Integrated Marketplace Protocols 20.0

4.3.1 Operating Reserve, Head-room and Floor-room Requirements

SPP calculates the amount of Operating Reserve required for the Operating Day, on both a system-wide basis and a Reserve Zone basis, to comply with the reliability requirements specified in the SPP Criteria. Additionally, SPP calculates the amount of Head-room and Floor-room required for the Operating Day to ensure that unit commitment is sufficient to reliably serve load in real-time while maintaining the Operating Reserve requirements. SPP calculates the hourly Regulation-Up, Regulation-Down, Contingency Reserve, Head-room and Floor-room requirements on an SPP BAA basis and calculates minimum Operating Reserve requirements and maximum Operating Reserve limitations for each Reserve Zone.

(1) SPP BAA Contingency Reserve requirements are set consistent with SPP Criteria and may vary on an hourly basis.

(2) SPP BAA Regulation-Up and Regulation-Down requirements are set to ensure compliance with NERC control performance requirements and are based upon a percentage of forecasted load, adjusted up or down to account for resource output variability, and may vary on an hourly basis.

(3) SPP BAA Head-room and Floor-room requirements are set to ensure that expected variations between real-time instantaneous load and the average load and variations between real-time variable resource output and projected variable resource output cleared in the Day-Ahead Market and the projected average load used in the RUC unit commitment processes can be reliably served in real-time while simultaneously maintaining the SPP BAA Operating Reserve requirements

(4) The SPP BAA requirements, minimum Reserve Zone Operating Reserve requirements and maximum Reserve Zone Operating Reserve limitations are calculated and posted no later than 7:00 AM Day-Ahead. At this time, SPP will also communicate each Asset Owner's estimated Operating Reserve obligations in each Reserve Zone using the BAA Mid-Term Load Forecast and the Asset Owner load forecasts developed by SPP under Section 4.1.2.1.5.

(5) These Operating Reserve requirements and limitations are used by SPP as inputs into the DA Market and RTBM clearing and RUC processes.

(a) SPP may increase Operating Reserve requirements for use in RTBM clearing and RUC processes above the requirements used in the DA Market clearing, including changes to Reserve Zone minimums and maximums, as required to meet increases in reliability requirements caused by changes in system conditions.

(6) Reserve Zone minimum Operating Reserve requirements and maximum Operating Reserve limitations are determined through reserve zone studies prior to the DA Market. Reserve zone studies are performed as described under Section 4.1.3.1.

4.1.3.2 Head-room and Floor-room Requirements

For Day-Ahead Market and RUC which use hourly load granularity, intra-hour Head-room and Floor-room requirements represent the needed real-time online capacity to address load changes within the Operating Hour and variations between real-time variable resource output and projected variable resource output. For example, during morning load pickup, the end-of-hour capacity requirements may be much greater than the average hourly energy represented by the cleared demand in the Day-Ahead Market or the load forecast used in the RUC processes. Additionally, the load forecast or generation forecast for a variable resource can be off due to uncertainties inherent in these load and generation forecasts. If Resources were committed only for the average hourly load, the online capacity at the end of the morning load pickup hour may be insufficient to support reliable real time operations. SPP calculates the required Head-room and Floor-room requirements for both the Day-Ahead Market and the RUC processes as follows. SPP may include up to 0% of the calculated Head-room and Floor-room requirements as an input into the Day-Ahead Market and may include 100% of the calculated Head-room and Floor-room requirements in all RUC processes.

4.1.3.2.1 Day-Ahead Market

SPP estimates the hourly Head-room and Floor-room requirements to be included in the Day-Ahead Market using SPP's Mid-Term Load Forecast and expected real-time instantaneous load values for the Operating Day including a factor for load forecast and variable resource output uncertainty. SPP's Mid-Term Load Forecast represents the expected average load in an Operating Hour. For Head-room and Floor-room requirement calculations, the instantaneous load is assumed to be equal to the expected average load at the midpoint of the Operating Hour and ramp linearly from this point to the expected average load at the midpoint of the neighboring Operating Hours. Because this assumption will not always be accurate, especially in Operating Hours in which an instantaneous peak load or an instantaneous minimum load trough occurs, and due to load forecast and variable resource output uncertainty, SPP requires an amount of Head-room and Floor-room requirements.

(1) The Head-room requirement for the current Operating Hour is set equal to the maximum of: (i) the difference between the expected instantaneous load at the beginning of the Operating Hour

and expected average load in the Operating Hour; (ii) the difference between the expected instantaneous load at the end of the Operating Hour and the expected average load in the Operating Hour; or (iii) the minimum Head-room requirement. SPP may reduce the Head-room requirement calculated above as operational experience dictates and/or to account for differences between offered Day-Ahead Market Resources and those available in the RUC processes.

(2) The Floor-room requirement for the current Operating Hour is set equal to the maximum of: (i) the difference between the expected average load in the Operating Hour and the expected instantaneous load at the beginning of the Operating Hour; (ii) the difference between the expected average load in the Operating Hour and the expected instantaneous load at the end of the Operating Hour; or (iii) the minimum Floor-room requirement. SPP may reduce the Floor-room requirement calculated above as operational experience dictates and/or to account for differences between offered Day-Ahead Market Resources and those available in the RUC processes.

The expected instantaneous load at the beginning of the Operating Hour is estimated as the load forecast value at the point at which a straight line drawn from the midpoint of the previous Operating Hour's expected average load to the midpoint of the current Operating Hour's expected average load crosses the beginning of the current Operating Hour.

The expected instantaneous load at the end of the Operating Hour is estimated as the load forecast value at the point at which a straight line drawn from the midpoint of the current Operating Hour's expected average load to the midpoint the next Operating Hour's expected average load crosses the end of the current Operating Hour.

The minimum Head-room and Floor-room requirements will be determined by SPP based upon operating experience. The Head-room and Floor-room requirements will be reviewed by the Market Working Group quarterly and may be refined over time based upon the relationship between SPP Mid-Term Load Forecast average loads and observed instantaneous load values.

4.1.3.2.2 RUC

For all RUC processes, SPP estimates the hourly Head-room and Floor-room requirements to be included in the RUC analyses using the most current Mid-Term Load Forecast and expected real-time instantaneous load values for the Operating Day using the same methodology as described under Section 4.1.3.2.1 for the Day-Ahead Market.