|  |  |  |  |
| --- | --- | --- | --- |
| NPRR Number |  | NPRR Title | Hydro RRS Deployment UFR Set Point |
| Date Posted | | June 9, 2011 | |
|  | |  | |
| Nodal Protocol Section(s) Requiring Revision | | 3.8.4, Hydro Generation Resources  3.18, Resource Limits in Providing Ancillary Service  8.1.1.4.2, Responsive Reserve Service Energy Deployment Criteria | |
| Requested Resolution | | Normal | |
| Revision Description | | This Nodal Protocol Revision Request (NPRR) clarifies that, for hydro Generation Resources operating in the synchronous condenser fast-response mode to provide Responsive Reserve (RRS), the initiation setting of the automatic under frequency relay (UFR) setting shall not be lower than 59.80 Hz. It also includes language to address the instances when a hydro Generation Resource operating in synchronous condenser fast response mode is triggered by an UFR device without a corresponding RRS deployment by ERCOT. It is a companion to Nodal Operating Guide Revision Request (NOGRR) 068 (Hydro-Responsive Reserve) and has been prepared in coordination with ERCOT Staff. | |
| Reason for Revision | | This Protocol revision establishes the minimum set point at which a hydro Generation Resource must set its UFR device for automatic response to an ERCOT System frequency event and also clarifies that same resource will not be deemed out of compliance when tripped by UFR without corresponding RRS deployment. | |
| Overall Market Benefit | | This protocol revision helps ERCOT recover frequency in a safe and reliable manner. | |
| Overall Market Impact | | Greater System reliability and overall lower RRS costs to market | |
| Consumer Impact | | Improves grid reliability by providing a less than 20-second response time to frequency dips below 59.80 Hz. | |
| Credit Implications  (Yes or No, and summary of impact) | | None | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Quantitative Impacts and Benefits | | | | |
| Assumptions | | 1 |  | |
| 2 |  | |
| 3 |  | |
| 4 |  | |
| Market Cost | |  | **Impact Area** | **Monetary Impact** |
| 1 | *None* | *None* |
| 2 |  |  |
| 3 |  |  |
| 4 |  |  |
| Market Benefit | |  | **Impact Area** | **Monetary Impact** |
| 1 | ***Improves system reliability by providing an automatic and 4 second generator response to frequency deviations.*** | *Difficult to quantify* |
| 2 |  |  |
| 3 |  |  |
| 4 |  |  |
| Additional Qualitative Information | | 1 | *Frequency response by hydro Generation Resources equipped with UFRs helps to minimize impact to the Grid, thus lowering the amount of risk premium built into RRS offers.* | |
| 2 |  | |
| 3 |  | |
| 4 |  | |
| Other Comments | | 1 |  | |
| 2 |  | |
| 3 |  | |
| 4 |  | |

|  |  |
| --- | --- |
| Sponsor | |
| Name | Jack Thormahlen |
| E-mail Address | [jack.thormahlen@lcra.org](mailto:jack.thormahlen@lcra.org) |
| Company | LCRA |
| Phone Number | 512-473-3200 ext 2635 |
| Cell Number |  |
| Market Segment | Cooperative |

|  |  |
| --- | --- |
| **Market Rules Staff Contact** | |
| **Name** |  |
| **E-Mail Address** |  |
| **Phone Number** |  |

|  |
| --- |
| Proposed Protocol Language Revision |

**3.8 Special Considerations for Split Generation Meters, Combined Cycle Generation Resources, Quick Start Generation Resources, and hydro Generation Resources**

3.8.4 Hydro Generation Resources

A QSE is exempt from meeting its RRS obligation for the MW amount provided by a hydro Generation Resource operating in synchronous condenser fast response mode and triggered by an Under Frequency Relay device (UFR) at the frequency set point specified in Protocol Section 3.18(3) (b) without corresponding RRS deployment by ERCOT. This exemption covers only the duration when hydro RRS MW is deployed by automatic UFR action.

3.18 Resource Limits in Providing Ancillary Service

(1) For both Generation Resources and Load Resources the High Sustained Limit (HSL) must be greater than or equal to the Low Sustained Limit (LSL) and the sum of the Resource-specific designation of capacity to provide Responsive Reserve (RRS), Regulation Up (Reg-Up), Regulation Down (Reg-Down), and Non-Spinning Reserve (Non-Spin).

(2) For Non-Spin, the amount of Non-Spin provided must be less than or equal to the HSL for Off-Line Generation Resources.

(3) For RRS Service:

(a) The amount of RRS provided from a Generation Resource must be less than or equal to 20% of thermal unit HSL for an Ancillary Service Offer and must be less than or equal to ten times the Emergency Ramp Rate;

(b) Hydro Generation Resources operating in the synchronous condenser fast-response mode may provide RRS up to the hydro Generation Resource’s proven 20-second response capability (which may be 100% of the HSL). The initiation setting of the automatic under frequency relay setting shall not be lower than 59.80 Hz.;

(c) For any hydro Generation Resource with a five percent droop setting operating as a generator, the amount of RRS provided may never be more than 20% of the HSL; and

(d) The amount of RRS provided from a Load Resource must be less than or equal to the HSL minus the sum of the LSL, Reg-Up Resource Responsibility, Reg-Down Resource Responsibility, and Non-Spin Resource Responsibility.

8.1.1.4.2 Responsive Reserve Service Energy Deployment Criteria

(1) Each QSE providing RRS shall so indicate by appropriate entries in the Resource’s Ancillary Service Schedule and the Ancillary Service Resource Responsibility providing that service. ERCOT shall adjust the Generation Resource’s Base Point for any requested RRS energy in the next cycle of SCED as specified in Section 6.5.7.6.2.2, Deployment of Responsive Reserve Service. For Controllable Load Resources, the QSE shall control its Resources to operate to the Resource’s Scheduled Power Consumption minus any Ancillary Service deployments. Control performance during periods in which ERCOT has deployed RRS shall be based on the requirements below and failure to meet any one of these requirements shall be reported to TRE as non-compliance:

(a) Within one minute following a deployment instruction, the QSE must update the telemetered Ancillary Service Schedule for RRS for Generation Resources and Load Resources to reflect the deployment amount. The difference between the sum of the QSE’s Resource RRS schedules and the sum of the QSE’s Resource RRS responsibilities must be equal to the QSE’s total RRS deployment instruction, excluding the deployment to Load Resources which are not Controllable Load Resources.

(b) For QSEs with Load Resources, excluding Controllable Load Resources, ten minutes following deployment instruction, the sum of the QSE’s Load Resource response shall not be less than 95%, nor more than 150% of the requested MW deployment and be maintained until recalled or the Resource’s obligation to provide RRS expires.

(c) For Load Resources, excluding Controllable Load Resources, associated with a QSE that does not successfully deploy as defined under this Section, ERCOT shall evaluate, identify and investigate each Load Resource that contributed to such failure, in order to determine failure under paragraph (9) of Section 8.1.1.1, Ancillary Service Qualification and Testing.

(d) A Load Resource providing RRS excluding Controllable Load Resources must return to at least 95% of its Ancillary Service Resource Responsibility for RRS within three hours following a recall instruction unless replaced by another Resource as described below. However, the Load Resource should attempt to return to at least 95% of its Ancillary Service Resource Responsibility for RRS as soon as practical considering process constraints. For a Load Resource that is not a Controllable Load Resource that is unable to return to its Ancillary Service Resource Responsibility within three hours of recall instruction, its QSE may replace the quantity of deficient RRS capacity within that same three hours using other Generation Resources or other Load Resources not previously committed to provide RRS.

(e) During periods when the Load level of a Load Resource (excluding Controllable Load Resources) has been affected by a Dispatch Instruction from ERCOT, the performance of a Load Resource in response to a Dispatch Instruction must be determined by subtracting the Load Resource’s actual Load response from its Baseline. “Baseline” capacity is calculated by measuring the average of the real power consumption for five minutes before the Dispatch Instruction if the Load level of a Load Resource had not been affected by a Dispatch Instruction from ERCOT. The actual Load response is the average of the real power consumption data being telemetered to ERCOT during the Settlement Interval indicated in the Dispatch Instruction.

(2) For all Measurable Events, ERCOT shall use the recorded data for each two-second scan rate value of real power output for each Generation Resource, Controllable Load Resource. ERCOT shall use the recorded MW data beginning one minute before the start of the frequency excursion event until ten minutes after the start of the frequency excursion event. Satisfactory performance must be measured by comparing actual Primary Frequency Response to the expected Primary Frequency Response as required in the Operating Guides.

(3) ERCOT shall monitor the Primary Frequency Response that is delivered during Measurable Events of Generation Resources and Controllable Load Resources, relay response for Loads and hydro RRS at the frequency specified in Protocol Section 3.18(3)(b). Primary Frequency Response performance must be analyzed by TAC and a performance metric must be provided in the Operating Guides.