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Appendix 24

Purpose

The Purpose of this procedure is to coordinate with the applicable **Gas Transmission Operator** (GTO) concerning gas limitations imposed on generation resources that occur in both Day-Ahead and/or Real-Time periods, to ensure both gas and electric reliability to the extent possible.

This procedure outlines the steps taken when there is a natural gas reduction or insufficiency in a region, requiring Curtailment of multiple generator resources consistent with the gas company's Tariff as interpreted by the gas company.

1. Responsibilities

Gas Transmission Operator (GTO)	• Communicates with CAISO Operations Planning Engineer or CAISO Manager, BA Operations to provide the same information as well as availability of gas supply to the extent known. • Communicates with the impacted generators the gas limitations, per the gas company tariff. • Communicates to the impacted generators and CAISO the end of the gas limitations.
Generator Operator (GOP)	• Informs its Scheduling Coordinator of Curtailment/Outage and supply insufficient information received from the Gas Transmission Operator. • Requests Generation Outages, as required due to impacts of Curtailment.
Scheduling Coordinator (SC)	• Informs the CAISO about generating resources affected by natural gas Curtailments. • Works with the CAISO Generation Dispatcher to determine if a generation output pattern is necessary due to new gas limitations.
CAISO Manager, Balancing Authority (BA) Operations	Directs timely and appropriate Real-Time actions necessary to ensure reliable operation of the CAISO Controlled Grid and Balancing Authority Area.
CAISO Market Operator	Reviews market results to determine potential Curtailment effects by performing the following: • Reviews yesterday's Day-Ahead Market (DAM), D+2, and D+3 results. • Reviews actual Load and forecasts. • Determines whether any Minimum Online Capacity (MOC) constraint needs to be enforced. • Runs Extremely Long-Start Commitment Process (ELC) to determine ELC commitment. • Determines whether any constraint enforcement is necessary. • Verifies DAM closed automatically. • Evaluates output of Residual Unit Commitment (RUC) process. • Evaluates DAM results. • Runs Market Power Mitigation model (MPM), Integrated Forward Market model (IFM), and RUC. • Runs power flow studies with Scheduled Outages and Curtailments.

CAISO Generation Dispatcher	• Works with the Scheduling Coordinator if a different generation output pattern is necessary, due to new gas limitations. • Reviews and approves instructions from Real-Time Market (RTM) and sends instructions to Market Participants via Automated Dispatch System (ADS). • Logs all compliance issues. • Ensures RTM model runs at the designated intervals. • Dispatches resources with Exceptional Dispatch (ED), as requested by the CAISO Manager, BA Operations. • Constrains resources, as required for reliability purposes. • Sends Market Notification (Market Notification System (MNS) and ADS) market messages, as required. • Utilizes RTM/Exceptional Dispatch to modify resources in RTM. • Adjusts RTM (as needed) for proper Dispatching.
CAISO Operations Planning Engineer (OEP)	In the Operations Planning time horizon, evaluates potential for planned reductions or outages to natural gas supply and reliability impact to Bulk Electric System operation with the following activities: • Confirms receipt of requests for electric generation and transmission Outages and provides notice of rejection, approval, and other communications. • Analyzes outages for impacts to reliable operations of the Bulk Electric System. • Evaluates potential reductions or outages to natural gas supply, providing input on what impact an event may have on reliable Bulk Electric System operation. • Create transmission outage card to notify RMOE potential Gas Nomogram activation and create Gas Nomogram Curtailment in Supplemental Market Data Management (SMDM) for planned gas pipeline limitations.
CAISO System Operator	• Participate in and coordinate, event reporting and notification of gas Curtailment events that can impact the operation of the Day-Ahead and Real-Time Markets, and reliability of the grid.
CAISO Reliability and Market Operations Engineer (RMOE)	• Performs operations engineering studies to support reliable operations. • Performs contingency analysis in Day-Ahead (DA) and Real-Time (RT), as required and makes recommendations regarding outage plans and unit commitment requirements. • Considers critical variables and requirements that System Operations needs for planning and mitigating grid conditions. • Activates Gas Nomograms created by CAISO Operations Planning Engineer for inclusion in Day-Ahead and Real-Time markets, as applicable for trade dates confirmed by the gas company.

2. Scope/Applicability

2.1 Background

Maintenance (planned gas transmission outages and Curtailments, gas pressure reductions, etc.) of natural gas infrastructure systems required for reliable operation of the California ISO (CAISO) Controlled Grid shall be coordinated between Gas Transmission Operators (GTO), CAISO Operations Planning Engineer, and CAISO System Operations, especially when actions or events may impact electric system reliability.

Natural gas transmission pipelines are not subject to the jurisdiction or authority of the CAISO but are primarily regulated by state and/or federal regulatory agencies. Therefore, Gas Transmission Operator cooperation with these procedures is voluntary, does not operate as a waiver or consent to CAISO jurisdiction, and may be limited by or subject to compliance with state and/or federal agency rules and regulations. Information shared between the GTO and the CAISO, in accordance with any Non-Disclosure Agreement (NDA) shall be governed by the NDA.

2.2 Scope/ Applicability

Gas and electric operations coordination is critical to electric grid reliability and to the natural gas supply infrastructure, due to the support provided by electric generation fueled by gas. Outages of the gas transmission system may occur with advance notice (e.g., tests, planned maintenance), or without advance notice (e.g., leaks, dig-ins).

Such systems include, but are not limited to natural gas pipelines that have California power plants as end-users:

- Pacific Gas and Electric Company (PGAE)
- El Paso Natural Gas Company (Kinder Morgan)
- Southern California Gas Company (SoCalGas)
- Kern River Gas Transmission (Kern River)

Under normal circumstances, the Generator Operator or Scheduling Coordinator is responsible for notifying the CAISO about these types of supply Outages. In the case of a larger natural gas constraint or Outage, the Gas Transmission Operator will be engaged to actively coordinate Outage planning and project communication. Maintenance and Operations of supporting infrastructure systems required for reliable operation of the CAISO Controlled Grid and Balancing Authority Area should be coordinated with either CAISO Operations Planning (Operations Planning Horizon) or CAISO System Operations (Real-Time Operations Horizon), including but not limited to when fuel supply inventory concerns, actions, or events may affect electric system reliability.

3. Procedure Detail

3.1 General Information

Each day, the CAISO makes available, via Customer Market Results Interface (CMRI), to each Gas Transmission Operator, two Estimated Gas Usage reports. The first when D+1 is completed, and the second when D+2 is completed. The estimated gas usage reports provide hourly and daily totals for each Gas Transmission Operator entity for the areas they specify. Unit level hourly and daily estimated gas usage details supporting these reports is available to the Gas Transmission Operator upon demand, subject to terms of the executed Non-Disclosure Agreement (NDA).

These Estimated Gas Usage reports are the basis of any potential gas Curtailment events covered by this operating procedure. For that reason, this operating procedure cannot be in effect, regarding gas Curtailments covered in Section 3.4, as to a given trading day until the CAISO has provided the D+2 Estimated Gas Usage report for that trading day to the Gas Transmission Operator. These reports may also be used to establish the basis for the gas limitations implemented through use of the Gas Nomogram covered in Section 3.2.

Time is of the essence during any potential gas Curtailment events and reliability of the gas and electric systems are top priority. As such, the CAISO and the Gas Transmission Operator (GTO) shall ensure all Curtailment calculations are completed, and communications occur as expeditiously as possible. Should the integrity of the gas or electric system be at imminent risk, both gas and electric operators shall take whatever means necessary to safeguard system reliability.

Nothing in this procedure limits the authority of the CAISO to take actions authorized by its FERC-accepted Tariff, as the CAISO deems necessary in its sole discretion, to ensure the safe and reliable operation of the electric gird.

3.2 Natural Gas Limitations Using Gas Nomogram in SoCalGas Service Area

This section applies to SoCalGas for natural gas Limitations with advanced or immediate notice. This may occur either before or after the gas day begins (0700-0700). This section only applies to scenarios using the Gas Nomogram to manage applicable gas pipeline limitations.

3.2.1 Gas Nomogram Notice Options

Option 1: If there is a planned gas outage Limitation submitted before D+4 and posted in the ENVOY system, **continue to** Section 3.2.1.1, Option 1: Advance Notice.

Option 2: If there is a gas outage Limitation submitted after D+4, **skip to** Section 3.2.1.2, Option 2: Immediate Notice.

Each of these options continues to Activation in Section 3.2.1.3.

3.2.1.1 Option 1: Advance Notice

If there is a planned gas outage submitted before D+4 and posted in the ENVOY system, the following steps are used to coordinate:

SoCalGas System Operator
1. **Notify** the CAISO in weekly planning coordination calls as soon as known, but not later than four (4) calendar days prior to the impacted electric operating day; and **notify** CAISO Operations Planning Engineer representative or delegate: • **Specify** if this is a Limitation. • **Specify** the gas zone(s) and/or specific generation resource(s) affected. • **Specify** the limitation in terms of maximum MMcf/d, MMcf/h, or percent limitation values and whether the limitation must be a fixed volume, per hour or per day. ***Note:*** *Typically, the Day-Ahead Gas Nomogram is activated for all 24-hours, as any hours not included in the Gas Nomogram will allow the Day-Ahead to award gas resources with no gas constraints. The Gas Nomogram may be applied to specific periods with starting and ending hours for scenarios where the gas system limitation is only applicable during the corresponding period.* • **Specify** date with begin and end times of limitation period. ***Note:*** *Gas pipeline limitation affecting only one generator should be handled by instructing generator to enter fuel limitation outage, per Section 3.3.*

Operations Planning Engineer (OEP)
1. **Consider** the outage in outage study case. • If it is feasible, OEP **creates** a transmission outage card in WebOMS. 2. **Add** the Gas outage information into external note section, and 3. **Add** an instruction for RMOE in the market notes of the market impact panel regarding Gas Nomogram impacts and the specific gas limitation. • **Log into** SMDM and **select** Gas Burn option under nomogram. 4. **Create** day-ahead and real-time Curtailment. • **Refer** to OES Desktop Procedure OEP-049 for detailed instructions.

Continue to Section 3.2.1.3 Activation.

3.2.1.2 Option 2: Immediate Notice

If gas outages submitted after D+4, the following steps are used to coordinate:

SoCalGas System Operator
1. **Notify** the CAISO Manager, BA Operations, and provide the following information as soon as known: • **Specify** if this is a Curtailment Watch or Limitation. ○ **Specify** if or when the Watch notice is going to be posted on Envoy. • **Specify** the gas zone(s) and/or specific generation resource(s) affected. • **Specify** the limitation in terms of maximum MMcfd or percent limitation relative to the DA-2 or Day-Ahead Gas Burn Report values, and whether the limitation must be a fixed volume per hour or per day. • **Specify** date with begin and end times of limitation period. ***Note:*** *Gas pipeline limitation affecting only one generator should be managed by Gas Transmission Operator, instructing generator to enter fuel limitation outage card. GTO is to contact CAISO Manager, BA Operations, as well.*

CAISO Manager, BA Operations
1. **Confirm** with SoCalGas, Curtailment Watch or Limitation, which zone(s) and/or specific generation resources will be impacted, the required limitation amount in MMcf/d, MMcf/h or percent limitation, and the expected duration. 2. **Create** a SLIC log.

Reliability and Market Operations Engineer (RMOE)
1. **Consider** the outage in outage study case. 2. **Add** the Gas outage information into external note section, and 3. **Add** an instruction for RMOE in the market notes of the market impact panel regarding Gas Nomogram impacts and the specific gas limitation. 4. **Log into** SMDM and **select** Gas Burn option under nomogram. 5. **Create** day-ahead and real-time Curtailment. 6. **Refer** to OES Desktop Procedure OEP-049 for detailed instructions.

CAISO Operations Planning Engineer (OEP)
1. If it is feasible, OPE **creates** a transmission outage card in WebOMS.

3.2.1.3 Activation

Reliability and Market Operations Engineer (RMOE)
1. **Activate** the Gas Nomogram: • **Open** SMDM Gas Burn tab. • **Review** limitation to ensure grid reliability is maintained. • **Notify** CAISO Manager, BA Operations of review and necessary adjustments to maintain electric system reliability and activate nomogram. o **Utilize** three-part communication with CAISO Manager, BA Operations to **confirm** all nomogram parameters.

CAISO Manager, BA Operations
1. **After** SoCalGas has issued their notice on Envoy, • **Issue** the appropriate Market Notification **via** MNS (Day-Ahead and Real-Time) and ADS (Real-Time only) Message.* 2. **Evaluate** system conditions for Restricted Maintenance Operations, per CAISO Operating Procedure 4420 System Emergency. 3. **Notify** RC West and **advise** them of the following information when using either Gas Curtailment Tool or Gas Nomogram Tool: • Duration, amount of limitation, and impacted zone(s) or specific generation resource(s). 4. **Notify** other gas companies serving generation in CA and **advise** them of the following information when using either Gas Curtailment Tool or Gas Nomogram Tool: • Duration, that they may see increased generation in their gas service area, and if they have any concerns with increased natural gas demand: o Pacific Gas and Electric Company (PGAE)

CAISO Manager, BA Operations
○ El Paso Natural Gas Company (Kinder Morgan) ○ Kern River Gas Transmission (Kern River) ***Note*:** *See Section 3.6 Market Notification (MNS and ADS) Scripts.*

CAISO Generation Dispatcher
1. **Create** Ancillary Service (AS) Blocks for each resource in the Gas Nomogram before market execution and for the duration of the Nomogram activation. 2. **Ensure** the MNS and ADS messaging in *Section 3.6* includes the AS Blocking detail. ***Note:** The Gas Nomogram does not consider AS awards. Without such AS Blocks at the resource level, the total gas curtailment target requested by the gas company may be exceeded.* 3. **Monitor** generator output to **ensure** resource(s) are dispatched in accordance with any fuel availability reductions, and in a manner that meets system reliability needs. 4. If the Generator Operator or SC determine new hourly gas burn modifications are necessary or desired, • **Contact** SoCalGas System Operator (or representative) for their approval.

SoCalGas System Operator
1. **Notify** affected Generating Station(s) of Gas Nomogram activation and potential impact to market dispatches.

Generator Operator (GOP)
1. **Notify** Scheduling Coordinator of Gas Nomogram activation and potential impact to market dispatches.

Scheduling Coordinator (SC)
1. **Follow** CAISO dispatch instructions.

3.3 Reduction/Outage Implementation for all Gas Transmission Operators

This section applies to a natural gas reduction or insufficiency requiring a Curtailment of scheduled gas volumes, with advance or immediate notice where the gas system limitation or scheduled gas reduction impacts one or few Generator Operators, rather than a defined gas Curtailment zone.

Applicable to the following Gas Companies:

1. Pacific Gas and Electric Company (PGAE)
2. El Paso Natural Gas Company (Kinder Morgan)
3. Southern California Gas Company (SoCalGas)
4. Kern River Gas Transmission (Kern River)

Gas Transmission Operator (GTO)
1. **Notification** by the GTO to impacted end-use customer(s) (e.g., Generator Operator) **with** details regarding the limitations and scheduled gas reductions. 2. **Notify** the CAISO Manager, BA Operations of impacts to end-use customers that include one or more generators, as appropriate to **coordinate** outage planning per CAISO Operating Procedure 3220 Generation Outages, which may include, but is not limited to: • Which Generating Units will be affected • Degree of impact (MMcf/d, MMcf/h, or percent limitation) • Reduction/outage start date and time, and end date and time 3. If reduction/shortage is anticipated one (1) to two (2) days in advance, • **Notify** the CAISO Manager, BA Operations by telephone. 4. **Communicate** any gas issues with the CAISO and other affected Gas Transmission Operators, as early as possible.

Scheduling Coordinator (SC)
1. **Notify** the CAISO Market Operator of impacts to the Generating Unit, **using** the Outage management system (OMS), per CAISO Operating Procedure 3220 Generation Outages: • If reduction/shortage is anticipated 1 to 2 days in advance: ○ **Provide** timely notification to the CAISO Market Operator by telephone and ○ **Submit** a derate card **via** the outage management system, **using** "Fuel Insufficiency" nature of work category. 2. **Submit** bids for Day-Ahead Market, as appropriate for the impacted period, consistent with the updated gas availability for the Trade Day. • If shortage occurs after the close of the Day-Ahead Market, but prior to Real-Time: ○ **Notify** the CAISO Generation Dispatcher by telephone and ○ **Submit** a derate card **via** the outage management system, **using** "Fuel Insufficiency" nature of work category.

CAISO Market Operator
1. If anticipating an increase in unit commitments for the next day, • **Request** the CAISO Manager, BA Operations to **contact** the impacted Gas Transmission Operators and **advise** them of forecasted increase in demand for supply. • **Communicate** any gas issues between the CAISO and each Gas Transmission Operator, as early as possible. ***Note:*** *In addition, consider a peak day call mechanism to alert market participants.*

CAISO Manager, BA Operations
1. **Consider Implementing** Restricted Maintenance Operations, per CAISO Operating Procedure 4420 System Emergency. ***Note****: The specific actions and the order of the actions taken may vary due to system conditions as well as the impacts of natural gas supply issues.*

CAISO Reliability and Market Operations Engineer (RMOE)
1. **Study** and **analyze** the constraints that show up in Real-Time study tools due to gas Curtailment: • **Consider** path and transfer capabilities and limitations for procurement of energy and Contingency Reserves.

CAISO Reliability and Market Operations Engineer (RMOE)
• If appropriate, **refer** to applicable Bulk and/or Regional procedures for studied operating scenarios and requirements. • **Prepare** market contingencies, nomograms, and displays as appropriate. 2. If the Curtailment will go beyond the current electric day, • **Provide** input regarding forecast gas burn and gas requirements and adjustments for the Day-Ahead Market, as applicable, to CAISO Manager, BA Operations, Day-Ahead RMOE and appropriate operators, which may include: o Planned Generating Units online o Day-Ahead schedule o Adjustments needed to maintain reliability and gas fuel Curtailments o Units' commitments needed for reliability o Generating Units' commitments needed for reliability

CAISO System Operator
1. **Continue to coordinate** planning and communications, prior to and throughout reduction/outage implementation period.

3.4 Gas System Curtailment Implementation in Defined Gas Transmission Zone

This section applies to a natural gas reduction or insufficiency requiring a pro rata Curtailment in a defined gas transmission zone(s) with advance or immediate notice. This may occur either before or after the gas day begins (0700-0700), whenever a pro rata reduction is required for end-use customers in the defined zone(s). The section is applicable to the following Gas Companies:

- Pacific Gas and Electric Company (PGAE)
- Southern California Gas Company (SoCalGas)
- Kern River Gas Transmission (Kern River)

Whenever possible use of the Gas Nomogram (SoCalGas only) process, as defined in Section 3.2, is preferred over the manual Curtailment steps in this Section 3.4 for limitations applicable to gas transmission zones; however, nomogram use is only applicable to SoCalGas and there may be cases where the Gas Nomogram use is not possible for SoCal Gas. In all cases, the initiation of this section is at the request of the Gas Transmission Operator.

Gas Transmission Operator (GTO)

1. **Notify** the CAISO Manager, BA Operations and **provide** the following information
   - **Specify** if this is a Curtailment.
   - **Specify** the gas zone(s) (only SoCalGas) and/or specific generation resource(s) affected.
   - **Specify** the MMcf/d reduction.
   - **Specify** date and begin and end time of limitation period.

CAISO Manager, BA Operations

1. **Confirm** with Gas Transmission Operator Curtailment, which zone(s) the required reduction amount in MMcf/d and the date, with begin and end time of the Curtailment period.
2. If Gas Curtailment Tool will be utilized and start time of limitation is **< 2-hour** notice,
   - **Calculate** pro rata reduction of schedules necessary to reduce the zone(s) or resource(s) by the required MMcf/d and convert to MW.
   - **Review** pro rata results with RMOE to ensure grid reliability is maintained.
   - **Notify** Gas Transmission Operator **via** email, **with** a follow-up phone call.
   - **Verify** that Gas Transmission Operator will notify affected generating plants.
3. If Gas Curtailment Tool will be utilized and start time of limitation is **> 2-hour** notice,
   - **Calculate** pro rata reduction of schedules necessary to reduce the zone(s) or specific generation resource(s) by the required MMcfd and convert to MW.
     - For a limitation prior to the start of the Day-Ahead or in Real-Time,
       - **Use** the specific generation resource(s) hourly MMcf values from the estimated gas burn report.
   - **Review** pro rata results with RMOE to ensure grid reliability is maintained.
4. **Notify** Gas Transmission Operator **via** email**, with** a follow-up phone call.
   - **Verify** that Gas Transmission Operator will notify affected generating plants.

Gas Transmission Operator (GTO)
1. **Notify** each affected end-use customer (Generator Operator) **with** information on the natural gas Curtailment to provide the maximum daily and/or hourly gas consumption limits in MMcf/h or MMcf/d for the Curtailment period. 2. **Communicate** any gas issues with the CAISO and other affected Gas Transmission Operators, as early as possible.

CAISO Manager, BA Operations
1. If Gas Curtailment Tool will be utilized and start time of limitation is **< 2-hour** notice, • **Exceptional Dispatch** impacted generation resources to their new MW value for impacted period: ○ **Use** ED Code SYSEMR. 2. **Adjust** and **reallocate** limitations, as necessary.* 3. **After** Gas Transmission Operator has issued their notice, • **Issue** the appropriate Market Notification **via** MNS (Day-Ahead and Real-Time) and ADS (Real-Time only) Message.** 4. **Evaluate** system conditions for Restricted Maintenance Operations, per CAISO Operating Procedure 4420 System Emergency. 5. **Notify** RC West and **advise** them of the following information when using either Gas Curtailment Tool: • Duration, amount of limitation (MW) and impacted zone(s) or specific generation resource(s). 6. **Notify** other gas companies that do not have limitations serving generation in CA, and **advise** them of the following information when using either Gas Curtailment Tool or Gas Nomogram Tool: • Duration and that they may see increased generation in their gas service area: ○ Pacific Gas and Electric Company (PGAE) ○ El Paso Natural Gas Company (Kinder Morgan) ○ Southern California Gas Company (SoCalGas) ○ Kern River Gas Company (Kern River) 7. **Request** the CAISO Generation Dispatcher to block all Ancillary Service awards for all gas resources in the Gas Nomogram certified for Ancillary Services including Regulation Up, Regulation Down, Spin and Non-Spin. **Reference** *CAISO Operating Procedure 2330C Exceptional Dispatch Instruction Type Codes.* ***See** Section 3.6 Market Notification (MNS and ADS) Scripts.*

Scheduling Coordinator (SC)
1. If Gas Transmission Operator provides a new hourly gas burn for a specific resource(s): • **Submit** outage information for each generating unit to meet total generating station new hourly gas burn **via** CAISO's Outage management system (WebOMS). ***Note:*** *Outages must be submitted for the duration of the anticipated gas limitation.* *The "Ambient Not Due to Temp" nature of work may not be used until the CAISO Generation Dispatcher has provided a Market Notification Message, advising that Operating Procedure 4120 has been invoked.*

CAISO Generation Dispatcher, CAISO Manager, BA Operations
1. **Review** and **approve** outage cards. 2. **Create** Ancillary Service (AS) Blocks for each resource in the Gas Nomogram before market execution and for the duration of the Nomogram activation. 3. **Monitor** generator output to ensure unit is dispatched, in accordance with any fuel availability reductions, and in a manner that meets system reliability needs. • If needed, such as the Gas Transmission Operator is unable to issue instructions to Generation Operators in time, **issue** an Exceptional Dispatch to meet reliability needs. 4. Depending on system conditions and/or OEP/RMOE studies, • **Consider** potential for **increasing** generating unit(s) above its WebOMS limitation: ***Note:*** *Actual increase requires additional actions, following.* ○ **Calculate** the additional MMcf/h necessary, **using** Gas Curtailment Tool. • **Contact** via phone, Gas Transmission Operator to ensure additional gas burn can be accommodated with a follow-up email: ○ **Request** Gas Transmission Operator to **adjust** the plant level gas burn to allow for additional calculated MMcf/h. • **Contact** applicable Generator SCs to **confirm** Gas Transmission Operator has communicated available gas to adjust WebOMS availability to reflect revised fuel availability. 5. **Communicate** any gas issues between the CAISO and each Gas Transmission Operator as early as possible. ***Note****: In addition, consider a peak day call mechanism to alert market participants.*

Gas Transmission Operator (GTO)
1. **Notify** Generator Operator with newly adjusted hourly gas burn.

CAISO Generation Dispatcher
1. **Notify** the Scheduling Coordinator of the generating unit output adjustment.

Scheduling Coordinator (SC)
1. **Adjust** WebOMS outage card for the affected generating unit(s) accordingly. • **Reference** CAISO Operating Procedure 3220 Generation Outages.

CAISO Generation Dispatcher
1. **Monitor** generator output to ensure resource(s) are dispatched, in accordance with any fuel availability reductions, and in a manner that meets system reliability needs.

3.5 Recovering from Natural Gas Reduction or Insufficiency

Take the following actions when Gas Transmission Operator has notified affected Generator Operators that gas limitations are no longer in effect.

CAISO Generation Dispatcher, CAISO Manager, BA Operations
1. **Review** reliability impacts of returning generating units to schedule **in coordination with** the Gas Transmission Operator. 2. **Notify** CAISO Generation Dispatcher of anticipated return to normal system operations. 3. **Notify** RC West. 4. **Notify** other potentially impacted Gas Transmission Operators, as applicable, such as: • Pacific Gas and Electric Company (PGAE), • El Paso Natural Gas Company (Kinder Morgan), • Southern California Gas Company, and/or • Kern River Gas Company (Kern River).

Gas Transmission Operator (GTO)
1. **Notify** CAISO that electric generation resources impacted by the fuel limitation has been lifted.

Gas Transmission Operator (GTO)
2. **Notify** electric generation resources impacted by the fuel limitation that the fuel limitation has been lifted.

Scheduling Coordinator (SC)
1. **Adjust** WebOMS outage card for the affected generating unit(s) accordingly.

CAISO Generation Dispatcher
1. **Approve** WebOMS cards and **allow** generating units to return to their schedules. 2. **Utilize** exceptional dispatches, as necessary to maintain system reliability, while returning to normal system operations. 3. **Make** all necessary Market Notifications (MNS and ADS).

3.6 Market Notification (MNS and ADS) Scripts

The following are sample Market Notification (MNS and ADS) messages to consider when sending a market message to participants through MNS and ADS.

Applicable to SoCalGas Only for use in conjunction with Gas Nomogram activation in Section 3.2 of this procedure.

For more information, refer to the documents posted at www.caiso.com under Stakeholder Processes > Aliso Canyon Gas-Electric Coordination.

***Note**: To the extent that the SoCalGas System Operator is willing to assist in providing the "description of aggregate outage area," the CAISO Manager, BA Operations should consult and consider their proposal for wording. Examples of a "broad description outage area" are "San Diego" or "SP 15."*

Potential Gas Nomogram Limitation
In the advance (before Day-Ahead Market) or immediate (Day-Ahead or Real-Time) notice options, if SoCalGas has declared a Curtailment Watch or Gas Pipeline limitation, consider sending the following message: *The California ISO (CAISO) and Southern California Gas Company are coordinating to ensure the most efficient use of available natural gas supply for electric generation.* *To facilitate this coordination, the CAISO will be enforcing electric generation limits for Generating Units within [XX] zone(s) for trade date [MM/DD]. The CAISO anticipates these limits to be in effect from HE [XX] through HE [XX]. To help mitigate impacts to electric system reliability, the CAISO [may be or will be] enforcing a Gas Nomogram, per CAISO Operating Procedure* 4120 Gas Transmission Pipeline System Limitations or Outages *and may be issuing additional notices, as needed.* *In addition, should the CAISO enforce a Gas Nomogram, all gas resources in the Gas Nomogram certified for Ancillary Services including Regulation Up, Regulation Down, Spin and Non-Spin will not be awarded any Ancillary Services for the duration of the activation. This is to ensure the gas limitations are respected by the Gas Nomogram.* *Maximum conservation efforts are encouraged for the period specified in this notice.* *Please monitor the CAISO System Conditions Website for more information.*

Applicable to all during Natural gas limitation or Curtailment for a defined transmission zone pursuant to Section 3.4.

Curtailment Requiring Exceptional Dispatch
In the event that *a* Gas Transmission Operator has issued a Curtailment, which requires a CAISO response, consider sending the following message: *Per CAISO Operating Procedure 4120 Gas Transmission Pipeline System Limitations or Outages, the California ISO (CAISO) has confirmed with [**insert Gas Transmission Operator**] that a gas delivery system Curtailment is currently impacting [XX] zone(s).* *To mitigate impacts to electric system reliability, the CAISO will be utilizing Exceptional Dispatch to reposition the affected electrical generation for up to [XX] hours from the time of this notice.* *Maximum conservation efforts are encouraged for the period specified in this notice. The CAISO may issue additional notices, as needed. Please monitor the CAISO System Conditions Website for more information*.

Potential Gas Curtailment > 2 Hours' Notice
In the event that a Gas Transmission Operator has issued a Curtailment with greater than 2 hours' notice, consider sending the following message: *With [insert Gas Transmission Operator] notifying specific electric generators that a gas supply limitation is expected to impact [XX] zone for trade date [MM/DD from HEXX through HEXX].* *To help mitigate impacts to electric system reliability, per CAISO Operating Procedure 4120 Gas Transmission Pipeline System Limitations or Outages, [insert Gas Transmission Operator] may be issuing a Curtailment.* *The CAISO requires all impacted units to update their electric generation availability, using an Outage Management System (OMS) Ambient Not Due To Temperature derate card. Ancillary Service will be procured outside of the impacted area(s).* *Maximum conservation efforts are encouraged for the period specified in this notice. The CAISO may issue additional notices, as needed. Please monitor the CAISO System Conditions Website for more information.*

Immediate Gas Curtailment < 2 Hours' Notice
In the event that a Gas Transmission Operator has issued a Curtailment in Real-Time, which requires an immediate CAISO response, consider sending the following message: *Per CAISO Operating Procedure 4120 Gas Transmission Pipeline System Limitations or Outages, the California ISO (CAISO) has confirmed with [insert Gas Transmission Operator] that a gas delivery system limitation is currently impacting [XX] zone(s) through HE [XX].* *To mitigate impacts to electric system reliability, the CAISO may be utilizing Exceptional Dispatch to reposition the affected electrical generation for up to [XX] hours from the time of this notice, or until the generators receive an updated available gas limitation from [insert Gas Transmission Operator], whichever comes first.* *Once new gas burn amounts are received, electric generators are expected to update their electric generation availability, using an Outage Management System (OMS) Ambient Not Due To Temperature derate card. Ancillary Service will be procured outside of the impacted area(s).* *Maximum conservation efforts are encouraged for the period specified in this notice. The CAISO may issue additional notices, as needed.* *Please monitor the CAISO System Conditions Website for more information*.

Emergency Due to Gas Limitation
In the event that all the above mitigating actions have been taken, and further actions are required to maintain system stability, refer to CAISO Operating Procedure 4420 System Emergency and consider sending the following message: *Due to gas supply limitations in the [xx] zone, the California ISO (CAISO) anticipates the need to interrupt firm load for the period [Start Date], [Start Time] through [End Date], [End Time] in the amount of [MW amount] MW for each respective hour based on system conditions as of [Notice Post Date].* *Maximum conservation efforts are encouraged for the period specified in this notice. Utility Distribution Companies and Metered Subsystems await further Operating Instructions from the CAISO.* *The CAISO will issue a notice when the load interruptions have begun or are imminent.* *Please monitor the CAISO System Conditions Website for more information.*

Recovery
When recovering from natural gas limitation, consider sending the following message: *For [HE ____], the CAISO expects the imposed fuel limitations to be lifted, and requests Market Participants resume normal operation.*

4. Supporting Information

Operationally Affected Parties

CAISO Public

References

Resources studied in the development of this procedure and that may influence some steps taken herein include but are not limited to:

CAISO Tariff	Section 27.5.6(f)
CAISO Operating Procedure	2330C Exceptional Dispatch Instruction Type Codes 3220 Generation Outages 4110 Operations Emergency Preparation Notifications and Reporting 4420 System Emergency 4510 Load Management Programs and Underfrequency Load Shedding
NERC Requirements	EOP-011-4 R2, R2.2.2, & R2.2.3.2
WECC Criterion	
Other References	

Definitions

Unless the context otherwise indicates, any word or expression defined in the Master Definitions Supplement to the CAISO Tariff shall have that meaning when capitalized in this Operating Procedure.

The following additional terms are capitalized in this Operating Procedure when used as defined below:

Curtailment	For SoCal Gas, as defined in SoCalGas Tariff, Rule 23 and SGDE Gas Rule 14, Utility initiated suspension of natural gas service. Utility may temporarily reduce the quantity of gas it will transport or deliver, or may terminate service entirely, for certain service categories, as needed for operational requirements. For PGAE and Kern River Gas Transmission Company, as defined in respective tariffs.
Curtailment Watch	For So Cal Gas system, a public notice posted to Envoy to advise customers of the potential for a Curtailment, based on the forecast and system conditions. Not all Curtailment watches become an actual Curtailment event.
DCPA	Dynamic Competitive Path Assessment
Limitation	Can define all the following: Daily Imbalance, Limited Imbalance tolerance, System Imbalance, Daily Gas imbalance, Imbalance limitation, Gas constraint, Imbalance tolerance, Gas system limitation, Gas burn constraint, Gas Curtailments, Capacity reduction limitations, Restricted system limitations, Gas burn limitation. For So Cal Gas, such limitations may be enforced using Gas Nomogram, per Section 3.2.
MMcf	Million cubic feet
MMcf/d	Million cubic feet per day
MMcf/h	Million cubic feet per hour
Gas Nomogram	A set of operating or scheduling rules, which are used to ensure that simultaneous operating limits are respected, to meet NERC and WSCC operating criteria.
Point of Receipt (POR)	Point(s) of interconnection on the Transmission Provider's Transmission System where capacity and/or energy transmitted by the Transmission Provider will be made available to the Delivering Party. The Point(s) of Receipt shall be specified in the Service Agreement.

Version History

Version	Change	Date
7.17.2	Section 3.2.1.1: Added Note after third bullet in SoCalGas System Operator task table. Section 3.3: Minor edit to update task role for CAISO Shift Manager Desk.	2/10/22
7.3	Sections 3.2.1.3 & 3.5: Removed Emergency Response Coordinator (ERC) notification tasks and minor grammar edits. References Section: Updated NERC reference of EOP-011. Definitions Section: Removed Emergency Response Coordinator. Removed history prior to five years. Minor formatting and grammar updates.	5/18/23
7.4	Replaced Shift Manager with Manager of Real-Time Operations.	9/11/23
7.5	Periodic Review: Updated remaining instances of ISO to CAISO throughout. Replaced instances of Day-Ahead Market Operator and Day-Ahead Market Desk with Market Operator and replaced Generation "Desk" with "Dispatcher". Minor formatting and grammar edits throughout.	2/22/24
8.0	Updated from Natural Gas Transmission Pipeline System Operator to Gas Transmission Operator (GTO) throughout. Updated from El Paso Gas Co. (Mojave Pipeline) to El Paso Natural Gas Company (Kinder Morgan) throughout. Updated instances of CAISO Generation “Desk” to “Dispatcher.” Minor edits for clarification under Sections 1, 2.1, 2.2, 3.1 and 3.2. Sections 3.2.1.1 & 3.2.1.2: For SoCalGas System Operator, updated language to reflect SoCalGas’ actions and other minor edits to responsibilities. Section 3.2.1.2: For Manager, Real-Time Operations, added Step 2 and added task table for Operations Planning Engineer (OEP). Section 3.2.1.3: For CAISO Manger, Real-Time Operations, added Step 4 to notify other gas companies and other minor edits for clarity. Section 3.3: For Gas Transmission Operator (GTO), updated Step 1, and other minor edits for clarity. Section 3.4: For CAISO Manger, Real-Time Operations, added Step 6 to notify other gas companies. Added CAISO Manager, Real-Time Operations to the CAISO Generation Dispatcher tasks and other minor edits for clarity. Section 3.5: For Gas Transmission Operator, added new Step1 to notify CAISO and other minor edits for clarity. References: Updated NERC EOP-011 reference version due to standard update. Definitions: Added Gas Nomogram.	2/05/25

Version	Change	Date
	Minor formatting and grammar edits.	
8.1	Replaced Manager of Real-Time Operations and Manager, Real-Time Operations with Manager of BA Operations and Manager, BA Operations. Minor formatting and grammar edits.	11/06/25
8.2	Added the requirement to block all gas resources in the given Gas Nomogram from receiving Ancillary Service awards during the Gas Nomogram activation period (Sections 3.2.1.3, 3.4, and 3.6). Updated Operationally Affected Parties section to reflect "CAISO" Public. Minor format and grammar edits and removed history prior to five years.	9/17/26

5. Periodic Review Procedure

Review Criteria & Incorporation of Changes

There are no specific review criteria identified for this procedure, follow instructions in CAISO Operating Procedure 5510. Gas Transmission Operator entities should notify the CAISO whenever they are planning for changes in their regulatory requirements or operations practices that would have an impact on these procedures, and this action would trigger a review.

Frequency

Every three (3) Years.

Appendix

4120B CAISO and Gas Pipeline Power Plant Reference List