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Parameter Limited Schedules: Educational Document

Current Rules and Issues:

Parameter Limited Schedules (PLS) are limitations that are imposed on the parameters of a generator as part of their cost-based offer. According to current rules, per Manual 11: *Energy & Ancillary Services*, as of December 1st, 2008, PJM units were limited to a defined parameter limited schedule matrix, to be utilized on cost-based offers, and price-based offers in emergency situations. Units are placed on cost-based schedules when they are called on for transmission constraints and fail the TPS test, in which case they are then required to follow their pre-defined parameter limits, as submitted with their cost-based schedules. In the case of a Maximum Generation Emergency alert, units are placed on a parameter-limited price-based schedule, in which the energy offers of their schedule may still be market based, but the operating parameters must adhere to their pre-defined parameter limits. Units that cannot adhere to the limits in the current parameter limited schedule are able to submit long-term exceptions to the Market Monitor. In addition, units are able to submit daily exceptions for short-term issues with parameter limits.

Currently, only units that fail the Three Pivotal Supplier test are placed on their cost-based schedules, which include parameter limits. Price-based schedules are not required to incorporate any pre-defined parameter limits. The Market Monitor has noted that this may allow participants to use price-based schedule parameters to exercise market power, and require the payment of additional operating reserve credits. A unit could increase its minimum down time parameter on its price-based schedule, which could increase operating reserve credits received by the unit and operating reserve charges paid by other participants. In this example, a unit could extend its price-based minimum down time in order to avoid PJM determining that the unit was not needed for economics. Instead of the unit turning off or self scheduling, the unit would receive operating reserve credits for running during the off-peak period.

Units are also able to offer more flexible parameters on price-based schedules than on cost-based schedules. For example, a large frame CT unit may offer a 4 hour minimum run time on a price-based schedule and offer a 5 hour minimum run time on the cost-based schedule, as required by the parameter-limited schedule. This indicates the unit is more flexible than the minimum run time in its cost-based offer. This inflexibility causes PJM to keep units running longer than physically necessary, resulting in the payment of additional and unnecessary operating reserve credits for the unit. This issue results in an inefficient application of the TPS test because offer capped units are kept on longer than required by the physical attributes of the units.

Manual 11: *Energy & Ancillary Services* pages 25-30 contains the current parameter limited schedule rules.

Examples:

Example 1:
Unit extends minimum downtime parameter to avoid cycling during off-peak period

A sub-critical coal unit has a 9.0 hour minimum down time on its cost-based schedule, and a 24.0 hour minimum down time on its price-based schedule. The unit is offered using these parameters Monday-Thursday of each week. For the Friday offer, the unit extends its price-based minimum down time parameter to 72.0 hours.

The unit is called on for economics for Monday's peak period, and is needed throughout the week, until Friday's peak ends (2300 EPT). PJM expects to need the unit for Monday's peak period. The extension of the minimum down time parameter means that PJM dispatchers must keep the unit on line during the off-peak period rather than the unit shutting down or self scheduling. The unit receives operating reserve credits for this period. The result is that the cost of operating the unit has been transferred from the unit owner to those market participants paying operating reserves charges.

Example 2:
Unit offers more flexible parameters on price-based schedule than on cost-based schedule

A 100-MW Large Frame CT unit has a minimum run time of 5.0 hours on its cost-based schedule and a minimum run time of 2.0 hours on its price-based schedule. The unit's economic minimum is 100 MW.

The unit offers $100/MWh on its price-based schedule, and $50/MWh on its cost-based schedule. If the unit is dispatched on its price-based schedule, PJM can release the unit after two hours. The unit will receive $20,000 for those hours. However, if the unit fails the TPS test, and operates on its cost-based schedule, it must stay online for five hours. The unit will receive $25,000 for those hours, receiving operating reserves credits for three of five hours. If the unit is flexible enough to run for 2.0 hours, then the 5.0 hour minimum run time is not appropriate, as the intent of the parameter limited schedule rule is to ensure that units' operating parameters are consistent with the physical limits of the units. This also defeats the purpose of the TPS test, which is to ensure that units offer competitively when required to run when they have local market power.