|  |  |  |  |
| --- | --- | --- | --- |
| NPRR Number | [792](http://www.ercot.com/mktrules/issues/NPRR792) | NPRR Title | Changing Special Protection System (SPS) to Remedial Action Scheme (RAS) |
|  | |  | |
| Date | | September 1, 2016 | |
|  | |  | |
| Submitter’s Information | | | |
| Name | | Sandip Sharma | |
| E-mail Address | | [ssharma@ercot.com](mailto:ssharma@ercot.com) | |
| Company | | ERCOT | |
| Phone Number | | 512-248-4298 | |
| Cell Number | |  | |
| Market Segment | | Not applicable | |

|  |
| --- |
| Comments |

ERCOT has received feedback from various stakeholders regarding NPRR792. Some of these concerns were regarding changes that were perceived to be beyond what is needed to align ERCOT Protocols with the North American Electric Reliability Corporation’s (NERC) Remedial Action Scheme (RAS) definition.

Concerns were also raised regarding the restriction imposed by proposed language in not allowing implementation of Constraint Management Plans (CMPs) or RASs on Interconnection Reliability Operating Limits (IROLs) or Generic Transmission Constraints (GTCs). It is ERCOT’s position that the severity of an IROL is such that the mis-operation of a RAS or Automatic Mitigation Plan (AMP) is an unacceptable risk to the region being monitored by that RAS/AMP. This is especially true for stability constraints such as the North to Houston IROL. We will review proposals for the installation of a RAS or a CMP to protect non-IROL system operating limits on a case by case basis to ensure that the effects of any mis-operation would be limited in scope to just the local area.

ERCOT has conducted further discussions with these stakeholders and is proposing the following edits to NPRR792. The remaining issues that initially were part of this NPRR can be addressed in a future NPRR.

|  |
| --- |
| Revised Proposed Protocol Language |

**2.1 DEFINITIONS**

Constraint Management Plan (CMP)

A set of pre-defined manual transmission system actions, or automatic transmission system actions that do not constitute a Remedial Action Scheme, which are executed in response to system conditions to prevent or to resolve one or more thermal or non-thermal transmission security violations or to optimize the transmission system. CMPs may be developed in cases where studies indicate economic dispatch alone may be unable to resolve a transmission security violation or in response to Real-Time conditions where SCED is unable to resolve a transmission security violation. ERCOT will employ CMPs to facilitate the market use of the ERCOT Transmission Grid, while maintaining system security and reliability in accordance with the Protocols, Operating Guides and NERC Reliability Standards. CMPs are intended to supplement, not to replace, the use of SCED for prevention or resolution of one or more thermal or non-thermal transmission security violations. CMPs include, but are not limited to the following:

Automatic Mitigation Plan (AMP)

A set of pre-defined automatic actions to execute post-contingency to address voltage issues or reduce overloading on one or more given, monitored Transmission Facilities to below their Emergency Rating, excluding any set of automatic actions that constitute a Remedial Action Scheme. AMPs shall only include schemes which switch series reactors by monitoring quantities that are solely located at the same substation as the switched device. AMPs shall not include adjusting or tripping generation or Load shedding and shall not be implemented on Interconnection Reliability Operating Limits (IROLs).

Mitigation Plan

A set of pre-defined manual actions to execute post-contingency to address voltage issues or reduce overloading on one or more given, monitored Transmission Facilities to below their Emergency Rating with restoration of normal operating conditions within two hours. A Mitigation Plan must be implementable and may include transmission switching and Load shedding. Mitigation Plans shall not be used to manage constraints in SCED.

Pre-Contingency Action Plan (PCAP)

A set of pre-defined manual actions to execute pre-contingency to address voltage issues or reduce overloading on one or more given, monitored Transmission Facilities to below their Emergency Rating with restoration of normal operating conditions within two hours. A PCAP may include transmission switching and does not include Load shedding. A PCAP may also be implemented for the duration of an Outage and shall be included in the Outage Scheduler as soon as practicable.

Remedial Action Plan (RAP)

A set of pre-defined manual actions to execute post-contingency to address voltage issues or in order to reduce loading on one or more given, monitored Transmission Facilities to below their Emergency Rating within 15 minutes. RAPs are sufficiently dependable to assume they can be executed without loss of reliability to the interconnected network, with restoration of normal operating conditions and below Normal Rating within two hours as defined in the Network Operations Model. RAPs may be relied upon in allowing additional use of the transmission system in SCED. RAPs shall not include generation re-Dispatch or Load shedding.

Temporary Outage Action Plan (TOAP)

A temporary set of pre-defined manual actions to execute post-contingency, during a specified Transmission Facility or Resource Outage, in order to address voltage issues or reduce overloading on one or more given, monitored Transmission Facilities to below their Emergency Rating with restoration of normal operating conditions within two hours. A TOAP must be implementable and may include transmission switching and/or Load shedding. TOAPs shall not be used to manage constraints in SCED.

Remedial Action Scheme (RAS)

A scheme designed to detect predetermined ERCOT System conditions and automatically take corrective actions that may include, but are not limited to, adjusting or tripping generation (MW and Mvar), tripping load, or reconfiguring a System(s) to maintain a secure system. RASs do not include under-frequency or under voltage Load shedding, the isolation of fault conditions, or out-of-step relaying (not designed as an integral part of an RAS). RASs shall not be implemented on Interconnection Reliability Operating Limits (IROLs). Additional criteria that are excluded from being classified as RAS are outlined in the Operating Guides. A RAS owner can be a TSP or Resource Entity.

2.2 ACRONYMS AND ABBREVIATIONS

**AMP Automatic Mitigation Plan**

**RAS Remedial Action Scheme**

3.3.2 Types of Work Requiring ERCOT Approval

(1) Each TSP, QSE and Resource Entity shall coordinate with ERCOT the requirements of Section 3.10, Network Operations Modeling and Telemetry, the following types of work for any addition to, replacement of, or change to or removal from the ERCOT Transmission Grid:

(a) Transmission lines;

(b) Equipment including circuit breakers, transformers, disconnects, and reactive devices;

(c) Resource interconnections; and

(d) Protection and control schemes, including changes to Remedial Action Plans (RAPs), Supervisory Control and Data Acquisition (SCADA) systems, Energy Management Systems (EMSs), Automatic Generation Control (AGC), Remedial Action Schemes (RASs), or Automatic Mitigation Plans (AMPs).

3.10.7.4 Remedial Action Schemes, Automatic Mitigation Plans and Remedial Action Plans

(1) All approved Remedial Action Schemes (RASs), Automatic Mitigation Plans (AMPs) and Remedial Action Plans (RAPs) must be defined in the Network Operations Model where practicable.

(2) Proposed new RASs, AMPs and RAPs and proposed changes to RASs, AMPs and RAPs must be submitted to ERCOT for review and approval. ERCOT shall seek input from TSPs and Resource Entities that own Transmission Facilities included in the RASs or AMPs or RAPs, and shall approve proposed new RASs, AMPs and RAPs and proposed changes to RASs, AMPs and RAPs in accordance with the process outlined in the Operating Guides. This shall include verification of the Network Operations Model. ERCOT shall provide notification to the market and post all RASs, AMPs and RAPs under consideration on the MIS Secure Area within five Business Days of receipt.

(3) ERCOT shall use a NOMCR to model approved RASs, AMPs and RAPs where practicable and include the RASs, AMPs or RAPs modeled in the Network Operations Model in the security analysis. The NOMCR shall include a detailed description of the system conditions required to implement the RASs, AMPs or RAPs. Execution of RASs, AMPs or RAPs modeled in the Network Operations Model shall be included or assumed in the calculation of LMPs. ERCOT shall provide notification to the market and post on the MIS Secure Area all approved RASs, AMPs and RAPs at least two Business Days before implementation, identifying the date of implementation. For RAPs developed in Real-Time, ERCOT shall provide notification to the market as soon as practicable.

***3.14.1 Reliability Must Run***

(1) RMR Service is the use by ERCOT, under contracts with Resource Entities, of capacity and energy from Generation Resources that otherwise would not operate and that are necessary to provide voltage support, stability or management of localized transmission constraints under applicable reliability criteria, where market solutions do not exist. This includes service provided by RMR Units and Must-Run Alternative (MRA) Resources.

(a) Upon receiving Notice from a Resource Entity as described in Section 3.14.1.1, Notification of Suspension of Operations, ERCOT may enter into RMR Agreements and begin procurement of RMR Service under this Section.

(b) Before entering into an RMR Agreement, ERCOT shall assess alternatives to the proposed RMR Agreement. ERCOT shall evaluate and present in a written report posted on the Market Information System (MIS) Secure Area the information in items (i) through (v) below. ERCOT is not limited in the number of additional scenarios it chooses to evaluate. The written report shall include an explanation as to why the items below are insufficient, either alone or in combination, to fill the requirement that will be met by the potential RMR Unit. The report shall be posted in the time frame required under paragraph (3) of Section 3.14.1.2, ERCOT Evaluation. The list of alternatives ERCOT must consider includes (as reasonable for each type of reliability concern identified):

(i) Redispatch/reconfiguration through operator instruction;

(ii) Automatic Mitigations Plans (AMPs) and Remedial Action Plans (RAPs);

(iii) Remedial Action Schemes (RASs) initiated on unit trips or Transmission Facilities’ Outages;

(iv) Load response alternatives once a suitable Load response service is defined and available; and

(v) Resource alternatives, including capabilities of Distributed Generation (DG), Load Resources, Direct Current Ties (DC Ties), Block Load Transfers (BLTs), etc.

(c) ERCOT shall minimize the use of RMR Units as much as practicable subject to the other provisions of these Protocols. ERCOT may Dispatch an RMR Unit at any time for ERCOT System security.

(d) Each RMR Unit must meet technical requirements specified in Section 8.1.1.1, Ancillary Service Qualification and Testing.

(e) ERCOT may execute RMR Agreements for no less than one month and no more than one year, with one exception. ERCOT may execute an RMR Agreement for a term longer than 12 months if the Resource Entity must make a significant capital expenditure to meet environmental regulations or to ensure availability to continue operating the RMR Unit so as to make an RMR Agreement in excess of 12 months appropriate, in ERCOT’s opinion. The term of a multi-year RMR Agreement must take into account the appropriate RMR exit strategy discussed in Section 3.14.1.4, Exit Strategy from an RMR Agreement. In the event ERCOT chooses to contract for an RMR Unit for longer than one year, ERCOT shall annually re-evaluate the need for the RMR Unit under the criteria set forth in paragraph (b) above. If ERCOT determines the RMR Unit is no longer needed, ERCOT shall enter into exit negotiations with the contract signatories to attempt to exit the contract early. However, ERCOT shall not enter into such negotiations until a Market Notice is issued providing the anticipated RMR exit time frame. The RMR standard Agreement is included in Section 22, Attachment B, Standard Form Reliability Must-Run Agreement. ERCOT shall post each RMR Agreement in its entirety, including amendments or modifications thereto, within five Business Days of execution on the MIS Secure Area.

(f) A Generation Resource is eligible for RMR status based on criteria established by ERCOT indicating its operation is necessary to support ERCOT System reliability according to the Operating Guides. A combined-cycle generation Facility must be treated as a single unit for RMR purposes unless the combustion turbine and the steam turbine can operate separately. If the steam turbine and combustion turbine can operate separately, and the steam turbine is powered by waste heat from more than one combustion turbine, the combustion turbine accepted for RMR Service and a proportionate part of the steam turbine must be treated as a single unit for RMR purposes. If the combustion turbine accepted for RMR Service can operate separately from the steam turbine, and only the combustion turbine is accepted as an RMR Unit, the RMR energy price will be reduced by the value of the combustion turbine’s waste heat calculated at the Fuel Index Price (FIP), except when the steam turbine is Off-Line. ERCOT shall post to the MIS Secure Area the criteria upon which it evaluates whether an RMR Unit meets the test of operational necessity to support ERCOT System reliability within five Business Days of change and shall issue a Market Notice stating the determination is available. This includes the case where a unit previously identified by ERCOT as potentially needed for RMR Service is no longer needed regardless of whether an RMR Agreement was ever signed.

|  |
| --- |
| ***[NPRR664: Replace paragraph (f) above with the following upon system implementation:]***  (f) A Generation Resource is eligible for RMR status based on criteria established by ERCOT indicating its operation is necessary to support ERCOT System reliability according to the Operating Guides. A combined-cycle generation Facility must be treated as a single unit for RMR purposes unless the combustion turbine and the steam turbine can operate separately. If the steam turbine and combustion turbine can operate separately, and the steam turbine is powered by waste heat from more than one combustion turbine, the combustion turbine accepted for RMR Service and a proportionate part of the steam turbine must be treated as a single unit for RMR purposes. If the combustion turbine accepted for RMR Service can operate separately from the steam turbine, and only the combustion turbine is accepted as an RMR Unit, the RMR energy price will be reduced by the value of the combustion turbine’s waste heat calculated at the Fuel Index Price for Resource (FIPRr), except when the steam turbine is Off-Line. ERCOT shall post to the MIS Secure Area the criteria upon which it evaluates whether an RMR Unit meets the test of operational necessity to support ERCOT System reliability within five Business Days of change and shall issue a Market Notice stating the determination is available. This includes the case where a unit previously identified by ERCOT as potentially needed for RMR Service is no longer needed regardless of whether an RMR Agreement was ever signed. |

(g) A Resource Entity cannot be compelled to enter into an RMR Agreement. A Resource Entity that owns a Generation Resource that is uneconomic to remain in service can voluntarily petition ERCOT for contracted RMR status by following the process in this subsection. ERCOT shall determine whether the Generation Resource is necessary for system reliability based on the criteria set forth in this Section.

(h) ERCOT must contract for the entire capacity of each RMR Unit.

(i) ERCOT shall post on the MIS Secure Area all information relative to the use of RMR Units including energy deployed monthly.

(j) The Resource Entity that owns the RMR Unit may not use the RMR Unit for:

(i) Participating in the bilateral energy market;

(ii) Self-providing of energy except for plant auxiliary Load obligations under the RMR Agreement; and

(iii) Providing of Ancillary Service to any Entity.

(k) ERCOT shall issue a Market Notice on the need for an RMR Unit prior to entering negotiations for the RMR Unit. Such Market Notice shall include the link to the ERCOT final RMR evaluation, the Resource name and pneumonic, the name of the Resource Entity, the name of the Qualified Scheduling Entity (QSE) for the Resource, the Resource MW rating by Season, and potential duration of the RMR Agreement, including anticipated start and end dates.

(l) ERCOT shall, through the issuance of Market Notices, provide the same information, contemporaneously, about the need for, or elimination of an RMR Unit to all registered Market Participants, including QSEs and Resource Entities with RMR Units.

***5.5.1 Security Sequence***

(1) The figure below highlights the key computational modules and processes that are used in the Security Sequence:



(2) The Security Sequence uses computational modules functionally similar to those used in Real-Time Sequence, however, the inputs into the Security Sequence are based on a snapshot of projected hourly system conditions and constraints rather than Real-Time data.

(3) The Security Sequence uses the status of all transmission breakers and switches (current status for the first hour and normal status for all other hours of Hourly Reliability Unit Commitment (HRUC) and normal status for all hours of Day-Ahead Reliability Unit Commitment (DRUC)), updated for approved Planned Outages for equipment out of service and returned to service for building a representation of the ERCOT Transmission Grid for each hour of the Reliability Unit Commitment (RUC) Study Period. The Network Topology Processor constructs a network model for each hour that must be used by the Bus Load Forecast to estimate the hourly Load for each transmission bus.

(4) The weather forecast obtained by ERCOT must be provided to the Dynamic Rating Processor to create weather-adjusted MVA limits for each hour of the RUC Study Period for all transmission lines and transformers that have Dynamic Ratings.

(5) ERCOT shall analyze base configuration, select n-1 contingencies and select n-2 contingencies under the Operating Guides. The Operating Guides must also specify the criteria by which ERCOT may remove contingencies from the list. ERCOT shall post to the Market Information System (MIS) Secure Area the standard contingency list, including identification of changes from previous versions before being used in the Security Sequence. ERCOT shall evaluate the need for Resource-specific deployments during Real-Time operations for management of congestion consistent with the Operating Guides.

(6) ERCOT shall also post to the MIS Secure Area any contingencies temporarily removed from the standard contingency list by ERCOT immediately after successful execution of the Security Sequence. ERCOT shall include the reason for removal of any contingency as soon as practicable but not later than one hour after removal.

(7) As part of the Network Security Analysis (NSA), for each hour of the RUC Study Period, ERCOT shall analyze all selected contingencies and perform the following:

(a) Perform full AC analysis of all contingencies;

(b) Monitor element and bus voltage limit violations; and

(c) Monitor transmission line and transformer security violations.

(8) As part of the NSA, if there is an approved Remedial Action Plan (RAP) available, it must be used before considering a Resource commitment.

(9) ERCOT shall review all security violations prior to RUC execution.

(10) All RASs, AMPs and RAPs modeled in the Network Operations Model shall be included in the contingency analysis. The computational modules must enable ERCOT to analyze contingencies, including the effects of all RASs and AMPs included in the Network Operations Model.

(11) ERCOT may deselect certain contingencies known to cause errors or that otherwise result in inconclusive study output in the RUC. On continued de-selection of contingencies, ERCOT shall prepare an analysis to determine the cause of the error. ERCOT may use information from the Day-Ahead processes as decision support during the Hour-Ahead processes. ERCOT shall post to the MIS Secure Area any contingencies deselected by ERCOT and must include the reason for removal as soon as practicable, but not later than one hour after deselection.

**6.5.1.1 ERCOT Control Area Authority**

(1) ERCOT, as Control Area Operator (CAO), is authorized to perform the following actions for the limited purpose of securely operating the ERCOT Transmission Grid under the standards specified in North American Electric Reliability Corporation (NERC) Standards, the Operating Guides and these Protocols,including:

(a) Direct the physical operation of the ERCOT Transmission Grid, including circuit breakers, switches, voltage control equipment, and Load-shedding equipment;

(b) Dispatch Resources that have committed to provide Ancillary Services;

(c) Direct changes in the operation of voltage control equipment;

(d) Direct the implementation of Reliability Must-Run (RMR) Service, Remedial Action Plans (RAPs), Automatic Mitigation Plans (AMPs), Remedial Action Schemes (RASs), and transmission switching to prevent the violation of ERCOT Transmission Grid security limits; and

(e) Perform additional actions required to prevent an imminent Emergency Condition or to restore the ERCOT Transmission Grid to a secure state in the event of an ERCOT Transmission Grid Emergency Condition.

(2) Consistent with paragraph (1)(e) above, if ERCOT seeks to exercise its authority to prevent an anticipated Emergency Condition relating to serving Load in the current or next Season by procuring existing capacity that may be used to maintain ERCOT System reliability in a manner not otherwise delineated in these Protocols and the Operating Guides, ERCOT shall take the following actions:

(a) Upon determination by ERCOT that additional capacity is needed to prevent an Emergency Condition and prior to any procurement activity associated with such additional capacity, ERCOT shall issue a Notice as soon as practicable with the following information:

(i) A detailed description of the reliability condition and need for additional capacity as determined by ERCOT and the timing of the proposed procurement;

(ii) Justification for the quantity of additional capacity to be requested;

(iii) Identification of potential Generation Resources or Load providing capacity considered by ERCOT to be acceptable for providing the additional capacity. Load capacity may be provided by Entities who, at ERCOT’s direction, would interrupt consumption of electric power and remain interrupted until released by ERCOT; and

(iv) A schedule of activities associated with the proposed procurement.

(b) If ERCOT identifies a specific Entity with which it will negotiate the terms for procurement of additional capacity, then ERCOT shall issue a Notice as soon as practicable that includes the Entity name and, as applicable, the Resource mnemonic, the Resource MW rating by Season, the name of the Resource Entity, and the potential duration of any contract, including anticipated start and end dates.

(c) ERCOT shall, to the fullest extent practicable, ensure that any actions taken to procure additional capacity meet the following criteria:

(i) Any capacity procured pursuant to this paragraph will be procured using an open process, and the terms of the procurement between ERCOT and the Entity will be memorialized in contracts that will be publicly available for inspection on the ERCOT website.

(ii) Each contract will include specified financial terms and termination dates. For purposes of Settlement, any contract associated with a Generation Resource will include substantially the same terms and conditions as an RMR Unit under a RMR Agreement, including the Eligible Cost budgeting process.

(iii) ERCOT shall provide notice to the ERCOT Board, at the next ERCOT Board meeting after ERCOT has signed the contract, that the actions required prior to execution of the contract, pursuant to paragraphs (2)(a) through (c) above, were completed by ERCOT before the contract was executed.

(iv) Any information submitted by the Entity to ERCOT through the procurement process may be designated as Protected Information and treated in accordance with the provisions of Section 1.3, Confidentiality, provided that final contract terms must be made available for public inspection.

(d) A Generation Resource that has received capital contributions from ERCOT pursuant to a contract executed under this paragraph (2) may not participate in the energy or Ancillary Services markets until such capital contributions have been refunded to ERCOT. For the purposes of this Section, capital contributions are defined as improvements with an asset life greater than one year under the applicable federal tax rules. The Resource Entity’s refund of capital contributions shall be a lump sum payment calculated as follows:

(i) If the Generation Resource chooses to participate in the energy or Ancillary Service markets after the termination date of the contract executed under this paragraph (2), the Qualified Scheduling Entity (QSE) representing the Resource Entity shall repay, in a lump sum payment, 100% of the book value of the capitalized equipment and all installation charges leading to turn key, one-time startup based on a linear depreciation over the estimated life of the capitalized component(s) in accordance with Generally Accepted Accounting Principles (GAAP) standards for electric utility equipment. The estimated life shall be based on documentation provided by the manufacturer; if installing used equipment, the estimated life may be based on an approximation agreed to by the Resource Entity and ERCOT.

(ii) If the Generation Resource chooses to participate in the energy or Ancillary Services markets as contemplated in item (2)(d)(i) above, and its participation requires a lump sum payment of capital contributions, ERCOT will issue a notice to all registered Market Participants announcing the Generation Resource’s decision to participate in the market(s) and identifying the amount of the lump sum payment due pursuant to item (2)(d)(i) above. ERCOT will also issue a notice to all registered Market Participants after completion of the collection and disbursement of the capital contributions, as described in item (2)(d)(iii) below, and after resolution of any disputes related to these capital contributions.

(iii) After ERCOT receives a Notification of Change of Generation Resource Designation (Section 22, Attachment H, Notification of Change of Generation Resource Designation) changing the Resource designation to “operational” at a future date, ERCOT shall charge the QSE representing the Resource Entity for capital expenditures incurred and previously paid to the Resource Entity as a result of the Resource’s return to service pursuant to this Section.

(A) For months in the contract term where notice is received more than five Business Days prior to True-Up Settlement of the first Operating Day of that month, ERCOT shall claw back any payments made for the capital expenditure associated with that month and subsequent months of the term, on the next practical Settlement but no later than the True-Up Settlement.

(B) For months in the contract term where notice is received five Business Days or less prior to True-Up Settlement of the first Operating Day of that month, ERCOT shall claw back any payments made for the capital expenditures within 45 days of receipt of the notice.

(C) ERCOT shall distribute the repayment to QSEs representing Load on the same basis used to collect the monthly capital expenditures, using a monthly Load Ratio Share (LRS). A QSE’s monthly LRS shall be the QSE’s total Real-Time Adjusted Metered Load (AML) for the month divided by the total ERCOT Real-Time AML for the same month.

(e) ERCOT shall endeavor to minimize the deployment of capacity procured pursuant to this paragraph with the goal of reducing the potential distortion of markets. Resources and Loads deployed to alleviate imminent Emergency Conditions will not be offered into the Day-Ahead Market (DAM). Rather, ERCOT will determine whether to use the capacity as part of the Hourly Reliability Unit Commitment (HRUC) process based on system conditions and the ability to meet Demand. In the event Generation Resources are committed and On-Line, ERCOT systems will generate a proxy offer for the Generation Resource at the System-Wide Offer Cap (SWCAP). The default offer will place the Generation Resources among the last for economic Dispatch, so as not to displace Generation Resources that are On-Line and offering into the market. To the extent practicable, the capacity deployed to alleviate imminent Emergency Conditions will not be used solely for the purpose of reducing local congestion.

(f) An Entity cannot be compelled to enter into a contract under this paragraph.

***6.5.7.1.10 Network Security Analysis Processor and Security Violation Alarm***

(1) Using the input provided by the State Estimator, ERCOT shall use the NSA processor to perform analysis of all contingencies in the active list. For each contingency, ERCOT shall use the NSA processor to monitor the elements for limit violations. ERCOT shall use the NSA processor to verify Electrical Bus voltage limits to be within a percentage tolerance as outlined in the Operating Guides. Contingency security violations for transmission lines and transformers occur if:

(a) The predicted post-contingency MVA exceeds 100% of the Emergency Rating after consideration of Dynamic Ratings; and

(b) A RAP, AMP or RAS is not defined allowing relief within the time allowed by the security criteria as defined in Operating Guide Section 2.2.2, Security Criteria.

(2) When the NSA processor notifies ERCOT of a security violation, ERCOT shall immediately:

(a) Initiate the process described in Section 6.5.7.1.11, Transmission Network and Power Balance Constraint Management;

(b) Seek to determine what unforeseen change in system condition has arisen that has resulted in the security violation, especially those that were 125% or greater of the Emergency Rating for a single SCED interval or greater than 100% of the Emergency Rating for a duration of 30 minutes or more; and

(c) Where possible, seek to reverse the action (e.g. initiating a transmission clearance that the system was not properly pre-dispatched for) that has led to a security violation until further preventative action(s) can be taken.

(3) If SCED does not resolve a transmission security violation, ERCOT shall attempt to relieve the security violation by:

(a) Confirming that pre-determined RAPs are properly modeled in the system;

(b) Instructing Resources to follow Base Points from SCED if those Resources are not already doing so;

(c) Instructing Resources to update the Resources Status in the COP from ONTEST to ON in order to provide more capacity to SCED;

(d) Deploying Resource-Specific Non-Spin;

(e) Committing additional Generation Resources through the Reliability Unit Commitment (RUC) process;

(f) Removing conflicting non-cascading constraints from the SCED process;

(g) Re-Dispatching generation by over-riding HDLs and LDLs;

(h) Instructing TSPs to utilize Reactive Power devices to manage voltage; and

(i) If all other mechanisms have failed, ERCOT may authorize the expedited use of a Temporary Outage Action Plan (TOAP) or Mitigation Plan.

(4) NSA must be capable of analyzing contingencies, including the effects of RASs, AMPs and RAPs modeled in the Network Operations Model. The NSA must fully integrate the evaluation and deployment of RASs, AMPs and RAPs and notify the ERCOT Operator of the application of these RASs, AMPs and RAPs to the solution.

(5) The Real-Time NSA may employ the use of appropriate ranking and other screening techniques to further reduce computation time by executing one or two iterations of the contingency study to gauge its impact and discard further study if the estimated result is inconsequential.

|  |
| --- |
| ***[NPRR649: Insert paragraph (6) below upon system implementation and renumber accordingly:]***  (6) HDL or LDL overrides required to pre-posture for an expected Outage shall only be utilized until SCED is capable of managing the related constraint by economic dispatch. |

(6) ERCOT shall report monthly:

(a) All security violations that were 125% or greater of the Emergency Rating for a single SCED interval or greater than 100% of the Emergency Rating for a duration of 30 minutes or more during the prior reporting month and the number of occurrences and congestion cost associated with each of the constraints causing the security violations on a rolling 12 month basis.

(b) Operating conditions on the ERCOT System that contributed to each transmission security violation reported in paragraph (6)(a) above. Analysis should be made to understand the root cause and what steps could be taken to avoid a recurrence in the future.

**6.5.7.10 IRR Ramp Rate Limitations**

(1) Each IRR that is part of a Standard Generation Interconnection Agreement (SGIA) signed on or after January 1, 2009 shall limit its ramp rate to 20% per minute of its nameplate rating (MWs) as registered with ERCOT when responding to or released from an ERCOT deployment.

(2) The requirement of paragraph (1) above does not apply during a Force Majeure Event or during intervals in which a decremental deployment instruction coincides with a demonstrated decrease in the available IRR.

(3) Each IRR that is part of an SGIA signed on or before December 31, 2008 and that controls power output by means other than turbine stoppage shall limit its ramp rate to 20% per minute of its nameplate rating (MWs) as registered with ERCOT when responding to or released from an ERCOT deployment.

(4) The requirement of paragraph (3) above does not apply during a Force Majeure Event, during intervals in which a decremental deployment instruction coincides with a demonstrated decrease in the available IRR, or during unit start up and shut down mode.

(5) The ramp rate requirement of paragraph (3) above shall not apply to an IRR during a limited compliance transition period if the IRR:

(a) Meets the technical specifications of paragraph (3) above but does not comply with the ramp rate requirement; and

(b) Submitted a compliance plan to ERCOT on or before June 1, 2009 that details the technical limitations leading to non-compliance, a work plan to achieve compliance by a reasonable date, and a ramp rate mitigation plan describing the IRR’s best efforts to adhere to the IRR ramp rate limitation during the applicable compliance transition period.

(6) The ramp rate requirement of paragraph (3) above shall not apply to an IRR that:

(a) Does not meet the technical specifications of paragraph (3) above; and

(b) Submitted an operations plan to ERCOT on or before June 1, 2009 describing the IRR’s best efforts to adhere to the IRR ramp rate limitation.

(7) IRRs subject to the ramp rate limitations of paragraphs (1) and (3) above are exempt from the requirements of the applicable paragraph upon receipt of a valid Dispatch Instruction from ERCOT to exceed the applicable ramp rate limitation when necessary to protect ERCOT System reliability.

(8) IRRs that operate under an RAS are exempt from the ramp rate limitations of paragraphs (1) and (3) above when decreasing unit output to avoid RAS activation.

(9) IRRs that meet the requirements of paragraphs (1) and (3) above are compliant with the ramp rate limitation requirements when the number of eligible one-minute intervals with an average ramp rate of 25% or less of nameplate capacity is equal to or greater than 90% of the eligible one-minute intervals in any one of three consecutive months. Intervals where paragraphs (2), (4), (7) or (8) above apply shall be excluded as eligible intervals for this performance metric. ERCOT shall initiate a review process with the IRR where the IRR’s score is less than 90%.

**7.5.5.3 Auction Process**

(1) The CRR Auction must be a single-round, simultaneous auction for selling the CRRs available for all auction products. ERCOT shall enter into the CRR Auction system a credit limit for each Counter-Party that has at least one CRR Account Holder. A Counter-Party’s CRR Auction credit limit is equal to the lesser of the credit limit as determined in Section 16.11.4.6.1, Credit Requirements for CRR Auction Participation, or, if provided, the Counter-Party’s self-imposed CRR Auction credit limit for the CRR Monthly Auction or for a time-of-use within a CRR Auction held as part of a CRR Long-Term Auction Sequence.

(2) Prior to the CRR Auction, ERCOT will conduct a two-part pre-auction screening process. First, if the Counter-Party’s CRR Auction credit limit is greater than that Counter-Party’s credit exposure as defined below using the CRR bid volumes rather than awarded volumes, then the Counter-Party’s CRR Auction credit limit will be ignored as the CRR Auction is solved. Second, for each CRR Account Holder of a Counter-Party, if the CRR Account Holder’s self-imposed credit limit is greater than that CRR Account Holder’s credit exposure as defined below, then the CRR Account Holder’s self-imposed credit limit will be ignored as the CRR Auction is solved.

The calculated exposure for the pre-auction screening for each CRR Account Holder is the sum of the credit exposure for PTP Obligation bids, PTP Obligation offers, and PTP Option bids for that CRR Account Holder. The calculated exposure for the pre-auction screening for each Counter-Party is the sum of the credit exposure for PTP Obligation bids, PTP Obligation offers, and PTP Option bids for that Counter-Party. PTP Option offers have zero credit exposure. Separately, for PTP Obligation bids, PTP Obligation offers, and PTP Option bids, for each source/sink Settlement Point combination, the credit exposure will use the bid price and MW quantity that produces the maximum credit exposure that could result from the CRR Auction for that source/sink Settlement Point combination.

(3) The credit constraint for each Counter-Party is based on the following calculation:

**ACR*b* = AOBLCR *b* + AOPTCR *b*- AOBLCRO *b***

Where:

AOBLCR *b* = ∑*m* ∑*h*∑*j, k*[(BOBLMW *m, h,(j, k), b*\* (Max(0, BPOBL *m, h,(j, k), b*) – Min(0,A *ci99, m, h,(j, k), b*, EACP *m, h,(j, k)*)))]

AOPTCR *b* = ∑*m* ∑*h*∑*j*, *k*[(BOPTMW *m, h,(j, k), b* \* BPOPT*m, h,(j, k), b*)]

AOBLCRO *b* = ∑*m* ∑*h*∑*j*, *k*(OOBLMW*m, h,(j, k), b* \* Min(0, OPOBL*m, h,(j, k), b*))

The above variables are defined as follows:

|  |  |  |
| --- | --- | --- |
| **Variable** | **Unit** | **Description** |
| ACR *b* | $ | *Auction Credit Requirement*—The auction credit requirement for a Counter-Party *b.* |
| AOBLCR *b* | $ | *Auction PTP Obligation Credit Requirement*—The auction credit requirement for all PTP Obligation bids submitted by a Counter-Party *b* for all Operating Days. |
| BOBLMW *m, h, (j, k), b* | MW | *Awarded Bid PTP Obligation*—The awarded bid PTP Obligation with the source *j* and sink *k* for the hour *h,* and month *m* submitted by a Counter-Party *b.* |
| BPOBL *m, h, (j, k), b* | $/MW per hour | *Bid Price for PTP Obligation*—Bid Price for PTP Obligationwith the source *j* and sink *k* for the hour *h,* and month *m* submitted by a Counter-Party *b.* |
| A*ci 99, m, h, (j, k), b* | $/MW per hour | *Path-Specific DAM-Based Adder*—The path-specific DAM-based adder with the source *j* and sink *k* for the hour *h,* and month *m* submitted by a Counter-Party *b*; calculated as 99th percentile of the average rolling consecutive DAM settled price for the reference CRR source/sink over a period that represents a month for each product type (18 days for 5\*16, 8 days for 2\*16, 28 days for 7\*8). The look-back period for DAM settled prices shall be the lesser of Nodal Market go-live to current time and current time minus three years. If historical Day-Ahead Settlement Point Prices (DASPPs) are not available for a Settlement Point for one or more Operating Days, ERCOT will designate a proxy Settlement Point for this purpose, and the DASPPs of the proxy Settlement Point of corresponding Operating Days are used. |
| EACP*m, h, (j, k)* | $/MW per hour | *Effective Auction Clearing Price*—The auction clearing price with the source *j* and sink *k* for the hour *h,* and month *m*.  For each CRR PTP Obligation, this value is equal to the auction clearing price of an awarded CRR selected as follows:  (a) Awarded CRRs with the source *j* and sink *k* containing hour *h* and operating month *m* are selected from the set of unexpired awarded PTP Obligations. If no awarded CRRs are found the EACP value is zero.  (b) If (a) results in more than one awarded CRR, awarded CRRs with the most recent award date are selected.  (c) If (b) results in more than one awarded CRR, then the awarded CRR with the lowest auction clearing price is selected. |
| AOBLCRO *b* | $ | *Auction PTP Obligation Credit Requirement for Offers*—The auction credit requirement for all PTP Obligation offers submitted by a Counter-Party *b* for all Operating Days. |
| OOBLMW*m, h, (j, k), b* | MW | *Awarded Offer PTP Obligation*—The awarded offer PTP Obligation with source *j* and sink *k* for the hour *h,* and month *m* submitted by a Counter-Party *b.* |
| OPOBL *m, h, (j, k ), b* | $/MW per hour | *Offer Price for PTP Obligation*—The offer price for PTP Obligation with the source *j* and sink *k* for the hour *h,* and month *m* submitted by a Counter-Party *b.* |
| AOPTCR *b* | $ | *Auction PTP Option Bid Credit Requirement*—The auction credit requirement for all PTP Option bids submitted by a Counter-Party *b.* |
| BOPTMW*m, h, (j, k),b* | MW | *Awarded Bid PTP Option*—The awarded bid PTP Option with the source *j* and sink *k* for the hour *h,* and month *m* submitted by a Counter-Party *b.* |
| BPOPT*m, h, (j, k), b* | $/MW per hour | *Bid Price for PTP Option*—The bid price for PTP Option with the source *j* and sink *k* for the hour *h,* and month *m* submitted by a Counter-Party *b*. |
| *b* | none | A Counter-Party. |
| *m* | none | An operating month. |
| *h* | none | An Operating Hour. |
| *j* | none | A source Settlement Point. |
| *k* | none | A sink Settlement Point. |
| *ci99* | none | 99th percentile confidence interval. |

(4) ERCOT may review preliminary CRR Auction results to ensure that post auction collateral requirements are satisfied for all CRR Account Holders participating in the CRR Auction. If it is practicable to rerun the applicable CRR Auction, and the post CRR Auction collateral requirements for a Counter-Party are not satisfied, ERCOT:

(a) Shall promptly notify the Counter-Party of the amount by which its Financial Security must be increased and allow it until 1500 on the next Bank Business Day from the date on which ERCOT delivered Notification to increase the Financial Security.

(b) If sufficient Financial Security is not received by 1500 on the next Bank Business Day, ERCOT shall void all of the Counter-Party’s bids and offers in the CRR Auction and rerun the CRR Auction without that Counter-Party’s activity.

(c) ERCOT shall award CRRs in quantities truncated to the nearest tenth MW (0.1 MW).

(d) The CRR clearing price is equal to the corresponding Shadow Price for that CRR product.

(e) When a CRR Account Holder is awarded CRRs as a result of a CRR Auction, the CRRs do not become the property of the winning CRR Account Holder, and the CRRs may not be placed in their CRR accounts, until the required CRR Invoice has been paid.

(5) ERCOT shall use a linear programming auction engine model for each CRR Auction that evaluates all CRR Auction bids and CRR Auction offers submitted, and selects a combination of CRR Auction bids and CRR Auction offers that:

(a) Makes the solution simultaneously feasible within the limits of the ERCOT network capability over the auction term; and

(b) Maximizes the objective function, which is equal to the total economic value (as expressed in the CRR Auction bids) of the awarded CRR Auction bids, less the total economic cost (as expressed in CRR Auction offers) of the awarded CRR Auction offers, while observing all applicable constraints.

(6) The CRR Network Model must, to the extent practicable, reflect the continuous and post-contingency system operating limits and operational procedures (i.e., Remedial Action Schemes (RASs), Automatic Mitigation Plans (AMPs) and Remedial Action Plans (RAPs)) in the Network Operations Model used by ERCOT during Real-Time Operations, as discussed below in Section 7.5.5.4, Simultaneous Feasibility Test

(7) Once a CRR Auction is complete, ERCOT shall archive and keep the CRR Auction system and all models used to finalize the CRR Auction results under ERCOT’s data retention policy as that policy applies to data that may be needed to resolve requests for billing adjustments under applicable billing adjustment procedures.

(8) Once a CRR Auction is complete, ERCOT will make available on the MIS Certified Area each active CRR Account Holder’s credit exposure calculated within the CRR Auction process (as defined in paragraph (3) above).

**7.5.5.4 Simultaneous Feasibility Test**

(1) The Simultaneous Feasibility Test (SFT) is a market feasibility test that confirms that the transmission system can support the awarded set of CRRs during normal system conditions, assuming that the Network Operations Model updated with Real-Time network topology is the same as that modeled (for the CRR Auction), while observing all security constraints.

(2) The SFT uses a Direct Current (DC) power-flow model to model the effect of CRR Auction bids and offers on the expected system network topology during the auction term. SFT is not a system reliability test and is not intended to model actual system operating conditions. SFTs are run during the determination of the winning bids and offers for the CRR Auction.

(3) Inputs to the SFT model include:

(a) CRR bids and offers for the auction;

(b) All previously awarded or allocated CRRs for each month;

(c) Transmission line Outage schedules;

(d) Expected configuration of Transmission Facilities, adjusted for oversold CRRs, as specified in paragraph (e) below;

(e) Increased capacity of each element that has been oversold in prior CRR Auctions and CRR allocations to exactly match the amount of CRRs that have been sold or allocated on that element (this ensures the feasibility of the CRR Auction);

(f) Thermal operating limits (including estimates for Dynamic Ratings) for transmission lines;

(i) For a CRR Long-Term Auction Sequence, ERCOT shall use Dynamic Ratings based on a historical analysis of the maximum peak-hour temperatures for the previous ten years; and

(ii) For the CRR Monthly Auction, ERCOT shall use Dynamic Ratings for the maximum peak-hour temperature forecast for the month;

(g) Voltage and stability limits that are valid for the study period converted to thermal limits;

(h) ERCOT Transmission Grid pre- and post-contingency ratings;

(i) All Transmission Element contingencies expected to be used by ERCOT in Real-Time operations; and

(j) RAPs, AMPs and RASs.