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Appendix **13**

Purpose

Provides guidelines for running the Real-Time Market (RTM) process and for procuring Ancillary Services (AS) in the RTM.

1. Responsibilities

CAISO Generation Dispatcher	• Reviews and allows instructions from RTM to be sent to Market Participants via Automated Dispatch System (ADS) • Logs all compliance issues • Ensures RTM runs at the designated intervals • Dispatches resources with Exceptional Dispatch as requested by the CAISO Manager of Balancing Authority (BA) Operations

	• Conform transmission constraints as required for reliability purposes • Sends market messages as required • Utilizes RTM/Exceptional Dispatch to modify resources in RTM • Adjusts RTM (as needed) for proper Dispatching
Scheduling Coordinator (SC)	Submits Energy and Ancillary Service Schedules and Bids for the Real-Time Markets.

2. Scope/Applicability

2.1. Background

Describes Real-Time Market activities.

2.2. Scope/ Applicability

This procedure applies to Real-Time Market activities.

3. Procedure Detail

3.1. Running the Real-Time Market

3.1.1. Real-Time Load Forecast

Take the following actions to forecast Load:

CAISO Generation Dispatcher
1. **Access** the ALFS Load Forecast System (**via** the MetrixDRX.X icon on the desktop) and **select** the RTD or RTPD option from the drop-down. 2. **Review** for operator awareness and potential load adjustment consideration: • Accuracy of the forecast compared to the actual load once the interval has passed. • The last time the latest load forecast was published. • Comparison and confirmation that the load forecast in the ALFS system and what is received in the market are the same. 3. In the RT Market System, **adjust** the RTD/RTPD/STUC Load Forecast, if necessary. ***Note:*** *All RTD/RTPD/STUC load adjustments and the Reason are automatically published to OASIS.*

3.1.2. Real-Time Ancillary Service Requirement

RTPD Description

- The AS requirements for the HASP and RTUC processes are based on NERC/WECC requirements.
- AS Requirement Setter (ASRS) is calculated and published every five (5) minutes.
- RT AS is procured on a 15-minute basis, as needed, from resources certified to provide AS.
- In the event sufficient AS cannot be procured through the CAISO Real-time markets in each hour, additional AS may be assigned at a resource-level to meet NERC/WECC requirements. The CAISO will replace such AS with market procured AS, as soon as practicable.

***Note**: The first consideration in determining which resource to assign AS should be based upon the resource's ability to deliver the assigned AS. See CAISO Desktop Procedure GEN-029 Manual AS Assignment.*

Take the following actions to review/adjust AS requirements in RTPD:

CAISO Generation Dispatcher
1. If the CAISO makes a change after DAM but prior to the close of HASP of a min or max, • **Issue** an Market Notification System (MNS) message as soon as reasonably practicable. ***Note**: After the close of HASP, the AS limits used in HASP are published in OASIS.* 2. **Open** the ASRS screen in RTN. • **Review** calculated requirements. • **Adjust** market provided reserves as required for reliability. • **Update** new requirements to RTN (**see** CAISO Desktop Procedure GEN-007 Ancillary Service Requirements Setter). 3. **Determine** whether any forecasted transmission and/or generation constraints exist: • If no transmission and/or generation constraints exist, ○ **Go to** Section 3.1.3. • If there are transmission and/or generation constraints, ○ **Identify** the applicable unit(s) associated with the constraint(s) (i.e., units not addressed using min and max of existing AS sub-regions). ○ **Block** AS Bids, as necessary.

CAISO Generation Dispatcher

- **Log** the event.

Notes:

- *This historical record of AS blocking/buy back is used to assist in determining whether new AS sub-regions need to be created.*
- *Other reasons for blocking AS include Resource Testing and communications outages.*

4. If additional reserves are necessary and all market mechanisms have been utilized,
   - **Ask** the CAISO Manager of BA Operations whether to issue Dispatch instructions to the Scheduling Coordinators (SCs) for any AS certified Units.
5. If AS bids are skipped to maintain the applicable NERC and CAISO reserve requirements,
   - **Notify** Market Participants.
6. If insufficient AS have been procured,
   - **Refer** to CAISO Operating Procedure 4420 System Emergency.
   - **Log** any deficiencies.
7. **Inform** the CAISO Manager of BA Operations of any deviations from this procedure and **prepare** a written report that provides the following information:
   - The procedure from which the deviation occurred.
   - A description of the deviation.
   - The duration of the deviation.
   - A detailed explanation of the reason for the deviation.
   - Any system reliability concern that led to the deviation.
8. **Determine** if minimum and/or maximum AS procurement limits are necessary for each or any AS Region.
   - **Consider** the following:
     - Path Contingency de-ratings.
     - Path OTCs.
     - Most Severe Single Contingency (on-line Generating Unit or in-service transmission). See Section 3.2, CAISO Operating Procedure 2230 Most Severe Single Contingency (MSSC) Designation for a list of current MSSCs)
     - Forecasted path flows
     - Other anticipated local operating conditions for Load and/or Generation pocket AS Regions
9. If an Outage to a major transmission line results in Supply being curtailed into the Balancing Authority area and the Outage on the transmission line is a credible single Contingency,
   - **Consider** the transmission event a single largest Contingency for the purposes of determining Operating Reserves.

3.1.3. Real-Time Pre-Dispatch (RTPD)

Take the following actions for RTPD:

Scheduling Coordinator (SC)
1. **Submit** HASP and RTM Bids 75 minutes before the Operating Hour through SIBR.

CAISO Generation Dispatcher
1. **Ensure** adequate resources are available to meet all system reliability requirements. 2. If additional area resources are required: • **Consider conforming** impacted element per CAISO Operating Procedure 2220 Transmission Conforming. • **Consider adjusting** and **publishing** to RTN a revised RT Load Forecast. • **Consider committing** additional units in RTN **using** Exceptional Dispatch per CAISO Operating Procedure 2330 Real-Time Exceptional Dispatch. 3. **Review** HASP results, **including** Intertie Dispatches. • **Modify** or **block** results as necessary to meet reliability requirements. 4. If HASP robustness [1] has occurred, • **Adjust** the Interties as needed, and • **Request** Market Operator to manually publish the Interties and commitment. ***Notes:*** ▪ *The HASP Market results are published automatically to the Customer Market Results Interface (CMRI) and ADS to notify Market Participants of their commitments and advisory status.* ▪ *Short Term Unit Commitment (STUC) will run automatically at T-52.5 minutes.* 5. **Determine** if STUC has run properly and output is feasible. • If results are acceptable, **take** no action. • If results are not acceptable, **determine** whether results need to be modified. ○ **Adjust** as necessary to meet reliability requirements.

[1] HASP robustness is an automated process designed to increase the likelihood of a complete and accurate HASP run should receipt of a required input payload is running late. The system will continually search for the late payload and restart HASP if it is received up until XX:59. This may impact publishing of final HASP results.

CAISO Generation Dispatcher
6. **Determine** if additional Dispatch Instructions are needed based on the load forecast[2] and the STUC Dispatches. • **Communicate** any additional Dispatch Instructions through Exceptional Dispatch instructions. • **Refer** to CAISO Operating Procedure 2330 Real-Time Exceptional Dispatch. 7. **Repeat** Steps 7 and 8 for the remaining RTPD runs.

3.1.4. Real-Time Dispatch

Take the following actions for Real-Time Dispatch (RTD):

CAISO Generation Dispatcher
1. **Adjust** the 5-minute Real-Time Load Forecast as necessary to ensure reliability requirements are met. 2. **Review** the RTD results. • **Adjust** results as necessary to meet reliability requirements. 3. After issuing a 5-minute Dispatch, • **Verify** the Dispatch transferred to ADS, and • **Monitor** the Market Participants' response to ADS instructions to ensure reliability requirements are met. ○ If ADS is not functioning properly, **refer** to CAISO Operating Procedure 5410 Loss of Monitoring and Analysis Tool Functionality ○ If EMS is not functioning properly, ▪ **Evaluate** the need to request Market Operator to switch Dispatch Initialization Source to the State Estimator (SE). ○ If RTM is not functioning properly, ▪ **Dispatch** resources as required **via** ADS or manually through an Exceptional Dispatch. ▪ **Refer** to CAISO Operating Procedure 2330 Real-Time Exceptional Dispatch.

[2] In the CAISO Tariff and BPM, the load forecast is referred to as the CAISO Forecast of CAISO Demand (CFCD).

3.1.5. Real-Time Contingency Dispatch

Take the following actions to address Contingencies in RT:

CAISO Generation Dispatcher
Notes: - *The Contingency Event Recovery Period, is 15 minutes after the start of a Reportable Balancing Contingency Event.* - *The Contingency Reserve Restoration Period is 90 minutes. Note that it starts AFTER the 15-minute Contingency Event Recovery Period ends.* - *The Real-Time Contingency Dispatch (RTCD) can be activated at any time to address Contingencies by Dispatching contingent Operating Reserves.* 1. **Manually execute** RTCD. • **Refer** to CAISO Desktop procedure GEN-015 Real-Time Contingency Dispatch. 2. **Consider requesting** Market Operator to check "Run RTD Power Flow" option in market software prior to initiating the Contingency Dispatch. 3. **Determine** whether requirements are met. 4. **Review** the Dispatches and **adjust,** as necessary. • If Emergency Operations conditions exist such as reserve shortages, Load Shedding, Black Start restoration, etc., ○ **Refer** to CAISO Operating Procedure 4420 System Emergency. ○ **Determine** emergency requirements. 5. **Issue** the RTCD instructions to the Market Participants. 6. If the system is recovered from the Contingency situation, • **Return** the Dispatched Contingency reserves back to Contingency reserves in a manner that does not cause frequency or Area Control Error (ACE) excursions.

3.1.6. Real-Time Manual Dispatch

Take the following actions whenever the RTD fails to converge because of bad data, network model issues, or optimization engine failure:

CAISO Generation Dispatcher
1. **Run** Real-Time Manual Dispatch. 2. If RTD Requirements are not met, • **Adjust** the 5-minute forecast while in RTMD to get the desired quantity. 3. If RTMD Dispatch instructions do not produce the desired results, • **Issue** Exceptional Dispatch instructions.

CAISO Generation Dispatcher

• **Refer** to CAISO Operating Procedure 2330 Real-Time Exceptional Dispatch.
• If reasons for Exceptional Dispatch no longer exist,
  ○ **Issue** RTMD Dispatch instructions only, or
• **Refer** to CAISO Operating Procedure 4420 System Emergency.
• When a bid is removed to resolve Market Disruption,
  ○ **Refer** to CAISO Operating Procedure 2710 Market Disruption - RTM Failure and Suspension.

3.2. Real-Time Timelines

The following diagrams attached below in the image section describe the HASP/STUC/RTPD and RTED timelines:

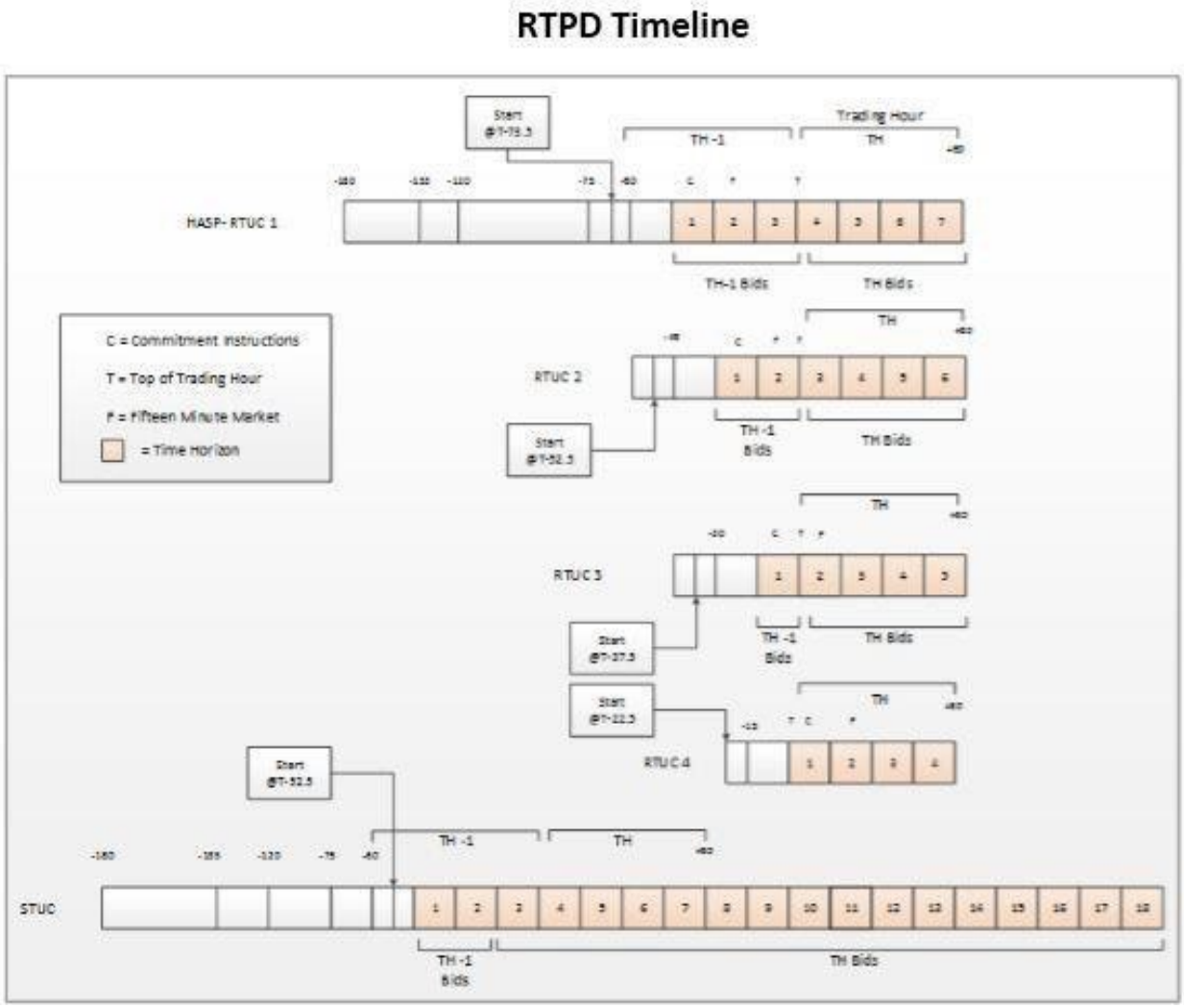

Figure 1: RTPD Timeline

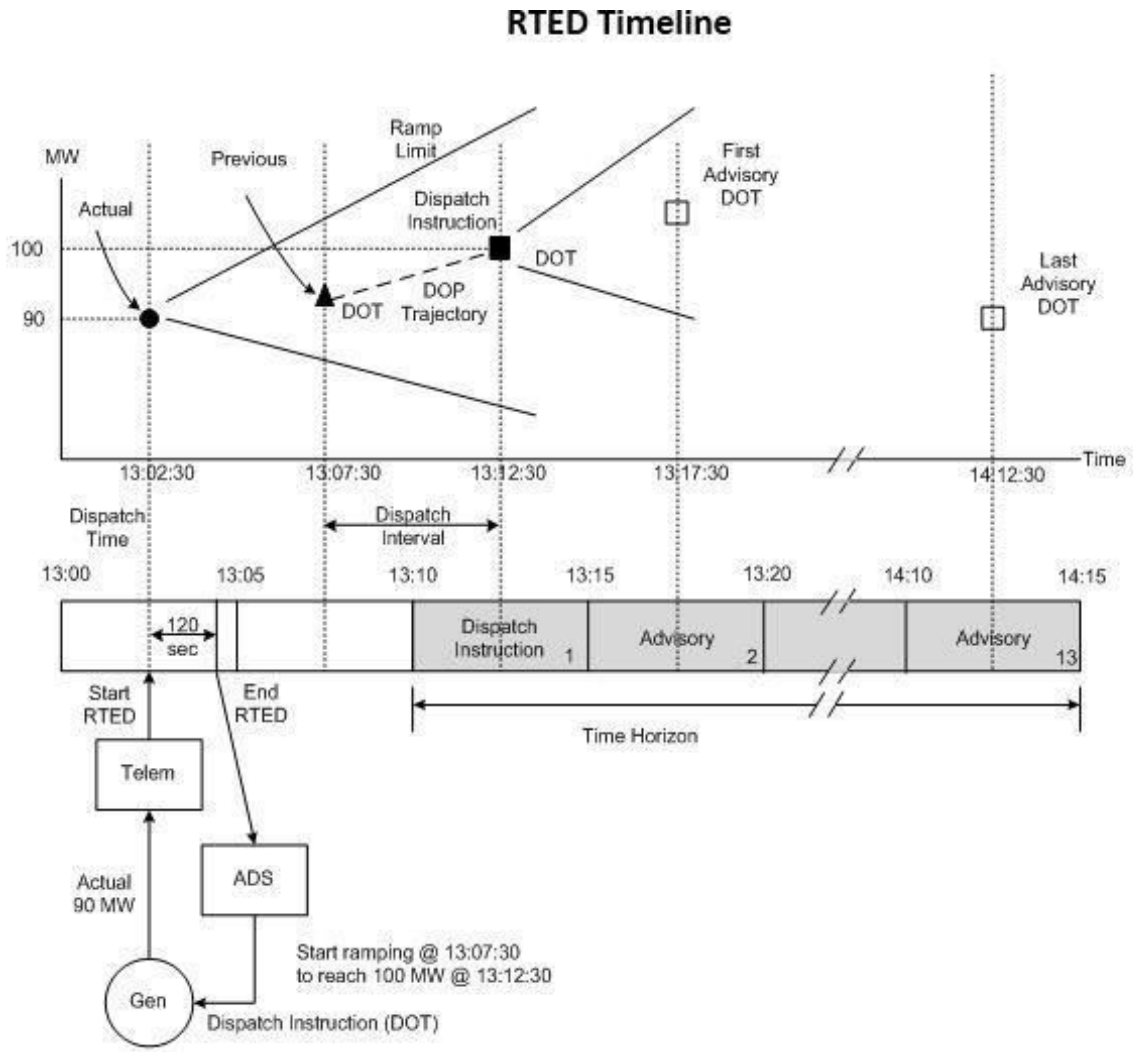

Figure 2: RTED Timeline

4. Supporting Information

Operationally Affected Parties

Shared with the Public and posted to the WEIM Portal.

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	
CAISO Operating/Desktop Procedures	GEN-007 Ancillary Service Requirements Setter GEN-015 Real-Time Contingency Dispatch
NERC Requirements	BAL-002-3
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:

AS	Ancillary Services
Robustness	HASP Robustness occurs when HASP is given more time to run than normal (it steals time from STUC if there is time available)
RTD	Real-Time Dispatch
RTCD	Real-Time Contingency Dispatch
RTMD	Real-Time Manual Dispatch
RTPD	Real-Time Pre-Dispatch
Contingency Event Recovery Period	A period that begins at the time that the resource output begins to decline within the first one-minute interval of a Reportable Balancing Contingency Event and extends for fifteen minutes thereafter.
Reportable Balancing	Any Balancing Contingency Event occurring within a one-minute interval of an initial sudden decline in the responsible entity's Reporting

Contingency Event	ACE that results in a loss of MW output less than or equal to its Most Severe Single Contingency (MSSC) , and greater than or equal to the lesser amount of: • 80% of its MSSC. Prior to any given calendar quarter, the 80% threshold may be reduced by the responsible entity upon written notification to its Regional Entity, or • The amount listed below for the applicable Interconnection. ○ Western Interconnection: 500 MW

Version History

Version	Change	Date
11.0	Periodic Review: Section 3.1: Updated RT to Real-Time for all sub-section headers. Section 3.1.2: Replaced A/S with AS, added Note and updated existing Note. Section 3.1.4, #3 & Reference Section: Removed reference to Desktop Procedure GEN-001, as it retired on 4/05/18. Minor formatting and grammar updates. Removed version history prior to 5-years.	2/29/20
11.1	Added note that all RTD/RTPD/STUC load forecast adjustments are automatically published to OASIS. Replaced ISO with CAISO and updated NERC reference. Minor formatting and punctuation edits.	6/01/22
11.2	Periodic Review: Removed sub requirement to BAL-002-3, as it is no longer listed. Minor formatting edits and updated procedure links.	2/01/23
11.3	Replaced Generation Desk with Generation Dispatcher, replaced RTMO with Market Operator and replaced Shift Manager with Manager of Real-Time Operations.	9/11/23
11.4	Updates made in Sections 3.1.1 through 3.1.4, as suggested following operator review. Minor formatting and/or grammar edits.	2/22/24
11.5	Section 3.1.2, RTPD Description: Added second bullet for 5-minute ASRS calculation.	4/09/24
11.6	Replaced Manager of Real-Time Operations with Manager of Balancing Authority (BA) Operations. Update reference to OP 5410 in Section 3.1.4 due to title change. Updated Operationally Affected Parties to include "posted to the WEIM Portal." Minor formatting and grammar edits and removed history prior to five years.	10/09/25
11.7	Periodic Review: Minor grammar edits only, no other content changes.	1/29/26
11.8	Added definitions and changes for BAL-002-WECC standard retirement on July 1, 2026.	7/01/26

5. Periodic Review Procedure

Review Criteria & Incorporation of Changes

There are no specific criteria for reviewing or changing this document, follow instructions in CAISO Operating Procedure 5510.

Frequency

Every three (3) Years

Appendix

2210D Ancillary Service Blocking and Disqualification
2210Z Effectiveness Factors - All