

Aliso Canyon Gas-Electric Coordination Phase 5: Draft Tariff Language

Department of Market Monitoring

October 4, 2019

The draft tariff language CAISO has posted would make permanent three of the seven measures aimed at addressing the limited operability of the Aliso Canyon gas storage facility which were first approved in 2016 on a temporary basis:

- (1) the maximum gas usage constraint;
- (2) the authority to deem a constraint uncompetitive (which can trigger bid mitigation within constrained areas) when the maximum gas usage constraint is enforced; and
- (3) the right to suspend virtual bidding when the maximum gas usage constraint is enforced.

In comments submitted in prior reports, stakeholder processes and filings at FERC, DMM has expressed numerous concerns with these Aliso Canyon gas usage nomograms. These concerns fall under four categories:

- 1. Gas usage constraint refinement:** Improvements are needed in how gas usage constraints are set and managed in the day-ahead market model and in the real-time market.
- 2. Dynamic competitive path assessment:** DMM continues to support the granting of authority to the ISO to manually deem constraints uncompetitive if necessary. If the ISO finds it necessary to use the manual override on a regular basis, DMM recommends adding gas usage constraints to the automated dynamic competitive path assessment.
- 3. Lack of mitigation for exceptional dispatch associated with gas usage constraints.** DMM has recommended that incremental and decremental exceptional dispatches related to the management of Aliso Canyon gas issues be considered non-competitive and subject to exceptional dispatch market power mitigation.
- 4. Real-time energy imbalance offset costs.** Use of the gas constraints can cause unnecessarily high real-time imbalance offset costs if the gas constraint is set too low and is not adjusted dynamically in real-time.

DMM provides detailed comments on these concerns below.

1. Gas usage constraints require refinement

Although the ISO has had the ability to enforce gas usage constraints since June of 2016, the constraints have only been enforced for short periods each year and have rarely been binding.

In February of 2018, the ISO resolved an issue that had prevented the gas usage limitation constraints from limiting gas burn on their own. Since this change, gas usage constraints have only been enforced over a two week period in 2018 and over four days in 2019.

When binding, gas usage limitations appear to have created energy imbalance offset costs and other secondary impacts. DMM recommends that the ISO continue to assess the full market impact of gas usage constraints when enforced and continue to refine this tool in light of this experience.

DMM continues to believe that, as indicated in DMM's October 2017 comments to FERC, "the CAISO's limited experience with maximum gas constraints suggests that while such constraints may be a useful tool in the future, additional refinement of the software and operational processes through which the constraints are implemented is necessary."¹ DMM recommends that any refinements to the gas usage limitation be made transparent to market participants.

Gas usage constraints should be reshaped to reflect hourly gas burn rather than ISO load.

In order to allow the market pricing and dispatch to accurately reflect physical limitations on the gas system, the maximum gas constraints must be properly calibrated and managed. In practice, establishing and managing a gas constraint in the CAISO market model requires a substantial degree of judgement by grid operators. As explained in the CAISO's business practice manual, CAISO operators must convert a potential limit on cumulative gas flow over a day or multi-hour period into a constraint applicable to each market interval in which a gas constraint will be enforced CAISO (hourly, 15-minutes and/or 5-minutes).

To do this, the CAISO's business practice manual indicates the CAISO will "distribute the daily limitation across the hours by a ratio of hourly load forecast to daily load forecast to support greater electric flexibility, unless the CAISO has coordinated an alternative specific gas limitation with the gas company." CAISO operators may then modify the constraint limit based on the CAISO's observations of actual or expected system conditions.

DMM's October 2017 comments to FERC provided an empirical example from January 23-26, 2017 illustrating the issues involved in effectively setting and managing the maximum gas usage constraint. Figure 1 shows the figure used to illustrate this example in DMM's October 2017 comments. As shown in this example, the ISO set the constraint for each 15-minute market intervals over these days to follow the basic shape of CAISO system loads. During most hours, modeled gas usage was well below the maximum limit set by the CAISO for each 15-minute intervals. However, during the peak evening ramping hours modeled gas usage hit or exceeded the limit set by the CAISO for 15-minute intervals during this period. In that example, excess

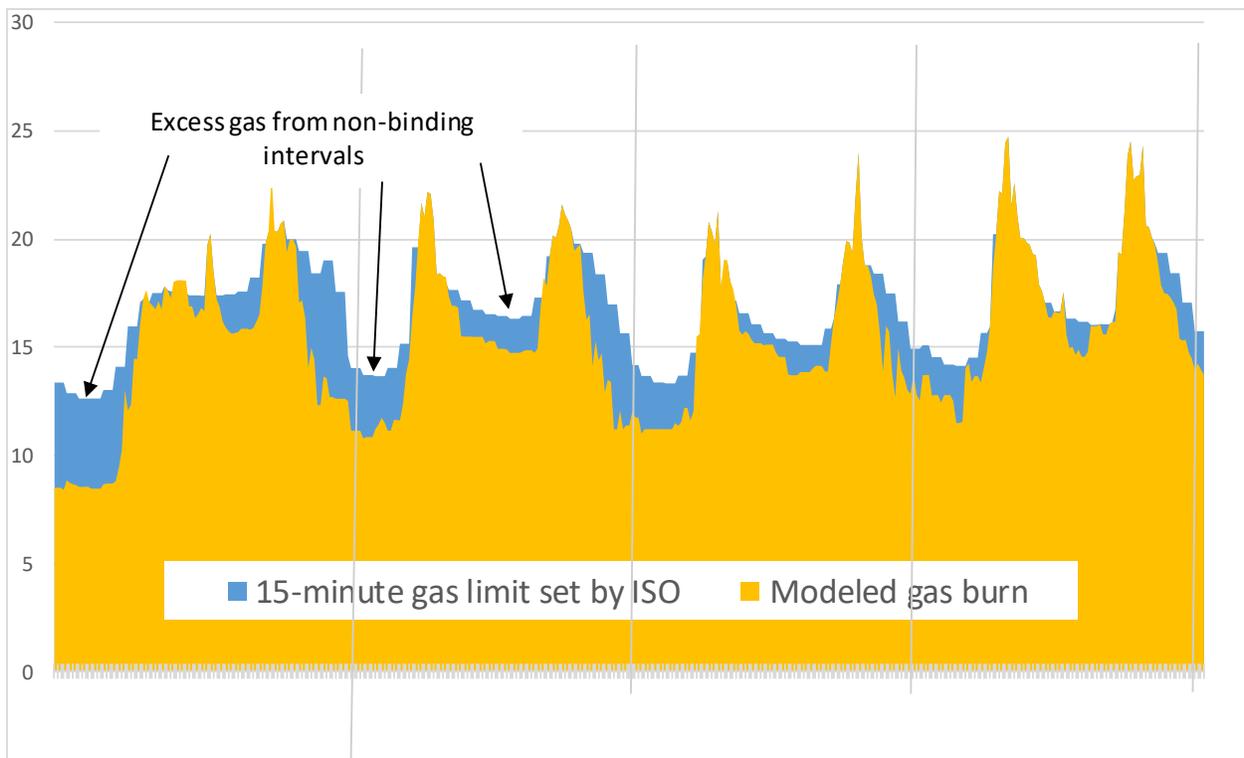
¹ *Comments of the Department of Market Monitoring*, Docket No. ER17-2568, *Comments of the Department of Market Monitoring*, Docket No. ER17-2568, October 26, 2017. p12.
http://www.aiso.com/Documents/Oct26_2017_DMMComments-AlisoCanyonElectric-GasCoordinationPhase3_ER17-2568.pdf

gas should actually have been available during the evening ramping hours when the gas usage constraint was binding and the need for fast ramping capacity from gas-fired units was most critical.

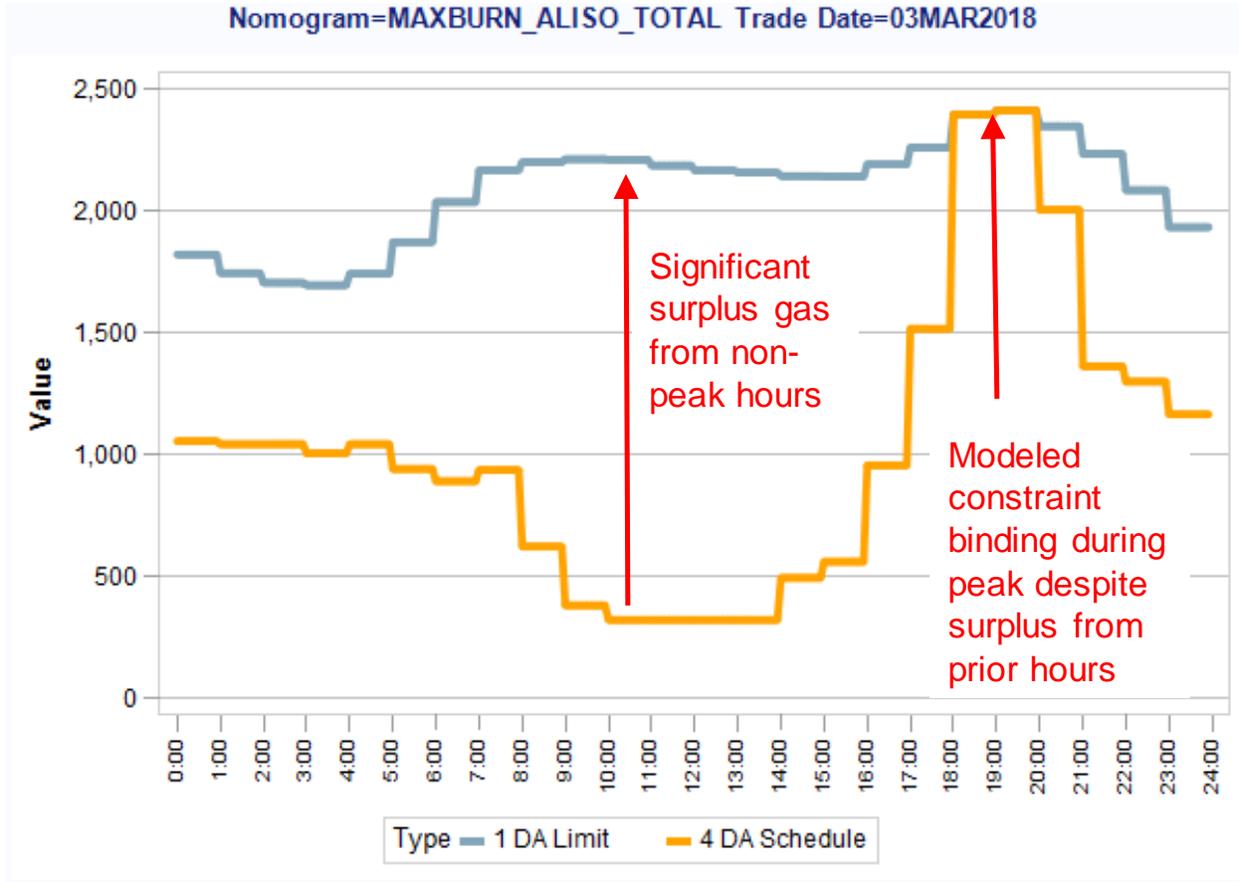
This issue continues in 2018 and 2019. Figure 2 shows another example of this pattern which DMM included in its October 2018 comments at FERC. This example is based on one of the days in which the gas usage constraint was used in the day-ahead market in spring 2018. As shown in figure 2, during most hours, modeled gas usage was well below the maximum hourly limit set by the CAISO. However, the constraint was binding during the peak evening ramping hours.

Again, this suggests that excess gas should actually have been available during the evening ramping hours when the gas usage constraint was binding and the need for fast ramping capacity from gas-fired units was most critical. Reshaping the constraint to reflect likely hourly gas burn rather than ISO load would avoid setting unnecessarily tight limits on gas generation when the need is most critical.

Figure 1. Aliso Canyon Area Gas Usage Limits and Modeled Gas Burn (January 23-26, 2017)



**Figure 2. Gas burn constraint and modeled gas usage in day-ahead market
(March 3, 2018)²**



The ISO has informed DMM that gas usage constraints will be refined to reflect net load (load less utility scale solar and wind generation) rather than overall system load. DMM requests that the ISO confirm this.

Although setting the gas constraint based on net load is an incremental improvement over setting the constraint based on total load, DMM would have recommended using the shape of the total gas burn within the area subject to the gas constraint. The shape of the gas burn on a typical day can be easily calculated from past data as well as the two-day ahead runs of the market software that the ISO performs.

² *Comments of the Department of Market Monitoring*, Docket No. ER18-2520, October 19, 2018. pp.25. <http://www.caiso.com/Documents/CommentsOfTheDepartmentOfMarketMonitoring-Aliso4-Oct192018.pdf>.

Gas usage constraints should be sufficiently flexible to allow gas from unconstrained hours to be consumed in later constrained hours.

During most hours when gas usage limitations are enforced, modeled gas usage was well below the maximum hourly limit set by the CAISO, as shown in Figures 1 and 2. However, the constraint was binding during the peak evening ramping hours. Again, this suggests that excess gas should have actually have been available during the evening ramping hours when the gas usage constraint was binding and the need for fast ramping capacity from gas-fired units was most critical.

Currently, gas usage limitations are instantaneous rather than dynamic limits. Allowing the market to allocate gas burn across time, optimizing against total gas burn over a day, would allocate gas burn more efficiently than a static limit. Short of creating a dynamic limit, the ISO could refine the limit to allow excess gas to be added to the constraint as gas usage constraint conformance. In addition to recommending exploration of these refinements, DMM recommends that the ISO continue to make such refinements transparent to market participants.

It is DMM's understanding that gas usage limitation levels are not adjustable in either the day-ahead or real-time market. Instead, limitations may be enforced or unenforced in response to changes in real-time conditions. DMM requests that the ISO confirm this understanding.

2. Manual override of dynamic competitive path assessment

To date, the CAISO has made limited use of its authority to implement the gas constraints. Therefore, DMM has not had to perform any analysis to determine if any transmission constraints should be deemed uncompetitive to account for the impact of any maximum gas constraints on the actual available supply of power that could relieve a congested constraint. However, DMM has been and will remain prepared to assess whether any transmission constraints should be deemed uncompetitive to account for the impact of these gas constraints.

No constraint would be deemed non-competitive versus competitive retrospectively, so that any mitigation would be applied after-the-fact. In fact, DMM would not deem any transmission constraint uncompetitive unless and until DMM could actually observe a number of things in the market. First, that a maximum gas usage constraint was actually being enforced in the day-ahead or real-time market. Second, that this gas usage constraint appeared to be causing a transmission constraint – which was being deemed competitive based on the automated market power tests incorporated in the market software – to in fact be uncompetitive after taking into account supply that was unavailable due to this gas constraint. And thirdly, that this appeared to be having an actual impact on the market in terms of uncompetitive bids and prices.

If DMM made this determination – based on after-the-fact analysis of market outcomes – we would then provide operations with the recommendation that if a certain gas usage constraint is enforced, then and only then would one or more specific constraints be deemed uncompetitive in the market software. If congestion then occurred on that constraint, the CAISO’s regular automated bid mitigation procedures would then be triggered in the market software. Again, no constraint would be deemed uncompetitive retrospectively and no mitigation would be applied retrospectively.

If the CAISO’s authority to use maximum gas constraints is made permanent, having the ability to assess and deem transmission constraints uncompetitive remains important. DMM recommends updated testing of tools developed in earlier implementation cycles. If the ISO finds it necessary to use the manual override on a regular basis, DMM recommends adding gas usage constraints to the automated dynamic competitive assessment. As long as the constraints are not incorporated in the automated dynamic competitive assessment, this creates the risk that constraints could undermine the ISO’s automated local market power mitigation when the constraints are activated and transmission congestion occurs into the gas constrained area.

3. Lack of mitigation for exceptional dispatch associated with gas usage constraints

The ISO has indicated that exceptional dispatch will continue to be used as needed to manage Aliso Canyon gas limitations. Therefore, DMM has recommended that incremental and decremental exceptional dispatches related to the management of Aliso Canyon gas issues be considered non-competitive and subject to exceptional dispatch market power mitigation.

DMM raised this issue with the CAISO prior to the start of this initiative. However, the issue was not included in any of the CAISO’s proposals in this stakeholder process. In response to requests from stakeholders for more analysis of this issue, DMM provided a detailed analysis of market concentration in our stakeholder comments in the first Aliso stakeholder process.³

Exceptional dispatch is used to manage factors which are not reflected in or effectively managed through constraints or conditions incorporated in the market software. In some situations, Aliso Canyon related gas system limitations may not be effectively incorporated or managed by the market software, so that exceptional dispatch of electric generators may be required.

³ *Comments on Aliso Canyon Gas-Electric Coordination Phase 2 – Straw Proposal*, Department of Market Monitoring September 15, 2016, p. 1-5.

http://www.aiso.com/Documents/DMMComments_AlisoCanyonGas-ElectricCoordinationPhase2StrawProposal.pdf

These exceptional dispatches may be incremental (i.e., to commit a unit or dispatch it at a higher level of generation) or decremental (i.e., to de-commit a unit or dispatch it at a lower level of generation). In some cases, DMM understands that CAISO operators may manage gas issues by issuing decremental exceptional dispatches to one or more units, while issuing incremental exceptional dispatches to one or more other units. In such cases, DMM recommends that these exceptional dispatches be considered non-competitive and subject to exceptional dispatch market power mitigation.

4. Real-time energy imbalance offset costs

In February 2018, it became apparent that use of the gas usage constraint can create significant real-time energy imbalance offset costs.⁴ This can occur when the gas constraints become binding in real-time and constrain generation below day-ahead levels. While this is an inherent potential cost stemming from use the gas constraints, these costs could be unnecessarily high if the constraints are not set and managed effectively. For instance, the examples shown in Figure 1 and Figure 2 show cases in which the gas constraints have been unnecessarily binding in day-ahead and real-time due to how the ISO sets the gas constraint and then does not adjust the constraint dynamically in real-time. DMM recommends that the ISO continue to publicly report on generation of real-time energy imbalance offset costs and other secondary impacts of imposing gas usage constraints and consider such impacts before imposing gas usage constraints in the market.

⁴ *2018 Annual Report on Market Issues and Performance*, Department of Market Monitoring, May 2019, p. 80. <http://www.caiso.com/Documents/2018AnnualReportonMarketIssuesandPerformance.pdf>