UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

California Independent System Operator Corporation	**)** **)**	**Docket No. ER20-273-000**

MOTION TO INTERVENE AND COMMENTS
OF THE DEPARTMENT OF MARKET MONITORING FOR THE
CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION

Pursuant to Rules 211, 212, and 214 of the Rules of Practice and Procedure of the Federal Energy Regulatory Commission ("FERC" or "Commission"), 18 C.F.R. §§ 385.211, 385.212, 385.214, the Department of Market Monitoring ("DMM"), acting in its capacity as the Independent Market Monitor for the California Independent System Operator Corporation ("CAISO") submits these comments in the above-captioned proceeding.

The CAISO is seeking approval for a continuation of tariff provisions allowing CAISO to enforce a maximum gas constraint for groups of units in the SoCalGas system. CAISO is also seeking approval of related provisions allowing the CAISO to manually incorporate gas limits in market power mitigation procedures and to suspend virtual bidding if market inefficiencies are observed when the maximum gas constraint is enforced. If the Commission declines to approve these provisions on a permanent basis CAISO requests another one year extension of the provisions through 2020.

DMM agrees with the CAISO that incorporating maximum gas constraints into the market software can in theory be more effective and efficient at managing gas limitations than use of manual dispatches made by system operators. However, DMM's review of the limited times the CAISO has utilized maximum gas constraints suggests that use of the

constraints can unnecessarily increase market costs and the design and implementation of gas constraints require enhancements to ensure that gas constraints are an effective tool for helping to ensure reliability. DMM therefore continues to recommend that the CAISO enhance how it utilizes the maximum gas constraint and improve how gas usage constraint limits are set and adjusted in real-time.

I. MOTION TO INTERVENE

DMM respectfully requests that the Commission afford due consideration to these comments and motion to intervene, and afford DMM full rights as a party to this proceeding. As the CAISO's Independent Market Monitor, the mission of DMM is as follows:

> To provide independent oversight and analysis of the CAISO Markets for the protection of consumers and Market Participants by the identification and reporting of market design flaws, potential market rule violations, and market power abuses.[1]

The CAISO tariff states that "DMM shall review existing and proposed market rules, tariff provisions, and market design elements and recommend proposed rule and tariff changes to the CAISO, the CAISO Governing Board, FERC staff, the California Public Utilities Commission, Market Participants, and other interested entities."[2] As this proceeding involves CAISO tariff provisions which affect the efficiency and potential for market power in the CAISO markets, it implicates matters within DMM's purview.

[1] CAISO Tariff Appendix P, Section 1.2.

[2] CAISO Tariff Appendix P, Section 5.1.

II. COMMENTS

A. Maximum gas usage constraints

The effectiveness of maximum gas usage constraints has been limited and further refinements are needed in how the CAISO implements this tool.

DMM agrees with the CAISO that incorporating maximum gas constraints into the market software can in theory be more effective and efficient at managing gas limitations than use of manual dispatches made by system operators. The CAISO now has well over three years of experience with the maximum gas usage constraint covering a period spanning four summers and three winters. This market experience suggests that the effectiveness of the maximum gas usage constraint has been very limited and that further refinements are needed in how the CAISO models and sets maximum gas constraints.

In DMM's October 2017 comments to the Commission, DMM noted that "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." [3] DMM's October 2017 comments provided an empirical example from January 23-26, 2017 illustrating the issues involved in effectively setting and managing the maximum gas usage constraint (see Figure 1).[4]

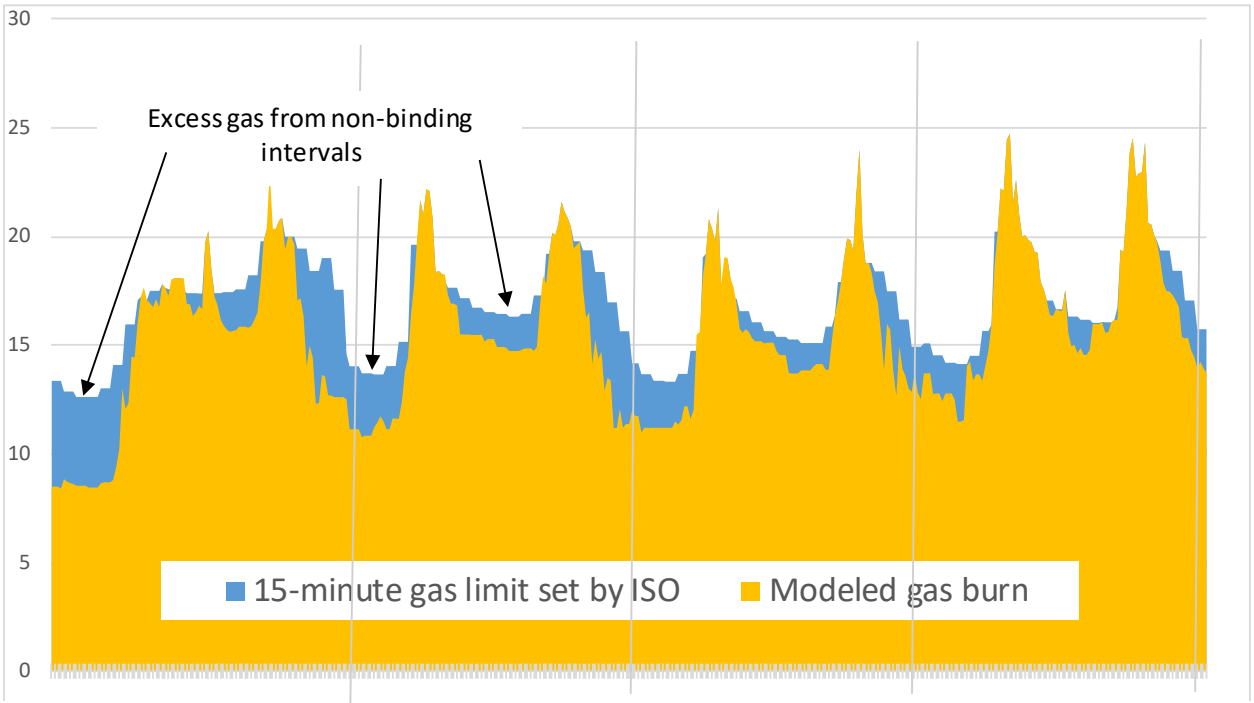
As shown in that example, the CAISO set the constraint for each 15-minute market intervals over these days to follow the basic shape of CAISO system loads. During most hours, modeled gas usage was well below the maximum limit set by the

[3] *Comments of the Department of Market Monitoring*, Docket No. ER17-2568, pp.15-16. http://www.caiso.com/Documents/Oct26_2017_DMMComments-AlisoCanyonElectric-GasCoordinationPhase3_ER17-2568.pdf

[4] *Comments of the Department of Market Monitoring*, Docket No. ER17-2568, p.12.

CAISO for each 15-minute interval. 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 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.

Figure 2. Aliso Canyon Area Gas Nomogram Limits and Modeled Gas Burn (Real time market, January 23-26, 2017)



In DMM's October 2018 comments on the CAISO's last request for a temporary extension DMM recommended "that CAISO refine how it utilizes the maximum gas constraint and improve how gas usage constraint limits are set and adjusted in real-time," and noted that "market performance during the limited times the CAISO has utilized maximum gas constraints shows that this measure can increase market costs significantly

and should be more effectively designed and implemented to ensure it is an effective tool for helping to ensure reliability". [5]

DMM's October 2018 comments provided another example of this pattern from one of the days in which the gas usage constraint was used in the day-ahead market in spring 2018 (see Figure 2).[6] 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 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.

The CAISO's current filing includes another empirical example from February 2019 showing how the CAISO's current methodology for setting gas burn limits based on gross load appears to over constrain gas usage in the evening ramping hours when reliance on gas generation is highest and most critical, while under constraining gas usage during the mid-day hours when reliance on gas generation is lowest. As shown in Figure 6 of the CAISO's transmittal letter, the gas use limit used in the day ahead market on this day appears to have unnecessarily constrained gas usage in hours 19 to 22.[7]

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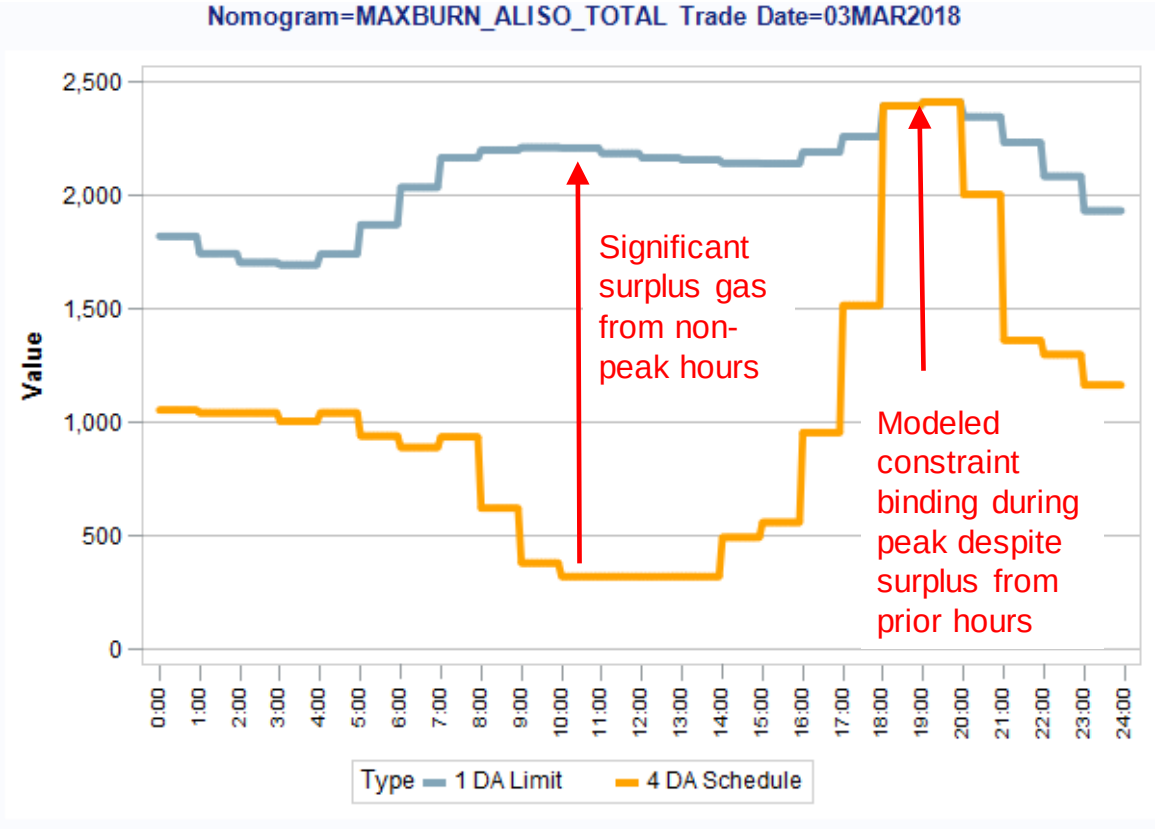
[5] *Comments of the Department of Market Monitoring*, Docket No. ER18-2520-000, October 19, 2018, pp.24-26. http://www.caiso.com/Documents/CommentsoftheDepartmentofMarketMonitoirng-Aliso4-Oct192018.pdf

[6] *Comments of the Department of Market Monitoring*, Docket No. ER18-2520-000, pp.24-26.

[7] Transmittal letter, p.30.

Figure 2. Gas burn constraint and modeled gas usage in day-ahead market



The net load approach for shaping the gas usage constraint being considered by the CAISO appears to be a significant improvement over the current approach.

The CAISO's November 2018 reply to comments on its last Aliso Canyon filing indicated that "CAISO continues to improve on the constraint as it employs and observes its effectiveness and impact, and the CAISO will continue to do so in the upcoming year" and "will continue to work with DMM as it makes adjustments." [8] The CAISO's transmittal letter indicates that CAISO has determined that it "can improve the gas limits it uses in the maximum gas constraint by using the net load assessment rather than gross load

[8] *Reply to Comments and Protests*, ER18-2520-000, November 2, 2018, pp.16-17. http://www.caiso.com/Documents/Nov5-2018-Motion-Leave-FileAnswer-Answer-Comments-Protests-AlisoCanyonGas-ElectricCoordinationPhase4-ER18-2520.pdf

assessment it uses today."[9] DMM agrees that Figure 6 of the transmittal letter, which is based on the one sample day analyzed by CAISO (February 8, 2019), suggests that the net load approach for shaping the gas usage constraint would be likely to be a significant improvement that may avoid the problems with the gross load approach currently in use. However, as discussed below, DMM encourages the CAISO to pursue further enhancements and consider other ways of setting the maximum gas constraints.

DMM encourages CAISO to pursue further enhancements for shaping the gas usage constraint.

DMM agrees with CAISO that details of how gas usage constraints are set should not be hardcoded in the CAISO tariff and that the CAISO should have flexibility in setting and adjusting constraints based on operating conditions and judgment.[10] DMM also appreciates the CAISO's commitment in the transmittal letter to pursue enhancements to the current approach for setting gas constraints through the BPM change management stakeholder process.[11] However, DMM has been disappointed that the CAISO has not already used this flexibility to address the fundamental flaw with the gross load approach that CAISO has continued to use to set gas usage constraints since 2016.

The CAISO's filing includes a comparison of the gross and net load approaches for one sample day with several approaches based on simple historical averages of past gas usage. The CAISO transmittal letter incorrectly refers to the approaches based on averages of historical gas usage that are examined in the CAISO's filing as "the DMM's proposed

[9] Transmittal letter, p.28.

[10] Transmittal letter, p.28-29.

[11] Transmittal letter, p.32

typical gas day methodology" or "DMM's proposed gas constraint."[12] None of the approaches examined in the CAISO's transmittal letter have been proposed by DMM. Rather, DMM has suggested that the shape of the gas burn could be estimated based on "past data as well as the two-day ahead runs of the market software that the ISO performs."[13]

Figure 3 below shows the same data shown in Figure 6 of the CAISO's transmittal letter, but also includes a line showing what the maximum gas constraint would be if this constraint was based on the shape of the projected gas usage from the CAISO's two day ahead run of the day-ahead market software, as suggested by DMM (red line). This two-day ahead modeling process is specifically designed to project and assess gas and generation needs based on the best available information prior to each day.[14]

As shown in Figure 3, a maximum gas constraint based on the CAISO's two day ahead market run (red line) would have exceeded the CAISO's calculation in the day-ahead market even *without* the maximum as constraint that was actually used by the CAISO on this day (compare red and blue lines). However, setting the constraint based on gross load (dotted black line) or on net load (gold line) would both appear to have unnecessarily constrained gas usage on this day in the day-ahead market. Unnecessarily limiting gas

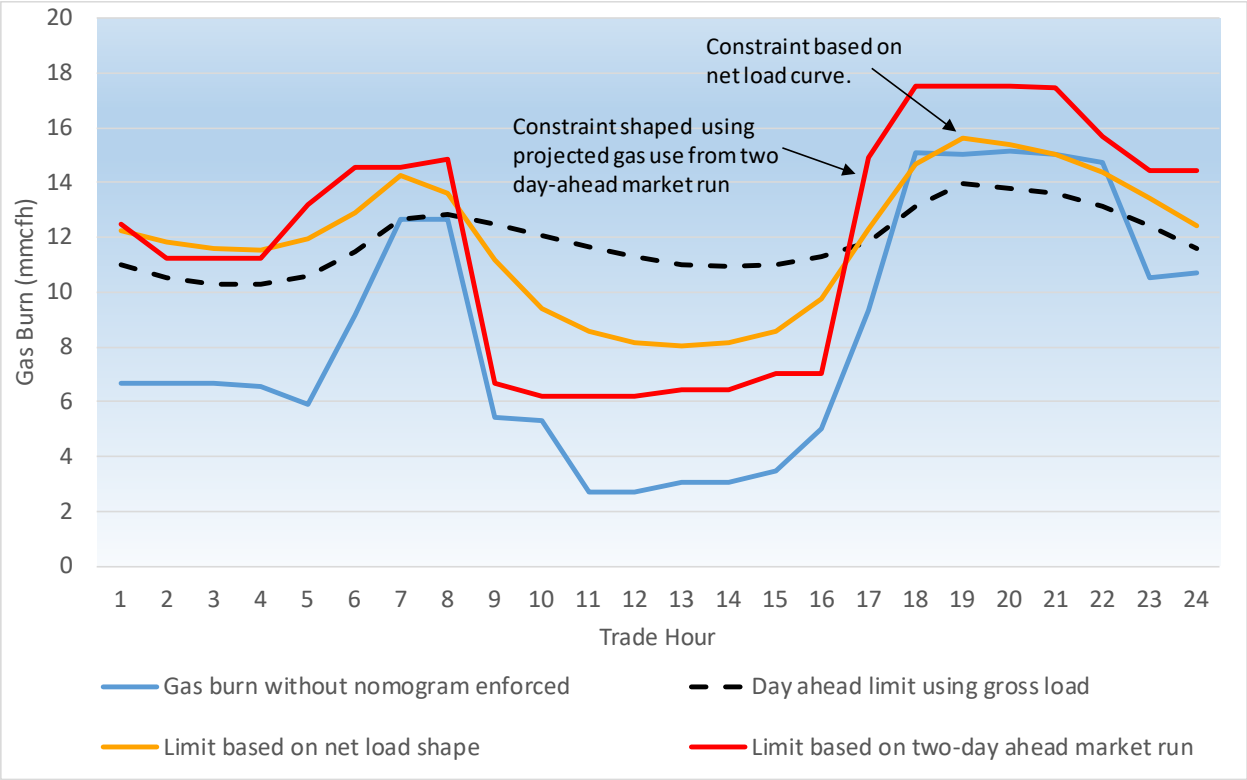
[12] Transmittal letter p.29, 30

[13] *Comments on Aliso Canyon Gas-Electric Coordination Phase 5: Draft Tariff Language*, October 4, 2019 (p.4) http://www.caiso.com/Documents/DMMComments-AlisoCanyonGas-ElectricCoordinationPhase5-DraftTariffLanguage.pdf

[14] Results of this two-day ahead modeling process are provided to scheduling coordinator for the explicit purpose of helping to enhance their to gas purchasing and scheduling decisions. As explained in the CAISO's 2017 filing, this two-day ahead modeling process "involves the CAISO running the commitment process based on available bids and estimates of system conditions at that time."

burn in peak hours could create inefficient dispatch, raising costs and creating unnecessary risks to reliability.

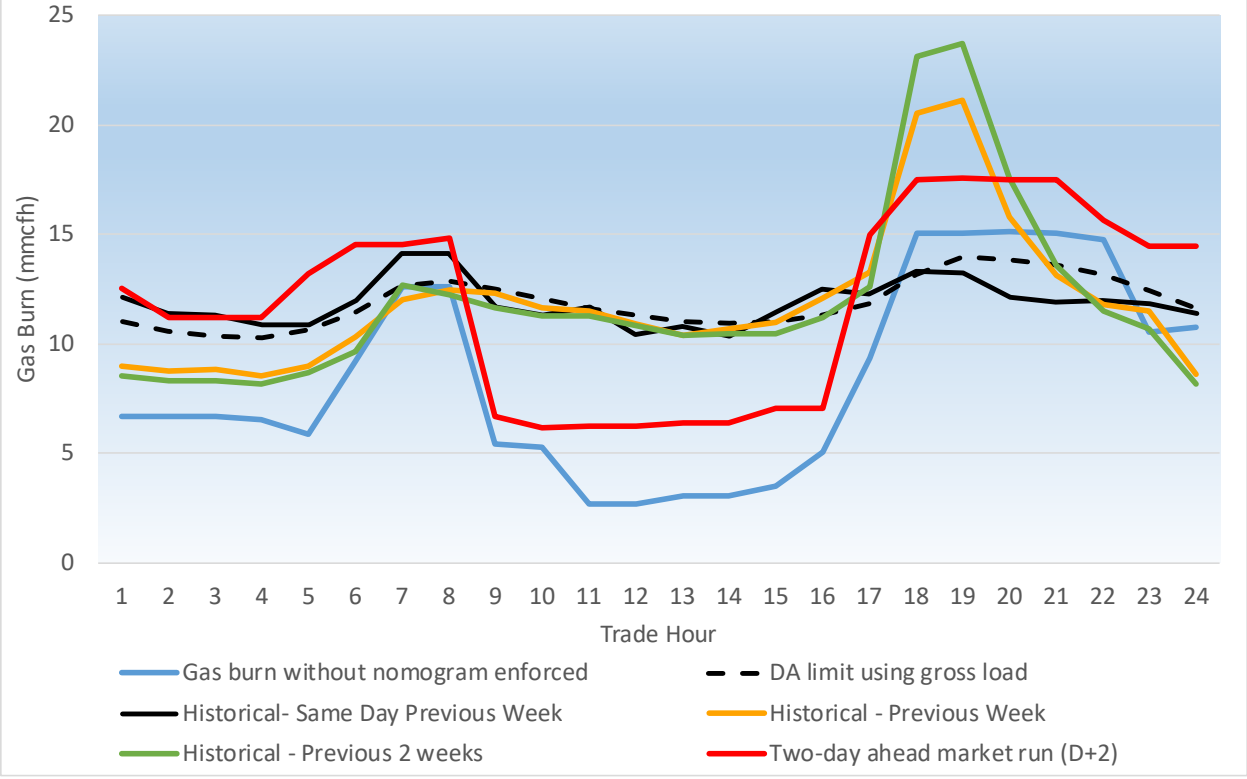
Figure 3. Gas burn constraint based on net load versus CAISO's two day ahead market run



While the net load approach proposed by the CAISO appears likely to be a significant improvement over the gross load approach currently in use, Figure 3 suggests that the net load approach may still unnecessarily limit gas usage in the peak ramping hours. The shape of the net load curve reflects load that must be met by gas generation, as well as other forms for supply such as imports, nuclear and hydro. As shown in Figure 3, shaping the gas constraint based on projected gas use from the two-day ahead modeling process may reduce cases in which gas usage is unnecessarily limited in the peak ramping hours.

Figure 4 shows the same data shown in Figure 7 of the CAISO's transmittal letter, but also includes a red line showing a gas usage constraint based on the CAISO's two day ahead run of the day-ahead market software. As shown in Figure 4, setting the gas constraint based on any the three approaches based on historical data examined by the CAISO would also appear to have unnecessarily constrained gas usage in the day-ahead market on this day. However, Figure 4 suggests that setting the maximum gas constraint based on the CAISO's two day ahead market run (red line) would have avoided issues associate with the approaches based on historical data examined by the CAISO in its transmittal letter.

Figure 4. Gas burn constraint based on historical data examined by the CAISO



If the gas usage constraints are used more frequently, DMM encourages CAISO to consider enhancements to the simplified manner in which gas constraints are modeled.

The CAISO's filing clarifies that the actual gas limitations provided to the CAISO by the gas companies are actually more complicated than the way in which gas usage constraints are currently modeled in the CAISO market software (i.e. which is currently based on a daily gas limit distributed hourly). As noted in the transmittal letter, "gas companies convey gas limitations to the CAISO not only in the form of daily and hourly amounts, but also as limitations on the instantaneous draw from the gas system."[15] This clarification further illustrates that the modeling approach currently employed by the CAISO is relatively simplistic and that further enhancements may be warranted if the need to utilize the gas usage constraints and the intervals in which the constraints are binding becomes more frequent.

CAISO should seek to avoid unnecessarily high imbalance energy offset costs that can result from enforcement of the gas constraint.

DMM has cautioned that "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."[16] As explained in DMM's prior comments, "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". [17]

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[15] Transmittal letter pp. 27-28.

[16] Transmittal letter p. 32.

[17] DMM *Comments on Aliso Canyon Gas-Electric Coordination Phase 5: Draft Tariff Language*, October 4, 2019 (p.7)

In it transmittal letter, the CAISO argues that "Although limitations on the gas system may affect real-time imbalance energy offsets, the DMM errs in concluding that enforcing the constraint causes increases in the real-time imbalance energy offsets."[18] The CAISO filing presents a summary of market conditions on days in February 2019 with high real-time imbalance offset costs which CAISO contends shows that "although, the CAISO enforced the maximum gas constraint on some of those days, there is no evidence that enforcing the constraint alone caused the RTIEO to also increase."[19]

DMM agrees that any gas usage limitation can cause higher costs and that the gas usage constraint was not the sole cause of real-time imbalance offset costs in February 2018. However, DMM continues to recommend that the CAISO seek to avoid setting the gas constraints in a manner that may cause the constraints to be binding unnecessarily in real-time so that generation is constrained below day-ahead levels, as this can create unnecessarily high real-time imbalance offset costs.

B. Authority to designate constraints non-competitive due to gas usage constraints

The CAISO is also seeking to extend its authority to deem selected internal constraints non-competitive as part of its local market power mitigation procedures due to supply limitation created by enforcement of gas usage constraints. DMM agrees with the Commission that the CAISO's maximum gas constraint should not require frequent manual interventions into its market power mitigation process. The CAISO has made limited use of its authority to implement the gas constraints and DMM has not observed the cases in which

[18] Transmittal letter p. 32.

[19] Transmittal letter p. 34.

gas constraints have undermined the automated local market power mitigation. However, DMM notes that in practice relying on this manual process might take several days or even weeks to implement, due to the need to perform ex post analysis of the impact of the impact of gas constraints and the changing nature of gas constraints.

If the CAISO's authority to use maximum gas constraints is made permanent, it will remain important for the CAISO to have the ability and authority to assess and deem transmission constraints uncompetitive. As long as the constraints are not incorporated in the automated dynamic competitive assessment, this creates the risk that constraints could undermine the CAISO's automated local market power mitigation when the constraints are activated and transmission congestion occurs into the gas constrained area. Therefore, if the ISO finds it necessary to use the gas constraints and these constraints are binding on a more regular basis, DMM recommends adding gas usage constraints to the automated dynamic competitive assessment.

C. Authority to suspend or limit virtual bidding when gas usage constraint is being enforced.

The CAISO is also seeking to extend its authority to limit or suspend virtual bidding activities if CAISO determines that virtual bids are detrimentally effecting market efficiency or reliability when the gas usage constraint is employed. The CAISO has never exercised its authority to limit or suspend virtual bidding. However, DMM agrees that it is prudent to continue to provide the CAISO with this authority in the event CAISO implements any maximum gas usage constraints.

III. Conclusion

DMM supports extension of the CAISO's authority to enforce a maximum gas constraint for groups of units in the SoCalGas system, along with related provisions allowing the CAISO to manually incorporate gas limits in market power mitigation procedures and to suspend virtual bidding if market inefficiencies are observed when the maximum gas constraint is enforced. However, DMM continues to recommend that the CAISO further refine how it utilizes the maximum gas constraint and improve how gas usage constraint limits are set and adjusted in real-time. DMM respectfully requests that the Commission afford due consideration to these comments as it evaluates the proposed tariff provisions before it.

Respectfully submitted,

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Independent Market Monitor for the California
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Dated: November 21, 2019

CERTIFICATE OF SERVICE

I hereby certify that I have served the foregoing document upon the parties listed on the official service lists in the above-referenced proceedings, in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure (18 C.F.R. § 385.2010).

Dated at Folsom, California this 21th day of November, 2019.

/s/ Anna Pascuzzo
Anna Pascuzzo