



# Business Rules Document

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## OMS Replacement Project

Document Version: 4.51.6

Date Created: 2/19/2015/4/16/2015

	<b>Technology</b>	<b>Template Version:</b>	<b>2</b>
		<b>Document Version:</b>	<b>1-51.6</b>
<b>OMS Replacement Project Business Rules Document</b>		<b>Date Created:</b>	<b>2/19/2015/16/2015</b>


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		<b>Document Version:</b>	<b>4-51.6</b>
<b>OMS Replacement Project Business Rules Document</b>		<b>Date Created:</b>	<b>2/19/2015/16/2015</b>

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# 1. Introduction

## 1.1 Purpose

The purpose of this document is to provide a comprehensive description of the business rules associated with the OMS System.

# 2. Business Rules

## 1.2 Common Business Rules

The table listed below specifies Business Rules. Each Business Rule is assigned a unique ID starting with the system acronym plus a prefix of "BRL" followed by a 3 digit number with leading zeros if necessary. Each Business Rule must be related to and referenced by at least one Functional Requirement, but may be referenced by multiple Functional Requirements and Use Cases.

BRL ID	Business Rule Description
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OMS-COM-BRL001

An outage transitions through various states throughout its lifecycle, from inception to completion, from the equipment's initial loss of capacity to return to normal operation.

These states are:

State	Description	Outage Requester Action (Allowed, Required or Not Allowed)
Received	An outage request goes to the "Received" state when an Outage Requester has created and submitted an outage request that has passed all validation rules.	Allowed
Cancelled	An outage goes to the "Cancelled" state when the Outage Requester submits a change request with a cancel action.	Not allowed
Disapproved	An outage goes to the "Disapproved" state when CAISO staff disapprove an outage.	Not allowed
Study	An outage goes to the "Study" state when CAISO staff are studying an outage.	Allowed
OE Recommended	An outage goes to the "OE Recommended" state when CAISO OE staff have completed review successfully.	Allowed
OE Not Recommended	An outage goes to the "OE Not Recommended" state when CAISO OE staff have completed review unsuccessfully.	Allowed
Pre-approved	An outage goes to the "Pre-approved" state when CAISO staff have pre-approved the outage.	Allowed
Approved	An outage goes to the "Approved" state when CAISO staff have approved the outage.	Required/Allowed
Late To Start	An outage goes to the "Late To Start" state when an outage has not been acted upon by the Outage Requestor before the Scheduled Start Time.	Required/Allowed
ISO Hold	An outage goes to the "ISO Hold" state when the CAISO staff have decided an outage may need to be delayed.	Allowed
OUT OK	An outage goes to the "OUT OK" state either via a manual transition by the outage requester/ISO operator or automatically via the OMS system to indicate that an outage is ready to start	Required/Allowed
OUT	An outage goes to the "OUT" state when the outage requester provides the actual start time of the outage	Required/Allowed



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OMS-COM-BRL001 continued	<b>State</b>	<b>Description</b>	<b>Outage Requester Action (Allowed, Required or Not Allowed)</b>
	Late To End	An outage goes to "Late To End" state when the Outage Requestor has not submitted an "IN OK" request before the Scheduled End Time.	Required/All owed
	IN OK	An outage goes to the "IN OK" state via a manual transition by the outage requester/ISO operator to indicate that an outage is about to be completed	Required/All owed
	IN Service Editable	An outage goes to the "IN Service Editable" state either via an automatic transition by the system or a manual transition by the outage requester to indicate the actual end time of an outage	Allowed (only for updating notes)
	IN Service	An outage goes to the "IN Service" state automatically after 24 hours in the "IN Service Editable" state.	Not allowed
OMS-COM-BRL002	<p>A cancel change request action on an outage can be submitted when the outage is in any of the following states:</p> <ul style="list-style-type: none"> <li>• "Received"</li> <li>• "Study";</li> <li>• "OE Recommended";</li> <li>• "OE Not Recommended";</li> <li>• "Pre-approved";</li> <li>• "Approved";</li> <li>• "Late To Start"; and</li> <li>• "ISO Hold".</li> </ul> <p>A cancel change request action on an outage <u>cannot</u> be submitted when the outage is in any of the following states:</p> <ul style="list-style-type: none"> <li>• "Disapproved"</li> <li>• "OUT OK";</li> <li>• "OUT";</li> <li>• "Late To End";</li> <li>• "IN OK";</li> <li>• "IN Service Editable"; and</li> <li>• "IN Service".</li> </ul>		
OMS-COM-BRL003	A withdrawal of an outage change request can only be submitted before CAISO staff have approved or rejected the outage change request.		

<p>OMS-COM-BRL004</p>	<p>An outage is assigned either 'Planned' or 'Forced' type upon entry by comparing the length of time period between the Outage Entry and Outage Start against a predefined threshold (which is set to seven calendar days, not including the submission date and date of the outage).</p> <p><b>If</b> { (Planned Outage Start Time – Time of Outage Entry) &lt;= Threshold }  <b>Then</b> Outage Type = "Forced"  <b>Else</b> Outage Type = "Planned"</p>
<p>OMS-COM-BRL005</p>	<p>A change request to a Forced outage may transition it into the Planned timeframe. This will lead to an outage type change, in compliance with conditions described below.</p> <p><b>If</b> {(Outage Type = "Forced") and (New Planned Outage Start Time – Time of Outage Request Entry) &gt; Threshold}  <b>Then</b> Outage Type = "Planned"  <b>Else</b> Outage Type remains unchanged</p>
<p>OMS-COM-BRL030</p>	<p>A change request to a Planned Transmission outage may transition it into the Forced timeframe. This will lead to an outage type change, in compliance with conditions described below.</p> <p><b>If</b> {(Outage Type = "Planned") and (New Planned Outage Start Time – Time of Outage Request Entry) &lt;= Threshold}  <b>Then</b> Outage Type = "Forced"  <b>Else</b> Outage Type remains unchanged</p> <p>A change request to a Planned Resource (generation) outage will not lead to an outage type change. For an originally Planned Resource (generation) outage that is approved, if the change request is accepted, then the outage remains "Planned". If the change request is denied, there is no change to the original Planned outage and a new outage may be submitted.</p>
<p>OMS-COM-BRL006</p>	<p>Outage Approval Type can either be Final Approval Required (FAR) or Final Approval Not Required (FAN). This is computed for an outage when the outage is initially entered, each time the outage is modified via a modification request, and when a group is created that includes the outage. It can transition from FAN to FAR or FAR to FAN based on the data entry and actions taken by users</p>

OMS-COM-BRL007

Alerts are issued by the system in response to direct user actions when creating, modifying, or acting on an outage. Such alerts can include notifications about validation errors in outage data upon entry or incorrect actions on outages that violate business rules. These include but are not limited to the following:


Alert Type (Warning, Error, Information)	Alert Description
Information	Upon detection of outage conflicts a soft alert will be generated informing the user about conflicts with the proposed outage that needs to be resolved (i.e. contingency conflicts)
Information	When a user attempts to save an outage that has been modified by other users, since it was first opened, a soft alert will be produced informing the user that saving the outage will overwrite changes made by other another user
Information	When equipment is selected during outage creation through the outage entry display by an internal or external client, the user shall receive a soft alert notifying them those operational procedures that reference the selected equipment are available
Information	When a user specifies "AVR/Exciter" as the NOW in outage entry, a soft alert with the text "Contact Transmission Operator for Voltage Schedules" will be issued
Error	Upon detection of switch conflicts in transmission outages, if the trumping option is not available a hard alert will be issued. Users will be asked to resolve the conflict before the entry can be allowed.  The alert will include: <ol style="list-style-type: none"> <li>1. All outages in conflict</li> <li>2. All switch(es) in conflict</li> <li>3. Time periods for all conflicts</li> </ol>
Information	Upon detection of switch conflicts in transmission outages, if the trumping option is available, the alert presented will be issued as a soft alert.  The alert will include: <ol style="list-style-type: none"> <li>1. All outages in conflict</li> <li>2. All switch(es) in conflict</li> <li>3. Time periods for all conflicts</li> </ol>



OMS-COM-BRL007 (continued)	Alert Type (Warning, Error, Information)	Alert Description
	Error	Upon detection of conflicts in equipment with shared ownership a hard alert will be produced blocking the entry of the new outage. In such cases, an outage creator has rights to equipment but not outages with that equipment entered by co-owners. A hard alert will be issued informing a user about a conflict with the co-owner's outage along with a recommendation to contact CAISO to resolve the situation
	Information	When an internal user makes a change to an outage that is linked within an outage group, they will receive a soft alert that will indicate the other outages that are part of the group as well as any additional note associated with the group
	Warning	If any outage in an Outage Group changes in one of the manners below, all remaining outages in group will receive a warning that must be acknowledged. <ol style="list-style-type: none"> <li>1. Change to start or end time</li> <li>2. Change to modeling</li> <li>3. Outage Cancellation or Disapproval</li> <li>4. Change to any Market Impacts</li> </ol>
	Warning	A warning will be issued in the following scenarios with regards to equipment ownership change to the: <ol style="list-style-type: none"> <li>1. new equipment owner about outages now assigned to his company by ownership changes.</li> <li>2. old equipment owner for outages now assigned to another company due to ownership changes</li> </ol>
	Information	A notification alert is issued to users when they attempt to extend or shorten either a trumping or impacted outage
	Error	Miscellaneous validation errors associated with outage data upon entry or incorrect actions on outages that violate business rules
	Information	Miscellaneous validation information messages associated with outage data upon entry or update actions on outages
	Warning	For outages on RA resources, a warning will be issued to users when a CAISO operator makes the determination that an RA replacement is required in order for the outage to be allowed to proceed and sets the RA Replacement Decision flag accordingly
OMS-COM-BRL008	Warnings are acknowledged on a company basis. The first user acknowledging a warning will do so on behalf of his company (internal or external). All warnings must be acknowledged in order to be cleared.	



		<b>Technology</b>	<b>Template Version:</b>	<b>2</b>
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OMS-COM-BRL009	External Warnings can be acknowledged by either an external CAISO participant, or a CAISO internal user. If an external warning is acknowledged by an internal user, the user will receive an alert verifying their intent to acknowledge the external warning prior to processing the request			
OMS-COM-BRL010	<p>Outage Priority Date is computed when the outage is entered and possibly also when the outage is modified.</p> <p>On outage entry, Outage Priority Date is set to the outage submission date</p> <p>Outage Priority Date is updated on an outage modification:</p> <ol style="list-style-type: none"> <li>1. For Generation Outages when there is an increase in the PMax derate of the outage or increase in time scope.</li> <li>2. For Transmission Outages when there is an increase in time scope.</li> </ol>			
OMS-COM-BRL011	<b>Outage Creation Validation:</b> Emergency Return Time cannot exceed outage duration and will only be validated on outage creation.			
OMS-COM-BRL012	<b>Outage Creation/Modification Validation:</b> Outage Planned end date/time must be greater than outage Planned start date/time.			
OMS-COM-BRL013	<b>Outage Creation Validation:</b> System assigns unique numeric ID (Outage ID) upon outage creation.			
OMS-COM-BRL014	<b>Outage Creation Validation:</b> For the outage time period, only an active resource/equipment and participant can be utilized.			
OMS-COM-BRL015	<b>Outage Creation/Modification Validation:</b> All Start and End Dates and Times for referenced equipment or profiles within the outage must be wholly contained within the outage Start and End Date/Time.			
OMS-COM-BRL016	An outage group is created when two or more outages are linked together. When an outage group is created it is assigned a unique ID and all outages in the group will share the same outage group ID.			
OMS-COM-BRL017	<p>An outage group can only be created manually by internal users or automatically by the System under certain conditions such as trumping.</p> <p>Only internal users can manage outage groups.</p>			
OMS-COM-BRL018	An outage group may be visible by internal users only or All Users. When a group is manually created by a CAISO internal user, the Group visibility flag will default to Internal Only, but the CAISO user may change the flag to be All Users, if desired. Groups automatically created by the System (e.g., Trumping Actions) can optionally set the visibility of the group as needed.			
OMS-COM-BRL019	An outage group can be removed (i.e. ungrouped) by CAISO users only.			
OMS-COM-BRL020	<p>The planned start time of an outage can only be modified when the outage is in the following states:</p> <ul style="list-style-type: none"> <li>• "Received"</li> <li>• "Study";</li> <li>• "OE Recommended";</li> <li>• "OE Not Recommended";</li> <li>• "Pre-approved";</li> <li>• "Approved";</li> <li>• "Late To Start"; and</li> <li>• "ISO Hold"</li> </ul>			

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### 1.3 Generation Business Rules

The table listed below specifies Business Rules. Each Business Rule is assigned a unique ID starting with the system acronym plus a prefix of "BRL" followed by a 3 digit number with leading zeros if necessary. Each Business Rule must be related to and referenced by at least one Functional Requirement, but may be referenced by multiple Functional Requirements and Use Cases.

BRL ID	Business Rule Description
OMS-GEN-BRL001	Availability reporting of aggregated resource child resources is required when the child resource is de-rated by 50MW or greater or when the child resource is a Black start unit. So, this only applies to child resources that: <ol style="list-style-type: none"> <li>1. Are at least 50MW and de-rated by 50MW or more.</li> <li>2. Are Black start units with any de-rates</li> </ol>
OMS-GEN-BRL002	Outage Approval Type of FAR is automatically set for any of the following scenarios otherwise, FAN is automatically set: <ol style="list-style-type: none"> <li>1. Any data defined in the Market Impacts portion of the outage</li> <li>2. Resource is a Black start resource</li> <li>3. NoW of Automatic Voltage Regulator (AVR)/Exciter, <u>Transmission Induced</u> or Power System Stabilizer (PSS) is specified</li> <li>4. NOW that requires Ancillary Service (AS) Availability data to be entered has been specified</li> <li>5. If the curtailment value is greater than a predefined MW value, some level of curtailment will be selected as FAR</li> <li>6. Outage is included in a group</li> </ol>
OMS-GEN-BRL003	Outage Approval Type (FAR or FAN) is viewable by CAISO Internal Users only. Externally, all Generation outages will appear to have an outage approval type of FAR



Technology

Template Version:

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Document Version:

4-51.6

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Date Created:

2/19/2015 4/16/2015

OMS-GEN-BRL004

Allowed de-rates and re-rates based on Nature of Work are:

Nature of Work	Pmax Curtailment/Stated Availability	Pmin Rerate	Loadmax Derate	Loadmin Rerate	A/S Availability	Ramp Rate Rerate	Use Limit	Overlaps Allowed	Exclusive Nature of Work
Environmental Restrictions	A	A	A	A	A			Yes	Yes
Use Limit Reached	A		A	A	A		R	Yes	Yes
Transmission Induced	A		A					Yes	Yes
Plant Maintenance	A	A	A	A	A			Yes	Yes
Plant Trouble	A	A	A	A	A			Yes	Yes
Unit Cycling	A	A	A	A				Yes	Yes
Unit Supporting Startup	A	A						Yes	Yes
Transitional Limitation	A	A	A	A				Yes	Yes
Ambient Due to Temp	A	A	A	A	A			No	Yes
Ambient Not Due to Temp	A	A	A	A	A			No	Yes
Power System Stabilizer					A			No	Yes
New Generator Test Energy								Yes	Yes
Unit Testing	A	A	A	A	A			Yes	Yes
Metering/Telemetry					R			Yes	Yes
RTU/RIG					R			Yes	Yes
ICCP					R			Yes	Yes
Ramp Rate						R		No	Yes
AVR/Exciter					A			Yes	Yes
Pre Unit Commercial Testing	A	A	A	A				Yes	Yes

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OMS-GEN-BRL005

Allowed de-rates and re-rates based on Resource types are:

OMS Resource Type	Resource Classification	Stated Availability	Pmax Curtailment	Pmin Rerate	Load max Derate	Load min Rerate	Ramp Rate Rerate	A/S Availability	Minimum Energy limit	Maximum Energy Limit
GEN or TG	Individual	Yes	Calculated	Yes	No	No	Yes	Yes	No	No
GEN	MSG	Calculated or entered total derate to zero	Calculated	No	No	No	No	Yes	No	No
GEN	MSG Configuration	Yes	Calculated	Yes	No	No	Yes	No	No	No
GEN or TG	Aggregate	Yes	Calculated	Yes	No	No	Yes	Yes	No	No
GEN or TG	Aggregate Child	Yes	Calculated	No	No	No	No	No	No	No
NGR	Individual	Yes	Calculated	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pump Storage	Individual	Yes	Calculated	Yes	Yes	Yes	Yes	Yes	No	No
Participating Load	Individual	No	No	No	Yes	Yes	No	Yes	No	No
ITIE or ETIE	Individual	Yes	Calculated	Yes	No	No	No	No	No	No
Load (Pumps)	Individual	No	No	No	Yes	Yes	No	Yes	No	No

GEN = Generator, TG = Tie Generator, ITIE = Import Intertie, ETIE= Export Intertie, NGR= Non Generating Resource, MSG = Multi Stage Generator

OMS-GEN-BRL006

In order to maintain existing Standard Capacity Product (SCP) rules, when a generation outage is initially created:

1. If the Outage type is Planned, the SCP Exempt flag is not set (SCP flag is not applicable to Planned outages).
2. If the Outage type is Forced with the difference between the Planned outage Start Date/Time and outage Submission time between seven and four days (excluding the Outage Submission date and Outage Planned Start Date), the SCP Exempt flag is set.
3. If the Outage type is Forced with the difference between the Planned outage Start Date/Time and outage Submission time three days or less (excluding the Outage Submission date and Outage Planned Start Date), the SCP Exempt flag is not set

OMS-GEN-BRL007

When outage modification requests are accepted, the SCP Exempt Flag will be updated if the Planned Start Time of the Outage has changed. The computation of the SCP Exempt Flag will be the same as when the outage was first submitted, except the difference will be computed based on the Submission Time of the Request and the new Planned start of the outage.

OMS-GEN-BRL008	For resource outages, only one pending request can be submitted against a resource for any given timeframe. If an outage for the resource already has an active request for the same timeframe that has not been acted on by CAISO staff, the external participant will not be able to submit an additional request against ANY outage related to the same resource in that timeframe. Timeframe is derived as the scope of the existing outage and pending request.
OMS-GEN-BRL009	For PMin re-rates, ramp rate re-rates, LoadMax derates, LoadMin rerates, Minimum Energy Limits, Maximum Energy Limits and AS availability changes, overlapping outages are not allowed.
OMS-GEN-BRL010	For PMax derates, overlapping outages are allowed
OMS-GEN-BRL011	For NGRs: <ol style="list-style-type: none"> <li>1. The Maximum Energy Limit (Maximum Stored Energy) de-rated value must be zero or positive. In addition, it must be lower than or equal to the value defined in resource reference model.</li> <li>2. The Minimum Energy Limit (Minimum Stored Energy) de-rated value must be zero or positive. In addition, it must be lower than or equal to the value defined in the reference model and lower than the Maximum Energy Limit de-rated value.</li> </ol>
OMS-GEN-BRL012	For a FAR generation outage, an outage goes to the "OUT OK" state when the Outage Requestor submits an "OUT OK" change request before the Scheduled Start Time <u>and</u> : <ul style="list-style-type: none"> <li>• The "OUT OK" change request has been accepted by CAISO staff.</li> </ul> <p>For a FAN generation outage, an outage goes to the "OUT OK" state when the Outage Requestor submits an "OUT OK" change request before the Scheduled Start Time.</p> <ul style="list-style-type: none"> <li>• An "OUT OK" change request will not be allowed before a specific time-period before the Scheduled Start Time (i.e., "OUT OK" not allowed prior to 30 minutes before Scheduled Start Time).</li> </ul> <p>An "OUT OK" change request for FAR and FAN generation outages can only be submitted when the current state of the outage is "Approved" or "Late To Start".</p> <ul style="list-style-type: none"> <li>• If an "OUT OK" change request is submitted and accepted when the outage is in the "Approved" state, the outage will transition into the "OUT OK" state.</li> <li>• If an "OUT OK" change request is submitted and accepted when the outage is in the "Late To Start" state, the outage will transition into the "OUT" state.</li> </ul>
OMS-GEN-BRL013	For both FAR and FAN generation outages, an outage goes to the "OUT" state: <ul style="list-style-type: none"> <li>• If the current state of the outage is "OUT OK"; <ul style="list-style-type: none"> <li>○ The outage will automatically transition to the "OUT" state at the Scheduled Start Time.</li> </ul> </li> <li>• If the current state of the outage is "Approved" or "Late To Start"; <ul style="list-style-type: none"> <li>○ An "OUT OK" change request is required first, and if accepted, will transition the outage into the "OUT" state.</li> </ul> </li> </ul>

<p>OMS-GEN-BRL014</p>	<p>For a FAR generation outage, an outage goes to the "IN OK" state when the Outage Requestor submits an "IN OK" change request before the Scheduled End Time <u>and</u>:</p> <ul style="list-style-type: none"> <li>The "IN OK" change request has been accepted by CAISO staff.</li> </ul> <p>For a FAN generation outage, an outage goes to the "IN OK" state when the Outage Requestor submits an "IN OK" request before the Scheduled End Time.</p> <p>An "IN OK" change request for FAR and FAN generation outages can only be submitted when the current state of the outage is "OUT" or "Late To End".</p> <ul style="list-style-type: none"> <li>If an "IN OK" change request is submitted and accepted when the outage is in the "OUT" state, <u>and before the Scheduled End Time</u>, the outage will transition into the "IN OK" state.</li> <li>If an "IN OK" change request is submitted and accepted when the outage is in the "Late To End" state, the outage will transition into the "IN Service Editable" state.</li> </ul>
<p>OMS-GEN-BRL015</p>	<p>For both FAR and FAN generation outages, an outage goes to the "IN Service Editable" state:</p> <ul style="list-style-type: none"> <li>If the current state of the outage is "IN OK"; <ul style="list-style-type: none"> <li>The outage will automatically transition to the "IN Service Editable" state at the Scheduled End Time.</li> </ul> </li> <li>If the current state of the outage is "OUT" or "Late To End";</li> </ul> <p>An "IN OK" change request is required first, and if accepted, will transition the outage into the "IN Service Editable" state.</p>
<p>OMS-GEN-BRL016</p>	<p>For outages with PMax derates, Outage requesters must explicitly state availability in every new or modified outage while resulting curtailments will be computed by the system based on the stated availability values subject to existing curtailments in overlapping outages.</p> <p>The curtailment is computed as follows:  Curtailment (i) = Previous Availability(i) – New Availability(i)</p> <p>where (i) is each time segment of the new or modified outage.</p> <p>For a modified generation outage:  New Curtailment(i) = Previous Curtailment(i) + (Previous Availability(i) – New Availability(i))</p> <p>The new curtailment computed using either of these formulas must be non-negative for each time segment. If the computation yields a negative value, an error is declared and the outage entry/modification is rejected.</p>

OMS-GEN-BRL017	<p>A special case of outage modification is a change in its Start Time and/or End Time. If the new Outage Start Time is later than the original Start Time and/or the new End Time is earlier than the original one, a portion of the original outage time span will not be covered by new duration resulting in one or more vacated period(s).</p> <p>Other outages of the same resource may or may not overlap with periods vacated in a given outage.</p> <p>If there are no overlaps, this means that no outages exist for such periods and the resource availability will be automatically reset to Pmax</p> <p>If overlaps exist, the availability must be stated for the vacated periods on the modified outages along with the indication of an outage id to which of the overlapping outages, if there are more than one, this availability value applies. The curtailment will be recomputed for the specified outage for the affected period(s).</p>
OMS-GEN-BRL018	For Regulation Up, Regulation Down, Spin and Non Spin A/S availability MW values, the OMS shall only allow zeroes to be entered by the outage requester. When either regulation up/down is set to zero then the system shall set both of them to zero.
OMS-GEN-BRL019	For ITIEs and ETIEs that are designated as RA resources, the RA value shall replace the PMax reference value and will be used as the basis for any PMax derates on these resources.
OMS-GEN-BRL020	Short Notice Opportunity Outages can be requested a configurable number of hours in advance of the Outage Planned Start Date/Time. They cannot exceed a configurable number of days in length and cannot be extended.
OMS-GEN-BRL021	For MSGs, the plant level stated availability is calculated to be highest stated availability out of all it's configurations except for when it is entered as a total derate to zero using the out_of_service (OOS) flag
OMS-GEN-BRL022	<b>Outage Creation/Modification Validation:</b> Stated Availability cannot exceed Resource PMax (submitted value must be a non-negative value).
OMS-GEN-BRL023	<b>Outage Creation/Modification Validation:</b> PMin rerate value cannot be below PMin (submitted value must be a positive value).
OMS-GEN-BRL024	<b>Outage Creation/Modification Validation:</b> Load Curtailment cannot exceed Load Max (submitted value must be a positive value).
OMS-GEN-BRL025	<b>Outage Creation/Modification Validation:</b> Load rerate value cannot be below Load Min (submitted value must be a positive value).
OMS-GEN-BRL026	<b>Outage Creation/Modification Validation:</b> Ramp rate re-rate values can only last for the balance of the day they are submitted for, unless it is after 2200 when they can be entered for the next day. The duration of the ramp rate rerate is configurable.
OMS-GEN-BRL027	<b>Outage Creation/Modification Validation:</b> PMin or PMin rerate must be less than the Stated Availability value.
OMS-GEN-BRL028	<b>Outage Creation/Modification Validation:</b> Ramp rate rerate value for each segment must be between the minimum and maximum values defined for the resource (entered value must be a positive value).
OMS-GEN-BRL029	<b>Outage Creation Validation:</b> For a Resource outage that is considered Forced Immediate i.e. the start time of the outage (at the time of the outage submittal) is either the current time or a time in the past or a Resource outage modification that extends the return time of an outage: The System will make known to the user if the Resource is identified on the Market Impacts Tab (Gen Requirements) of any other outage that overlaps the timeframe of the outage.





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OMS-GEN-BRL030	Actual times cannot be entered by the user. They will be auto-populated at the planned start time and the planned end time	
OMS-GEN-BRL031	For a PMin re-rate on an MSG resource, user must set the PMin re-rate for the specific configuration(s) to the desired value(s). All other configurations must be set to their reference data PMin value.	
OMS-GEN-BRL032	For a PMax de-rate on an MSG, user must set the availability value for the specific configuration(s) to the desired value(s). All other higher configurations must be set to Out-of-Service using the OOS flag and lower configurations must be set to their reference data PMax value	
OMS-GEN-BRL033	Availability, PMin, LoadMax, LoadMin, Minimum Energy Limit, Maximum Energy Limit cannot be updated for time periods in the past when an outage is in the "OUT", "OUT OK", "IN OK", "LATE to END" states.	
OMS-GEN-BRL034	An outage may be flagged as invalid or inconsistent due to reference data changes. Inconsistencies/invalidity may span an entire outage or just portions of an outage	



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OMS-GEN-BRL035 Reference data changes may result in an impacted outage being flagged as inconsistent or invalid as indicated in the table below.

Data Change	Compare to Rerate/Derate	Resulting Outage Classification
PMax New > PMax Old	N/A	Inconsistent
PMax New < PMax Old	PMax New < Stated Availability	Inconsistent
	PMax New > Stated Availability	Inconsistent
	PMax New > PMin Rerate	Inconsistent
PMin New > PMin Old	PMin New > PMin Rerate	Inconsistent
	PMin New < PMin Rerate	N/A
PMin New > Stated Availability	PMin New > Stated Availability	Inconsistent
PMin New < PMin Old	N/A	N/A
MSG to Non MSG Non MSG to MSG Aggregate to Non Aggregate Non Aggregate to Aggregate Addition/Removal of MSG configurations Addition/Removal of child resources Addition/Removal of Ramp rate segments	N/A	Invalid
Load Max New > Load Max Old	All	N/A
Load Max New < Load Max Old	Load Max New < LoadMax Rerate	Inconsistent
	Load Max New > LoadMax Rerate	N/A
	Load Max New < LoadMin Rerate	inconsistent
Load Min New > Load Min Old	Load Min New > LoadMin Rerate	inconsistent
	Load Min New < LoadMin Rerate	N/A
Load Min New > LoadMax Rerate	Load Min New > LoadMax Rerate	Inconsistent
Load Min New < Load Min Old	N/A	N/A
Maximum Energy Limit New > Maximum Energy Limit Old	All	N/A
Maximum Energy Limit New < Maximum Energy Limit Old	Maximum Energy Limit New < Maximum Energy Limit Rerate	Inconsistent
	Maximum Energy Limit New > Maximum Energy Limit Rerate	N/A
	Maximum Energy Limit New < Minimum Energy Limit Rerate	N/A
Minimum Energy Limit New > Minimum Energy Limit Old	Minimum Energy Limit New > Minimum Energy Limit Rerate	N/A
	Minimum Energy Limit New < Minimum Energy Limit Rerate	N/A
Minimum Energy Limit New > Maximum Energy Limit Rerate	Minimum Energy Limit New > Maximum Energy Limit Rerate	Inconsistent
Minimum Energy Limit New < Minimum Energy Limit Old	N/A	N/A

OMS-GEN-BRL036 Invalid outages must be shortened or canceled while inconsistent outages can be updated to correct the inconsistency caused by the increase or decrease in reference data values

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OMS-GEN-BRL037	Invalid outages will not complete auto state transitions while still flagged as invalid while inconsistent outages will complete auto state transitions as applicable
OMS-GEN-BRL038	Pending requests associated with inconsistent/invalid outages will be left as-is however such pending requests cannot be accepted by a CAISO user. These requests can only be rejected by a CAISO user or withdrawn by the requester
OMS-GEN-BRL039	New break points will be added to an invalid outage indicating the start of the reference data change (such as MSG to Non MSG) that caused the outage to be flagged as invalid
OMS-GEN-BRL040	New availability break points will be added to an inconsistent outage indicating the start of a PMax increase or decrease.
OMS-GEN-BRL041	Warnings will be generated and associated with invalid or inconsistent outages
OMS-GEN-BRL042	All resource de-rate and re-rate profiles (e.g. availability, PMin, etc) must match the start and end date of the outage

## 1.4 Transmission Business Rules

The table listed below specifies Business Rules. Each Business Rule is assigned a unique ID starting with the system acronym plus a prefix of "BRL" followed by a 3 digit number with leading zeros if necessary. Each Business Rule must be related to and referenced by at least one Functional Requirement, but may be referenced by multiple Functional Requirements and Use Cases.

BRL ID	Business Rule Description
OMS-TRN-BRL001	Outage Approval Type of FAR is automatically set for any of the following scenarios otherwise FAN is automatically set: <ol style="list-style-type: none"> <li>1. Any data defined in the Market Impacts portion of the outage</li> <li>2. Equipment with voltage of 500kv or higher</li> <li>3. NOW of Communications is selected</li> <li>4. Outage is included in a group</li> </ol>
OMS-TRN-BRL002	Outage Approval Type is viewable by both CAISO Internal and External Users
OMS-TRN-BRL003	Via the Graphical User Interface (GUI), when Facility Outage Definition Modeling flag is set and data is populated into the Outage Entry page, the user will be able to manually modify the selected equipment before the outage is saved
OMS-TRN-BRL004	Via an Application Programming Interface (API) request to submit an outage, when the Facility Outage Definition Modeling flag is set, the outage will be created with the default equipment provided in the pre-defined modeling. No additional information defining switches associated with the facility can be submitted with the outage submittal. If additional switches are submitted for the facility, the outage submittal will be rejected.



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OMS-TRN-BRL005 For Transmission Outages, only one Pending request can be submitted against an outage for Transmission equipment for a given timeframe. If an outage for transmission equipment already has an active request for the same timeframe that has not been acted on by CAISO staff, the external participant will not be able to submit an additional request against any outage related to the same transmission equipment in that timeframe. Timeframe is derived as the scope of the existing outage and pending request. If the participant needs to make further modifications, they would need to withdraw the existing request, and submit a modified request.

OMS-TRN-BRL006 Allowed features by Natures of Work are:

Nature of Work	Switch Modeling	Equipment Derate	Overlaps Allowed	Exclusive Nature of Work
Out of service	R	A	Yes	Yes
Energized Work			Yes	Yes
Relay work	A	A	Yes	Yes
Special Setup	A	A	Yes	Yes
Test Program	A	A	Yes	Yes
Equipment Derate	A	R	Yes	Yes
Equipment Abnormal	A	A	Yes	Yes
Path Limitation	A	A	Yes	Yes
Communications			Yes	Yes
Out of Service with Special Setup	A	A	Yes	Yes

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OMS-TRN-BRL021 Out of Service with special setup NoW is used for transmission outages that include a combination of switches that are being closed as well as switches that are being opened.

OMS-TRN-BRL007 Via the API, the following are optional Transmission outage fields:  
 1. IsNewEquipmentEnergized - Not required, defaults to 'No'  
 2. SwitchModelingComplete - Not required, defaults to 'Yes'  
 3. isRecurring - Not required, defaults to 'No'

OMS-TRN-BRL008 For a FAR transmission outage, an outage goes to the "IN OK" state when the Outage Requestor submits an "IN OK" change request and:

- The "IN OK" change request has been accepted by CAISO staff.

An "IN OK" cannot be requested for a FAN transmission outage.

An "IN OK" for FAR transmission outages can only be requested when the current state of the outage is "OUT" or "Late To End".

<p>OMS-TRN-BRL009</p>	<p>For a FAR transmission outage, an outage goes to the “OUT OK” state when the Outage Requestor submits an “OUT OK” change request <u>and</u>:</p> <ul style="list-style-type: none"> <li>• The “OUT OK” change request has been accepted by CAISO staff.</li> </ul> <p>An “OUT OK” cannot be requested for a FAN transmission outage.</p> <p>An “OUT OK” for FAR transmission outages can only be requested when the current state of the outage is “Approved” or “Late To Start”.</p>
<p>OMS-TRN-BRL010</p>	<p>For a FAR transmission outage, an outage goes to the “OUT” state when the Outage Requestor submits an “OUT” change request with the actual start time of the outage <u>and</u>:</p> <ul style="list-style-type: none"> <li>• The “OUT” request has been accepted by CAISO staff.</li> </ul> <p>An “OUT” change request for a FAR transmission outage can only be submitted when the current state of the outage is “OUT OK”.</p> <p>For a FAN transmission outage, an outage goes to the “OUT” state when the Outage Requestor submits an “OUT” change request with the actual start time of the outage.</p> <ul style="list-style-type: none"> <li>• An “OUT” request will not be allowed before a specific time-period before the Scheduled Start Time (i.e., “OUT” not allowed prior to 30 minutes before Scheduled Start Time).</li> </ul> <p>An “OUT” change request for a FAN transmission outage can only be submitted when the current state of the outage is “Approved” or “Late To Start”.</p>
<p>OMS-TRN-BRL011</p>	<p>For a FAR transmission outage, an outage goes to the “IN Service Editable” state when the Outage Requestor submits an “IN Service” change request with the actual end time of the outage <u>and</u>:</p> <ul style="list-style-type: none"> <li>• The “In Service” request has been accepted by CAISO staff.</li> </ul> <p>An “In Service” change request for a FAR transmission outage can only be submitted when the current state of the outage is “IN OK”.</p> <p>For a FAN transmission outage, an outage goes to the “IN Service Editable” state when the Outage Requestor submits an “IN Service” request with the actual end time of the outage.</p> <p>An “IN Service” request for a FAN transmission outage can only be submitted when the current state of the outage is “OUT” or “Late To End”.</p>

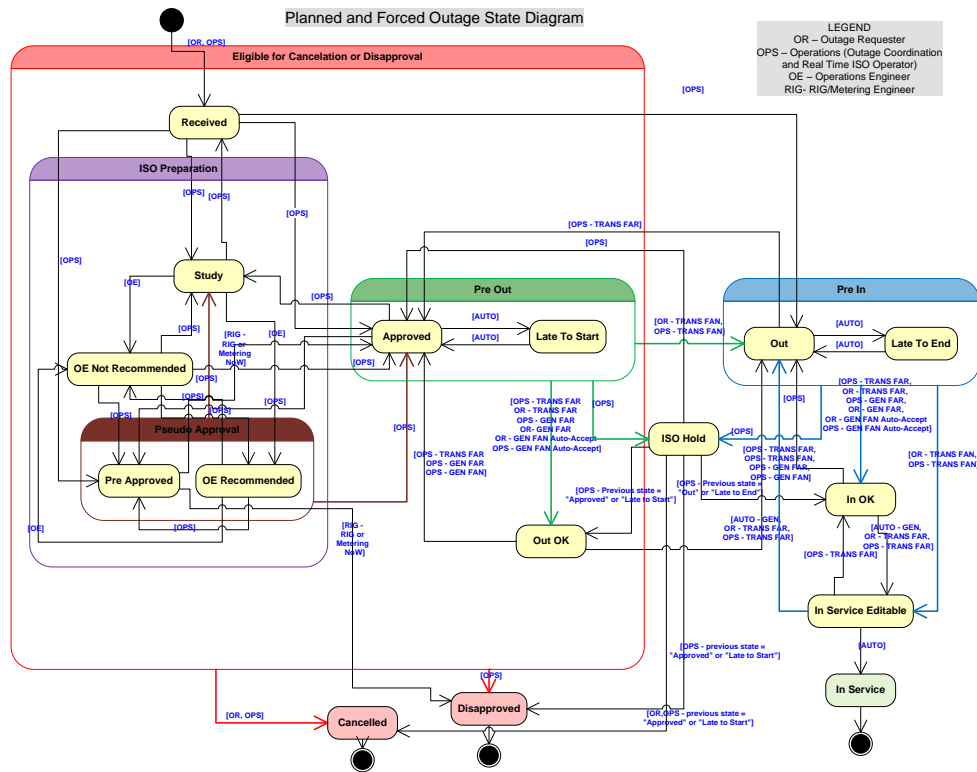
OMS-TRN-BRL012	Allowed transmission outage features based on Equipment types are: <table border="1" data-bbox="342 514 865 1213"> <thead> <tr> <th>Equipment Type</th> <th>Facility Outage Definition</th> <th>Equipment Rating Change</th> </tr> </thead> <tbody> <tr> <td>Substation</td> <td>Yes</td> <td>No</td> </tr> <tr> <td>Busbar Section</td> <td>Yes</td> <td>No</td> </tr> <tr> <td>Line</td> <td>Yes</td> <td><del>Yes</del>No</td> </tr> <tr> <td>AC Line Segment</td> <td>Yes</td> <td><del>No</del>Yes</td> </tr> <tr> <td>DC Line Segment</td> <td>Yes</td> <td>No</td> </tr> <tr> <td>Power Transformer</td> <td>Yes</td> <td>Yes</td> </tr> <tr> <td>Shunt Compensator</td> <td>Yes</td> <td>No</td> </tr> <tr> <td>Series Compensator</td> <td>Yes</td> <td>No</td> </tr> <tr> <td>Conforming Load</td> <td>Yes</td> <td>No</td> </tr> <tr> <td>Non Conforming Load</td> <td>Yes</td> <td>No</td> </tr> <tr> <td>Energy Consumer</td> <td>Yes</td> <td>No</td> </tr> <tr> <td>Disconnect</td> <td>No</td> <td>No</td> </tr> <tr> <td>Switch</td> <td>No</td> <td>No</td> </tr> <tr> <td>Breaker</td> <td>No</td> <td>No</td> </tr> </tbody> </table>	Equipment Type	Facility Outage Definition	Equipment Rating Change	Substation	Yes	No	Busbar Section	Yes	No	Line	Yes	<del>Yes</del> No	AC Line Segment	Yes	<del>No</del> Yes	DC Line Segment	Yes	No	Power Transformer	Yes	Yes	Shunt Compensator	Yes	No	Series Compensator	Yes	No	Conforming Load	Yes	No	Non Conforming Load	Yes	No	Energy Consumer	Yes	No	Disconnect	No	No	Switch	No	No	Breaker	No	No
Equipment Type	Facility Outage Definition	Equipment Rating Change																																												
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Disconnect	No	No																																												
Switch	No	No																																												
Breaker	No	No																																												
OMS-TRN-BRL019	For equipment types that have the facility outage definition available, the outage requester is required to specify whether CAISO's facility outage definition should be used or the discrete switches will be provided for the outaged equipment by the outage requester																																													
OMS-TRN-BRL013	In order to resolve switch conflicts for outages that are submitted or modified within a specified time prior to the start of the outage, an outage will be allowed to trump one or more existing outages.  For all other outages, that are not submitted or modified within the specified time prior to the start of the outage, switch status conflicts will not be allowed.																																													
OMS-TRN-BRL014	Trumping may impact more than one existing outage. In such cases the trumping will result in switch status changes in each of the impacted outages for the duration of trumping. A group will be automatically created that includes the trumping and impacted outages.																																													
OMS-TRN-BRL015	Only a single level of trumping will be allowed i.e. any new conflicting outages that overlap the existing trumping period will be rejected and the trumping option will not be provided. Users will have to manually resolve switch status conflicts in order to enter a new outage in this case.																																													



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OMS-TRN-BRL016	<p>Via the UI, within the time period that trumping is allowed, a user will be given the option to trump all outages in conflict (all or nothing) before a new outage can be entered without conflicts.</p> <p>If not within the time period that trumping is allowed or a user decides not to use trumping, a user will be required to resolve all conflicts before the System will accept the outage.</p>			
OMS-TRN-BRL017	<p>Via the API, a user can submit or resubmit an outage with a trump allowed flag allowing it to trump one or more outages within the time period that trumping is allowed.</p> <p>If not within the time period that trumping is allowed and/or the trump allowed flag is not set, the outage request will be rejected.</p>			
OMS-TRN-BRL018	<p>Via the API, when an outage modification request is made that will trump one or more outages, the new request will be in a "Pending" status and the existing outages will not be modified yet. Upon acceptance of the request by a CAISO user, all existing outages that are impacted will be trumped via a new request that is auto-accepted.</p>			
OMS-TRN-BRL020	<p>For all forced (unplanned) outages, Primary (P) Cause Code and a Secondary (S) Cause Code are required upon outage submission. The cause code may be updated at a later date by PTO (i.e. if initial cause is "Unknown" but further investigation reveals cause was "Vegetation"). A list of valid primary and secondary cause codes shall be provided to select from via the UI and API.</p>			
OMS-TRN-BRL021	<p><b>Outage Creation/Modification Validation:</b> Voltage value is only necessary when there is an equipment naming conflict with equipment at the same substation with different voltage levels. This will be editable and user will be able to select from a list of valid voltage values. A model for voltage levels will be maintained within the OMS System.</p>			
OMS-TRN-BRL022	<p><b>Outage Creation/Modification Validation:</b> For Equipment Rating Changes:</p> <ol style="list-style-type: none"> <li>1. Start Date and End Date will default to the outage Start Date and End Date via the UI.</li> <li>2. Equipment Rating change values must be a positive value.</li> </ol> <p>Entered Normal values must be less than or equal to Emergency values.</p>			
OMS-TRN-BRL023	<p><b>Outage Modification Validation:</b> The actual start time of an outage must be stated by the user when submitting the "OUT" request and actual end time must be stated by the user when submitting the "IN_SERVICE" request</p>			
OMS-TRN-BRL024	<p>Out of Service with Special Set-up nature of work must have at least one piece of equipment modeled</p>			
OMS-TRN-BRL025	<p>Outages with Out of Service nature of work must have at least one piece of equipment modeled and all switches modeled must be in the open position</p>			
OMS-TRN-BRL026	<p>Outages with Equipment Derate nature of work must have an entered Equipment Rating Change</p>			

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### 3. Appendix



**Figure 1: Planned and Forced Outage State Diagram**



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Forced Immediate Outage State Diagram

LEGEND  
 OR – Outage Requester  
 OPS – Operations( Outage Coordination and Real Time ISO Operator)  
 OE – Operations Engineer  
 RIG – RIG/Metering Engineer

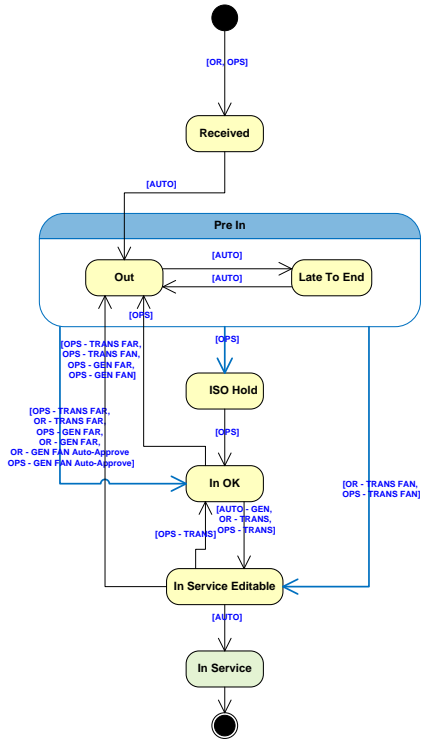



Figure 2: Forced Immediate Outage State Diagram

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**Table 1: Validation Rules for canceling outages and modifying outage planned start/end times**

Outage State	Allow user to submit request to <u>cancel</u> and re-state availability for time periods that have already occurred:	Allow user to submit request to <u>re-schedule</u> Planned Start Time to be in the past (including re-stating availability for time periods that have already occurred, if necessary):	Allow user to submit request to <u>re-schedule</u> Planned End Time to be in the past (including re-stating availability for time periods that have already occurred, if necessary):	Allow user to submit request to <u>cancel</u> and re-state availability for time periods that have <b>not</b> already occurred:	Allow user to submit request to <u>re-schedule</u> Planned Start Time to be in the future (including re-stating availability for time periods that have <b>not</b> already occurred):	Allow user to submit request to <u>re-schedule</u> Planned End Time to be in the future (including re-stating availability for time periods that have <b>not</b> already occurred):	Allow user to submit request to <u>re-schedule</u> Planned End Time to be before Planned Start Time:
Received	Yes	Yes	Yes	Yes	Yes	Yes	No
Approved	Yes	Yes	Yes	Yes	Yes	Yes	No
OE Recommend	Yes	Yes	Yes	Yes	Yes	Yes	No
OE Not Recommend	Yes	Yes	Yes	Yes	Yes	Yes	No
Pre Approved	Yes	Yes	Yes	Yes	Yes	Yes	No
Study	Yes	Yes	Yes	Yes	Yes	Yes	No
Late to Start	Yes	Yes	Yes	Yes	Yes	Yes	No
ISO Hold	Yes	Yes	Yes	Yes	Yes	Yes	No
Out OK	No	No	No	Yes	Yes	Yes	No
Out	No	No	No	No	No	Yes	No
In OK	No	No	No	No	No	Yes	No
Late To End	No	No	No	No	No	Yes	No
In Service Editable	No	No	No	No	No	No	No
In Service	No	No	No	No	No	No	No
Cancel	No	No	No	No	No	No	No

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