r* at Resource Node *p* represented by the QSE *q*, represented as a negative value, for the 15-minute Settlement Interval.
RTRUNET $_{q, r}$	$	*Real-Time Reg-Up Net Revenue*– The difference between the Real-Time Reg-Up Revenue and the Real-Time Reg-Up Revenue Target for QSE *q* for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRDNET $_{q, r}$	$	*Real-Time Reg-Down Net Revenue* – The difference between calculated revenue for the Real-Time Reg-Down Revenue and the Real-Time Reg-Down Revenue Target for QSE *q* for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRRNET $_{q, r}$	$	*Real-Time Responsive Reserve Net Revenue* – The difference between Real-Time RRS Revenue and the Real-Time RRS Revenue Target for QSE *q* for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.

RTNSNET $_{q, r}$	$	*Real-Time Non-Spin Net Revenue* – The difference between Real-Time Non-Spin Revenue and the Real-Time Non-Spin Revenue Target for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTECRNET $_{q, r}$	$	*Real-Time ERCOT Contingency Reserve Service Net Revenue* – The difference between Real-Time ECRS Revenue and the Real-Time ECRS Revenue Target for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRUREV $_{q, r}$	$	*Real-Time Reg-Up Revenue*— The calculated Real-Time Reg-Up revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRDREV $_{q, r}$	$	*Real-Time Reg-Down Revenue*— The calculated Real-Time Reg-Down revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRRREV $_{q, r}$	$	*Real-Time Responsive Reserve Revenue*— The calculated Real-Time RRS revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTNSREV $_{q, r}$	$	*Real-Time Non-Spin Revenue*— The calculated Real-Time Non-Spin revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTECRREV $_{q, r}$	$	*Real-Time ERCOT Contingency Reserve Service Revenue*— The calculated Real-Time ECRS revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRUREVT $_{q, r, p}$	$	*Real-Time Reg-Up Revenue Target* – The revenue target of the Reg-Up award to Resource *r* at Resource Node *p* represented by QSE *q* based on the Ancillary Service Offer for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRDREVT $_{q, r, p}$	$	*Real-Time Reg-Down Revenue Target* – The revenue target of the Reg-Down award to Resource *r* at Resource Node *p* represented by QSE *q* based on the Ancillary Service Offer for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRRREVT $_{q, r, p}$	$	*Real-Time Responsive Reserve Revenue Target* – The revenue target of the RRS award to Resource *r* at Resource Node *p* represented by QSE *q* based on the Ancillary Service Offer for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTNSREVT $_{q, r, p}$	$	*Real-Time Non-Spin Revenue Target* – The revenue target of the Non-Spin award to Resource *r* at Resource Node *p* represented by QSE *q* based on the Ancillary Service Offer for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTECRREVT $_{q, r, p}$	$	*Real-Time ERCOT Contingency Reserve Service Revenue Target* – The revenue target of the ECRS award to Resource *r* at Resource Node *p* represented by QSE *q* based on the Ancillary Service Offer for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.

RTRUWAPR $_{q, r, p}$	$/MW	*Real-Time Reg-Up Weighted-Average Price* – The weighted average of the Ancillary Service Offer prices corresponding with the Reg-Up awards on the Ancillary Service Offer curves for Resource *r* at Resource Node *p* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRDWAPR $_{q, r, p}$	$/MW	*Real-Time Reg-Down Weighted-Average Price* – The weighted average of the Ancillary Service Offer prices corresponding with the Reg-Down awards on the Ancillary Service Offer curves for Resource *r* at Resource Node *p* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRRWAPR $_{q, r, p}$	$/MW	*Real-Time Responsive Reserve Weighted-Average Price* – The weighted average of the Ancillary Service Offer prices corresponding with the RRS awards on the Ancillary Service Offer curves for Resource *r* at Resource Node *p* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTNSWAPR $_{q, r, p}$	$/MW	*Real-Time Non-Spin Weighted-Average Price* – The weighted average of the Ancillary Service Offer prices corresponding with the Non-Spin awards on the Ancillary Service Offer curves for Resource *r* at Resource Node *p* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTECRWAPR $_{q, r, p}$	$/MW	*Real-Time ERCOT Contingency Reserve Service Weighted-Average Price* – The weighted average of the Ancillary Service Offer prices corresponding with the ECRS awards on the Ancillary Service Offer curves for Resource *r* at Resource Node *p* represented by QSE *q*, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRUAWD $_{q, r}$	MW	*Real-Time Reg-Up Award per Resource per QSE*— The Reg-Up amount awarded to QSE *q* for Resource *r* in Real-Time for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRDAWD $_{q, r}$	MW	*Real-Time Reg-Down Award per Resource per QSE*— The Reg-Down amount awarded to QSE *q* for Resource *r* in Real-Time for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRRAWD $_{q, r}$	MW	*Real-Time Responsive Reserve Award per Resource per QSE*— The RRS amount awarded to QSE *q* for Resource *r* in Real-Time for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTNSAWD $_{q, r}$	MW	*Real-Time Non-Spin Award per Resource per QSE*— The Non-Spin amount awarded to QSE *q* for Resource *r* in Real-Time for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTECRAWD $_{q, r}$	MW	*Real-Time ERCOT Contingency Reserve Service Award per Resource per QSE*— The ECRS amount awarded to QSE *q* for Resource *r* in Real-Time for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRUOPR $_{q, r, ~~p,~~ y}$	$/MW	*Real-Time Reg-Up Offer Price* – The price on the Ancillary Service Offer curve at the Reg-Up award of Resource *r* ~~at Resource Node *p*~~ represented by QSE *q* for the SCED interval *y*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.

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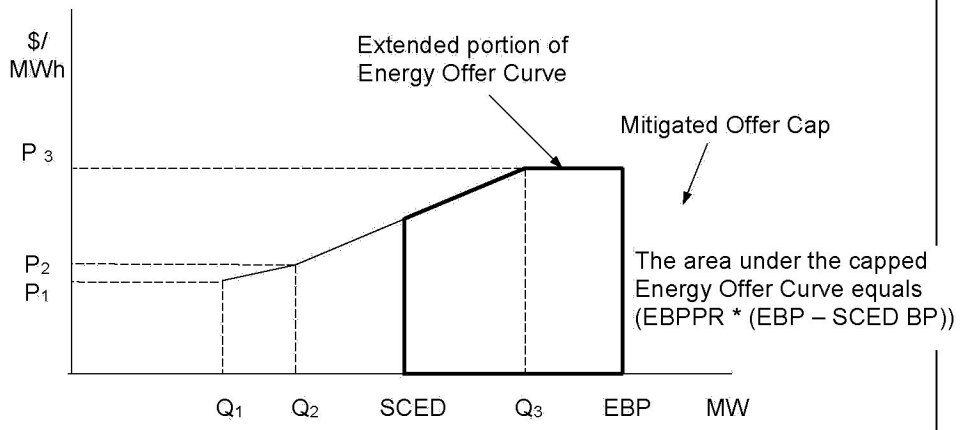
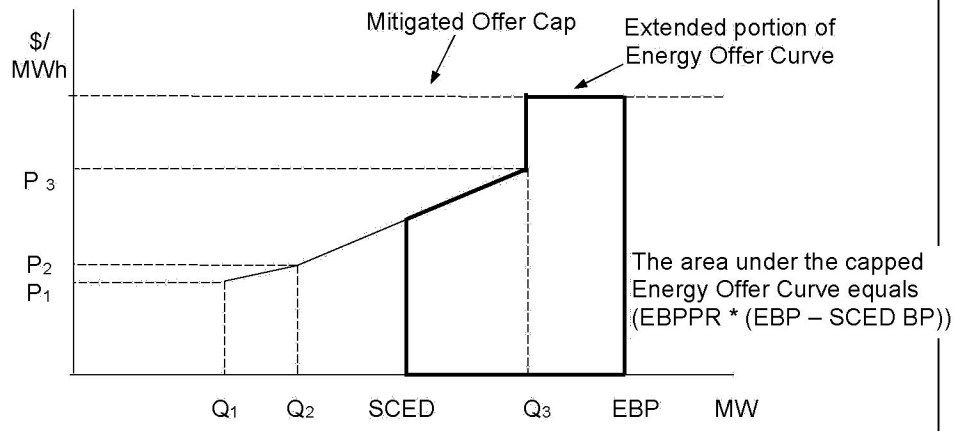
RTRDOPR $_{q, r, \sout{p,} y}$	$/MW	*Real-Time Reg-Down Offer Price* – The price on the Ancillary Service Offer curve at the Reg-Down award of Resource *r* ~~at Resource Node *p*~~ represented by QSE *q* for the SCED interval *y*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
RTRROPR $_{q, r, \sout{p,} y}$	$/MW	*Real-Time Responsive Reserve Offer Price* – The price on the Ancillary Service Offer curve at the RRS award of Resource *r* ~~at Resource Node *p*~~ represented by QSE *q* for the SCED interval *y*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
RTNSOPR $_{q, r, \sout{p,} y}$	$/MW	*Real-Time Non-Spin Offer Price* – The price on the Ancillary Service Offer curve at the Non-Spin award of Resource *r* ~~at Resource Node *p*~~ represented by QSE *q* for the SCED interval *y*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
RTECROPR $_{q, r, \sout{p,} y}$	$/MW	*Real-Time ERCOT Contingency Reserve Service Offer Price* – The price on the Ancillary Service Offer curve at the ECRS award of Resource *r* ~~at Resource Node *p*~~ represented by QSE *q* for the SCED interval *y*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
RTRUAWDS $_{q, r, \sout{p,} y}$	MW	*Real-Time Reg-Up Award per Resource per QSE per SCED interval* - The Reg-Up amount awarded to QSE *q* for Resource *r* in Real-Time for the SCED interval *y*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
RTRDAWDS $_{q, r, \sout{p,} y}$	MW	*Real-Time Reg-Down Award per Resource per QSE per SCED interval* - The Reg-Down amount awarded to QSE *q* for Resource *r* in Real-Time for the SCED interval *y*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
RTRRAWDS $_{q, r, \sout{p,} y}$	MW	*Real-Time Responsive Reserve Award per Resource per QSE per SCED interval* - The RRS amount awarded to QSE *q* for Resource *r* in Real-Time for the SCED interval *y*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
RTNSAWDS $_{q, r, \sout{p,} y}$	MW	*Real-Time Non-Spin Award per Resource per QSE per SCED interval* - The Non-Spin amount awarded to QSE *q* for Resource *r* in Real-Time for the SCED interval *y*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
RTECRAWDS $_{q, r, \sout{p,} y}$	MW	*Real-Time ERCOT Contingency Reserve Service Award per Resource per QSE per SCED interval* - The ECRS amount awarded to QSE *q* for Resource *r* in Real-Time for the SCED interval *y*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
TLMP $_{y}$	second	*Duration of Emergency Base Point interval or SCED interval per interval*— The duration of the portion of the Emergency Base Point interval or SCED interval *y* within the 15-minute Settlement Interval.
q	none	A QSE.
p	none	A Resource Node Settlement Point.
r	none	A Generation Resource or ESR.
y	none	An Emergency Base Point interval or SCED interval that overlaps the 15-minute Settlement Interval.
3600	none	The number of seconds in one hour.

(3) The extension of the Energy Offer Curve or Energy Bid/Offer Curve and Mitigated Offer Cap (MOC) is used to calculate the Emergency Base Point Price (EBPPR). If the Emergency Base Point MW value is greater than the largest MW value on the Energy Offer Curve or Energy Bid/Offer Curve submitted by the QSE for the Resource, or the Resource's MOC, then the Energy Offer Curve, ~~or~~ Energy Bid/Offer Curve, or MOC is extended to the Emergency Base Point MW value with a $/MWh value that is equal to the highest $/MWh value on the applicable curve. ~~MOC (pursuant to Section 4.4.9.4.1) for the highest MW output on the Energy Offer Curve or Energy Bid/Offer Curve submitted by the QSE for the Resource.~~ If the Emergency Base Point MW value is lower than the lowest MW value on the Energy Offer Curve or Energy Bid/Offer Curve submitted by the QSE for the Resource, or the Resource's MOC, then the Energy Offer Curve, Energy Bid/Offer Curve or MOC is extended to the Emergency Base Point MW value with a $/MWh value that is equal to the lowest $/MWh value on the applicable curve.





(4) The total additional compensation to each QSE for emergency Settlement of Resources for the 15-minute Settlement Interval is calculated as follows:

$$\mathbf{EMREAMTQSETOT}_{q} = \sum_{r}\sum_{p}\mathbf{EMREAMT}_{q,r,p}$$

The above variables are defined as follows:

Variable	Unit	Definition
EMREAMTQSETOT $_q$	$	*Emergency Energy Amount QSE Total per QSE*—The total of the payments to QSE *q* as additional compensation for additional energy or Ancillary Services of the Resources represented by this QSE for the 15-minute Settlement Interval.
EMREAMT $_{q, r, p}$	$	*Emergency Energy Amount per QSE per Settlement Point per Resource*—The payment to QSE *q* as additional compensation for the additional energy or Ancillary Services produced or consumed by Resource *r* at Resource Node *p* in Real-Time during the Emergency Condition or Watch, for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
q	none	A QSE.
p	none	A Resource Node Settlement Point.
r	none	A Generation Resource or ESR.

6.7.4 Adjustments to Cost Allocations for Ancillary Services Procurement

(1) Each QSE for which ERCOT purchases Ancillary Service capacity in the DAM, a SASM, or an RSASM, is charged for the QSE's share of the net costs incurred for each service. For each QSE, its share of the DAM costs has been calculated in Section 4.6.4, Settlement of Ancillary Services Procured in the DAM; its share of the net total costs incurred in the DAM, a SASM, or an RSASM less its DAM charge is calculated in this section.

(2) For Reg-Up, if applicable:

(a) The net total costs for Reg-Up for a given Operating Hour is calculated as follows:

$$\mathbf{RUCOSTTOT} = \mathbf{(-1) * (\sum_{m} (RTPCRUAMTTOT_{m}) + PCRUAMTTOT + RUFQAMTTOT + RUINFQAMTTOT)}$$

Where:

Total payment of SASM- and RSASM-procured capacity for Reg-Up by market

$$RTPCRUAMTTOT_{m} = \sum_{q} RTPCRUAMT_{q,m}$$

Total payment of DAM-procured capacity for Reg-Up

$$PCRUAMTTOT = \sum_{q} PCRUAMT_{q}$$

Total charge of failure on Ancillary Service Supply Responsibility for Reg-Up

$$RUFQAMTTOT = \sum_{q} RUFQAMTQSETOT_{q}$$

Total payment of SASM- and RSASM-procured capacity for Reg-Up by QSE

$$RTPCRUAMTQSETOT_{q} = \sum_{m} RTPCRUAMT_{q,m}$$

Total charge of infeasible Ancillary Service Supply Responsibility for Reg-Up

$$RUINFQAMTTOT = \sum_{q} RUINFQAMT_{q}$$

The above variables are defined as follows:

Variable	Unit	Description
RUCOSTTOT	$	*Reg-Up Cost Total*—The net total costs for Reg-Up for the hour.
$RTPCRUAMTTOT_{m}$	$	*Procured Capacity for Reg-Up Amount Total by market*—The total payments to all QSEs for the Ancillary Service Offers cleared in the market *m* for Reg-Up, for the hour.
$RTPCRUAMT_{q,m}$	$	*Procured Capacity for Reg-Up Amount per QSE by market*—The payment to QSE *q* for its Ancillary Service Offers cleared in the market *m* for Reg-Up, for the hour.

RUFQAMTTOT	$	*Reg-Up Failure Quantity Amount Total*—The total charges to all QSEs for their capacity associated with failures and reconfiguration reductions on their Ancillary Service Supply Responsibilities for Reg-Up, for the hour.
RUFQAMTQSETOT $_q$	$	*Reg-Up Failure Quantity Amount Total per QSE*—The charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for Reg-Up, for the hour.
RTPCRUAMTQSETOT $_q$	$	*Procured Capacity for Reg-Up Amount Total per QSE*—The total payments to a QSE *q* in all SASMs and RSASMs for the Ancillary Service Offers cleared for Reg-Up, for the hour.
PCRUAMT $_q$	$	*Procured Capacity for Reg-Up Amount per QSE in DAM*—The DAM Reg-Up payment for QSE *q*, for the hour.
RUINFQAMTTOT	$	*Reg-Up Infeasible Quantity Amount Total* — The charge to all QSEs for their total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for Reg-Up, for the hour.
RUINFQAMT $_q$	$	*Reg-Up Infeasible Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for Reg-Up, for the hour.
PCRUAMTTOT	$	*Procured Capacity for Reg-Up Amount Total in DAM*—The total of the DAM Reg-Up payments for all QSEs, for the hour.
q	none	A QSE.
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

[NPRR841: Replace paragraph (a) above with the following upon system implementation:]

(a) The net total costs for Reg-Up for a given Operating Hour is calculated as follows:

$$\mathbf{RUCOSTTOT} = \mathbf{(-1) * (\sum_m (RTPCRUAMTTOT_m) + PCRUAMTTOT + RUFQAMTTOT + RUINFQAMTTOT + RUMWINFATOT)}$$

Where:

Total payment of SASM- and RSASM-procured capacity for Reg-Up by market

$$RTPCRUAMTTOT_m = \sum_q RTPCRUAMT_{q,m}$$

Total payment of DAM-procured capacity for Reg-Up

$$PCRUAMTTOT = \sum_q PCRUAMT_q$$

Total charge of failure on Ancillary Service Supply Responsibility for Reg-Up

$$RUFQAMTTOT = \sum_q RUFQAMTQSETOT_q$$

Total payment of SASM- and RSASM-procured capacity for Reg-Up by QSE

$$RTPCRUAMTQSETOT_q = \sum_m RTPCRUAMT_{q,m}$$

Total charge of infeasible Ancillary Service Supply Responsibility for Reg-Up

$$RUINFQAMTTOT = \sum_q RUINFQAMT_q$$

Total Real-Time DAM Make-Whole Payment for Reg-Up

$$RUMWINFATOT = \sum_q RUMWINFA_{q,h}$$

The above variables are defined as follows:

Variable	Unit	Description
RUCOSTTOT	$	*Reg-Up Cost Total*—The net total costs for Reg-Up for the hour.
$RTPCRUAMTTOT_m$	$	*Procured Capacity for Reg-Up Amount Total by market*—The total payments to all QSEs for the Ancillary Service Offers cleared in the market *m* for Reg-Up, for the hour.
RUMWINFATOT	$	*Reg-Up Make-Whole Infeasible Amount total*— The total Real-Time calculated payment to all QSEs, for their contribution of Reg-Up, to make-whole the Startup and energy costs of all Resources committed in the DAM, for the hour.
$RUMWINFA_{q,h}$	$	*Reg-Up Make-Whole Infeasible Amount per QSE per hour*— The total Real-Time calculated payment to QSE *q*, for its contribution of Reg-Up, to make-whole the Startup and energy costs of all Resources committed in the DAM, for the hour *h*.
$RTPCRUAMT_{q,m}$	$	*Procured Capacity for Reg-Up Amount per QSE by market*—The payment to QSE *q* for its Ancillary Service Offers cleared in the market *m* for Reg-Up, for the hour.
RUFQAMTTOT	$	*Reg-Up Failure Quantity Amount Total*—The total charges to all QSEs for their capacity associated with failures and reconfiguration reductions on their Ancillary Service Supply Responsibilities for Reg-Up, for the hour.
$RUFQAMTQSETOT_q$	$	*Reg-Up Failure Quantity Amount Total per QSE*—The charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for Reg-Up, for the hour.
$RTPCRUAMTQSETOT_q$	$	*Procured Capacity for Reg-Up Amount Total per QSE*—The total payments to a QSE *q* in all SASMs and RSASMs for the Ancillary Service Offers cleared for Reg-Up, for the hour.
$PCRUAMT_q$	$	*Procured Capacity for Reg-Up Amount per QSE in DAM*—The DAM Reg-Up payment for QSE *q*, for the hour.
RUINFQAMTTOT	$	*Reg-Up Infeasible Quantity Amount Total* — The charge to all QSEs for their total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for Reg-Up, for the hour.
$RUINFQAMT_q$	$	*Reg-Up Infeasible Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for Reg-Up, for the hour.
PCRUAMTTOT	$	*Procured Capacity for Reg-Up Amount Total in DAM*—The total of the DAM Reg-Up payments for all QSEs, for the hour.

q	none	A QSE.
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

(b) Each QSE's share of the net total costs for Reg-Up for the Operating Hour is calculated as follows:

$$\mathbf{RUCOST}_q = \mathbf{RUPR} * \mathbf{RUQ}_q$$

Where:

$$RUPR = RUCOSTTOT / RUQTOT$$

$$RUQTOT = \sum_q RUQ_q$$

$$RUQ_q = RUO_q - SARUQ_q$$

$$RUO_q = \sum_q (SARUQ_q + \sum_m (RTPCRU_{q,m}) + PCRU_q - RUFQ_q - RRUFQ_q) * HLRS_q$$

$$SARUQ_q = DASARUQ_q + RTSARUQ_q$$

The above variables are defined as follows:

Variable	Unit	Description
$RUCOST_q$	$	*Reg-Up Cost per QSE*—QSE *q*'s share of the net total costs for Reg-Up, for the hour.
RUPR	$/MW per hour	*Reg-Up Price*—The price for Reg-Up calculated based on the net total costs for Reg-Up, for the hour.
RUCOSTTOT	$	*Reg-Up Cost Total*—The net total costs for Reg-Up, for the hour. See item (2)(a) above.
RUQTOT	MW	*Reg-Up Quantity Total*—The sum of every QSE's Ancillary Service Obligation minus its self-arranged Reg-Up quantity in the DAM and any and all SASMs, for the hour.
RUQ_q	MW	*Reg-Up Quantity per QSE*—The QSE *q*'s Ancillary Service Obligation minus its self-arranged Reg-Up quantity in the DAM and any and all SASMs, for the hour.
RUO_q	MW	*Reg-Up Obligation per QSE*—The Ancillary Service Obligation of QSE *q*, for the hour.
$DASARUQ_q$	MW	*Day-Ahead Self-Arranged Reg-Up Quantity per QSE*—The self-arranged Reg-Up quantity submitted by QSE *q* before 1000 in the Day-Ahead.
$RTSARUQ_q$	MW	*Self-Arranged Reg-Up Quantity per QSE for all SASMs*—The sum of all self-arranged Reg-Up quantities submitted by QSE *q* for all SASMs due to an increase in the Ancillary Service Plan per Section 4.4.7.1, Self-Arranged Ancillary Service Quantities.

$RTPCRU_{q, m}$	MW	*Procured Capacity for Reg-Up per QSE by market*—The MW portion of QSE *q*'s Ancillary Service Offers cleared in the market *m* to provide Reg-Up, for the hour.
$RUFQ_{q}$	MW	*Reg-Up Failure Quantity per QSE*—QSE *q*'s total capacity associated with failures on its Ancillary Service Supply Responsibility for Reg-Up, for the hour.
$RRUFQ_{q}$	MW	*Reconfiguration Reg-Up Failure Quantity per QSE*—QSE *q* total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for Reg-Up, for the hour.
$HLRS_{q}$	none	*The Hourly Load Ratio Share calculated for QSE q for the hour.* See Section 6.6.2.4, QSE Load Ratio Share for an Operating Hour.
$PCRU_{q}$	MW	*Procured Capacity for Reg-Up per QSE in DAM*—The total Reg-Up capacity quantity awarded to QSE *q* in the DAM for all the Resources represented by the QSE, for the hour.
$SARUQ_{q}$	MW	*Total Self-Arranged Reg-Up Quantity per QSE for all markets*—The sum of all self-arranged Reg-Up quantities submitted by QSE *q* for DAM and all SASMs.
q	none	A QSE.
m	none	A SASM for the given Operating Hour.

(c) The adjustment to each QSE's DAM charge for the Reg-Up for the Operating Hour, due to changes during the Adjustment Period or Real-Time operations, is calculated as follows:

$$\mathbf{RTRUAMT}_{q} = \mathbf{RUCOST}_{q} - \mathbf{DARUAMT}_{q}$$

The above variables are defined as follows:

Variable	Unit	Description
$RTRUAMT_{q}$	$	*Real-Time Reg-Up Amount per QSE*—The adjustment to QSE *q*'s share of the costs for Reg-Up, for the hour.
$RUCOST_{q}$	$	*Reg-Up Cost per QSE*—QSE *q*'s share of the net total costs for Reg-Up, for the hour.
$DARUAMT_{q}$	$	*Day-Ahead Reg-Up Amount per QSE*—QSE *q*'s share of the DAM cost for Reg-Up, for the hour.
q	none	A QSE.

(3) For Reg-Down, if applicable:

(a) The net total costs for Reg-Down for a given Operating Hour is calculated as follows:

$$\mathbf{RDCOSTTOT} = \mathbf{(-1)} * \left(\sum_{m} \mathbf{(RTPCRDAMTTOT}_{m}\mathbf{)} + \mathbf{PCRDAMTTOT + RDFQAMTTOT + RDINFQAMTTOT)}\right)$$

Where:

Total payment of SASM- and RSASM-procured capacity for Reg-Down by market

$$RTPCRDAMTTOT_{m} = \sum_{q} RTPCRDAMT_{q, m}$$

Total payment of DAM-procured capacity for Reg-Down

$$PCRDAMTTOT = \sum_{q} PCRDAMT_{q}$$

Total charge of failure on Ancillary Service Supply Responsibility for Reg-Down

$$RDFQAMTTOT = \sum_{q} RDFQAMTQSETOT_{q}$$

Total payment of SASM- and RSASM-procured capacity for Reg-Down by QSE

$$RTPCRDAMTQSETOT_{q} = \sum_{m} RTPCRDAMT_{q,m}$$

Total charge of infeasible Ancillary Service Supply Responsibility for Reg-Down

$$RDINFQAMTTOT = \sum_{q} RDINFQAMT_{q}$$

The above variables are defined as follows:

Variable	Unit	Description
RDCOSTTOT	$	*Reg-Down Cost Total*—The net total costs for Reg-Down, for the hour.
$RTPCRDAMTTOT_{m}$	$	*Procured Capacity for Reg-Down Amount Total by market*—The total payments to all QSEs for the Ancillary Service Offers cleared in the market *m* for Reg-Down, for the hour.
$RTPCRDAMT_{q, m}$	$	*Procured Capacity for Reg-Down Amount per QSE by market*—The payment to QSE *q* for its Ancillary Service Offers cleared in the market *m* for Reg-Down, for the hour.
RDFQAMTTOT	$	*Reg-Down Failure Quantity Amount Total*—The total charges to all QSEs for their capacity associated with failures on their Ancillary Service Supply Responsibilities for Reg-Down, for the hour.
$RDFQAMTQSETOT_{q}$	$	*Reg-Down Failure Quantity Amount Total per QSE*—The charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for Reg-Down, for the hour.
$RTPCRDAMTQSETOT_{q}$	$	*Procured Capacity for Reg-Down Amount Total per QSE*—The total payments to a QSE *q* in all SASMs and RSASMs for the Ancillary Service Offers cleared for Reg-Down, for the hour.
$PCRDAMT_{q}$	$	*Procured Capacity for Reg-Down Amount per QSE for DAM*—The DAM Reg-Down payment for QSE *q*, for the hour.
PCRDAMTTOT	$	*Procured Capacity for Reg-Down Amount Total in DAM*—The total of the DAM Reg-Down payments for all QSEs for the hour.
RDINFQAMTTOT	$	*Reg-Down Infeasible Quantity Amount Total* — The charge to all QSEs for their total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for Reg-Down, for the hour.
$RDINFQAMT_{q}$	$	*Reg-Down Infeasible Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with infeasible deployment of its Ancillary Service Supply Responsibilities for Reg-Down, for the hour.
q	none	A QSE.
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

[NPRR841: Replace paragraph (a) above with the following upon system implementation:]

(a) The net total costs for Reg-Down for a given Operating Hour is calculated as follows:

$$\mathbf{RDCOSTTOT} = \mathbf{(-1) * (\sum_{m} (RTPCRDAMTTOT_{m}) + PCRDAMTTOT + RDFQAMTTOT + RDINFQAMTTOT + RDMWINFATOT)}$$

Where:

Total payment of SASM- and RSASM-procured capacity for Reg-Down by market

$$RTPCRDAMTTOT_{m} = \sum_{q} RTPCRDAMT_{q,m}$$

Total payment of DAM-procured capacity for Reg-Down

$$PCRDAMTTOT = \sum_{q} PCRDAMT_{q}$$

Total charge of failure on Ancillary Service Supply Responsibility for Reg-Down

$$RDFQAMTTOT = \sum_{q} RDFQAMTQSETOT_{q}$$

Total payment of SASM- and RSASM-procured capacity for Reg-Down by QSE

$$RTPCRDAMTQSETOT_{q} = \sum_{m} RTPCRDAMT_{q,m}$$

Total charge of infeasible Ancillary Service Supply Responsibility for Reg-Down

$$RDINFQAMTTOT = \sum_{q} RDINFQAMT_{q}$$

Total Real-Time Day-Ahead Make-Whole Payment for Reg-Down

$$RDMWINFATOT = \sum_{q} RDMWINFA_{q,h}$$

The above variables are defined as follows:

Variable	Unit	Description
RDCOSTTOT	$	*Reg-Down Cost Total*—The net total costs for Reg-Down, for the hour.
$RTPCRDAMTTOT_{m}$	$	*Procured Capacity for Reg-Down Amount Total by market*—The total payments to all QSEs for the Ancillary Service Offers cleared in the market *m* for Reg-Down, for the hour.
$RTPCRDAMT_{q,m}$	$	*Procured Capacity for Reg-Down Amount per QSE by market*—The payment to QSE *q* for its Ancillary Service Offers cleared in the market *m* for Reg-Down, for the hour.
RDFQAMTTOT	$	*Reg-Down Failure Quantity Amount Total*—The total charges to all QSEs for their capacity associated with failures on their Ancillary Service Supply Responsibilities for Reg-Down, for the hour.

RDMWINFATOT	$	*Reg-Down Make-Whole Infeasible Amount total*— The total Real-Time calculated payment to all QSEs, for their contribution of Reg-Down, to make-whole the Startup and energy costs of all Resources committed in the DAM, for the hour.
RDMWINFA $_{q, h}$	$	*Reg-Down Make-Whole Infeasible Amount per QSE per hour*— The total Real-Time calculated payment to QSE *q*, for its contribution of Reg-Down, to make-whole the Startup and energy costs of all Resources committed in the DAM, for the hour *h*.
RDFQAMTQSETOT $_{q}$	$	*Reg-Down Failure Quantity Amount Total per QSE*—The charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for Reg-Down, for the hour.
RTPCRDAMTQSETOT $_{q}$	$	*Procured Capacity for Reg-Down Amount Total per QSE*—The total payments to a QSE *q* in all SASMs and RSASMs for the Ancillary Service Offers cleared for Reg-Down, for the hour.
PCRDAMT $_{q}$	$	*Procured Capacity for Reg-Down Amount per QSE for DAM*—The DAM Reg-Down payment for QSE *q*, for the hour.
PCRDAMTTOT	$	*Procured Capacity for Reg-Down Amount Total in DAM*—The total of the DAM Reg-Down payments for all QSEs for the hour.
RDINFQAMTTOT	$	*Reg-Down Infeasible Quantity Amount Total* — The charge to all QSEs for their total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for Reg-Down, for the hour.
RDINFQAMT $_{q}$	$	*Reg-Down Infeasible Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with infeasible deployment of its Ancillary Service Supply Responsibilities for Reg-Down, for the hour.
q	none	A QSE.
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

(b) Each QSE's share of the net total costs for Reg-Down for the Operating Hour is calculated as follows:

RDCOST $_{q}$ = RDPR * RDQ $_{q}$

Where:

RDPR = RDCOSTTOT / RDQTOT

RDQTOT = $\sum_{q}$ RDQ $_{q}$

RDQ $_{q}$ = RDO $_{q}$ – SARDQ $_{q}$

RDO $_{q}$ = $\sum_{q}$ (SARDQ $_{q}$ + $\sum_{m}$ (RTPCRD $_{q, m}$) + PCRD $_{q}$ – RDFQ $_{q}$ – RRDFQ $_{q}$) * HLRS $_{q}$

SARDQ $_{q}$ = DASARDQ $_{q}$ + RTSARDQ $_{q}$

The above variables are defined as follows:

Variable	Unit	Description
RDCOST $_q$	$	*Reg-Down Cost per QSE*—QSE *q*'s share of the net total costs for Reg-Down, for the hour.
RDPR	$/MW per hour	*Reg-Down Price*—The price for Reg-Down calculated based on the net total costs for Reg-Down, for the hour.
RDCOSTTOT	$	*Reg-Down Cost Total*—The net total costs for Reg-Down, for the hour. See item (3)(a) above.
RDQTOT	MW	*Reg-Down Quantity Total*—The sum of every QSE's Ancillary Service Obligation minus its self-arranged Reg-Down quantity in the DAM and any and all SASMs for the hour.
RDQ $_q$	MW	*Reg-Down Quantity per QSE*—The QSE *q*'s Ancillary Service Obligation minus its self-arranged Reg-Down quantity in the DAM and any and all SASMs, for the hour.
RDO $_q$	MW	*Reg-Down Obligation per QSE*—The Ancillary Service Obligation of QSE *q*, for the hour.
DASARDQ $_q$	MW	*Self-Arranged Reg-Down Quantity per QSE for DAM*—The self-arranged Reg-Down quantity submitted by QSE *q* before 1000 in the Day-Ahead.
RTSARDQ $_q$	MW	*Self-Arranged Reg-Down Quantity per QSE for all SASMs*—The sum of all self-arranged Reg-Down quantities submitted by QSE *q* for all SASMs due to an increase in the Ancillary Service Plan per Section 4.4.7.1.
RTPCRD $_{q, m}$	MW	*Procured Capacity for Reg-Down per QSE by market*—The MW portion of QSE *q*'s Ancillary Service Offers cleared in the market *m* to provide Reg-Down, for the hour.
RDFQ $_q$	MW	*Reg-Down Failure Quantity per QSE*—QSE *q*'s total capacity associated with failures on its Ancillary Service Supply Responsibility for Reg-Down, for the hour.
RRDFQ $_q$	MW	*Reconfiguration Reg-Down Failure Quantity per QSE*—QSE *q*'s total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for Reg-Down, for the hour.
HLRS $_q$		*The Hourly Load Ratio Share calculated for QSE q for the hour.* See Section 6.6.2.4.
PCRD $_q$	MW	*Procured Capacity for Reg-Down per QSE in DAM*—The total Reg-Down capacity quantity awarded to QSE *q* in the DAM for all the Resources represented by the QSE, for the hour.
SARDQ $_q$	MW	*Total Self-Arranged Reg-Down Quantity per QSE for all markets*—The sum of all self-arranged Reg-Down quantities submitted by QSE *q* for DAM and all SASMs.
q	none	A QSE.
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

(c) The adjustment to each QSE's DAM charge for the Reg-Down for the Operating Hour, due to changes during the Adjustment Period or Real-Time operations, is calculated as follows:

RTRDAMT $_q$ = RDCOST $_q$ – DARDAMT $_q$

The above variables are defined as follows:

Variable	Unit	Description

RTRDAMT $_q$	$	*Real-Time Reg-Down Amount per QSE*—The adjustment to QSE *q*'s share of the costs for Reg-Down, for the hour.
RDCOST $_q$	$	*Reg-Down Cost per QSE*—QSE *q*'s share of the net total costs for Reg-Down, for the hour.
DARDAMT $_q$	$	*Day-Ahead Reg-Down Amount per QSE*—QSE *q*'s share of the DAM cost for Reg-Down, for the hour.
q	none	A QSE.

(4) For RRS, if applicable:

(a) The net total costs for RRS for a given Operating Hour is calculated as follows:

$$\mathbf{RRCOSTTOT} = \mathbf{(-1) * (\sum_m (RTPCRRAMTTOT_m) + PCRRAMTTOT + RRFQAMTTOT + RRINFQAMTTOT)}$$

Where:

Total payment of SASM- and RSASM-procured capacity for RRS by market

$$RTPCRRAMTTOT_m = \sum_q RTPCRRAMT_{q,m}$$

Total payment of DAM-procured capacity for RRS

$$PCRRAMTTOT = \sum_q PCRRAMT_q$$

Total charge of failure on Ancillary Service Supply Responsibility for RRS

$$RRFQAMTTOT = \sum_q RRFQAMTQSETOT_q$$

Total payment of SASM- and RSASM-procured capacity RRS Service by QSE

$$RTPCRRAMTQSETOT_q = \sum_m RTPCRRAMT_{q,m}$$

Total charge of infeasible Ancillary Service Supply Responsibility for RRS

$$RRINFQAMTTOT = \sum_q RRINFQAMT_q$$

The above variables are defined as follows:

Variable	Unit	Description
RRCOSTTOT	$	*Responsive Reserve Cost Total*—The net total costs for RRS, for the hour.
RTPCRRAMTTOT $_m$	$	*Procured Capacity for Responsive Reserve Amount Total by market*—The total payments to all QSEs for the Ancillary Service Offers cleared in the market *m* for RRS, for the hour.
RTPCRRAMT $_{q,m}$	$	*Procured Capacity for Responsive Reserve Amount per QSE by market*—The payment to QSE *q* for its Ancillary Service Offers cleared in the market *m* for RRS, for the hour.
RRFQAMTTOT	$	*Responsive Reserve Failure Quantity Amount Total*—The total charges to all QSEs for their capacity associated with failures and reconfiguration

Variable	Unit	Description
		reductions on their Ancillary Service Supply Responsibilities for RRS, for the hour.
RRFQAMTQSETOT $_q$	$	*Responsive Reserve Failure Quantity Amount Total per QSE*—The charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for RRS, for the hour.
RTPCRRAMTQSETOT $_q$	$	*Procured Capacity for Responsive Reserve Amount Total per QSE*—The total payments to a QSE *q* in all SASMs and RSASMs for the Ancillary Service Offers cleared for RRS, for the hour.
PCRRAMT $_q$	$	*Procured Capacity for Responsive Reserve Amount per QSE for DAM*—The DAM RRS payment for QSE *q*, for the hour.
PCRRAMTTOT	$	*Procured Capacity for Responsive Reserve Amount Total in DAM*—The total of the DAM RRS payments for all QSEs, for the hour.
RRINFQAMTTOT	$	*Responsive Reserve Infeasible Quantity Amount Total* — The charge to all QSEs for their total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for RRS, for the hour.
RRINFQAMT $_q$	$	*Responsive Reserve Infeasible Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for RRS, for the hour.
q	none	A QSE.
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

[NPRR841: Replace paragraph (a) above with the following upon system implementation:]

(a) The net total costs for RRS for a given Operating Hour is calculated as follows:

$$\mathbf{RRCOSTTOT} = \mathbf{(-1) * \left(\sum_{m} (RTPCRRAMTTOT_{m}) + PCRRAMTTOT + RRFQAMTTOT + RRINFQAMTTOT + RRMWINFATOT\right)}$$

Where:

Total payment of SASM- and RSASM-procured capacity for RRS by market

$$RTPCRRAMTTOT_{m} = \sum_{q} RTPCRRAMT_{q,m}$$

Total payment of DAM-procured capacity for RRS

$$PCRRAMTTOT = \sum_{q} PCRRAMT_{q}$$

Total charge of failure on Ancillary Service Supply Responsibility for RRS

$$RRFQAMTTOT = \sum_{q} RRFQAMTQSETOT_{q}$$

Total payment of SASM- and RSASM-procured capacity for RRS by QSE

$$RTPCRRAMTQSETOT_q = \sum_m RTPCRRAMT_{q,m}$$

Total charge of infeasible Ancillary Service Supply Responsibility for RRS

$$RRINFQAMTTOT = \sum_q RRINFQAMT_q$$

Total Real-Time Day-Ahead Make-Whole Payment for RRS

$$RRMWINFATOT = \sum_q RRMWINFA_{q,h}$$

The above variables are defined as follows:

Variable	Unit	Description
RRCOSTTOT	$	*Responsive Reserve Cost Total*—The net total costs for RRS, for the hour.
$RTPCRRAMTTOT_m$	$	*Procured Capacity for Responsive Reserve Amount Total by market*—The total payments to all QSEs for the Ancillary Service Offers cleared in the market *m* for RRS, for the hour.
$RTPCRRAMT_{q,m}$	$	*Procured Capacity for Responsive Reserve Amount per QSE by market*—The payment to QSE *q* for its Ancillary Service Offers cleared in the market *m* for RRS, for the hour.
RRFQAMTTOT	$	*Responsive Reserve Failure Quantity Amount Total*—The total charges to all QSEs for their capacity associated with failures and reconfiguration reductions on their Ancillary Service Supply Responsibilities for RRS, for the hour.
RRMWINFATOT	$	*Responsive Reserve Make-Whole Infeasible Amount total*— The total Real-Time calculated payment to all QSEs, for their contribution of RRS, to make-whole the Startup and energy costs of all Resources committed in the DAM, for the hour.
$RRMWINFA_{q,h}$	$	*Responsive Reserve Make-Whole Infeasible Amount per QSE per hour*—The total Real-Time calculated payment to QSE *q*, for its contribution of RRS, to make-whole the Startup and energy costs of all Resources committed in the DAM, for the hour *h*.
$RRFQAMTQSETOT_q$	$	*Responsive Reserve Failure Quantity Amount Total per QSE*—The charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for RRS, for the hour.
$RTPCRRAMTQSETOT_q$	$	*Procured Capacity for Responsive Reserve Amount Total per QSE*—The total payments to a QSE *q* in all SASMs and RSASMs for the Ancillary Service Offers cleared for RRS, for the hour.
$PCRRAMT_q$	$	*Procured Capacity for Responsive Reserve Amount per QSE in DAM*—The DAM RRS payment for QSE *q*, for the hour.
PCRRAMTTOT	$	*Procured Capacity for Responsive Reserve Amount Total in DAM*—The total of the DAM RRS payments for all QSEs, for the hour.
RRINFQAMTTOT	$	*Responsive Reserve Infeasible Quantity Amount Total* — The charge to all QSEs for their total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for RRS, for the hour.
$RRINFQAMT_q$	$	*Responsive Reserve Infeasible Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with infeasible

		deployment of Ancillary Service Supply Responsibilities for RRS, for the hour.
q	none	A QSE.
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

(b) Each QSE's share of the net total costs for RRS for the Operating Hour is calculated as follows:

$$\mathbf{RRCOST}_q = \mathbf{RRPR} * \mathbf{RRQ}_q$$

Where:

$$RRPR = RRCOSTTOT / RRQTOT$$

$$RRQTOT = \sum_q RRQ_q$$

$$RRQ_q = RRO_q - SARRQ_q$$

$$RRO_q = \sum_q (SARRQ_q + \sum_m (RTPCRR_{q,m}) + PCRR_q - RRFQ_q - RRRFQ_q) * HLRS_q$$

$$SARRQ_q = DASARRQ_q + RTSARRQ_q$$

The above variables are defined as follows:

Variable	Unit	Description
$RRCOST_q$	$	*Responsive Reserve Cost per QSE*—QSE *q*'s share of the net total costs for RRS, for the hour.
RRPR	$/MW per hour	*Responsive Reserve Price*—The price for RRS calculated based on the net total costs for RRS, for the hour.
RRCOSTTOT	$	*Responsive Reserve Cost Total*—The net total costs for RRS, for the hour. See item (4)(a) above.
RRQTOT	MW	*Responsive Reserve Quantity Total*—The sum of every QSE's Ancillary Service Obligation minus its self-arranged RRS quantity in the DAM and any and all SASMs for the hour.
RRQ_q	MW	*Responsive Reserve Quantity per QSE*—The QSE *q*'s Ancillary Service Obligation minus its self-arranged RRS quantity in the DAM and any and all SASMs, for the hour.
RRO_q	MW	*Responsive Reserve Obligation per QSE*—The Ancillary Service Obligation of QSE *q*, for the hour.
$DASARRQ_q$	MW	*Day-Ahead Self-Arranged Responsive Reserve Quantity per QSE*—The self-arranged RRS quantity submitted by QSE *q* before 1000 in the Day-Ahead.
$RTSARRQ_q$	MW	*Self-Arranged Responsive Reserve Quantity per QSE for all SASMs*—The sum of all self-arranged RRS quantities submitted by QSE *q* for all SASMs due to an increase in the Ancillary Service Plan per Section 4.4.7.1.

Variable	Unit	Description
RTPCRR $_{q, m}$	MW	*Procured Capacity for Responsive Reserve per QSE by market*—The MW portion of QSE *q*'s Ancillary Service Offers cleared in the market *m* to provide RRS, for the hour.
RRFQ $_{q}$	MW	*Responsive Reserve Failure Quantity per QSE*—QSE *q*'s total capacity associated with failures on its Ancillary Service Supply Responsibility for RRS, for the hour.
RRRFQ $_{q}$	MW	*Reconfiguration Responsive Reserve Failure Quantity per QSE*—QSE *q*'s total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for RRS, for the hour.
HLRS $_{q}$	none	*The Hourly Load Ratio Share calculated for QSE q for the hour.* See Section 6.6.2.4.
PCRR $_{q}$	MW	*Procured Capacity for Responsive Reserve per QSE in DAM*—The total RRS capacity quantity awarded to QSE *q* in the DAM for all the Resources represented by the QSE, for the hour.
SARRQ $_{q}$	MW	*Total Self-Arranged Responsive Reserve Quantity per QSE for all markets*—The sum of all self-arranged RRS quantities submitted by QSE *q* for DAM and all SASMs.
q	none	A QSE.
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

(c) The adjustment to each QSE's DAM charge for the RRS for the Operating Hour, due to changes during the Adjustment Period or Real-Time operations, is calculated as follows:

RTRRAMT $_{q}$ = RRCOST $_{q}$ – DARRAMT $_{q}$

The above variables are defined as follows:

Variable	Unit	Description
RTRRAMT $_{q}$	$	*Real-Time Responsive Reserve Amount per QSE*—The adjustment to QSE *q*'s share of the costs for RRS, for the hour.
RRCOST $_{q}$	$	*Responsive Reserve Cost per QSE*—QSE *q*'s share of the net total costs for RRS, for the hour.
DARRAMT $_{q}$	$	*Day-Ahead Responsive Reserve Amount per QSE*—QSE *q*'s share of the DAM cost for RRS, for the hour.
q	none	A QSE.

(5) For Non-Spin, if applicable:

(a) The net total costs for Non-Spin for a given Operating Hour is calculated as follows:

$$\mathbf{NSCOSTTOT} = \mathbf{(-1)} * \left(\sum_{m} \mathbf{(RTPCNSAMTTOT}_{m}\mathbf{)} + \mathbf{PCNSAMTTOT + NSFQAMTTOT + NSINFQAMTTOT)}\right)$$

Where:

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Total payment of SASM- and RSASM-procured capacity for Non-Spin by market

$$RTPCNSAMTTOT_m = \sum_q RTPCNSAMT_{q,m}$$

Total payment of DAM-procured capacity for Non-Spin

$$PCNSAMTTOT = \sum_q PCNSAMT_q$$

Total charge of failure on Ancillary Service Supply Responsibility for Non-Spin

$$NSFQAMTTOT = \sum_q NSFQAMTQSETOT_q$$

Total payment of SASM- and RSASM-procured capacity for Non-Spin by QSE

$$RTPCNSAMTQSETOT_q = \sum_m RTPCNSAMT_{q,m}$$

Total charge of infeasible Ancillary Service Supply Responsibility for Non-Spin

$$NSINFQAMTTOT = \sum_q NSINFQAMT_q$$

The above variables are defined as follows:

Variable	Unit	Description
NSCOSTTOT	$	*Non-Spin Cost Total*—The net total costs for Non-Spin, for the hour.
$RTPCNSAMTTOT_m$	$	*Procured Capacity for Non-Spin Amount Total by market*—The total payments to all QSEs for the Ancillary Service Offers cleared in the market *m* for Non-Spin, for the hour.
$RTPCNSAMT_{q,m}$	$	*Procured Capacity for Non-Spin Amount per QSE by market*—The payment to QSE *q* for its Ancillary Service Offers cleared in the market *m* for Non-Spin, for the hour.
NSFQAMTTOT	$	*Non-Spin Failure Quantity Amount Total*—The total charges to all QSEs for their capacity associated with failures and reconfiguration reductions on their Ancillary Service Supply Responsibilities for Non-Spin, for the hour.
$NSFQAMTQSETOT_q$	$	*Non-Spin Failure Quantity Amount Total per QSE*—The charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for Non-Spin, for the hour.
$RTPCNSAMTQSETOT_q$	$	*Procured Capacity for Non-Spin Amount Total per QSE*—The total payments to a QSE *q* in all SASMs and RSASMs for the Ancillary Service Offers cleared for Non-Spin, for the hour.
$PCNSAMT_q$	$	*Procured Capacity for Non-Spin Amount per QSE in DAM*—The DAM Non-Spin payment for QSE *q*, for the hour.
PCNSAMTTOT	$	*Procured Capacity for Non-Spin Amount Total in DAM*—The total of the DAM Non-Spin payments for all QSEs, for the hour.
NSINFQAMTTOT	$	*Non-Spin Infeasible Quantity Amount Total* — The charge to all QSEs for their total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for Non-Spin, for the hour.
$NSINFQAMT_q$	$	*Non-Spin Infeasible Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for Non-Spin, for the hour.
q	none	A QSE.

Variable	Unit	Description
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

[NPRR841: Replace paragraph (a) above with the following upon system implementation:]

(a) The net total costs for Non-Spin for a given Operating Hour is calculated as follows:

$$\mathbf{NSCOSTTOT} = \mathbf{(-1) * (\sum_{m} (RTPCNSAMTTOT_{m}) + PCNSAMTTOT + NSFQAMTTOT + NSINFQAMTTOT + NSMWINFATOT)}$$

Where:

Total payment of SASM- and RSASM-procured capacity for Non-Spin by market

$$RTPCNSAMTTOT_{m} = \sum_{q} RTPCNSAMT_{q,m}$$

Total payment of DAM-procured capacity for Non-Spin

$$PCNSAMTTOT = \sum_{q} PCNSAMT_{q}$$

Total charge of failure on Ancillary Service Supply Responsibility for Non-Spin

$$NSFQAMTTOT = \sum_{q} NSFQAMTQSETOT_{q}$$

Total payment of SASM- and RSASM-procured capacity for Non-Spin by QSE

$$RTPCNSAMTQSETOT_{q} = \sum_{m} RTPCNSAMT_{q,m}$$

Total charge of infeasible Ancillary Service Supply Responsibility for Non-Spin

$$NSINFQAMTTOT = \sum_{q} NSINFQAMT_{q}$$

Total Real-Time Day-Ahead Make-Whole Payment for Non-Spin

$$NSMWINFATOT = \sum_{q} NSMWINFA_{q,h}$$

The above variables are defined as follows:

Variable	Unit	Description
NSCOSTTOT	$	*Non-Spin Cost Total*—The net total costs for Non-Spin, for the hour.
$RTPCNSAMTTOT_{m}$	$	*Procured Capacity for Non-Spin Amount Total by market*—The total payments to all QSEs for the Ancillary Service Offers cleared in the market *m* for Non-Spin, for the hour.

RTPCNSAMT $_{q, m}$	$	*Procured Capacity for Non-Spin Amount per QSE by market*—The payment to QSE *q* for its Ancillary Service Offers cleared in the market *m* for Non-Spin, for the hour.
NSFQAMTTOT	$	*Non-Spin Failure Quantity Amount Total*—The total charges to all QSEs for their capacity associated with failures and reconfiguration reductions on their Ancillary Service Supply Responsibilities for Non-Spin, for the hour.
NSMWINFATOT	$	*Non Spin Make-Whole Infeasible Amount total*— The total Real-Time calculated payment to all QSEs, for their contribution of Non-Spin, to make-whole the Startup and energy costs of all Resources committed in the DAM, for the hour.
NSMWINFA $_{q, h}$	$	*Non Spin Make-Whole Infeasible Amount per QSE per hour*— The total Real-Time calculated payment to QSE *q*, for its contribution of Non-Spin, to make-whole the Startup and energy costs of all Resources committed in the DAM, for the hour *h*.
NSFQAMTQSETOT $_q$	$	*Non-Spin Failure Quantity Amount Total per QSE*—The charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for Non-Spin, for the hour.
RTPCNSAMTQSETOT $_q$	$	*Procured Capacity for Non-Spin Amount Total per QSE*—The total payments to a QSE *q* in all SASMs and RSASMs for the Ancillary Service Offers cleared for Non-Spin, for the hour.
PCNSAMT $_q$	$	*Procured Capacity for Non-Spin Amount per QSE in DAM*—The DAM Non-Spin payment for QSE *q*, for the hour.
PCNSAMTTOT	$	*Procured Capacity for Non-Spin Amount Total in DAM*—The total of the DAM Non-Spin payments for all QSEs, for the hour.
NSINFQAMTTOT	$	*Non-Spin Infeasible Quantity Amount Total* — The charge to all QSEs for their total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for Non-Spin, for the hour.
NSINFQAMT $_q$	$	*Non-Spin Infeasible Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for Non-Spin, for the hour.
q	none	A QSE.
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

(b) Each QSE's share of the net total costs for Non-Spin for the Operating Hour is calculated as follows:

$$\mathbf{NSCOST}_q = \mathbf{NSPR} * \mathbf{NSQ}_q$$

Where:

$$NSPR = NSCOSTTOT / NSQTOT$$

$$NSQTOT = \sum_q NSQ_q$$

$$NSQ_q = NSO_q - SANSQ_q$$

$$NSO_q = \sum_q (SANSQ_q + \sum_m (RTPCNS_{q,m}) + PCNS_q - NSFQ_q - RNSFQ_q) * HLRS_q$$

$$SANSQ_q = DASANSQ_q + RTSANSQ_q$$

The above variables are defined as follows:

Variable	Unit	Description
$NSCOST_q$	$	*Non-Spin Cost per QSE*—QSE *q*'s share of the net total costs for Non-Spin, for the hour.
NSPR	$/MW per hour	*Non-Spin Price*—The price for Non-Spin calculated based on the net total costs for Non-Spin, for the hour.
NSCOSTTOT	$	*Non-Spin Cost Total*—The net total costs for Non-Spin for the hour. See item (5)(a) above.
NSQTOT	MW	*Non-Spin Quantity Total*—The sum of every QSE's Ancillary Service Obligation minus its self-arranged Non-Spin quantity in the DAM and any and all SASMs, for the hour.
NSQ_q	MW	*Non-Spin Quantity per QSE*—The difference in QSE *q*'s Ancillary Service Obligation minus its self-arranged Non-Spin quantity in the DAM and any and all SASMs, for the hour.
NSO_q	MW	*Non-Spin Obligation per QSE*—The Ancillary Service Obligation of QSE *q*, for the hour.
$DASANSQ_q$	MW	*Day-Ahead Self-Arranged Non-Spin Quantity per QSE for DAM*—The self-arranged Non-Spin quantity submitted by QSE *q* before 1000 in the Day-Ahead.
$RTSANSQ_q$	MW	*Self-Arranged Non-Spin Quantity per QSE for all SASMs*—The sum of all self-arranged Non-Spin quantities submitted by QSE *q* for all SASMs due to an increase in the Ancillary Service Plan per Section 4.4.7.1.
$RTPCNS_{q,m}$	MW	*Procured Capacity for Non-Spin per QSE by market*—The MW portion of QSE *q*'s Ancillary Service Offers cleared in the market *m* to provide Non-Spin, for the hour.
$NSFQ_q$	MW	*Non-Spin Failure Quantity per QSE*—QSE *q*'s total capacity associated with failures on its Ancillary Service Supply Responsibility for Non-Spin, for the hour.
$RNSFQ_q$	MW	*Reconfiguration Non-Spin Failure Quantity per QSE*—QSE *q*'s total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for Non-Spin, for the hour.
$HLRS_q$	none	*The Hourly Load Ratio Share calculated for QSE q for the hour.* See Section 6.6.2.4.
$PCNS_q$	MW	*Procured Capacity for Non-Spin Service per QSE in DAM*—The total Non-Spin capacity quantity awarded to QSE *q* in the DAM for all the Resources represented by the QSE, for the hour.
$SANSQ_q$	MW	*Total Self-Arranged Non-Spin Supplied Quantity per QSE for all markets*—The sum of all self-arranged Non-Spin quantities submitted by QSE *q* for DAM and all SASMs.
q	none	A QSE.
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

(c) The adjustment to each QSE's DAM charge for the Non-Spin for the Operating Hour, due to changes during the Adjustment Period or Real-Time operations, is calculated as follows:

$$\mathbf{RTNSAMT_q = NSCOST_q - DANSAMT_q}$$

The above variables are defined as follows:

Variable	Unit	Description
RTNSAMT $_q$	$	*Real-Time Non-Spin Amount per QSE*—The adjustment to QSE *q*'s share of the costs for Non-Spin, for the hour.
NSCOST $_q$	$	*Non-Spin Cost per QSE*—QSE *q*'s share of the net total costs for Non-Spin, for the hour.
DANSAMT $_q$	$	*Day-Ahead Non-Spin Amount per QSE*—QSE *q*'s share of the DAM cost for Non-Spin, for the hour.
q	none	A QSE.

(6) For ECRS, if applicable:

(a) The net total costs for ECRS for a given Operating Hour is calculated as follows:

$$\mathbf{ECRCOSTTOT = (-1) * (\sum_{m} (RTPCECRAMTTOT_{m}) + PCECRAMTTOT + ECRFQAMTTOT + ECRINFQAMTTOT)}$$

Where:

Total payment of SASM- and RSASM-procured capacity for ECRS by market

$$RTPCECRAMTTOT_{m} = \sum_{q} RTPCECRAMT_{q,m}$$

Total payment of DAM-procured capacity for ECRS

$$PCECRAMTTOT = \sum_{q} PCECRAMT_{q}$$

Total charge of failure on Ancillary Service Supply Responsibility for ECRS

$$ECRFQAMTTOT = \sum_{q} ECRFQAMTQSETOT_{q}$$

Total payment of SASM- and RSASM-procured capacity ECRS Service by QSE

$$RTPCECRAMTQSETOT_{q} = \sum_{m} RTPCECRAMT_{q,m}$$

Total charge of infeasible Ancillary Service Supply Responsibility for ECRS

$$ECRINFQAMTTOT = \sum_{q} ECRINFQAMT_{q}$$

The above variables are defined as follows:

Variable	Unit	Description
ECRCOSTTOT	$	*ERCOT Contingency Reserve Service Cost Total*—The net total costs for ECRS, for the hour.
RTPCECRAMTTOT $_m$	$	*Procured Capacity for ERCOT Contingency Reserve Service Amount Total by market*—The total payments to all QSEs for the Ancillary Service Offers cleared in the market *m* for ECRS, for the hour.

Variable	Unit	Description
RTPCECRAMT $_{q, m}$	$	*Procured Capacity for ERCOT Contingency Reserve Service Amount per QSE by market*—The payment to QSE *q* for its Ancillary Service Offers cleared in the market *m* for ECRS, for the hour.
ECRFQAMTTOT	$	*ERCOT Contingency Reserve Service Failure Quantity Amount Total*—The total charges to all QSEs for their capacity associated with failures and reconfiguration reductions on their Ancillary Service Supply Responsibilities for ECRS, for the hour.
ECRFQAMTQSETOT $_{q}$	$	*ERCOT Contingency Reserve Service Failure Quantity Amount Total per QSE*—The charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for ECRS, for the hour.
RTPCECRAMTQSETOT $_{q}$	$	*Procured Capacity for ERCOT Contingency Reserve Service Amount Total per QSE*—The total payments to a QSE *q* in all SASMs and RSASMs for the Ancillary Service Offers cleared for ECRS, for the hour.
PCECRAMT $_{q}$	$	*Procured Capacity for ERCOT Contingency Reserve Service Amount per QSE for DAM*—The DAM ECRS payment for QSE *q*, for the hour.
PCECRAMTTOT	$	*Procured Capacity for ERCOT Contingency Reserve Service Amount Total in DAM*—The total of the DAM ECRS payments for all QSEs, for the hour.
ECRINFQAMTTOT	$	*ERCOT Contingency Reserve Service Infeasible Quantity Amount Total* — The charge to all QSEs for their total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for ECRS, for the hour.
ECRINFQAMT $_{q}$	$	*ERCOT Contingency Reserve Service Infeasible Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for ECRS, for the hour.
q	none	A QSE.
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

[NPRR841: Replace paragraph (a) above with the following upon system implementation:]

(a) The net total costs for ECRS for a given Operating Hour is calculated as follows:

$$\mathbf{ECRCOSTTOT} = \mathbf{(-1) * (\sum_{m} (RTPCECRAMTTOT_{m}) + PCECRAMTTOT + ECRFQAMTTOT + ECRINFQAMTTOT + ECRMWINFATOT)}$$

Where:

Total payment of SASM- and RSASM-procured capacity for ECRS by market

$$\text{RTPCECRAMTTOT}_{m} = \sum_{q} \text{RTPCECRAMT}_{q, m}$$

Total payment of DAM-procured capacity for ECRS

$$PCECRAMTTOT = \sum_{q} PCECRAMT_{q}$$

Total charge of failure on Ancillary Service Supply Responsibility for ECRS

$$ECRFQAMTTOT = \sum_{q} ECRFQAMTQSETOT_{q}$$

Total payment of SASM- and RSASM-procured capacity ECRS Service by QSE

$$RTPCECRAMTQSETOT_{q} = \sum_{m} RTPCECRAMT_{q,m}$$

Total charge of infeasible Ancillary Service Supply Responsibility for ECRS

$$ECRINFQAMTTOT = \sum_{q} ECRINFQAMT_{q}$$

Total Real-Time Day-Ahead Make-Whole Payment for ECRS

$$ECRMWINFATOT = \sum_{q} ECRMWINFA_{q,h}$$

The above variables are defined as follows:

Variable	Unit	Description
ECRCOSTTOT	$	*ERCOT Contingency Reserve Service Cost Total*—The net total costs for ECRS, for the hour.
$RTPCECRAMTTOT_{m}$	$	*Procured Capacity for ERCOT Contingency Reserve Service Amount Total by market*—The total payments to all QSEs for the Ancillary Service Offers cleared in the market *m* for ECRS, for the hour.
$RTPCECRAMT_{q,m}$	$	*Procured Capacity for ERCOT Contingency Reserve Service Amount per QSE by market*—The payment to QSE *q* for its Ancillary Service Offers cleared in the market *m* for ECRS, for the hour.
ECRFQAMTTOT	$	*ERCOT Contingency Reserve Service Failure Quantity Amount Total*—The total charges to all QSEs for their capacity associated with failures and reconfiguration reductions on their Ancillary Service Supply Responsibilities for ECRS, for the hour.
ECRMWINFATOT	$	*ERCOT Contingency Reserve Service Make-Whole Infeasible Amount total*— The total Real-Time calculated payment to all QSEs, for their contribution of ECRS, to make-whole the Startup and energy costs of all Resources committed in the DAM, for the hour.
$ECRMWINFA_{q,h}$	$	*ERCOT Contingency Reserve Service Make-Whole Infeasible Amount per QSE per hour*— The total Real-Time calculated payment to QSE *q*, for its contribution of ECRS, to make-whole the Startup and energy costs of all Resources committed in the DAM, for the hour *h*.
$ECRFQAMTQSETOT_{q}$	$	*ERCOT Contingency Reserve Service Failure Quantity Amount Total per QSE*—The charge to QSE *q* for its total capacity associated with failures and reconfiguration reductions on its Ancillary Service Supply Responsibility for ECRS, for the hour.
$RTPCECRAMTQSETOT_{q}$	$	*Procured Capacity for ERCOT Contingency Reserve Service Amount Total per QSE*—The total payments to a QSE *q* in all SASMs and RSASMs for the Ancillary Service Offers cleared for ECRS, for the hour.

PCECRAMT $_q$	$	*Procured Capacity for ERCOT Contingency Reserve Service Amount per QSE for DAM*—The DAM ECRS payment for QSE *q*, for the hour.
PCECRAMTTOT	$	*Procured Capacity for ERCOT Contingency Reserve Service Amount Total in DAM*—The total of the DAM ECRS payments for all QSEs, for the hour.
ECRINFQAMTTOT	$	*ERCOT Contingency Reserve Service Infeasible Quantity Amount Total* — The charge to all QSEs for their total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for ECRS, for the hour.
ECRINFQAMT $_q$	$	*ERCOT Contingency Reserve Service Infeasible Quantity Amount per QSE*—The total charge to QSE *q* for its total capacity associated with infeasible deployment of Ancillary Service Supply Responsibilities for ECRS, for the hour.
q	none	A QSE.
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

(b) Each QSE's share of the net total costs for ECRS for the Operating Hour is calculated as follows:

$$\mathbf{ECRCOST}_q = \mathbf{ECRPR} * \mathbf{ECRQ}_q$$

Where:

$$ECRPR = ECRCOSTTOT / ECRQTOT$$

$$ECRQTOT = \sum_q ECRQ_q$$

$$ECRQ_q = ECRO_q - SAECRQ_q$$

$$ECRO_q = \sum_q (SAECRQ_q + \sum_m (RTPCECR_{q,m}) + PCECR_q - ECRFQ_q - RECRFQ_q) * HLRS_q$$

$$SAECRQ_q = DASAECRQ_q + RTSAECRQ_q$$

The above variables are defined as follows:

Variable	Unit	Description
ECRCOST $_q$	$	*ERCOT Contingency Reserve Service Cost per QSE*—QSE *q*'s share of the net total costs for ECRS, for the hour.
ECRPR	$/MW per hour	*ERCOT Contingency Reserve Service Price*—The price for ECRS calculated based on the net total costs for ECRS, for the hour.
ECRCOSTTOT	$	*ERCOT Contingency Reserve Service Cost Total*—The net total costs for ECRS, for the hour. See item (6)(a) above.
ECRQTOT	MW	*ERCOT Contingency Reserve Service Quantity Total*—The sum of every QSE's Ancillary Service Obligation minus its self-arranged ECRS quantity in the DAM and any and all SASMs for the hour.

Variable	Unit	Description
ECRQ $_q$	MW	*ERCOT Contingency Reserve Service Quantity per QSE*—The QSE *q*'s Ancillary Service Obligation minus its self-arranged ECRS quantity in the DAM and any and all SASMs, for the hour.
ECRO $_q$	MW	*ERCOT Contingency Reserve Service Obligation per QSE*—The Ancillary Service Obligation of QSE *q*, for the hour.
DASAECRQ $_q$	MW	*Day-Ahead Self-Arranged ERCOT Contingency Reserve Service Quantity per QSE*—The self-arranged ECRS quantity submitted by QSE *q* before 1000 in the Day-Ahead.
RTSAECRQ $_q$	MW	*Self-Arranged ERCOT Contingency Reserve Service Quantity per QSE for all SASMs*—The sum of all self-arranged ECRS quantities submitted by QSE *q* for all SASMs due to an increase in the Ancillary Service Plan per Section 4.4.7.1.
RTPCECR $_{q, m}$	MW	*Procured Capacity for ERCOT Contingency Reserve Service per QSE by market*—The MW portion of QSE *q*'s Ancillary Service Offers cleared in the market *m* to provide ECRS, for the hour.
ECRFQ $_q$	MW	*ERCOT Contingency Reserve Service Failure Quantity per QSE*—QSE *q*'s total capacity associated with failures on its Ancillary Service Supply Responsibility for ECRS, for the hour.
RECRFQ $_q$	MW	*Reconfiguration ERCOT Contingency Reserve Service Failure Quantity per QSE*—QSE *q*'s total capacity associated with reconfiguration reductions on its Ancillary Service Supply Responsibility for ECRS, for the hour.
HLRS $_q$	none	*The Hourly Load Ratio Share calculated for QSE q for the hour.* See Section 6.6.2.4.
PCECR $_q$	MW	*Procured Capacity for ERCOT Contingency Reserve Service per QSE in DAM*—The total ECRS capacity quantity awarded to QSE *q* in the DAM for all the Resources represented by the QSE, for the hour.
SAECRQ $_q$	MW	*Total Self-Arranged ERCOT Contingency Reserve Service Quantity per QSE for all markets*—The sum of all self-arranged ECRS quantities submitted by QSE *q* for DAM and all SASMs.
q	none	A QSE.
m	none	An Ancillary Service market (SASM or RSASM) for the given Operating Hour.

(c) The adjustment to each QSE's DAM charge for the ECRS for the Operating Hour, due to changes during the Adjustment Period or Real-Time operations, is calculated as follows:

RTECRAMT $_q$ = ECRCOST $_q$ – DAECRAMT $_q$

The above variables are defined as follows:

Variable	Unit	Description
RTECRAMT $_q$	$	*Real-Time ERCOT Contingency Reserve Service Amount per QSE*—The adjustment to QSE *q*'s share of the costs for ECRS, for the hour.
ECRCOST $_q$	$	*ERCOT Contingency Reserve Service Cost per QSE*—QSE *q*'s share of the net total costs for ECRS, for the hour.
DAECRAMT $_q$	$	*Day-Ahead ERCOT Contingency Reserve Service Amount per QSE*—QSE *q*'s share of the DAM cost for ECRS, for the hour.
q	none	A QSE.

[NPRR1010: Replace Section 6.7.4 above with the following upon system implementation of the Real-Time Co-Optimization (RTC) project:]

6.7.4 Real-Time Settlement for Updated Day-Ahead Market Ancillary Service Obligations

(1) Each QSE is charged or paid for net obligations for each Ancillary Service procured in the DAM. DAM costs are calculated for each QSE in accordance with Section 4.6.4, Settlement of Ancillary Services Procured in the DAM. DAM net total costs for Ancillary Service procured in the DAM are re-calculated for each QSE under this Section based on Real-Time Load Ratio Share (LRS). Payments and/or charges for Ancillary Service obligations are calculated by Operating Hour as follows:

(a) For Regulation Up Service (Reg-Up), if applicable:

$$DARTPCRUAMT_q = (DARUNOBL_q - DASARUQ_q) * DARUPR - DARUAMT_q$$

Where:

$$DARUNOBL_q = DAPCRUQTOT * HLRS_q$$

$$DAPCRUQTOT = \sum_q (\sum_r PCRUR_{r,\,q,\,DAM} + DARUOAWD_q + DASARUQ_q)$$

The above variables are defined as follows:

Variable	Unit	Description
$DARTPCRUAMT_q$	$	*Day-Ahead Updated Real-Time Procured Capacity for Reg-Up Amount by QSE* - The payment or charge to QSE *q* for Reg-Up, for the re-calculated Real-Time obligation, for the Operating Hour.
DARUPR	$/MW	*Day-Ahead Reg-Up Price*—The DAM Reg-Up price for the Operating Hour.
$DARUNOBL_q$	MW	*Day-Ahead Reg-Up New Obligation per QSE*—The updated Reg-Up Ancillary Service Obligation in Real-Time for QSE *q* for the Operating Hour.
$DARUAMT_q$	$	*Day-Ahead Reg-Up Amount per QSE*—QSE *q*'s share of the DAM costs for Reg-Up for the Operating Hour.
$PCRUR_{r,\,q,\,DAM}$	MW	*Procured Capacity for Reg-Up per Resource per QSE in DAM*—The Reg-Up capacity awarded to QSE *q* in the DAM for Resource *r* for the Operating Hour. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
$DARUOAWD_q$	MW	*Day-Ahead Reg-Up Award for the QSE* —The Reg-Up Only capacity awarded in the DAM to QSE *q* for the Operating Hour.
$HLRS_q$	none	*Hourly Load Ratio Share per QSE*—The Real-Time LRS as defined in Section 6.6.2.4, QSE Load Ratio Share for an Operating Hour, for QSE *q*, for the Operating Hour.

DAPCRUQTOT	MW	*Day-Ahead Procured Capacity for Reg-Up Total*—The total Reg-Up capacity for all QSEs for all Reg-Up awarded and self-arranged in the DAM for the Operating Hour.
$DASARUQ_q$	MW	*Day-Ahead Self-Arranged Reg-Up Quantity per QSE*—The self-arranged Reg-Up capacity submitted by QSE *q* before 1000 in the DAM for the Operating Hour.
q	none	A QSE.
r	none	A Resource.

(b) For Regulation Down Service (Reg-Down), if applicable:

$$DARTPCRDAMT_q = (DARDNOBL_q - DASARDQ_q) * DARDPR - DARDAMT_q$$

Where:

$$DARDNOBL_q = DAPCRDQTOT * HLRS_q$$

$$DAPCRDQTOT = \sum_q (\sum_r PCRDR_{r,\,q,\,DAM} + DARDOAWD_q + DASARDQ_q)$$

The above variables are defined as follows:

Variable	Unit	Description
$DARTPCRDAMT_q$	$	*Day-Ahead Updated Real-Time Procured Capacity for Reg-Down Amount by QSE* - The payment or charge to QSE *q* for Reg-Down, for the re-calculated Real-Time obligation, for the Operating Hour.
DARDPR	$/MW	*Day-Ahead Reg-Down Price*—The DAM Reg-Down price for the Operating Hour.
$DARDNOBL_q$	MW	*Day-Ahead Reg-Down New Obligation per QSE*—The updated Reg-Down Ancillary Service Obligation in Real-Time, for QSE *q*, for the Operating Hour.
$DARDAMT_q$	$	*Day-Ahead Reg-Down Amount per QSE*—QSE *q*'s share of the DAM cost for Reg-Down, for the Operating Hour.
$PCRDR_{r,\,q,\,DAM}$	MW	*Procured Capacity for Reg-Down per Resource per QSE in DAM*—The Reg-Down capacity awarded to QSE *q* in the DAM for Resource *r* for the Operating Hour. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
$DARDOAWD_q$	MW	*Day-Ahead Reg-Down Only Award for the QSE* —The Reg-Down Only capacity awarded in the DAM to QSE *q* for the Operating Hour.
$HLRS_q$	none	*Hourly Load Ratio Share per QSE*—The Real-Time as defined in Section 6.6.2.4, QSE Load Ratio Share for an Operating Hour for QSE *q*, for the Operating Hour.
DAPCRDQTOT	MW	*Day-Ahead Procured Capacity for Reg-Down Total*—The total Reg-Down capacity for all QSEs for all Reg-Down awarded and self-arranged, in the DAM for the Operating Hour.
$DASARDQ_q$	MW	*Day-Ahead Self-Arranged Reg-Down Quantity per QSE*—The self-arranged Reg-Down capacity submitted by QSE *q* before 1000 in the DAM for the Operating Hour.
q	none	A QSE.

r	none	A Resource.

(c) For Responsive Reserve (RRS), if applicable:

$$DARTPCRRAMT_q = (DARRNOBL_q - DASARRQ_q) * DARRPR - DARRAMT_q$$

Where:

$$DARRNOBL_q = DAPCRRQTOT * HLRS_q$$

$$DAPCRRQTOT = \sum_q (\sum_r PCRRR_{r, q, DAM} + DARROAWD_q + DASARRQ_q)$$

The above variables are defined as follows:

Variable	Unit	Description
$DARTPCRRAMT_q$	$	*Day-Ahead Updated Real-Time Procured Capacity for Responsive Reserve Amount by QSE* - The payment or charge to QSE *q* for RRS, for the re-calculated Real-Time obligation, for the Operating Hour.
DARRPR	$/MW	*Day-Ahead Responsive Reserve Price*—The DAM RRS price for the Operating Hour.
$DARRNOBL_q$	MW	*Day-Ahead Responsive Reserve New Obligation per QSE*—The updated RRS Ancillary Service Obligation in Real-Time for QSE *q* for the Operating Hour.
$DARRAMT_q$	$	*Day-Ahead Responsive Reserve Amount per QSE*—QSE *q*'s share of the DAM cost for RRS for the Operating Hour.
$PCRRR_{r, q, DAM}$	MW	*Procured Capacity for Responsive Reserve per Resource per QSE in DAM*—The RRS capacity awarded to QSE *q* in the DAM for Resource *r* for the Operating Hour. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
$DARROAWD_q$	MW	*Day-Ahead Responsive Reserve Only Award for the QSE* —The RRS Only capacity awarded in the DAM to QSE *q* for the Operating Hour.
$HLRS_q$	none	Hourly Load Ratio Share per QSE—The Real-Time LRS as defined in Section 6.6.2.4, QSE Load Ratio Share for an Operating Hour for QSE *q* for the Operating Hour.
DAPCRRQTOT	MW	*Day-Ahead Procured Capacity for Responsive Reserve Total* —The total RRS capacity for all QSEs for all RRS awarded and self-arranged in the DAM for the Operating Hour.
$DASARRQ_q$	MW	*Day-Ahead Self-Arranged Responsive Reserve Quantity per QSE*—The self-arranged RRS capacity submitted by QSE *q* before 1000 in the DAM for the Operating Hour.
q	none	A QSE.
r	none	A Resource.

(d) For Non-Spinning Reserve (Non-Spin), if applicable:

$$DARTPCNSAMT_q = (DANSNOBL_q - DASANSQ_q) * DANSPR - DANSAMT_q$$

Where:

$$DANSNOBL_q = DAPCNSQTOT * HLRS_q$$

$$DAPCNSQTOT = \sum_q \left(\sum_r PCNSR_{r,q,DAM} + DANSOAWD_q + DASANSQ_q \right)$$

The above variables are defined as follows:

Variable	Unit	Description
$DARTPCNSAMT_q$	$	*Day-Ahead Updated Real-Time Procured Capacity for Non-Spin Amount by QSE* - The payment or charge to QSE *q* for Non-Spin for the re-calculated Real-Time obligation for the Operating Hour.
DANSPR	$/MW	*Day-Ahead Non-Spin Price*—The DAM Non-Spin price for the Operating Hour.
$DANSNOBL_q$	MW	*Day-Ahead Non-Spin New Obligation per QSE*—The updated Non-Spin Ancillary Service Obligation in Real-Time for QSE *q* for the Operating Hour.
$PCNSR_{r,q,DAM}$	MW	*Procured Capacity for Non-Spin per Resource per QSE in DAM*—The Non-Spin capacity awarded to QSE *q* in the DAM for Resource *r* for the Operating Hour. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
$DANSOAWD_q$	MW	*Day-Ahead Non-Spin Only Award for the QSE* — The Non-Spin Only capacity awarded in the DAM to QSE *q* for the Operating Hour.
$DANSAMT_q$	$	*Day-Ahead Non-Spin Amount per QSE*—QSE *q*'s share of the DAM cost for Non-Spin for the Operating Hour.
$HLRS_q$	none	*Hourly Load Ratio Share per QSE*—The Real-Time LRS as defined in Section 6.6.2.4, QSE Load Ratio Share for an Operating Hour for QSE *q* for the Operating Hour.
DAPCNSQTOT	MW	*Day-Ahead Procured Capacity for Non-Spin Total* —The total Non-Spin capacity for all QSEs for all Non-Spin awarded and self-arranged in the DAM for the Operating Hour.
$DASANSQ_q$	MW	*Day-Ahead Self-Arranged Non-Spin Quantity per QSE*—The self-arranged Non-Spin capacity submitted by QSE *q* before 1000 in the DAM for the Operating Hour.
q	none	A QSE.
r	none	A Resource.

(e) For ERCOT Contingency Reserve Service (ECRS), if applicable:

$$DARTPCECRAMT_q = (DAECRNOBL_q - DASAECRQ_q) * DAECRPR - DAECRAMT_q$$

Where:

$$DAECRNOBL_q = DAPCECRQTOT * HLRS_q$$

$$DAPCECRQTOT = \sum_{q}(\sum_{r} PCECRR_{r, q, DAM} + DAECROAWD_{q} + DASAECRQ_{q})$$

The above variables are defined as follows:

Variable	Unit	Description
$DARTPCECRAMT_{q}$	$	*Day-Ahead Updated Real-Time Procured Capacity for ERCOT Contingency Reserve Service Amount by QSE* - The payment or charge to QSE *q* for ECRS for the re-calculated Real-Time obligation for the Operating Hour.
DAECRPR	$/MW	*Day-Ahead ERCOT Contingency Reserve Price*—The DAM ECRS price for the Operating Hour.
$DAECRNOBL_{q}$	MW	*Day-Ahead ERCOT Contingency Reserve Service New Obligation per QSE*—The updated ECRS Ancillary Service Obligation in Real-Time for QSE *q* for the Operating Hour.
$PCECRR_{r, q, DAM}$	MW	*Procured Capacity for ERCOT Contingency Reserve Service per Resource per QSE in DAM*—The ECRS capacity awarded to QSE *q* in the DAM for Resource *r* for the Operating Hour. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
$DAECROAWD_{q}$	MW	*Day-Ahead ERCOT Contingency Reserve Service Only Award for the QSE* — The ECRS Only capacity awarded in the DAM to QSE *q* for the Operating Hour.
$DAECRAMT_{q}$	$	*Day-Ahead ERCOT Contingency Reserve Amount per QSE*—QSE *q*'s share of the DAM cost for ECRS for the Operating Hour.
$HLRS_{q}$	none	*Hourly Load Ratio Share per QSE*—The Real-Time LRS as defined in Section 6.6.2.4, QSE Load Ratio Share for an Operating Hour for QSE *q* for the Operating Hour.
DAPCECRQTOT	MW	*Day-Ahead Procured Capacity for ERCOT Contingency Reserve Total*—The total ECRS capacity for all QSEs for all ECRS awarded and self-arranged in the DAM for the Operating Hour.
$DASAECRQ_{q}$	MW	*Day-Ahead Self-Arranged ERCOT Contingency Reserve Quantity per QSE*—The self-arranged ECRS capacity submitted by QSE *q* before 1000 in the DAM for the Operating Hour.
q	none	A QSE.
r	none	A Resource.

[NPRR1010: Insert Section 6.7.5.2 below upon system implementation of the Real-Time Co-Optimization (RTC) project:]

6.7.5.2 Regulation Up Service Payments and Charges

(1) Reg-Up Imbalance Payment or Charge:

$$\mathbf{RTRUIMBAMT_{q}} = \mathbf{(-1) * [\sum_{r} [RTRUREV_{q, r} - (1/4) * (PCRUR_{r, q, DAM} * RTMCPCRU)] - (1/4) * (DASARUQ_{q} *}$$

RTMCPCRU) + (1/4) * (RUTP $_q$ – RUTS $_q$) * RTMCPCRU]

Where:

RTRUREV $_{q, r}$ = (1/4) * RTRUAWD $_{q, r}$ * RTMCPCRUR $_{q, r}$

RTMCPCRUR $_{q, r}$ = $\sum_y$ (RURWF $_{q, r, y}$ * (RTMCPCRUS $_y$ + RTRDPARUS $_y$))

RTRUAWD $_{q, r}$ = $\sum_y$ (RNWF $_y$ * RTRUAWDS $_{q, r, y}$)

Where:

RURWF $_{q, r, y}$ = [max(0.001, RTRUAWDS $_{q, r, y}$) * TLMP $_y$] / [$\sum_y$ max(0.001, RTRUAWDS $_{q, r, y}$) * TLMP $_y$]

And:

RNWF $_y$ = TLMP $_y$ / $\sum_y$ TLMP $_y$

The above variables are defined as follows:

Variable	Unit	Description
RTRUIMBAMT $_q$	$	*Real-Time Reg-Up Imbalance Amount for the QSE*— The total payment or charge to QSE *q* for the Real-Time Reg-Up imbalance for each 15-minute Settlement Interval.
RTRUREV $_{q, r}$	$	*Real-Time Reg-Up Revenue*— The Real-Time Reg-Up revenue for QSE *q* calculated for Resource *r* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRDPARUS $_y$	$/MW	*Real-Time Reliability Deployment Price Adder for Ancillary Service for Reg-Up per SCED interval* - The Real-Time price adder for Reg-Up that captures the impact of reliability deployments on Reg-Up prices for the SCED interval y.
RTRUAWD $_{q, r}$	MW	*Real-Time Reg-Up Award per Resource per QSE*— The Reg-Up amount awarded to QSE *q* for Resource *r* in Real-Time for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource *r* is the Combined Cycle Train.
RTRUAWDS $_{q, r, y}$	MW	*Real-Time Reg-Up Award per Resource per QSE per SCED interval* - The Reg-Up amount awarded to QSE *q* for Resource *r* in Real-Time for the SCED interval *y*. Where for a Combined Cycle Train, the Resource *r* is a Combined Cycle Generation Resource within the Combined Cycle Train.
RTMCPCRUR $_{q, r}$	$/MW	*Real-Time Market Clearing Price for Capacity for Reg-Up per Resource per QSE*— The Real-Time MCPC for Reg-Up for Resource *r*, represented by QSE *q* for the 15-minute Settlement Interval. Where for a Combined Cycle Train, the Resource r is the Combined Cycle Train.