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		Version No.	11.5
		Effective Date	4/09/24
Real-Time Market Activities		Distribution Restriction: None	

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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	<ul style="list-style-type: none"> • Reviews and allows instructions from RTM to be sent to Market Participants via ADS • Logs all compliance issues • Ensures RTM runs at the designated intervals • Dispatches resources with Exceptional Dispatch as requested by the CAISO Manager of Real-Time Operations
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	<ul style="list-style-type: none"> 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
<ol style="list-style-type: none"> 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. Review for operator awareness and potential load adjustment consideration: <ul style="list-style-type: none"> 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. In the RT Market System, adjust the RTD/RTPD/STUC Load Forecast, if necessary. <p>Note: All RTD/RTPD/STUC load adjustments and the Reason are automatically published to OASIS.</p>

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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 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 a given 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
<ol style="list-style-type: none"> 1. If the CAISO makes a change after DAM but prior to the close of HASP <u>of</u> a min or max, <ul style="list-style-type: none"> • Issue an MNS as soon as reasonably practicable. <p>Note: After the close of HASP, the AS limits used in HASP are published in OASIS.</p> 2. Open the ASRS screen in RTN. <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • If no transmission <u>and/or</u> generation constraints exist, <ul style="list-style-type: none"> ○ Go to Section 3.1.3. • If there are transmission and/or generation constraints, <ul style="list-style-type: none"> ○ Identify the applicable unit(s) associated with the constraint(s) (i.e. units not addressed by the use of min's and max's of existing AS sub-regions). ○ Block AS Bids as necessary.

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CAISO Generation Dispatcher	
<ul style="list-style-type: none"> ○ Log the event. <p>Notes:</p> <ul style="list-style-type: none"> • <i>This historical record of AS blocking/buy back is used to assist in determining whether new AS sub-regions need to be created.</i> • <i>Other reasons for blocking AS include Resource Testing and communications outages.</i> <p>4. If additional reserves are necessary and all market mechanisms have been utilized,</p> <ul style="list-style-type: none"> • Ask the CAISO Manager of Real-Time Operations whether to issue Dispatch instructions to the Scheduling Coordinators (SCs) for any AS certified Units. <p>5. If AS bids are skipped to maintain the WECC reserve requirement,</p> <ul style="list-style-type: none"> • Notify Market Participants. <p>6. If insufficient AS have been procured,</p> <ul style="list-style-type: none"> • Refer to CAISO Operating Procedure 4420 System Emergency. • Log any deficiencies. <p>7. Inform the CAISO Manager of Real-Time Operations of any deviations from this procedure and prepare a written report that provides the following information:</p> <ul style="list-style-type: none"> • 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. <p>8. Determine if minimum and/or maximum AS procurement limits are necessary for each or any AS Region.</p> <ul style="list-style-type: none"> • Consider the following: <ul style="list-style-type: none"> ○ 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 <p>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,</p> <ul style="list-style-type: none"> • Consider the transmission event a single largest Contingency for the purposes of determining Operating Reserves. 	

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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 <u>before</u> the Operating Hour through SIBR.


CAISO Generation Dispatcher
<ol style="list-style-type: none"> 1. Ensure adequate resources are available to meet all system reliability requirements. 2. If additional area resources are required: <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> • Modify or block results as necessary to meet reliability requirements. 4. If HASP robustness¹ has occurred, <ul style="list-style-type: none"> • Adjust the Interties as needed, <u>and</u> • Request Market Operator to manually publish the Interties and commitment. <p><i>Note: 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.</i></p> <p><i>Note: Short Term Unit Commitment (STUC) will run automatically at T-52.5 minutes.</i></p> 5. Determine if STUC has run properly and output is feasible. <ul style="list-style-type: none"> • If results are acceptable, take no action. • If results are <u>not</u> acceptable, determine whether results need to be modified. <ul style="list-style-type: none"> ○ Adjust as necessary to meet reliability requirements. 6. Determine if additional Dispatch Instructions are needed based on the load forecast² and the STUC Dispatches. <ul style="list-style-type: none"> • Communicate any additional Dispatch Instructions through Exceptional Dispatch instructions.

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.

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

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CAISO Generation Dispatcher
<ul style="list-style-type: none"> • Refer to CAISO Operating Procedure 2330 Real-Time Exceptional Dispatch. <p>7. Repeat Steps 7 and 8 for the remaining RTPD runs.</p>

3.1.4. Real-Time Dispatch

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


CAISO Generation Dispatcher
<ol style="list-style-type: none"> 1. Adjust the 5-minute Real-Time Load Forecast as necessary to ensure reliability requirements are met. 2. Review the RTD results. <ul style="list-style-type: none"> • Adjust results as necessary to meet reliability requirements. 3. After issuing a 5-minute Dispatch, <ul style="list-style-type: none"> • Verify the Dispatch transferred to ADS, <u>and</u> • Monitor the Market Participants' response to ADS instructions to ensure reliability requirements are met. <ul style="list-style-type: none"> ○ If ADS is not functioning properly, refer to CAISO Operating Procedure 5410 Communication/Applications Loss/Failure ○ If EMS is not functioning properly, <ul style="list-style-type: none"> ▪ Evaluate the need to request Market Operator to switch Dispatch Initialization Source to the State Estimator (SE). ○ If RTM is not functioning properly, <ul style="list-style-type: none"> ▪ Dispatch resources as required via ADS or manually through an Exceptional Dispatch. ▪ Refer to CAISO Operating Procedure 2330 Real-Time Exceptional Dispatch.

3.1.5. Real-Time Contingency Dispatch

Take the following actions to address Contingencies in RT:

CAISO Generation Dispatcher
<p>Notes:</p> <ul style="list-style-type: none"> • <i>The Disturbance Recovery Period is 15 minutes after the start of a Reportable Disturbance.</i> • <i>The Contingency Reserve Restoration Period is 60 minutes.</i> • <i>The Real-Time Contingency Dispatch (RTCD) can be activated at any time to address Contingencies by Dispatching contingent Operating Reserves.</i>

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CAISO Generation Dispatcher
<ol style="list-style-type: none"> 1. Manually execute RTCD. <ul style="list-style-type: none"> • 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 <u>and adjust</u> as necessary. <ul style="list-style-type: none"> • If Emergency Operations conditions exist such as reserve shortages, Load Shedding, Black Start restoration, etc., <ul style="list-style-type: none"> ○ 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, <ul style="list-style-type: none"> • Return the Dispatched Contingency reserves back to Contingency reserves in a manner that does <u>not</u> 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
<ol style="list-style-type: none"> 1. Run Real-Time Manual Dispatch. 2. If RTD Requirements are not met, <ul style="list-style-type: none"> • Adjust the 5-minute forecast while in RTMD to get the desired quantity. 3. If RTMD Dispatch instructions do not produce the desired results, <ul style="list-style-type: none"> • Issue Exceptional Dispatch instructions. • Refer to CAISO Operating Procedure 2330 Real-Time Exceptional Dispatch. • If reasons for Exceptional Dispatch no longer exist, <ul style="list-style-type: none"> ○ Issue RTMD Dispatch instructions only, <u>or</u> • Refer to CAISO Operating Procedure 4420 System Emergency. • When a bid is removed to resolve Market Disruption, <ul style="list-style-type: none"> ○ Refer to CAISO Operating Procedure 2710 Market Disruption - RTM Failure and Suspension.

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3.2. Real-Time Timelines

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

RTPD Timeline

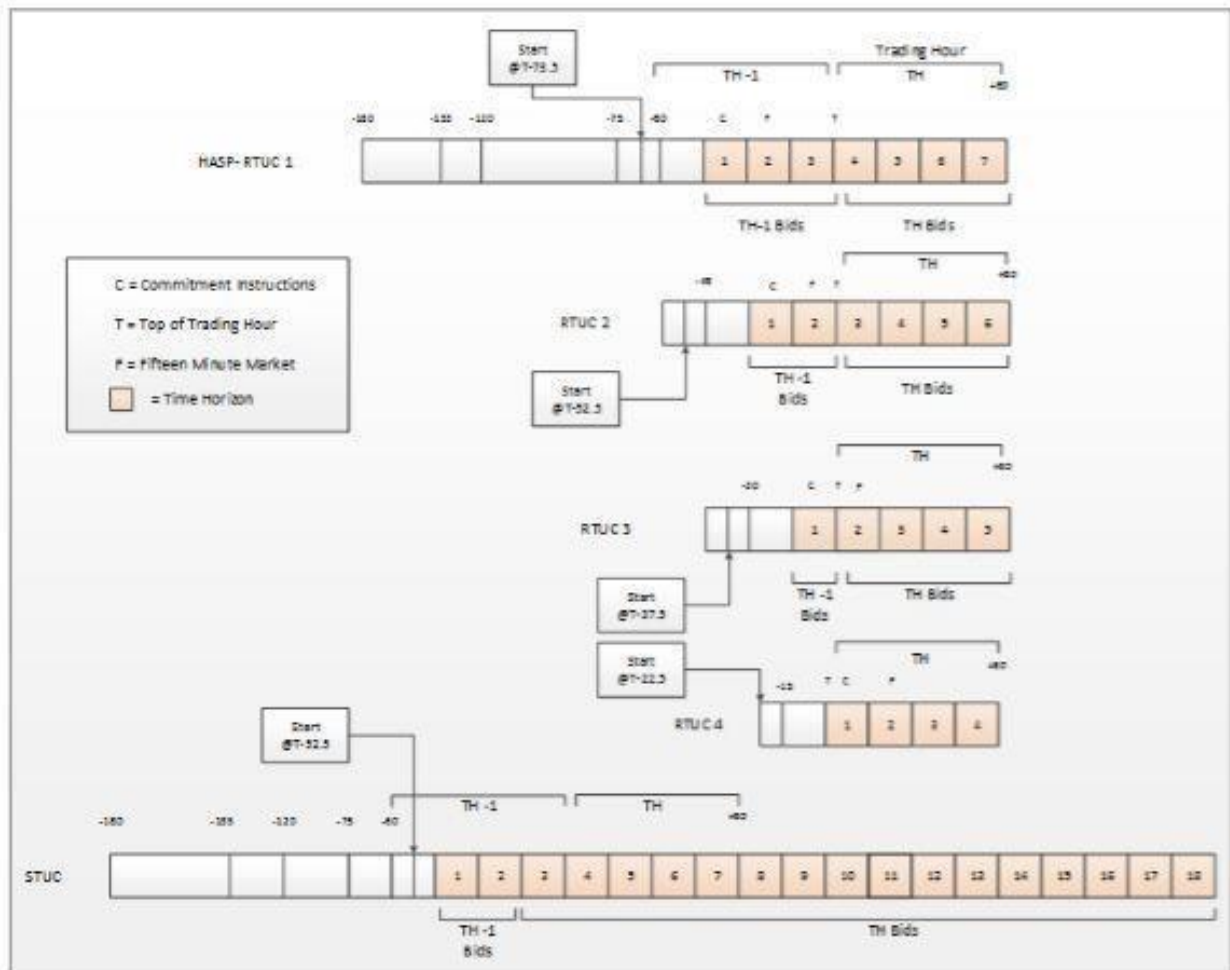



Figure 1: RTPD Timeline

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RTED Timeline

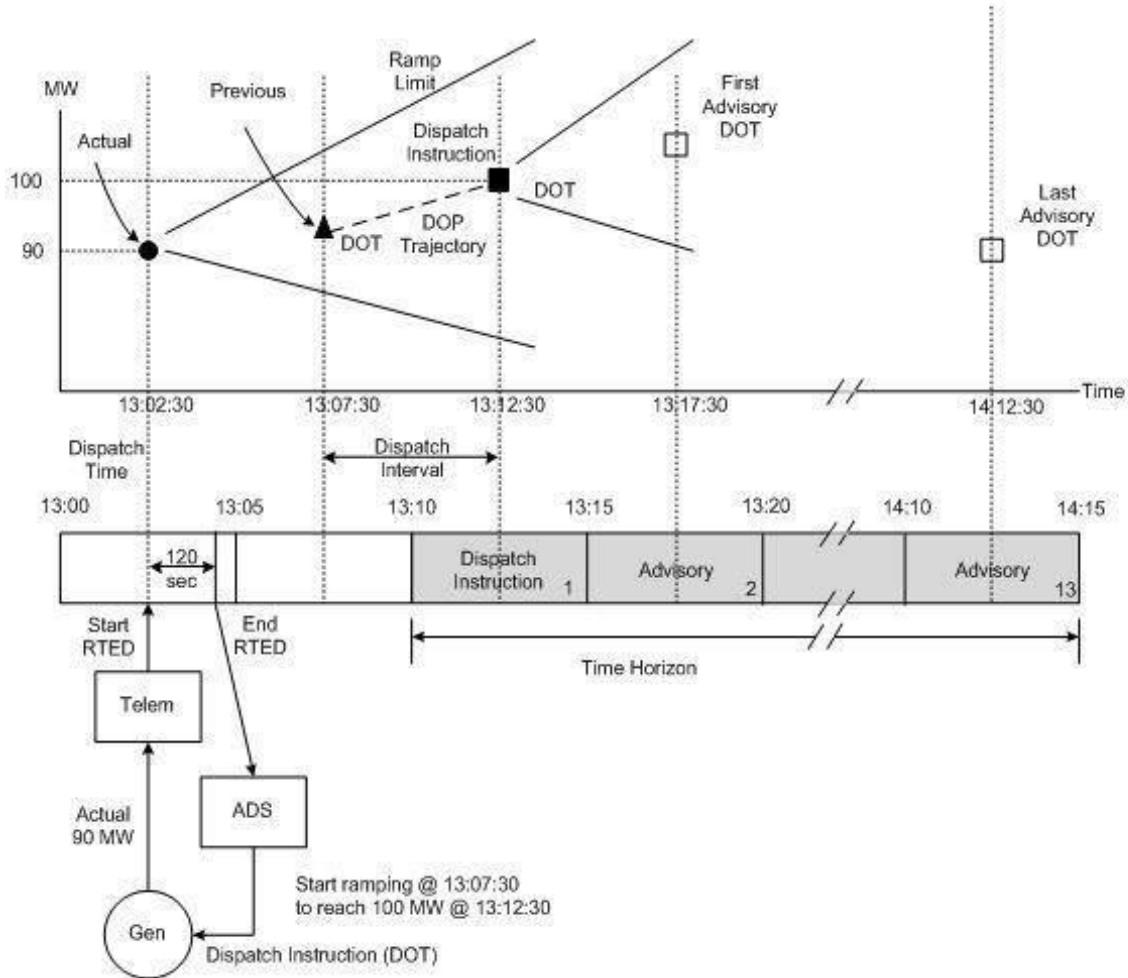



Figure 2: RTED Timeline

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4. Supporting Information

Operationally Affected Parties

Shared with the Public.

References

Resources studied in the development of this procedure and that may have an effect upon 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 actually 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

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Version History

Version	Change	Date
10.7	Section 3.1.6, step 1. Changed Merit Order to Manual to align with the Tariff. Updated section 3.1.3 to include language about bid removal and proper notification of the affected scheduling coordinator; Section 3.1.6 RT Manual Dispatch. Changed the role names used in this procedure to their new role names.	1/27/17
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

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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