



Resource Performance Expectations of Dispatch and Operating Instructions, July 25, 2023

Welcome

Our presentation will begin shortly.

Today's Trainer:

Heidi Holmberg Carder, Lead Customer Education Trainer

ISO PUBLIC - © 2023 CAISO
Rev. 9/14/23

Housekeeping



Keep yourself muted to minimize background noise



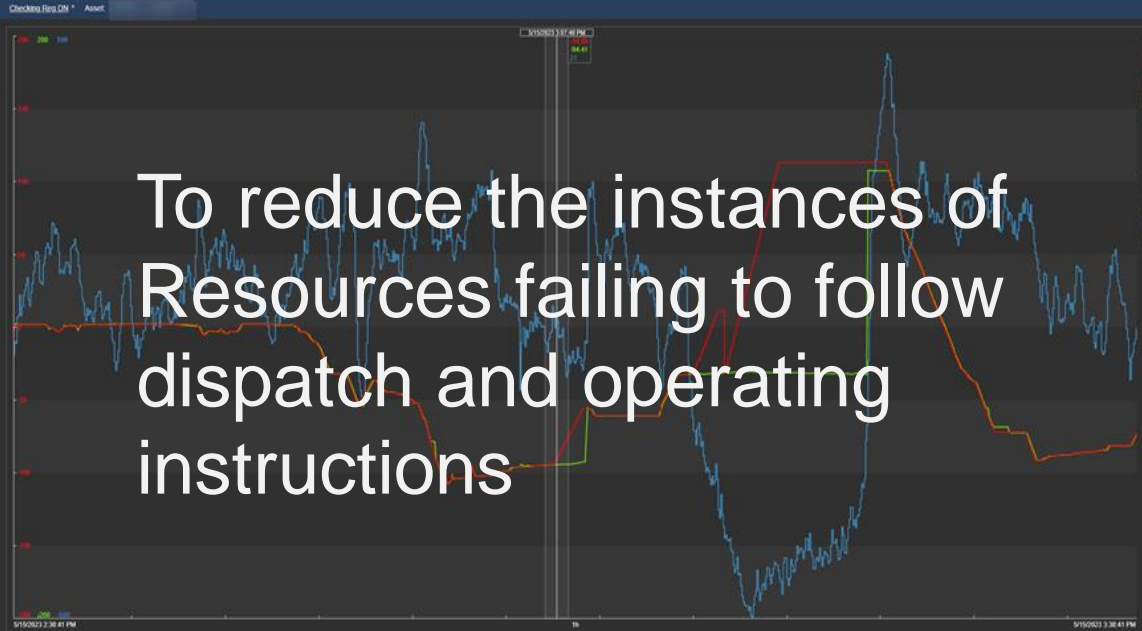
Unmute to ask verbal questions or write questions in the chat pod



Raise your hand using WebEx interactivity tools

The information contained in these materials is provided for general information only and does not constitute legal or regulatory advice. The ultimate responsibility for complying with the ISO FERC Tariff and other applicable laws, rules or regulations lies with you. In no event shall the ISO or its employees be liable to you or anyone else for any decision made or action taken in reliance on the information in these materials.

Why are we here?



To reduce the instances of Resources failing to follow dispatch and operating instructions

It requires a partnership to ensure the safety and reliability of the grid!

What Am I Missing?



How are Inverter-Based Resources handled differently?

What are the differences between a Dispatch Instruction and an Operating Instruction?

What are the consequences of not following my instructions?

What does the policy say?

What are testing guidelines for my resources?

Resource Instruction Fundamentals

Dispatch
Operating
Targets

Operating
Instructions

Daily Instructions

Optimal dispatch representing a single point on the Dispatch Operating Point trajectory in ADS

Emergency Instructions

Command by Operators to preserve the state, status, output or input of a Bulk Electric System resource

How Are Dispatch Instructions and Operating Instructions Different?

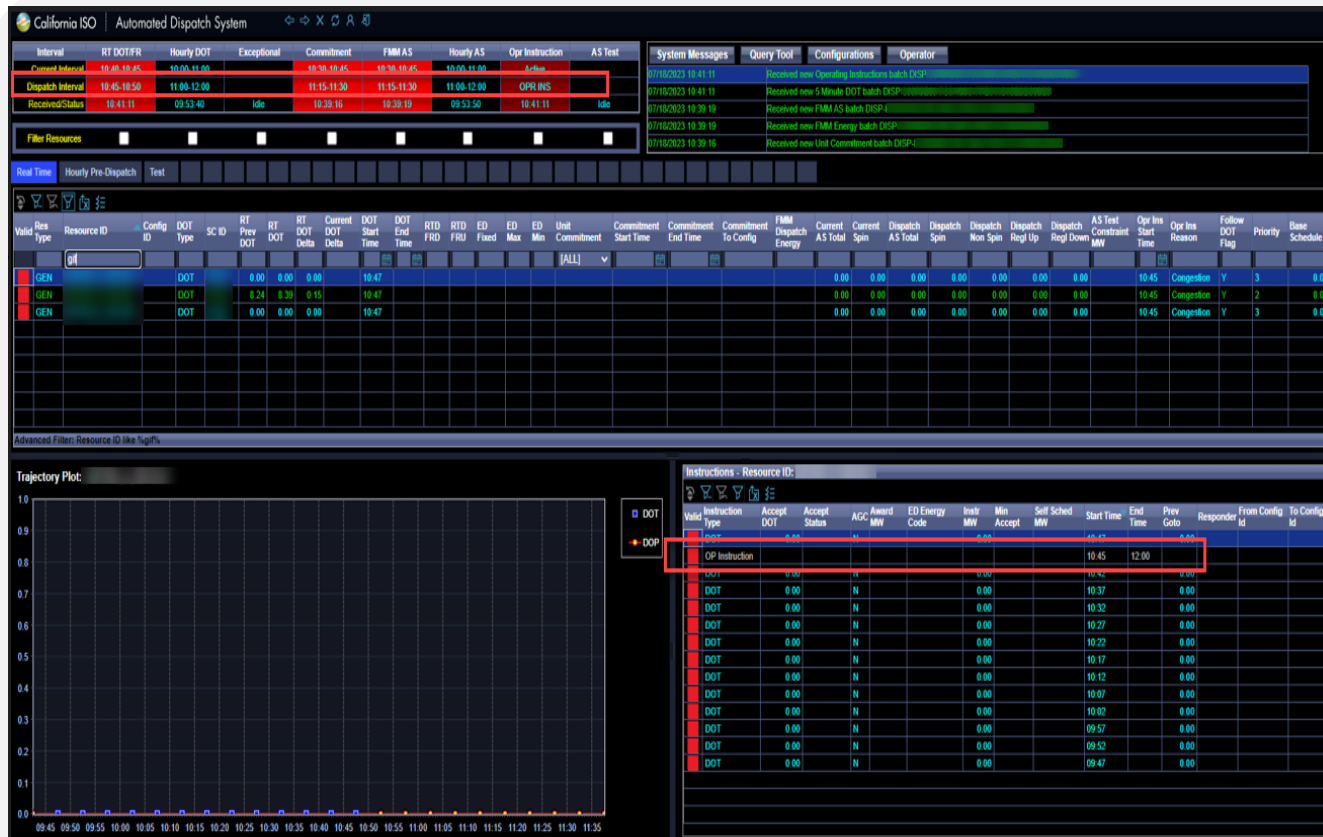
Dispatch Instructions

- Received via ADS
- Resources expected to perform as instructed and, for Eligible Intermittent Resources (EIRs) only, “produce as capable” unless they receive an Operating Instruction

Operating Instructions

- May be received via EMS and/or verbal communication
- May be received via ADS as a result of Operator intervention
- Required to be followed within given timelines and ramp requirements unless physically impossible

Example of Operating Instruction



- Note Field will indicate “Do not exceed DOT due to <Reason>”
- Resource obligated to comply with Operating Instruction within 10 minutes, ramping linearly with DOT.
 - The acknowledgement should be visible when the first user from the SC organization acknowledges the pop up.
- The message shall only pop up once per user per time horizon of the instruction, and will remain until acknowledged by the user.

What is Critical to Do for Proper Management of Resources?

- Ensure proper set up for resource testing and performance
- Communicate between SC and Resource Operator to ensure adequate control of resources
- Register accurate information in Master File
- Submit detailed outage cards reflecting physical limitations
- Actively monitor your resources
- Respond to Operating Instructions within required time parameters, consistent with Tariff requirements

Share information with your Resource Operators!



Commissioning of New Resources

Resource Testing & Performance Guidelines

Testing in Compliance with Operator Instructions

Resources Providing Energy, Capacity, or Ancillary Services: Review OP 5330

- The SC is responsible for ensuring that an active Outage request is in webOMS for the period of the test.
 - Outage must be approved prior to initiating testing. ISO approval or denial is indicated by updates to outage request in OMS.
 - Resource testing may be cancelled or postponed at the discretion of the ISO Generation Desk and/or Shift Manager due to system conditions.
- Resources seeking to test must be fully compliant with the applicable ISO telemetry standards and visible through telemetry on the ISO EMS.
 - Direct Telemetry BPM provides complete definitions of the required data points.
- A resource is ready to test when the outage has been approved, testing has been scheduled, and a test plan (if applicable) has been agreed to.

Testing in Compliance with Operator Instructions

Pre-COD Energy Tests: Review OP 5320 and OP 5320A (NGR)

- **OP 5320** applies to all resources engaged in on-site test operations and commissioning of a Generation Unit prior to Commercial Operation.
 - **OP 5320A** specifies additional procedures required for NGR resources.
- Scheduling Coordinator to submit an outage request through webOMS, using the **Nature of Work of NEW_GENERATOR_TEST_ENERGY**.
- Timing:

Day of test

SC to verify OMS indicates approval for testing

At least 90 minutes before test

SC to notify ISO Gen Desk via phone to confirm the test can start as scheduled

Any time prior to test:

may be cancelled or postponed at the discretion of the ISO Gen Desk and/or Shift Manager due to system conditions.

Testing in Compliance with Operator Instructions

A/S Certification Tests: Review OP 5330

- Resources seeking to provide ancillary services must complete testing to obtain certification.
 - OP 5330 covers additional testing options, including but not limited to, SC-requested Pmax testing.
- SC to submit an outage request through webOMS, using the **Nature of Work UNIT_TESTING** and, *separately*, submit applicable Request for Test (Form 5330A-E) and accompanying test plan proposal.
- Timing:

Day before test:

ISO to confirm with SC and Resource Operator testing schedule and details of test(s) to be performed

Day of test:

SC to verify OMS indicates approval for testing and conduct testing in accordance with testing procedures in Section 3.2.x of OP 5330

After the test:

Test results calculated and SC to update applicable RDT values to reflect approved test results

Review OP 5330, Section 3.4 for additional pseudo-tied and dynamic resources procedures and requirements

Testing in Compliance with Operator Instructions

Testing Resources on AGC: Additional Clarifications

Resource Operators:

- should be capable of implementing proper overrides to place resource in correct operating mode.
 - During certification testing, Resource will NOT receive flags/award data that could automatically place unit on AGC.
- **must** ensure adequate state of charge (SOC) available throughout test on resources with a battery component.
- should ensure communication systems are configured so set point data is passed from the RIG to relevant controllers.

It is important to note: All ramping must be linear from set point to set point.

Ramping in Accordance with Operator Instructions

Linear Ramp Rate

- The set point will increment linearly from starting point to target at an agreed upon ramp rate.
- Set points will increment every 4 seconds from start to finish.
 - Resource expected to respond linearly as instructions are received.
- Resource response must never “Step” above its expected ramp rate during testing or normal operations.
- Default ramp rate should be a controlled value.

Minimum Data Requirements For Each Real-Time Device Providing AGC Communication To/From the ISO's EMS

Telemetry Data Points

- Unit Control Switch (UCTL)
- Unit Authority Switch (UASW)
- Automatic generation control (UAGC) - Calculation
- Unit Connectivity (UCON) - Calculation
- Automatic generation control feedback (UCTL)
- Unit Operating High Limit (UOHL)
- Unit Operating Low Limit (UOLL)
- Point of Delivery MW (UPMW)
- State of Charge (SOC) – Battery only
- Maximum Continuous Energy (MXEnergy) – Battery only
- Ability to receive Automatic generation control Set Points from CAISO EMS

Test Condition Settings for Resources to Follow Set Point

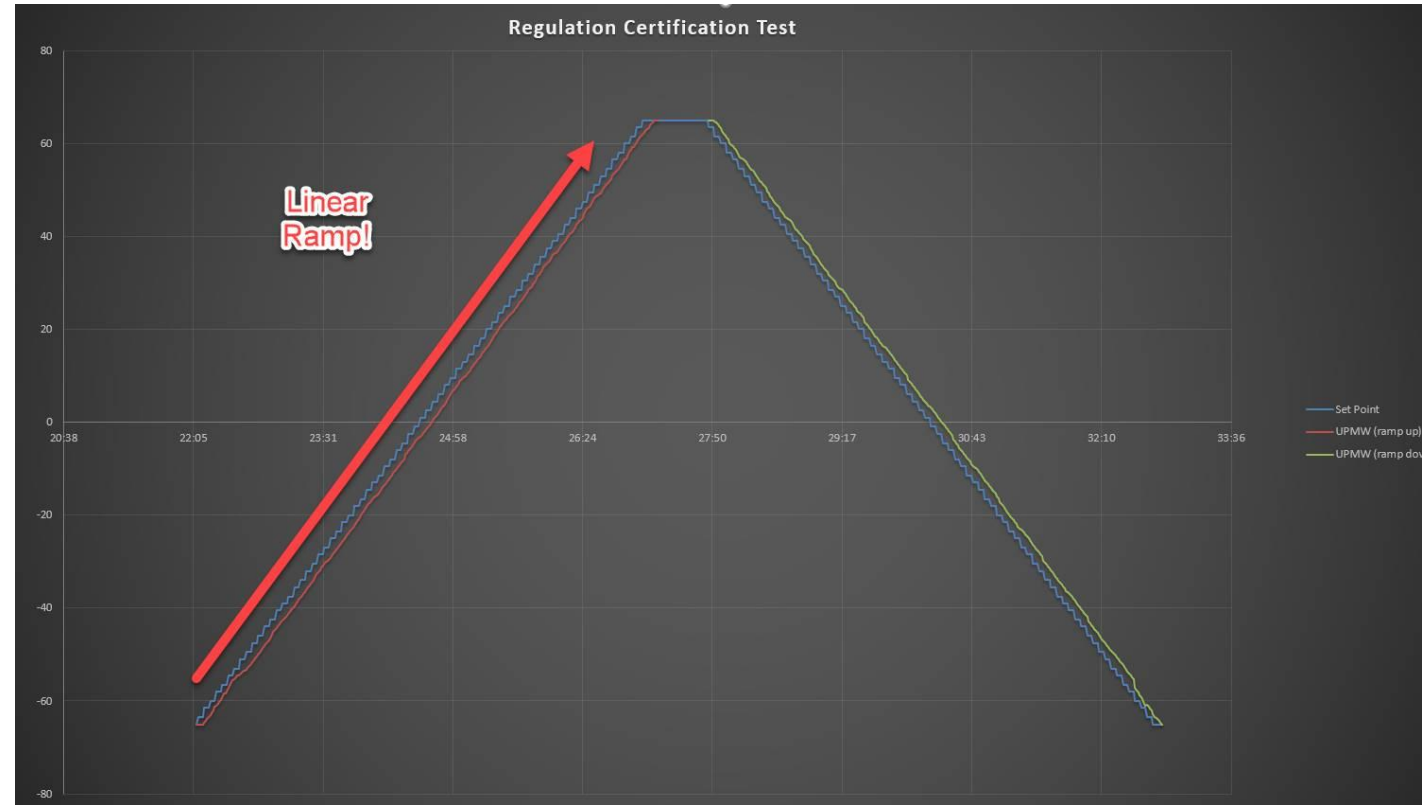
Direct Telemetry BPM

- Operating limit points must define an operating band suitable for the test/operation
- UCON must have a CLOSED/HIGH/ON value
- UASW must have a CLOSED/HIGH/ON value
- UCTL must have a CLOSED/HIGH/ON value
- POD MW readings must be within the defined operating limit band
- **SOC must be below MXENERGY (consistent with Master File)**
- Data quality of all points must be good

Refer to Hand Out
Modified Table from Direct Telemetry BPM, Section 6.1

Regulation Certification Test

Example of a Successful Test with a Linear Ramp





Management of Resources

Expected Response to Dispatch and Operating Instructions

Complying with Operating Instructions

Tariff Requires Compliance with Dispatch and Operating Instructions

4.2.1 Comply with Dispatch Instructions and Operating Instructions

- With respect to this Section 4.2, all Market Participants, including Scheduling Coordinators, Utility Distribution Companies, Participating Transmission Owners, Participating Generators, Participating Loads, Demand Response Providers, Distributed Energy Resource Providers, Balancing Authorities (to the extent the agreement between the Balancing Authority and the CAISO so provides), and MSS Operators within the CAISO Balancing Authority Area and all System Resources shall comply fully and promptly with the Dispatch Instructions and Operating Instructions, unless such compliance (1) would impair public health or safety; (2) is otherwise exempted pursuant to Section 34.13.1; or (3) it is physically impossible for the Market Participant to perform in compliance with the Dispatch Instruction or Operating Instruction. Shedding Load for a System Emergency does not constitute impairment to public health or safety. The Market Participant shall immediately notify the CAISO of its inability to perform in compliance with the Operating Instruction.

Example – Resource Not Following AGC Set Point Instruction



Green Plant MW Output
Red AGC Setpoint
Light Blue SOC as % of Max
Dark Blue DOT

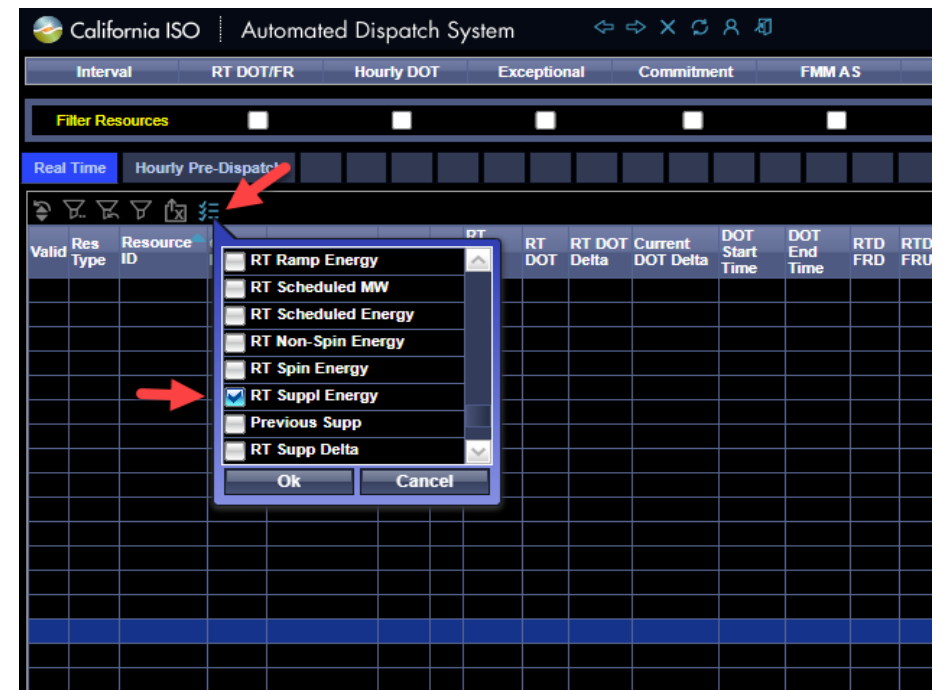
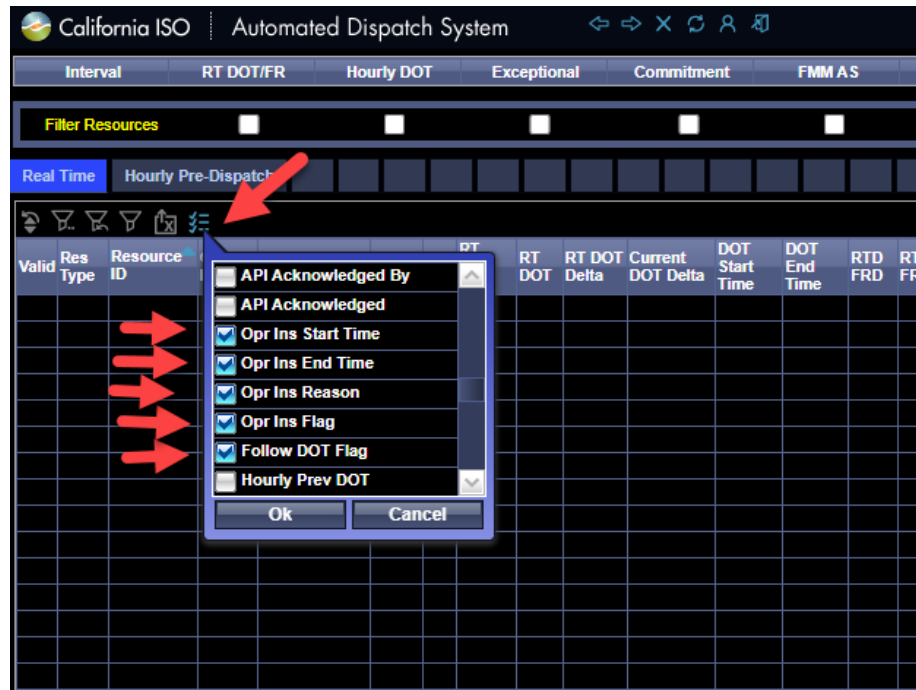
Example – Energy Resource Not Following Dispatch Instruction



Green Plant MW Output
Red AGC Setpoint
Light Blue SOC as % of Max
Dark Blue DOT

What Are Some Steps You Can Take To Improve Visibility?

Make These 6 Columns Visible To See Flags When Resources Are Not Following DOTs



This may significantly reduce the length of time resources fail to follow their DOTs

What Are Some Steps You Can Take To Improve Your Response?

Use OMS to Reflect Physical Limits of Resources

- The Outage Management System (OMS) is the primary method of communicating Outage related information. OMS provides an automated mechanism for parties to communicate all aspects of Outage information.
- OMS should be used for all physical limitations at the plant.
 - Early submission is highly encouraged.
 - Non-urgent outages should be scheduled based on the practices established in the Outage Management BPM.
 - Reference § 8.2 Outage Management BPM for Real-Time Outage Submissions.

Coordination & communication ensure the safety of the grid!

What Information Is Required For Outages?

Solar Example

NEW GENERATION OUTAGE

Participant Name: *

Outage Class: * Generation

Resource: * your SCID

Market Resource ID

Start Date/Time: * 07/18/2023 09:36

End Date/Time: * 07/18/2023 10:00

Outage Duration: 0 day(s) 0 hour(s) 24 minute(s)

Discovery Date/Time: * 07/18/2023 09:36

Emerg. Return Time/Type: * Duration

Nature of Work: * PLANT_TROUBLE

Refer to Procedure 3220 Section 3.3.1 Nature of Work (NOW) Categories

BA/TOP Confirmed:

Emergency: Operational:

RAS/SPS Out of Service: Y N N/A

RAS/SPS Reduced Redundancy: Y N N/A

Protection Zone: Y N N/A

EHS/ICCP Outage: Y N N/A

Opportunity: *

Participant Outage ID: *

GADS Cause Codes: *

Time To Start Up: *

Short Description: *

Test Outage

Be as detailed as possible in describing the issue with your resource

Availability(Pmax) = VER Capability

Availability	Notes	A/S Availability	PMIN Re-Rate	Ramp Re-Rate	Max Energy	Min Energy	Load Max	Load Min	Use Limited	RIMS
Resource:										
+	Availability Date/Time	OOS	NDC	MAX	Availability MW	Outage Curtailment	Total Curtailment	Overlapping Outages		
	07/18/2023 09:36	<input type="checkbox"/>	<input type="checkbox"/>	0	20.00	0.00	0.00			
	07/18/2023 10:00			20	20.00	0.00	0.00			

Regulation Up
Regulation Down
Spin/Non-Spin

Can your resource provide their awards?
If not, Enter 0 for the appropriate product.

If your resource minimum output needs to be adjusted up

What Information Is Required For Outages?

Battery Example – Additional Info Required

your SCID

Market Resource ID

Participant Name: [dropdown]
 Outage Class: Generation
 Resource: [dropdown]
 Start Date/Time: 06/29/2023 11:45
 End Date/Time: 06/29/2023 20:00
 Outage Duration: 0 day(s) 8 hour(s) 15 minute(s)
 Discovery Date/Time: 06/29/2023 11:45
 Emerg. Return Time/Type: Duration
 Nature of Work: PLANT_TROUBLE
 BA/TOP Confirmed:
 Emergency: Operational:
 RAS/SPS Out of Service: Y N N/A
 RAS/SPS Reduced Redundancy: Y N N/A
 Protection Zone: Y N N/A
 EMS/ICCP Outage: Y N N/A
 Opportunity: [dropdown]
 Participant Outage ID: [text]
 GADS Cause Codes: [text]
 Time To Start Up: [dropdown]

Short Description: *
 Test Outage

Be as detailed as possible in describing the issue with your resource

Min Energy = Minimum SOC (MWh)

Load Max(Pmin) = Charging Capability

Availability(Pmax) = Discharge Capability

Availability	Notes	A/S Availability	PMin Re-Rate	Ramp Re-Rate	Max Energy	Min Energy	Load Max	Load Min	Use Limited	RIMS
Resource: [dropdown]										
+	Availability Date/Time	OOS <input type="checkbox"/>	NDC <input type="checkbox"/>	PMAX	Availability MW	Outage Curtailment	Total Curtailment	Overlapping Outages		
	06/29/2023 11:45	<input type="checkbox"/>	<input type="checkbox"/>	100.45	85.00	0.00	15.45			
	06/29/2023 20:00			100.45	85.00	0.00	15.45			

Regulation Up
 Regulation Down
 Spin/Non-Spin

Can your resource provide their awards?
 If not, Enter 0 for the appropriate product.

Max Energy = Maximum SOC (MWh)



Failure to Comply with Operator Instructions

Settlements, Regulatory, and Enforcement Implications

Possible Implications of Non-Response

Settlements

Economic
Consequences

Regulatory

Contractual
Consequences

Enforcement

Report or referral to
FERC,
NERC/WECC
CAISO DMM

Settlements

Economic Consequences for Failure to Comply with Dispatch and Operating Instructions

- Resources face economic consequences for deviating from dispatch instructions, such as:
 - Energy deviations paid/charged at the Real-Time LMP as Uninstructed Imbalance Energy.
 - Ancillary Service (Regulation) deviations blocked/charged-back.
- Reliability penalties assessed against the ISO may be allocated to Scheduling Coordinators for non-compliant resources that exacerbated system conditions.

Regulatory

Contractual Consequences for Failure to Comply with Dispatch and Operating Instructions

- Scheduling Coordinators are **required** to notify the ISO in the event its resource is unable to comply with Dispatch **or** Operating Instructions. Failing to comply with Operator instructions, and failing to provide the required notifications, is inconsistent with:
 - California ISO Tariff.
 - Scheduling Coordinator Agreement.
 - Resource's Interconnection Agreement + Participating Generator Agreement.
- California ISO may investigate deviations with repeated or adverse behavior addressed through:
 - Formal notification of non-compliance sent to applicable entities.
 - Good faith negotiation with Resource Owners, Operators, and the ISO.
 - Referral to applicable enforcement regulator(s).
 - Revocation of applicable certification.

Enforcement

Report or Referral for Failure to Comply with Dispatch and Operating Instructions

- Scheduling Coordinators and/or Resources that fail to comply with Tariff and binding agreements should self-report such non-compliance to FERC enforcement (more information at [ferc.gov/self-reports](https://www.ferc.gov/self-reports)).
 - FERC has civil penalty authority of up to \$1.49 million per violation.
- Scheduling Coordinators and/or Resources registered with NERC/WECC that fail to comply with Operating Instructions should self-report non-compliance (more information at [nerc.com/pa/comp](https://www.nerc.com/pa/comp)).
- Scheduling Coordinators and/or Resources that fail to comply with Operating Instructions may be referred to the ISO's Department of Market Monitoring for code of conduct violation.



Wrap Up

Summary, Q&A

What Questions Do You Have?



Keep yourself muted to minimize background noise until you are ready to speak



Unmute to ask verbal questions or write questions in the chat pod



Raise your hand using WebEx interactivity tools to be put in verbal queue

To Recap: It Takes All Of Us To Maintain Safety and Reliability of the Grid!

- Ensure proper set up for resource testing and performance
- Communicate between SC and Resource Operator to ensure adequate control of resources
- Register accurate information in Master File
- Submit detailed outage cards reflecting physical limitations
- Actively monitor your resources
- Respond to Operating Instructions within required time parameters, consistent with Tariff requirements

Share information with your Resource Operators!



Thank you for your participation!

For more detailed information on anything presented, please visit our website at: www.caiso.com or send an email to: CustomerReadiness@caiso.com.

For resource specific questions or concerns, please submit a CIDI ticket.

Reference Links - Commissioning of New Resources Section

Telemetry BPM:

[https://bpmcm.caiso.com/BPM%20Document%20Library/Direct%20Telemetry/BPM for Direct Telemetry_V19%20Clean.docx](https://bpmcm.caiso.com/BPM%20Document%20Library/Direct%20Telemetry/BPM%20for%20Direct%20Telemetry_V19%20Clean.docx)

Certification: <http://www.caiso.com/Documents/5330.pdf>

Performance Verification: <http://www.caiso.com/Documents/5370.pdf>

Pre-COD Energy Tests, Operating Procedures 5320 & 5320A:

<http://www.caiso.com/Documents/5320.pdf>

<http://www.caiso.com/Documents/5320A.pdf>

Ancillary Services and A/S Certification Tests, Operating Procedure 5330:

<http://www.caiso.com/Documents/5330.pdf>

Reference Links - Management of Resources Section

Tariff Requires Compliance with Dispatch and Operating Instructions Section 4.2.1:

<http://www.caiso.com/Documents/Section4-Roles-and-Responsibilities-asof-Feb11-2023.pdf>

Energy Storage Enhancements Stakeholder Page:

<https://stakeholdercenter.caiso.com/StakeholderInitiatives/Energy-storage-enhancements>

Outage Management Business Practice Manual Section 8.2:

<https://bpmcm.caiso.com/Pages/BPMDetails.aspx?BPM=Outage%20Management>

ISO Tariff Section 9 (Outages):

<http://www.caiso.com/Pages/documentsbygroup.aspx?GroupID=E4ACC97A-173F-44CE-94CDE33FA7EC5DF1>

Outage Management Page: <http://www.caiso.com/market/Pages/OutageManagement/Default.aspx>

Eligible intermittent resource dispatch operating target training (2018):

<https://youtu.be/SHG0AE1D1zA>

<http://www.caiso.com/Documents/Presentation-DispatchOperatingTargetTariffClarificationTraining.pdf>

Reference Links – Failure to Comply with Operator Instructions Section

Non-Compliance FERC Self Reporting: <https://ferc.gov/self-reports>

Non-Compliance NERC Self Reporting: <https://www.nerc.com/pa/comp/Pages/default.aspx>

Scheduling Coordinator Page:

<http://www.caiso.com/participate/Pages/BecomeSchedulingCoordinator/Default.aspx>

New SC Guide:

<http://www.caiso.com/Documents/New-Scheduling-Coordinator-Resource-Owner-Reference-Guide.pdf>