



# Manual 11 Revisions – Quick Fix

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Real-Time Market Operations  
Market & Reliability Committee  
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- Section 3.2.8 – clean up reference section for hydropower LOC calculation

### 3.2.8 Hydropower Units Opportunity Cost

Since hydropower units operate on a schedule and do not have an energy bid, opportunity cost for these units is calculated as follows. Only hydropower units not enrolled in the ESR participation model are considered in the rules below:

- During those hours when a hydropower unit is in spill, the ED value is set to zero such that the opportunity cost is based on the full value of LMP. During the Operating Day, the operating company is responsible for communicating this condition to the PJM Master Coordinator, and indicating this condition on the Regulation Updates page of the Markets Gateway System.
- If a hydropower unit is committed Day-ahead with MW greater than zero, the formula is the same as Section ~~3.2.7.Regulation Market Clearing and Dispatch~~[3.2.7.4 Lost Opportunity Cost \(LOC\)](#), except the ED value is an average of the LMP at the hydropower unit bus for the appropriate on-peak (07:00 – 22:59) or off-peak (00:00 – 06:59, 23:00 – 23:59) period, excluding those hours during which all available units at the hydropower plant were operating. If this average LMP value is higher than the actual LMP at the generator bus, the opportunity cost is zero. Day-ahead LMPs are used for the purpose of estimating opportunity costs for hydropower units, and actual LMPs are used in the lost opportunity costs for settlement.

- Section 4.3 – clean up reference section for reserve demand curve

decision to change the Reserve Requirements is made.

- Regardless of the Reserve Requirements modeled in the Market Clearing Engine, PJM operators will continue to initiate emergency procedures based on the Reserve Requirements defined in PJM Manual 13: Emergency Operations.
- Each Reserve Requirement will have an associated reserve demand curve as specified in Section 4.~~2.63~~.3 of this Manual.

- Section 4.4.1 – clean up a typo in NSRMCP equation

If,

$\Upsilon_{SR}$ : quantity of SR Product contributing to meet the SR, PR, and 30-Min requirements

$\Upsilon_{NSR}$ : quantity of NSR Product contributing to meet the PR and 30-Min requirements

$\Upsilon_{SecR}$ : quantity of SecR Product contributing to meet the 30-Min requirement

and SP: shadow price of the next MW of the product requirement constraint.

Then,

$$SRMCP = SPSR(\Upsilon_{SR}) + SPPR(\Upsilon_{SR}, \Upsilon_{NSR}) + SP30MIN(\Upsilon_{SR}, \Upsilon_{NSR}, \Upsilon_{SecR})$$

$$NSRMCP = SPPR(\Upsilon_{SR}, \Upsilon_{NSR}) + SP30MIN(\Upsilon_{SR}, \Upsilon_{NSR}, \Upsilon_{SecR})$$

$$SecRMCP = SP30MIN(\Upsilon_{SR}, \Upsilon_{NSR}, \Upsilon_{SecR})$$

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## Quick Fix Manual 11 - MRC



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