

Stakeholder Comments Template

Submitted by	Company	Date Submitted
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Frequency Response Standard

The ISO believes the straw proposal and its accompanying technical appendix covers the standard's requirements for compliance purposes. The ISO is endeavoring to provide sufficient information to stakeholders for effective evaluation of the ISO's proposal. The ISO seeks comments on whether any unresolved questions on the standard and the ISO's obligation still exist.

Comments:

Calpine agrees that straw proposal clarifies the BAA obligations and sets the stage for compliance. Further, Calpine agrees that the ISO should explicitly state the parameters that it seeks from synchronous generators. That is, it should state acceptable droop settings, non-responsive bandwidth and outer loop control system parameters (e.g., frequency bias) that it seeks. Once these parameters are set, and generators are given the opportunity to modify systems, the CAISO should reevaluate the overall performance and the need for any further requirements.

At the same time, the CASIO must acknowledge that there are units or parts of units that will not respond to frequency perturbations – either because of operational conditions (e.g., steam valves operating wide open, or units in transition between configurations, or being actively dispatched in the opposite direction of PFR) or simply because the time lag of some mechanical governors will not provide a response in the evaluated time horizon.

Finally, Calpine agrees with other parties that suggest that a regional approach to meeting the BAL-003 standard should be explored. In fact, today, BPA reports the following:

“BPA has more frequency response reserves than it needs to meet its own obligations under the new standard, however many balancing authorities in WECC do not have sufficient capability to meet their NERC frequency response obligations. ... In response to this new standard, BPA intends to offer its surplus frequency response reserves to balancing authorities within WECC.”

Frequency Response Drivers

Several factors contribute to the primary frequency response performance of participating generators having governors. The ISO discusses some of the main drivers of PFR performance in Section 4.2 of its straw proposal. These factors include (1) magnitude of frequency deviation, (2) amount of synchronous on-line capacity providing sustained PFR, and (3) headroom available from that connected on-line capacity.

The ISO is evaluating what additional data points would need to be included in its Masterfile or through other mechanisms to facilitate a market tool or product to be designed. The ISO seeks comments on what factors influence a generators ability to provide PFR in the event of a frequency disturbance and the pieces of information necessary to estimate expected PFR.

Comments:

As Calpine has indicated above, and during the teleconference, calculating the amount of PFR movement from any individual resource introduces the real possibility of false-precision.

- First, not all synchronous capacity is created equal with respect to PFR. For example, the “synchronous capacity” of a combined-cycle gas turbine plant can be broken into three systems, only one of which will respond to frequency deviations in the desired timeframe.
 - Gas turbines, typically 50-70 percent of the Pmax of a CCGT will quickly sense frequency changes and the control system can immediately open fuel valves for fast-reacting response. They can and do provide effective PFR.
 - Steam turbines, on the other hand are often “slaves” to steam flow and often efficiently operate with valves wide open. While they will naturally respond to increases in the heat rejection of a gas turbine, the time to heat more steam and direct it to the steam turbine is beyond the targeted 52 seconds.
 - Duct Burners are simply an incremental source of heat injected directly into the heat recovery steam generators. While the gas valves can operate quickly, the time lag for this process is similarly too long to quickly arrest a frequency excursion.

In summary, not all synchronous capacity is capable of providing PFR. And as highlighted below, the operational status of the various forms of capacity will determine the amount of PFR available

- Second, the CAISO does not possess the data needed to precisely calculate current PFR capability. It may go without saying that if a unit is at its Pmax (Pmin), it will not provide upward (downward) PFR. Similarly, if a unit is being operated on temperature control, over-firing in order to create PFR will be prohibited by internal control systems.

Consider again, a CCGT. The ramping capability of a CCGT is generally supported by the operation of fast-ramping gas turbines. As the targeted ramp is met, the steam turbine increases its output (on a time lag) and the gas turbines wind down. Similarly, as a CCGT is moving down, the gas turbines generally pick up a large part of the decrease, and may pick up load as the steam turbine drops output. This see-saw of movement of the two (or more) generators is carefully orchestrated, but entirely non-visible to the CAISO at any moment. The only signal the ISO has is the aggregate metered output of the plant.

- Third, many generators may appropriate droop setting and bandwidth, but may have outer loop control systems programmed to drive to ISO dispatch orders, potentially squelching PFR. While the CAISO could mandate the elimination of any dampening control system by engaging frequency bias, it must consider three related matters; imbalance energy costs, indirect costs and finally, immutable tariff standards to comply with Dispatch Orders.
 - Imbalance energy will be created upon any deployment of PFR. While the expectation is that the quantity of energy produced is small, the price effects of significant contingency events could be large. Any energy produced during a frequency response should be considered optimal, instructed energy.
 - The CAISO should also evaluate the potential for other indirect charges (e.g., persistent deviation charges, allocators to imbalance energy) before requiring generation to deviate from ADS.
 - Finally, the CASIO should include explicit provisions in the tariff that allow generation to deviate from “Dispatch Orders” of the ISO during deployment of PFR.

In summary, not all units can provide PFR, and even for those that do, the CAISO does not have sufficient information to accurately calculate the available response.

Phase 1, addressing real-time deficiencies

Section 6.2 of the straw proposal discusses Phase 1 of the initiative which will enact the five steps to ensure it is capable of meeting the requirement at that time. The first step discussed in section 6.2.1 is to develop “look-ahead” tools to assess the PFR capability of the system at various time horizons in the future based on current system conditions. If the look ahead indicates an anticipated deficiency of PFR the ISO can take actions to address the deficiency.

The ISO seeks comments on its proposal for addressing real-time PFR deficiencies for 2017 compliance period.

Comments:

In general, Calpine does not object to the development of a “look-ahead” tool to assess the availability of PFR (of course, knowing the precise amount of PFR available from any particular unit at any particular time may not be reliable.) Calpine understands this proposal is preliminary, but much more information on the calculation methodology would be required.

In general, this calculation should form the basis of the demand for the new product on a forward basis.

Calpine would not support the development of this forward-looking tool if it merely establishes a basis for CAISO Operator out-of-market actions. As discussed below, any unit commitments necessary for PFR must create a capacity and / or shadow price. To do otherwise would unduly suppress energy market and Ancillary Services clearing prices.

Phase 1, tariff and interconnection revisions

Section 6.2 of the straw proposal discusses Phase 1 of the initiative which will enact five steps to ensure it is capable of meeting the requirement at that time. The first step discussed in section 6.2.2 is to revise the tariff to include requirements for all participating synchronous generators with governors, not just those providing spinning reserves, to set governors to specified droop settings and deadbands, and to not override governor response through outer-loop controls or other mechanisms.

The ISO seeks comments on the tariff revisions it is proposing to help the ISO ensure sufficient frequency responsive headroom and whether other revisions should be considered.

Comments:

Notwithstanding the concerns with the creation of imbalance energy above, we do not object to including objective Masterfile standards for droop, bandwidth and frequency bias. Even with these characteristics, however a steam turbine (as part of a CCGT, or as part of a geothermal project) may have no useful PFR.

Phase 1, ISO's practice of preserving operating reserve headroom

Section 6.2 of the straw proposal discusses Phase 1 of the initiative which will enact five steps to ensure it is capable of meeting the requirement at that time. The first step discussed in section 6.2.3 is to revise the tariff to clarify the authority of the ISO to designate any reserve not previously identified as Contingency Only by a Scheduling Coordinator (SC) as Contingency Only reserves.

Comments:

First, Calpine agrees with the Union of Concerned Scientists and the statements of WPTF that PFR and Spinning Reserves should be separate markets.

Calpine does not object to more spinning capacity being designated as contingency-only, however, we are not convinced that increasing the quantity of the spinning reserves is an efficient or appropriate way to increase PFR.

First, without additional constraints, additional procurement of spin does not translate equivalently into more PFR. Simply put, the ability to meet a dispatch and generate in 10 minutes does not translate directly into autonomous primary frequency response. In fact, the false presumption that spin and PFR are fungible will most likely result in deeper and more significant frequency perturbations. And more troubling, the absence of known autonomous response could allow the nadir (point C in the CAISO graphs) to drop, possibly low enough to trigger under-frequency load shedding.

Second, by designating more reserves as contingency-only, the CAISO creates less available energy for dispatch (load following, e.g., 15-minute, or 5-minute dispatch).

Finally, spinning reserves and PFR are distinct products. Counting spinning reserves as meeting a PFR obligation is inappropriate on its face.

Phase 1, performance requirements

Section 6.2 of the straw proposal discusses Phase 1 of the initiative which will enact five steps to ensure it is capable of meeting the requirement at that time. The first step discussed in section 6.2.4 is to include frequency response performance requirements for resources with governor control and frequency responsive capacity available.

The ISO will continue to develop the details of a proposed performance requirement and seeks comments from stakeholders on an appropriate performance requirement.

Comments:

Calpine asserts that as with other reserves, an explicit tariff requirement coupled with Masterfile characteristics and periodic reviews of response is a sufficient performance requirement. Of course a diligent and comprehensive review process should be established, with both a substantial opportunity for unit-owners to explain alleged non-performance as well as increasingly severe consequences of non-performance.

Phase 1, allocation of BAL-003-1 non-compliance penalties

Section 6.2 of the straw proposal discusses Phase 1 of the initiative which will enact five steps to ensure it is capable of meeting the requirement at that time. The first step discussed in section 6.2.5 is considering provisions for allocating any non-compliance penalties associated with BAL-003-1, should they be imposed on the ISO, to resources that should have provided more PFR than they actually delivered during frequency events.

The process discussed in ISO tariff section 14.7 applies to an allocation of any reliability-based penalty. The ISO seeks comment on how it could apply these tariff provisions to BAL-003-1 compliance and whether it should explore additional tariff provisions beyond those set forth in section 14.7 to impose responsibility for penalties on any resource that fails to provide primary frequency response for which it has an obligation to provide.

Comments:

Calpine “strenuously objects”¹ to this proposal.

First, as stated above, the CAISO does not possess the information necessary to calculate (without false precision) the counterfactual PFR response. Any assertion that a unit should have, or could have, or must have produced more responsive energy would open detailed and likely repeated factual disputes about the then-current conditions and the ability of individual machines to respond.

Second, the penalty proposal is unfair because not all units (e.g., vintage variable resources) are capable of providing PFR. Absent any other compensation, units subjected to asymmetric penalties would have to raise their capacity prices to reflect the risk-adjusted exposure to the penalties. This ironically, would place units providing a valuable service to the grid at a competitive disadvantage compared to units that have no ability to provide PFR.

Third, the proposal is cursed by a problem of big numbers. That is, if the CAISO is assessed a single occurrence penalty for not providing its individual share of PFR, that penalty could be as high as \$1MM. If only one generator did not meet the CAISO’s counterfactual response, it could be assessed the full \$1MM for a couple MW for a few seconds.

¹ A reference to which Jack Nicolson movie?

Phase 2, long-term approaches

Phase 2 of the initiative will evaluate if a market constraint or product is better suited to competition for frequency response capability (Section 6.3 of straw proposal). Such market-based mechanisms could not be designed, approved and implemented by December 1, 2016, and therefore the ISO will need to consider them in a second phase of this initiative.

Comments:

Calpine supports the development of a PFR market product that is separate and distinct from other reserve products. A separate revenue stream (or a separate statement of demand) will provide just and reasonable compensation for the incremental reliability value.

Under no circumstances should the CAISO create an uncompensated constraint in the market model that could force on units uneconomically. Such a capacity constraint (very much like the highly controversial Minimum Online Capacity Constraint) will, when binding, not create any shadow prices and in fact, will have a price suppressive effect.

However, Calpine sees no conflict with expanding the proposed Contingency Modeling Enhancements concept to a PFR constraint. That is, the ISO could create the new constraint and establish a nodal capacity payment akin to CME.