

Black Start Tariff Language

To be effective July 2017

4.9.4 MSS Operator Responsibilities

4.9.4.4 be responsible for any Reliability Must-Run Generation and Voltage Support required for reliability of the MSS, including the responsibility for any costs of such Reliability Must-Run Generation, and Voltage Support and may satisfy this requirement through Generating Units owned by the MSS Operator or under contract to the MSS Operator; and

~~4.9.4.5 [Not Used] be responsible for Black Start requirements for reliability of the MSS, however, if the MSS Operator can self provide this requirement, the MSS Operator shall not pay its pro-rata share of the Black Start requirement in accordance with Section 11; and~~

* * * *

5. Black Start and System Restoration

5.1 Black Start Capability [Current Section 8.2.3.4 has been moved to proposed

Section 5.1 – there are no proposed changes to the tariff language.]

The CAISO shall determine the amount and location of Black Start Generation it requires through a system restoration plan that meets the requirements of Applicable Reliability Criteria. In making this determination, the CAISO shall consult with Participating Transmission Owners.

Participating Transmission Owners with their own system restoration plans that include transmission lines and associated facilities that are part of the CAISO Controlled Grid shall upon the request of the CAISO provide the CAISO with these system restoration plans. The CAISO shall consider Participating Transmission Owners' system restoration plans in developing a system restoration plan for the CAISO system and may identify Black Start Generation needs for the CAISO system not identified in Participating Transmission Owners' system restoration plans.

Scheduling Coordinators shall notify the CAISO of their Load restoration time requirements for any Loads that provide emergency services. This notice shall include the MW amount of Load, required restoration time, and associated Node on the CAISO Controlled Grid. For purposes of preparing system restoration plans, the CAISO shall consult with applicable Participating Transmission Owners concerning any Load restoration information provided by Scheduling Coordinators.

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5.2 Black Start Units [Previously Proposed as Section 8.8.1]

The CAISO shall contract annually (or for such other period as the CAISO may determine is economically advantageous) for Black Start services. The CAISO will select Black Start Generating Units in locations where adequate transmission capacity can be made readily available (assuming no transmission damage) to connect the Black Start Generating Unit to energize the station service bus [or dead transmission bus] of a Generating Unit designated by the CAISO. Black Start Generating Units:

(a) must be located in the CAISO Balancing Authority Area;

(b) may be located anywhere in the CAISO

Balancing Authority Area provided that the Black Start [Generating Unit resource] is capable of meeting the CAISO performance requirements for starting and interconnecting to the CAISO Controlled Grid; but

(c) must be dispersed throughout the CAISO Balancing Authority Area.

5.3 Black Start Services [Previously Proposed as Section 8.8.2]

(a) All Participating Generators with Black Start Generating Units must satisfy technical requirements specified in Appendix D of the CAISO Tariff and the Participating Generators' Black Start Agreement in relation to the Black Start Generating Units.

(b) The CAISO shall from time to time undertake performance tests, with or without prior notification.

(c) The CAISO shall have the sole right to determine when the operation of Black Start Generating Units is required to respond to conditions on the CAISO Controlled Grid.

(d) If the CAISO has ~~intervened~~suspended in the market for Energy and/or Ancillary Services pursuant to Section 7.7.34, the price paid by the CAISO for Black Start services shall be sufficient to permit the relevant Participating Generator to recover its costs over the period that it is directed to operate by the CAISO.

(e) If a Black Start Generating Unit fails to achieve a Black Start when called upon

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Comment [A1]: This doesn't align with the technical requirements under "ADDITIONAL OPERATIONAL REQUIREMENTS:" of the document BlackStart_SystemRestorationPhase2_DraftTechnicalSpecification.pdf which states "Must have ability to energize a dead transmission bus ..."

Comment [A2]: The reference to Black Start resource should be changed to Black Start Generating Unit to eliminate confusion between a Black Start Generating Unit and a Black Start Resource.

The Blackstart Resource is defined in the NERC Glossary (effective 7/1/2016) as "A generating unit(s) and its associated set of equipment which has the ability to be started without support from the System or is designed to remain energized without connection to the remainder of the System, with the ability to energize a bus, meeting the Transmission Operator's restoration plan needs for Real and Reactive Power capability, frequency and voltage control, and that has been included in the Transmission Operator's restoration plan."

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~~by the CAISO, or fails to pass a performance test administered by the CAISO,
the Market Participant that has contracted to supply Black Start service from the
Generating Unit shall be subject to penalties as specified in its Black Start
Agreement.~~

~~(a) Black Start shall meet the standards specified for Black Start in this CAISO Tariff
and Appendix K; and~~

~~(b) (f) The CAISO will dispatch Black Start Generating Units as required in
accordance with the applicable Black Start aAgreement.~~

8.1 Scope

The CAISO shall be responsible for ensuring that there are sufficient Ancillary Services available to maintain the reliability of the CAISO Controlled Grid consistent with NERC and WECC reliability standards and any requirements of the NRC. The CAISO's Ancillary Services requirements may be self-provided by Scheduling Coordinators as further provided in the Business Practice Manuals. Those Ancillary Services which the CAISO requires to be available but which are not being self-provided will be competitively procured by the CAISO from Scheduling Coordinators in the Day-Ahead and Real-Time Markets consistent with Section 8.3. The provision of Ancillary Services from the Interties with interconnected Balancing Authority Areas is limited to Ancillary Services bid into the competitive procurement processes in the IFM and RTM. The CAISO will not accept Submissions to Self-Provide Ancillary Services that are imports to the CAISO Balancing Authority Area over the Interties with interconnected Balancing Authority Areas, except from Dynamic System Resources certified to provide Ancillary Services or if provided pursuant to ETCs, TORs or Converted Rights. The CAISO will accept Submissions to Self-Provide Ancillary Services from Pseudo-Ties of Generating Units to the CAISO Balancing Authority Area if they are certified to provide Ancillary Services. The CAISO will calculate payments for Ancillary Services supplied by Scheduling Coordinators and charge the cost of Ancillary Services to Scheduling Coordinators based on their Ancillary Service Obligations.

For purposes of this CAISO Tariff, Ancillary Services are: (i) Regulation Up and Regulation Down; (ii)

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Spinning Reserve, ~~and~~ (iii) Non-Spinning Reserve, ~~and (iv) Voltage Support, (iv) Voltage Support, and (v) Black Start capability.~~

Comment [A3]: PG&E supports the changes to undo the removal of voltage support from ancillary services.

These services will be procured as stated in Section 8.3.5. Bids for these services may be submitted by a Scheduling Coordinator for resources that are capable of providing the specific service and that meet applicable Ancillary Service standards and technical requirements, as set forth in Sections 8.1 through 8.4, and are certified by the CAISO to provide Ancillary Services. Identification of specific services in this CAISO Tariff shall not preclude development of additional interconnected operation services over time. The CAISO and Market Participants will seek to develop additional categories of these unbundled services over time as the operation of the CAISO Controlled Grid matures or as required by regulatory authorities.

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8.2.3 Quantities of Ancillary Services Required; Use of AS Regions

8.2.3.4 ~~[Not Used] Black Start Capability~~ [Current Section 8.2.3.4 has been moved to proposed Section 5.1 – there are no proposed changes to the tariff language.]

~~The CAISO shall determine the amount and location of Black Start Generation it requires through a system restoration plan that meets the requirements of Applicable Reliability Criteria. In making this determination, the CAISO shall consult with Participating Transmission Owners.~~

~~Participating Transmission Owners with their own system restoration plans that include transmission lines and associated facilities that are part of the CAISO Controlled Grid shall upon the request of the CAISO provide the CAISO with these system restoration plans. The CAISO shall consider Participating Transmission Owners' system restoration plans in developing a system restoration plan for the CAISO system and may identify Black Start Generation needs for the CAISO system not identified in Participating Transmission Owners' system restoration plans.~~

~~Scheduling Coordinators shall notify the CAISO of their Load restoration time requirements for any Loads that provide emergency services. This notice shall include the MW amount of Load, required restoration time, and associated Node on the CAISO Controlled Grid. For purposes of preparing system restoration~~

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~~plans, the CAISO shall consult with applicable Participating Transmission Owners concerning any Load restoration information provided by Scheduling Coordinators.~~

~~8.2.3.4.1~~ **Black Start Units**

~~The CAISO will select Black Start capacity in locations where adequate transmission capacity can be made readily available (assuming no transmission damage) to connect the Black Start Generating Unit to the station service bus of a Generating Unit designated by the CAISO. Black Start Generating Units:~~

- ~~(a) must be located in the CAISO Balancing Authority Area;~~
- ~~(b) may be located anywhere in the CAISO Balancing Authority Area provided that the Black Start resource is capable of meeting the CAISO performance requirements for starting and interconnection to the CAISO Controlled Grid; but~~
- ~~(c) must be dispersed throughout the CAISO Balancing Authority Area.~~

~~8.2.3.4.2~~ **Black Start Services**

- ~~(a) All Participating Generators with Black Start Generating Units must satisfy technical requirements specified by the CAISO.~~
- ~~(b) The CAISO shall from time to time undertake performance tests, with or without prior notification.~~
- ~~(c) The CAISO shall have the sole right to determine when the operation of Black Start Generating Units is required to respond to conditions on the CAISO Controlled Grid.~~
- ~~(d) If the CAISO has intervened in the market for Energy and/or Ancillary Services pursuant to Section 7.7.4, the price paid by the CAISO for Black Start services shall be sufficient to permit the relevant Participating Generator to recover its costs over the period that it is directed to operate by the CAISO.~~
- ~~(e) If a Black Start Generating Unit fails to achieve a Black Start when called upon by the CAISO, or fails to pass a performance test administered by the CAISO, the Market Participant that has contracted to supply Black Start service from the Generating Unit shall re-pay to the CAISO any reserve payment(s) that it has~~

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~~received since the administration of the last performance test or the last occasion upon which it successfully achieved a Black Start when called upon by the CAISO, whichever is the shorter period.~~

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8.3.1 Procurement of Ancillary Services

The CAISO shall operate competitive Day-Ahead and Real-Time Markets to procure Ancillary Services. The Security Constrained Unit Commitment (SCUC) and Security Constrained Economic Dispatch (SCED) applications used in the Integrated Forward Market (IFM) and the Real-Time Market (RTM) shall calculate optimal resource commitment, Energy, and Ancillary Services Awards and Schedules at least cost to End-Use Customers consistent with maintaining System Reliability. Any Scheduling Coordinator representing resources, System Units, Participating Loads, Proxy Demand Resources or imports of System Resources may submit Bids into the CAISO's Ancillary Services markets provided that it is in possession of a current certificate for the resources concerned. Regulation Up, Regulation Down, and Operating Reserves necessary to meet CAISO requirements not met by self-provision will be procured by the CAISO as described in this CAISO Tariff. The amount of Ancillary Services procured in the IFM is based on the CAISO Forecast Of CAISO Demand and the forecasted intertie schedules in the RTM for the Operating Hour net of (i) Self-Provided Ancillary Services from resources internal to the CAISO Balancing Authority Area (which includes Pseudo-Ties of Generating Units to the CAISO Balancing Authority Area) and Dynamic System Resources certified to provide Ancillary Services and (ii) Ancillary Services self-provided pursuant to an ETC, TOR or Converted Right. The amount of additional Ancillary Services procured in the RTM is based on the CAISO Forecast Of CAISO Demand, the Day-Ahead Schedules established net interchange, and the forecast of the Intertie Schedules for the Operating Hour in the RTM net of (i) available awarded Day-Ahead Ancillary Services, (ii) Self-Provided Ancillary Services from resources internal to the CAISO Balancing Authority Area (which includes Pseudo-Ties of Generating Units to the CAISO Balancing Authority Area) and Dynamic System Resources certified to

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provide Ancillary Services, and (iii) Ancillary Services self-provided pursuant to an ETC, TOR or Converted Right. The amount of Ancillary Services procured in the Real-Time Market is based upon the CAISO Forecast Of CAISO Demand and the net interchange for the Operating Hour from FMM Schedules net of (i) available awarded Day-Ahead Ancillary Services, (ii) Self-Provided Ancillary Services from resources internal to the CAISO Balancing Authority Area (which includes Pseudo-Ties of Generating Units to the CAISO Balancing Authority Area) and Dynamic System Resources certified to provide Ancillary Services, (iii) additional Operating Reserves procured in the FMM, and (iv) Ancillary Services self-provided pursuant to an ETC, TOR or Converted Right. The CAISO may procure incremental Ancillary Services in the Real-Time Market based in part on a determination during the FMM that any Ancillary Services capacity awarded or self-provided in the Day-Ahead Market is not available as a result of a resource constraint or Transmission Constraints. Resource constraints may include but are not limited to an Outage of a resource or Ramp Rate constraints. Incremental procurement in the Real-Time Market will exclude Ancillary Services Capacity the CAISO has determined is not available.

The CAISO will manage the Energy from both CAISO-procured and Self-Provided Ancillary Services as part of the FMM and Real-Time Dispatch. In the Day-Ahead Market, the CAISO procures one-hundred (100) percent of its Ancillary Service requirements based on the Day-Ahead Demand Forecast net of Self-Provided Ancillary Services. After the Day-Ahead Market, the CAISO procures additional Ancillary Services needed to meet system requirements from all resources in the Real-Time Market. The amount of Ancillary Services procured in the Real-Time Market is based on the CAISO Forecast Of CAISO Demand for the Operating Hour net of Self-Provided Ancillary Services.

Awards of AS in the RTM to Non-Dynamic System Resources are for the entire next Operating Hour. The CAISO procurement of Ancillary Services from all other resources in the Real-Time Market is for a fifteen (15) minute FMM interval. The CAISO's procurement of Ancillary Services from Non-Dynamic System Resources, Dynamic System Resources and internal Generation (which includes Generation from Generating Units that are Pseudo-Ties to the CAISO Balancing Authority Area) in the Real-Time Market is based on the Ancillary Service Bids submitted or generated in the RTM consistent with the requirements in Section 30. The CAISO may also procure Ancillary Services pursuant to the requirements in Section

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42.1 and as permitted under the terms and conditions of a Reliability Must-Run Contract.

The CAISO will contract for long-term Voltage Support service with owners of Reliability Must-Run Units under Reliability Must-Run Contracts. ~~The CAISO will procure Black Start capability through individual contracts with Scheduling Coordinators for Reliability Must-Run Units and other Generating Units that have Black Start capability.~~—These requirements and standards apply to all Ancillary Services whether self-provided or procured by the CAISO.

* * * *

8.3.4 Certification and Testing Requirements

The owner of and Scheduling Coordinator for each resource for which a Bid to provide Ancillary Services or Submission to Self-Provide Ancillary Services is allowed under the CAISO Tariff, and all other System Resources that are allowed to submit a Bid to provide Ancillary Services under this CAISO Tariff, must comply with the CAISO's certification and testing requirements as contained in Appendix K and the CAISO's Operating Procedures. Each resource used to bid Regulation or used to self-provide Regulation must have been certified and tested by the CAISO using the process defined in Part A of Appendix K. Each Dynamic System Resource offering Regulation must comply with the Dynamic Scheduling Protocol in Appendix M. Spinning Reserve may be provided only from resources that have been certified and tested by the CAISO using the process defined in Part B of Appendix K. Non-Spinning Reserve may be provided from resources that have been certified and tested by the CAISO using the process defined in Part C of Appendix K. ~~Black Start capability may only be provided from Generating Units that have been certified and tested by the CAISO using the process defined in Part E of Appendix K.~~—CAISO certification to provide Ancillary Services may be revoked by the CAISO under the provisions of this CAISO Tariff, including Appendix K.

8.3.5 Daily and Hourly Procurement

The CAISO shall procure Regulation Up, Regulation Down, Spinning Reserve, and Non-Spinning Reserve on a daily and Real-Time basis in the IFM and RTM, respectively. The CAISO shall procure

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Ancillary Services on a longer-term basis pursuant to Section 42.1.3 if necessary to meet Reliability Criteria. The CAISO shall contract for Voltage Support annually (or for such other period as the CAISO may determine is economically advantageous) and on a daily or hourly basis as required to maintain System Reliability. ~~The CAISO shall contract annually (or for such other period as the CAISO may determine is economically advantageous) for Black Start Generation.~~

* * * *

8.4.2 Ancillary Service Control Standards

The providers of Ancillary Services under this Tariff must comply with the following control standards:

- (a) Regulation. The Area Control Error will be calculated by the CAISO Energy Management System. Control signals will be sent from the CAISO EMS to raise or lower the output of resources providing Regulation when ACE exceeds the allowable CAISO Balancing Authority Area dead band for ACE;
- (b) Spinning Reserve and Non-Spinning Reserve. Each provider of Spinning Reserve or Non-Spinning Reserve must be capable of receiving a Dispatch Instruction within one (1) minute from the time the CAISO Control Center elects to Dispatch the Spinning Reserve resource or Non-Spinning Reserve resource and must ensure that its resource can be at the Dispatched operating level within ten (10) minutes after issuance of the Dispatch Instruction; and
- (c) Voltage Support. Generating Units providing Voltage Support must have automatic voltage regulators which can correct the bus voltages to be within the prescribed Voltage Limits and within the machine capability in less than one (1) minute; ~~and~~
- ~~(d) Black Start. (i) Voice Communications: each supplier of Black Start capability must ensure that normal and emergency voice communications are available to permit effective Dispatch of the Black Start capability; (ii) CAISO Confirmation: No Load served by the Black Start Generating Unit or by any designated~~

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~~Generating Unit or by any transmission facility used for Black Start service may be restored until the CAISO has confirmed that the need for such service has passed.~~

8.4.3 Ancillary Service Capability Standards

The providers of Ancillary Services under this CAISO Tariff must comply with the following capability standards **for**:

(a) — Spinning Reserve and Non-Spinning Reserve Capability. Each resource or external import of a System Resource scheduled to provide Spinning Reserve and each resource providing Non-Spinning Reserve must be capable of converting the full capacity reserved to Energy production within ten (10) minutes after the issue of the Dispatch Instruction by the CAISO. Each resource scheduled to provide Spinning Reserve and each resource scheduled to provide Non-Spinning Reserve must be capable of maintaining that output or scheduled Interchange for at least thirty (30) minutes from the point at which the resources reaches its award capacity.

~~(b) — Black Start. Each Black Start Generating Unit must be able to start up with a dead primary and station service bus within ten (10) minutes of issue of a Dispatch Instruction by the CAISO requiring a Black Start. Each Black Start Generating Unit must provide sufficient reactive capability to keep the energized transmission bus voltages within emergency Voltage Limits over the range of no load to full load. Each Black Start Generating Unit must be capable of sustaining its output for a minimum period of twelve (12) hours from the time when it first starts delivering Energy.~~

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8.4.6 Metering Infrastructure

8.4.6.1 ~~Additional Requirements for Black Start Units~~

~~A Participating Generator who wishes to offer Black Start must ensure that the requirements set out in~~

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~~Appendix D are met in relation to the Generating Units.~~

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8.8 Black Start [All of Section 8 has been moved to proposed Section 5.]

8.8.1 Black Start Units

~~The CAISO shall contract annually (or for such other period as the CAISO may determine is economically advantageous) for Black Start services. The CAISO will select Black Start Generating Units in locations where adequate transmission capacity can be made readily available (assuming no transmission damage) to connect the Black Start Generating Unit to the station service bus of a Generating Unit designated by the CAISO. Black Start Generating Units:~~

- ~~(a) must be located in the CAISO Balancing Authority Area;~~
- ~~(b) may be located anywhere in the CAISO Balancing Authority Area provided that the Black Start resource is capable of meeting the CAISO performance requirements for starting and interconnection to the CAISO Controlled Grid; but~~
- ~~(c) must be dispersed throughout the CAISO Balancing Authority Area.~~

8.8.2 Black Start Services

- ~~(a) All Participating Generators with Black Start Generating Units must satisfy technical requirements specified in Appendix D of the CAISO Tariff and the Participating Generators' Black Start Agreement in relation to the Black Start Generating Units.~~
- ~~(b) The CAISO shall from time to time undertake performance tests, with or without prior notification.~~
- ~~(c) The CAISO shall have the sole right to determine when the operation of Black Start Generating Units is required to respond to conditions on the CAISO Controlled Grid.~~
- ~~(d) If the CAISO has intervened/suspended in the market for Energy and/or Ancillary~~

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- ~~Services pursuant to Section 7.7.34, the price paid by the CAISO for Black Start services shall be sufficient to permit the relevant Participating Generator to recover its costs over the period that it is directed to operate by the CAISO.~~
- ~~(e) If a Black Start Generating Unit fails to achieve a Black Start when called upon by the CAISO, or fails to pass a performance test administered by the CAISO, the Market Participant that has contracted to supply Black Start service from the Generating Unit shall be subject to penalties as specified in its Black Start Agreement.~~
- ~~(a) Black Start shall meet the standards specified for Black Start in this CAISO Tariff and Appendix K; and~~
- ~~(b) (f) The CAISO will dispatch Black Start Generating Units as required in accordance with the applicable Black Start Agreement.~~

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8.9.5 ~~[Not Used] Compliance Testing for Black Start~~

~~The CAISO may test the Black Start capability of a Generating Unit by unannounced tests, which may include issuing Dispatch Instructions to start and synchronize the resource, testing of all communications circuits, simulating switching needed to connect the Black Start Generating Unit to the transmission system, and testing the features unique to each facility that relate to Black Start service.~~

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8.9.13 ~~[Not Used] Performance Audit for Black Start~~

~~The CAISO will audit the performance of a Black Start Generating Unit by analysis of Meter Data and other records to determine that the performance criteria relating to the Black Start from that Black Start Generating Unit were met when required.~~

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8.10.5 [Not Used] Black Start

~~The CAISO may test the Black Start capability of a Generating Unit by issuing unannounced Dispatch Instructions requiring the Generating Unit to start on a Black Start basis. The CAISO shall measure the response of the Generating Unit to determine compliance with the terms of the Black Start contract. The Scheduling Coordinator or Black Start Generator as stated in Section 11.10.1.5 for the Generating Unit shall be paid the Generating Unit's contract price for the output under the Black Start test.~~

* * * *

11.5.6 Settlement Amounts for IIE from Exceptional Dispatch

11.5.6.5 Settlement of IIE from Black Start

All IIE Settlement Amounts associated with Black Start receive the Exceptional Dispatch Settlement price as provided in Section 11.5.6.1, but the costs are allocated pursuant to Section 11.10.8.

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11.10.1 Settlements for Contracted Ancillary Services

11.10.1.5 Black Start

~~The total p~~Payments for each Scheduling Coordinator for Black Start capability shall consist of any payments under any Black Start Agreements~~long-term contracts due for the Settlement Period~~. If the Energy price and Start-Up Costs are not specified in the Black Start Agreement~~long-term contract~~, the Black Start Energy ~~will be paid as an Exceptional Dispatch in accordance with Section 11.5.6.1 and the resource will be entitled to Bid Cost Recovery.~~ Black Start Energy resulting from a performance test shall

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also be paid as an Exceptional Dispatch in accordance with Section 11.5.6.1. RMR Units providing Black Start are compensated in accordance with the RMR Contract rather than this Section 11.10.1.5.

* * * *

11.10.2 Settlement for User Charges for Ancillary Services

The CAISO shall determine a separate hourly user rate for Regulation Down Reserve, Regulation Up Reserve, Spinning Reserve, and Non-Spinning Reserve purchased for each Settlement Period. The hourly user rates for Regulation Down, Regulation Up, Spinning Reserve, and Non-Spinning Reserve include the cost incurred by the CAISO across the Day-Ahead Market and the Real-Time Market to procure this service. In computing the user rate for each service the quantity (MW) and costs of any substituting Ancillary Service will be treated as if they are costs and MW associated with the Ancillary Service need they are being used to fulfill. Each rate will be charged to Scheduling Coordinators on a volumetric basis applied to each Scheduling Coordinator's obligation for the specific Ancillary Service concerned which it has not self-provided, as adjusted by any Inter-SC Trades of Ancillary Services. Each Scheduling Coordinator's obligation for Regulation Down Reserve, Regulation Up Reserve, Spinning Reserve, and Non-Spinning Reserve shall be calculated in accordance with this Section 11.10.2, notwithstanding any adjustment to the quantities of each Ancillary Service purchased by the CAISO in accordance with Section 8.2.3.5. ~~The cost of Voltage Support and Black Start shall be allocated to Scheduling Coordinators as described in Sections 11.10.7 and 11.10.8.~~

Ancillary Services Obligations for an individual Scheduling Coordinator (before taking into account Self-Provided Ancillary Services) or Inter-SC Trades of Ancillary Services may be negative.

Credits for such negative obligations will be in accordance with the rates calculated in this Section 11.10.2, except that a Scheduling Coordinator's credit shall be reduced pro rata to the extent the sum of the negative obligations of all Scheduling Coordinators with the negative Ancillary Services Obligation (before self-provision or Inter-SC Trade) exceeds the obligation of all Scheduling Coordinators with positive obligation net of Self- Provided Ancillary Services, as specified in

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Section 11.10.5 in any Settlement Period, the net procurement quantity of Regulation Up, Regulation Down, Spinning Reserve, or Non-Spinning Reserve purchased by the CAISO in the Day-Ahead Market and the Real-Time Market due to the operation of Section 8.2.3.5 is zero (0), then the user rate for that Ancillary Service type will be zero (0). With respect to each Settlement Period, in addition to the user rates determined in accordance with this Section 11.10.2, each Scheduling Coordinator shall be charged an additional amount equal to its proportionate share, based on total purchases by Scheduling Coordinators of Regulation Down, Regulation Up, Spinning Reserve, and Non-Spinning Reserve of the amount, if any, by which (i) the total payments to Scheduling Coordinators pursuant to this Section 11.10.2 for the Day-Ahead Market and the Real-Time Market, exceed (ii) the total amounts charged to Scheduling Coordinators pursuant to this Section 11.10.2, for the Day-Ahead Market and the Real-Time Market. If total amounts charged to Scheduling Coordinators exceed the total payments to Scheduling Coordinators, each Scheduling Coordinator will be refunded its proportionate share, based on total purchases by Scheduling Coordinators of Regulation Down, Regulation Up, Spinning Reserve, and Non-Spinning Reserve.

With respect to each Settlement Period, in addition to Ancillary Service charges at the applicable user rates determined in accordance with this Section 11.10.2, each Scheduling Coordinator shall be charged additional neutrality adjustment amounts for each Ancillary Service type pursuant to Sections 11.10.2.4, 11.10.2.2.3, 11.10.3.3, and 11.10.4.3 and a neutrality adjustment amount for upward Ancillary Service types pursuant to Section 11.14.

* * * *

11.10.8 Black Start

11.10.8.1 Black Start Energy

The Black Start Energy payment user rate for any Settlement Period will be calculated based on the sum of Black Start Energy payments to Scheduling Coordinators paid in accordance with Section 11.10.1.5, including any Exceptional Dispatch Instructed Imbalance Energy payments for Black Start, in the

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applicable Settlement Period divided by Measured Demand, excluding exports to neighboring Balancing Authority Areas ~~and excluding Demand within an MSS except as provided by Section 4.9.4.5.~~

The Black Start Energy user charge for any Settlement Period for a Scheduling Coordinator will be the Black Start Energy payment user rate multiplied by the quantity of Measured Demand, excluding exports to neighboring Balancing Authority Areas ~~and excluding Demand within an MSS except as provided by Section 4.9.4.4.~~ for which that Scheduling Coordinator is responsible in that Settlement Period.

11.10.8.24- Black Start Capability

The CAISO shall allocate payments for Black Start capability under a Black Start Agreement as Reliability Services Costs to the Participating Transmission Owner whose Service Area in which where the Black Start Generating Unit is located.

* * * *

11.27 Voltage Support and Black Start Charges

The CAISO shall calculate, account for and settle charges and payments for Voltage Support and Black Start as set out in Sections 11.10.1.4, 11.10.1.5, 11.10.7, 11.10.8, and the applicable Business Practice Manual.

* * * *

- Ancillary Services (AS)

Regulation, Spinning Reserve, ~~and Non-Spinning Reserve,~~ ~~and Voltage Support~~ **Voltage Support and Black Start** together with such other interconnected operation services as the CAISO may develop in cooperation with Market Participants to support the transmission of Energy from Generation resources to Loads while maintaining reliable operation of the CAISO Controlled Grid in accordance with WECC standards and Good Utility Practice.

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- Black Start

The procedure by which a Generating Unit self-starts without an external source of electricity thereby restoring a source of power to the CAISO Balancing Authority Area following system or local area blackouts.

* * * *

- Black Start Generator

A Participating Generator in its capacity as party to a ~~an Interim~~ Black Start Agreement with the CAISO for the provision of Black Start services, but shall exclude Participating Generators in their capacity as providers of Black Start services under their Reliability Must-Run Contracts.

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- Black Start Generating Unit

A Generating Unit designated as a Black Start Generating Unit under a system restoration plan for the PTO or CAISO and providing Black Start service under a Black Start Agreement.

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- Interim Black Start Agreement

An agreement entered into between the CAISO, a Participating Transmission Owner, and a Participating Generator (other than a Reliability Must-Run Contract) for the provision by the Participating Generator of Black Start capability and Black Start Energy ~~on an interim basis until the introduction by the CAISO of its~~

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~~Black Start auction (or until terminated earlier by either party in accordance with its terms).~~

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- Reliability Services Costs

The costs associated with services provided by the CAISO: 1) that are deemed by the CAISO as necessary to maintain reliable electric service in the CAISO Balancing Authority Area; and 2) whose costs are billed by the CAISO to the Participating TO pursuant to the CAISO Tariff. Reliability Services Costs include costs charged by the CAISO to a Participating TO associated with service provided under a Reliability Must-Run Contract, or a Black Start Agreement, as well as Exceptional Dispatches and Minimum Load Costs associated with units committed for local reliability requirements.

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Appendix D

Black Start Generating Units

The following requirements must be met by Black Start Generating Units ~~providing Black Start:~~

- (a) Black Start Generating Units must be capable of starting and paralleling with the CAISO Controlled Grid without aid from the CAISO Controlled Grid;
- (b) Black Start Generating Units must be capable of making a minimum number of starts per event (to be without aid from the CAISO Controlled Grid as determined by the CAISO);
- (c) Black Start Generating Units must be equipped with governors capable of operating in the stand alone (asynchronous) and parallel (synchronous) modes.
- (d) Black Start Generating Units must have Start-Up load pickup capabilities at a level to be determined by the CAISO, including total Start-Up load (MW) and largest Start-Up load (MW) for such power output levels as the CAISO may specify. Each Black Start Generating Unit must be able to start up with a dead primary and station service bus within ten (10) minutes of issuance of

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an Exceptional Dispatch by the CAISO requiring a Black Start. Each Black Start Generating Unit must be capable of sustaining its output for a minimum period of twelve (12) hours from the time when it first starts delivering Energy. Black Start Agreements may specify a different minimum period.

- (e) All Black Start Generating Units must be capable of producing reactive Power (boost) and absorbing reactive Power (buck) as required by the CAISO to control system voltages. Each Black Start Generating Unit must provide sufficient reactive capability to keep the energized transmission bus voltages within emergency Voltage Limits over the range of no load to full load.

This requirement may be met by the operation of more than one Black Start Generating Unit in parallel providing that:

- (i) the Black Start Generation supplier demonstrates that the proposed Generation resource shares reactive burden equitably;
- (ii) all Participating Generators associated with the proposed Black Start source are located in the same general area.

Buck/boost capability requirement shall be dependent on the location of the proposed resource in relation to Black Start load.

- (f) All Black Start Generating Units must have the following communication/control requirements:

- (i) dial-up telephone;
- (ii) backup radio;
- (iii) manning levels which accord with Good Utility Practice;

(iv) Each Black Start Generator must ensure that normal and emergency voice communications are available to permit effective Exceptional Dispatch of Black Start Generating Units.

- (g) The Scheduling Coordinator for the Black Start Generating Unit shall not use No Load served by the Black Start Generating Unit to serve any Load other than station service Load. Station Power required by the Black Start Generating Unit may be restored until the CAISO has confirmed that the need for such Black Start service has passed.

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- ~~(h) Black Start Generating Units must pass performance tests for demonstrating Black Start capability, which the CAISO may periodically undertake in accordance with the CAISO's Operating Procedures for Black Start testing.~~
- ~~(i) All Black Start Generating Units will comply with Applicable Reliability Criteria.~~

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Appendix K Ancillary Service Requirements Protocol (ASRP)

PART E

[NOT USED] CERTIFICATION FOR BLACK START

- ~~E 1 A Generator wishing to provide Black Start capacity from a Generating Unit as an Ancillary Service must meet the requirements stated in Appendix D of the CAISO Tariff in order to be certified by the CAISO to provide Black Start capacity. In addition, the Generating Unit must have a rated capacity 1 MW or greater unless the Generating Unit is participating in an aggregation arrangement approved by the CAISO.~~
- ~~E 2 A Generator wishing to be considered for certification for Black Start service by the CAISO must make a written request to the CAISO. Such request must clearly identify the facilities related to the Generating Unit from which the Generator wishes to provide Black Start and shall identify the Scheduling Coordinator through whom the Generator wishes to offer Black Start service. The Generator shall send a copy of its request to its Scheduling Coordinator at the same time as it sends it to the CAISO. The Generator's written request must include at least the following:~~
 - ~~E 2.1 identification of the Generating Unit including Location Code;~~
 - ~~E 2.2 a single-line electrical diagram of the Generating Unit connections including auxiliary power busses and the connection to the station switchyard;~~
 - ~~E 2.3 a description of the fuel supply used for Black Start including on-site storage and resupply requirements;~~
 - ~~E 2.4 a single-line electrical diagram showing the transmission connection from the Generating Unit station switchyard to a connection point on the CAISO Controlled Grid;~~
 - ~~E 2.5 a description of the Generating Unit capability to provide both real and reactive power, any Start-Up and Shut-Down requirements, any staffing limitations; and~~
 - ~~E 2.6 a description of the primary, alternate and emergency back-up communications systems currently available to the Generator for communications to the CAISO Control Center.~~

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- ~~E 3~~ Upon receipt of the Generator's written request the CAISO shall review the information provided and respond in writing within two weeks of receipt of the request, providing a copy of its response to the Generator's Scheduling Coordinator. The CAISO response may be any of the following:
- ~~E 3.1~~ acceptance of the proposal as presented;
- ~~E 3.2~~ rejection of the proposal as presented with a rationale for such rejection; or
- ~~E 3.3~~ a request for additional information needed by the CAISO to properly evaluate the request.
- ~~E 4~~ A Generator receiving a rejection may submit a written request for reconsideration by the CAISO within 60 days of the date of the rejection notice. A request for reconsideration must address the rationale provided by the CAISO. The CAISO shall respond to a request for reconsideration within 60 days of the date of that request.
- ~~E 5~~ A Generator receiving a request for additional information shall provide such information within 60 days of such request providing a copy at the same time to its Scheduling Coordinator. The CAISO shall review the information and respond within 120 days of the date of the CAISO's request for additional information providing a copy at the same time to the Generator's Scheduling Coordinator.
- ~~E 6~~ Upon acceptance by the CAISO of the Generator's request and agreement as to the method of communication and control to be used by the Generator, the CAISO shall provisionally approve the proposal in writing providing a copy at the same time to the Generator's Scheduling Coordinator. The Generator may then proceed to procure and install the equipment and make arrangements for the required communication.
- ~~E 7~~ Design, acquisition, and installation of the Generator's equipment shall be under the control of the Generator. The CAISO shall bear no cost responsibility or functional responsibility for such equipment. The CAISO shall be responsible for the design, acquisition and installation of any necessary modifications to its own equipment at its own cost.
- ~~E 8~~ The Generator shall perform its own testing of its equipment to ensure that the Black Start system performs to meet the CAISO requirements.
- ~~E 9~~ When it is satisfied that its plant, equipment and communication systems meet the CAISO's requirements, the Generator shall request in writing that the CAISO conduct a certification test with a suggested primary date and time and at least two alternative dates and times. The CAISO shall, within two Business Days of receipt of the Generator's request, accept a proposed time if possible or suggest at least three alternatives to the Generator. If the CAISO responds by suggesting alternatives, the Generator shall, within two Business Days of receipt of the CAISO's response, respond in turn by accepting a proposed alternative if possible or suggesting at least three alternatives, and this procedure shall continue until agreement is reached on the date and time of the test. The Generator shall inform its Scheduling Coordinator of the agreed date and time of the test.

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- ~~E 10~~ Testing shall be performed under the direction of the CAISO. Such tests shall include, but not be limited to, the following:
 - ~~E 10.1~~ confirmation of control communication path performance;
 - ~~E 10.2~~ confirmation of primary, secondary, and emergency voice circuits for receipt of Dispatch Instructions;
 - ~~E 10.3~~ confirmation of the Generating Unit performance; and
 - ~~E 10.4~~ simulation of a Black Start event.
- ~~E 11~~ Upon successful completion of the test, the CAISO shall certify the Generating Unit as being permitted to provide Black Start capacity as an Ancillary Service and shall provide a copy of the certificate to the Scheduling Coordinator at the same time. The CAISO shall change its Generating Unit data base to reflect the permission for the Generating Unit to provide Black Start service.
- ~~E 12~~ The certification to provide Black Start shall remain in force until withdrawn by the Scheduling Coordinator or the Generator by written notice to the CAISO to take effect at the time noticed in the notice, which must be the end of a Trading Day.
- ~~E 13~~ The certification may be revoked by the CAISO only under provisions of the ASRP or other provisions of the CAISO Tariff.