

## **DYNAMIC SCHEDULING PROTOCOL**

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## **DYNAMIC SCHEDULING PROTOCOL (DSP)**

### **DSP 1 OBJECTIVES, DEFINITIONS, AND SCOPE**

#### **DSP 1.1 Objectives**

The objectives of this Protocol are to implement the ISO Tariff provisions relating to dynamic imports of Energy, Supplemental Energy, and Energy associated with non-Regulation Ancillary Services (Spinning Reserve and Non-Spinning Reserve) by Scheduling Coordinators from System Resources.

#### **DSP 1.2 Definitions**

##### **DSP 1.2.1 Master Definitions Supplement**

Any word or expression defined in the Master Definitions Supplement to the ISO Tariff shall have the same meaning where used in this Protocol. A reference to a Section or an Appendix is a reference to a Section or an Appendix of the ISO Tariff. References to DSP are to this Protocol or to the stated paragraph of this Protocol.

##### **DSP 1.2.2 Special Definitions for this Protocol**

In this Protocol, the following expressions shall have the meaning set opposite them:

**“Host Control Area”** means the Control Area within whose electrically metered boundaries a System Resource subject to this Protocol is located. The Host Control Area may, or may not, be directly interconnected with the ISO Control Area.

**“Intermediary Control Area”** means any Control Area between a Host Control Area and the ISO Control Area through which dynamically exchanged Energy or Energy associated with dynamically scheduled Ancillary Services must be scheduled to reach the ISO Control Area. An Intermediary Control Area may, or may not, be directly interconnected with the ISO Control Area.

##### **DSP 1.2.3 Rules of Interpretation**

- (a) Unless the context otherwise requires, if the provisions of this Protocol and the ISO Tariff conflict, the ISO Tariff will prevail to the extent of the inconsistency. Certain provisions of the ISO Tariff have been summarized or repeated in this Protocol only to aid understanding.
- (b) A reference in this Protocol to a given agreement, ISO Protocol, or instrument shall be a reference to that agreement or instrument as modified, amended, supplemented, or restated through the date as of which such reference is made.
- (c) The captions and headings in this Protocol are inserted solely to facilitate reference and shall have no bearing upon the interpretation of any of the terms and conditions of this Protocol.
- (d) This Protocol shall be effective as of June 29, 2004. Any amendment to this Protocol shall be effective as of the date specified by FERC.

**DSP 1.3 Scope**

**DSP 1.3.1 Scope of Application to Parties**

The DSP applies to the following entities:

- (a) Scheduling Coordinators (“SCs”);
- (b) System Resources;
- (c) Host Control Areas;
- (d) Intermediary Control Areas; and
- (e) the ISO.

**DSP 1.3.2 Liability of the ISO**

Any liability of the ISO arising out of or in relation to this Protocol shall be subject to Section 14 of the ISO Tariff as if references to the ISO Tariff were references to this Protocol.

**DSP 2 CONSISTENCY WITH NERC/WECC POLICIES AND REQUIREMENTS**

**DSP 2.1** Scheduling and operation of dynamic scheduling functionalities must comply with all applicable NERC and WECC policies and requirements regarding inter-Control Area scheduling, in accordance with Section 2.2.7.6 of the ISO Tariff.

**DSP 2.2** Scheduling and operation of dynamic scheduling functionalities must be consistent with the NERC Dynamic Transfer White Paper and all NERC standards or policies.

**DSP 2.3** All new dynamic functionality implementations may be subject to NERC-specified peer review.

**DSP 3 CONTRACTUAL RELATIONSHIPS**

**DSP 3.1** The Host Control Area and all Intermediary Control Areas must each execute an Interconnected Control Area Operating Agreement (“ICAOA”) with the ISO, with accompanying service schedule, or a special agreement particular to the operation of the functionality supporting dynamic imports of Energy, Supplemental Energy, and/or Energy associated with non-regulating Ancillary Services to the ISO Control Area.

**DSP 3.2** The SC for the System Resource must execute a special agreement with the ISO governing the operation of the dynamic scheduling functionality, which agreement will include a provision for its termination based on failure to comply with these standards.

**DSP 3.3** The SC for the System Resource must have the necessary operational and contractual arrangements in place with the Host Control Area (see Section 5 below). Such arrangements must include the Host Control Area operator's ability to receive telemetry from the System Resource and to issue a dynamic schedule signal pertinent to that System Resource to the ISO. Proof of such arrangements must be provided to the ISO.

**DSP 4 COMMUNICATIONS, TELEMETRY, AND OTHER TECHNICAL REQUIREMENTS**

- DSP 4.1** The communication and telemetry requirements set forth in the ISO's Standards for Imports of Regulation will apply to all dynamic schedules, except for (a) those dynamic functionalities established prior to the ISO Operations Date, (b) the requirements that are specific solely to Regulation, and (c) the requirements set forth below.
- DSP 4.2** Dedicated dual redundant communications links between the ISO's EMS and the Host Control Area EMS are required.
- DSP 4.3** The primary circuit will be T1-class, or equivalent, utilizing the inter-control center communications protocol ("ICCP"). The backup circuit will be diversely routed between the Host Control Area EMS and the ISO Control Area EMS on separate physical paths and devices.
- DSP 4.4** Dedicated dual redundant communications links between the Host Control Area EMS and every Intermediary Control Area EMS are required.
- DSP 4.5** The Control Area hosting a dynamically scheduled System Resource must have a mechanism implemented to override the associated dynamic signal.
- DSP 4.6** The dynamic signal must be properly incorporated into all involved Control Areas' ACE equations.
- DSP 4.7** The System Resource must have communications links with the Host Control Area consistent with these standards.

**DSP 5 LIMITS ON DYNAMIC IMPORTS**

- DSP 5.1** The ISO reserves the right to establish limits applicable to the amount of any Ancillary Services and/or Supplemental Energy imported into the ISO Control Area, whether delivered dynamically or statically. Such limits may be established based on any one, or a combination, of the following considerations: a percentage of, or a specific import limit applicable to, total ISO Control Area requirements; a percentage at, or a specific import limit applicable to, a particular Scheduling Point or a branch group; a percentage of, or a specific import limit applicable to, total requirements in a specific Congestion Zone; or operating factors which may include, but are not limited to, operating nomograms, Remedial Action Schemes, protection schemes, scheduling and curtailment procedures, or any potential single points of failure associated with the actual delivery process.
- DSP 5.2** The ISO may, at its discretion, either limit or forego procuring Ancillary Services at particular Control Area interties to ensure that Operating Reserves are adequately dispersed throughout the ISO Control Area as required by WECC Minimum Operating Reliability Criteria ("MORC").
- DSP 5.3** A dynamically scheduled System Resource and its schedules must be permanently associated with a particular ISO intertie (the ISO may, from time to time and at its discretion, allow for a change in such pre-established association of the dynamically scheduled System Resource with a particular ISO intertie).

**DSP 6 OPERATING AND SCHEDULING REQUIREMENTS**

- DSP 6.1** For any operating hour for which Energy, Supplemental Energy, and/or Ancillary Services (and associated Energy) is scheduled dynamically to the ISO from the System Resource, a firm (or non-interruptible for that hour) matching transmission service must be reserved across the entire dynamic schedule transmission path external to the ISO Control Area.
- DSP 6.2** All dynamic schedules associated with newly implemented dynamically scheduled System Resources must be electronically tagged (e-tagged).
- DSP 6.3** Formal inter-Control Area dynamic schedules may be issued only by the dynamically scheduled System Resource's Host Control Area and must be routed through the EMSs of all Intermediary Control Areas (such schedules would be considered "wheel-through" schedules by Intermediary Control Areas).
- DSP 6.4** The ISO will treat dynamically scheduled Energy as a resource contingent firm import. The ISO will procure (or allow for self-provision of) WECC MORC-required Operating Reserves for loads served by dynamically scheduled System Resources.
- DSP 6.5** All Energy schedules associated with dynamically scheduled imports of Spinning Reserve and Non-Spinning Reserve will be afforded similar treatment (i.e., resource contingent firm).
- DSP 6.6** The dynamic signal must be integrated over time by the Host Control Area for every operating hour.
- DSP 6.7** Notwithstanding any dispatches of the System Resource in accordance with the ISO Tariff, the ISO shall have the right to issue operating orders to the System Resource either directly or through the Host Control Area for emergency or contingency reasons, or to ensure the ISO's compliance with operating requirements based on WECC or NERC requirements and policies (e.g., WECC's Unscheduled Flow Reduction Procedure). However, such operating orders may be issued only within the range of the ISO-accepted Energy, Ancillary Services, and/or Supplemental Energy Schedules and bids for a given operating hour (or the applicable "sub-hour" interval).
- DSP 6.8** If there is no dynamic schedule in the ISO's Day-Ahead, Hour-Ahead, or Supplemental Energy markets, the dynamic signal must be at "zero" ("0") except when in response to ISO's Dispatch Instructions associated with accepted Ancillary Services and/or Supplemental Energy bids.
- DSP 6.9** The SC of the dynamically scheduled System Resource must have the ability to override the associated dynamic schedule in order to respond to the operating orders of the ISO or the Host Control Area.
- DSP 6.10** Unless the dynamically scheduled System Resource (1) is implemented as a directly-telemetered load-following functionality, (2) is base-loaded Regulatory Must Take Generation, or (3) responds to an ISO intra-hour Dispatch Instruction, the dynamic schedule representing such resource must follow WECC-approved practice of 20-minute ramps centered at the top of the hour. The ISO does not provide any special settlements treatment nor offer any ISO Tariff exemptions for dynamic load following functionalities.

**DSP 6.11** In real time the dynamic schedule may not exceed the maximum value established by the sum of the Day-Ahead and Hour-Ahead accepted Energy and Ancillary Services Schedules plus any accepted Supplemental Energy bids plus any response to the ISO's real-time Dispatch Instructions. The composite value of the dynamic schedule derived from the Day-Ahead and Hour-Ahead accepted Schedules plus any Supplemental Energy bids and Dispatch Instruction response represents not only the estimated dynamically scheduled System Resource's Energy but also the transmission reservation on the associated ISO inertia.

**DSP 6.12** Only one dynamically scheduled System Resource may be associated with any one physical generating resource.

**DSP 6.13** If the SC for the dynamically scheduled System Resource desires to participate in ISO's Regulation market, all provisions of the ISO's Standards for Imports of Regulation shall apply.

**DSP 7** **CERTIFICATION, TESTING, AND PERFORMANCE MONITORING OF DYNAMIC IMPORTS OF ANCILLARY SERVICES**

SCs and Host Control Areas that are already certified under the ISO's Standards for Imports of Regulation will be deemed to have fulfilled the technical implementation requirements of this Protocol; however, such SCs and Control Areas must still be certified separately for each non-Regulating Ancillary Service (all presently implemented Regulation import functionalities may be subject to review to ensure consistency between such functionalities and the requirements of this Protocol). SCs and Host Control Areas that wish to be certified for imports of Regulation shall be subject to certification under the Standards for Imports of Regulation, subject to verification of consistency with the requirements of this Protocol.

**DSP 7.1** The SC and Host Control Area operator must jointly request the certification of a System Resource to provide Ancillary Services for the ISO Control Area and cooperate in the testing of such System Resource (see the "Scheduling Coordinator & Host Control Area Operator Request for Certification of Dynamic Imports of Ancillary Services" certification form attached as Appendix A to this Protocol).

**DSP 7.2** Only ISO tested and certified System Resources will be allowed to bid and/or self-provide Ancillary Services into the ISO Control Area.

**DSP 7.3** Dynamic Ancillary Services imports will be certified through testing, in accordance with the relevant sections of the ISO's Operating Procedure G-213. All requests for certification of dynamic Ancillary Services imports will be reviewed and approved by the ISO with respect to any technical limitations imposed by existing operational considerations, such as Remedial Action Schemes, operating nomograms, and scheduling procedures. These reviews may impose certain Ancillary Services import limits in addition to those outlined in Section 4.1. Therefore, interested parties are advised and encouraged to contact the ISO before they begin the process of the necessary systems design, preparation, and implementation for import of Ancillary Services to the ISO Control Area.

**DSP 7.4** The ISO will measure the performance of the dynamic Energy schedule associated with accepted Ancillary Services bids against (1) the awarded range of Ancillary Service capacity; (2) the certified limits; and (3) the bid ramp rate, which shall be validated by the ISO against the certified ramp rate.

- DSP 7.5** The SC for the System Resource and the Host Control Area must notify the ISO should any changes, modifications, or upgrades affecting control and/or performance of the System Resource be made. Upon such notification, the ISO, at its discretion, may require that the System Resource and Host Control Area be re-certified to import Ancillary Services into the ISO Control Area.
- DSP 8 COMPLIANCE, LOSSES, AND FINANCIAL SETTLEMENTS**
- DSP 8.1** Energy delivered in association with dynamically scheduled System Resources will be subject to all provisions of the ISO's Imbalance Energy markets, including Uninstructed Deviation Penalties ("UDP") (just as is the case with ISO intra-Control Area Generating Units of Participating Generators).
- DSP 8.2** Dynamically scheduled and delivered Ancillary Services will be subject to the ISO's compliance monitoring and remedies, just as any ISO intra-Control Area Generating Units of Participating Generators.
- DSP 8.3** All Day-Ahead and Hour-Ahead submitted dynamic schedules shall be subject to ISO Congestion mitigation and as such may not exceed their transmission reservations in real time (with the exception of intra-hour Dispatch Instructions of the Energy associated with accepted Ancillary Services or Supplemental Energy bids).
- DSP 8.4** All dynamically scheduled and delivered Energy shall be subject to the standard ISO transmission loss calculation associated with the particular intertie ("TMMs" or ISO market redesign alternative).
- DSP 8.5** Any transmission losses attributed to the dynamic schedule on transmission system(s) external to the ISO Control Area will be the responsibility of the owner(s)/operator(s) of the dynamically scheduled System Resource.
- DSP 8.6** A predetermined, mutually agreed, and achievable "Pmax-like" fixed MW value will be established for every dynamically scheduled System Resource to be used as the basis for the UDP calculation. Responsible SCs will be able to report de-rates affecting the dynamically scheduled System Resource via the ISO's "SLIC" outage reporting system.
- DSP 8.7** Should there be any need or requirement, whether operational or procedural, for the ISO to make real time adjustments to the ISO's inter-Control Area schedules (to include curtailments), dynamic schedules shall be treated in the same manner as similarly situated and/or effective static ISO schedules.



## DSP APPENDIX A

### **Scheduling Coordinator & Host Control Area Operator Request for Certification of Imports of Spinning and Non-Spinning Reserves for which the associated Energy is delivered dynamically from a System Resource**

In accordance with the ISO Tariff, Protocols and Operating Procedures, \_\_\_\_\_, as Scheduling Coordinator, and \_\_\_\_\_, as Host Control Area operator (as such term is referred to in the ISO Dynamic Scheduling Protocol), collectively referred to as "Parties," or individually as "Party," hereby request the certification of the Parties and the System Resource(s) identified in the table below as a provider of Ancillary Services and associated Energy to the ISO Control Area subject to the Dynamic Scheduling Protocol. Further, the Parties acknowledge that their ability to import Ancillary Services and associated Energy will be tested for certification in accordance with ISO Operating Procedure G-213.

With this request for certification, the Parties recognize that the ISO Tariff, Protocols, and applicable agreements require the Host Control Area operator to issue dynamic Energy schedules to the ISO based on the Scheduling Coordinator's self-provided or bid external imports of non-Regulation Ancillary Services from the System Resource(s) at any time during the operating hour.

With this request for certification, the Host Control Area operator represents and warrants that it has in place the required communications links with the ISO Control Area in order to facilitate the delivery of Ancillary Services and associated Energy from the System Resource.

With this request for certification, the Scheduling Coordinator represents and warrants that it has made the appropriate arrangements for and has put in place the equipment and services necessary for the delivery of Ancillary Services and associated Energy from the System Resource to the point of interchange ("Scheduling Point") with the ISO Control Area in accordance with the Dynamic Scheduling Protocol.

The Scheduling Coordinator further certifies that any and all dynamic imports of Energy associated with self-provided or bid imports of non-Regulation Ancillary Services will be deliverable over non-interruptible, non-recallable transmission rights, from the source of the associated Energy to the Scheduling Point with the ISO Control Area.

System Resource	External Host Control Area in which System Resource is Located	Scheduling Point (ISO interchange ID)	Maximum Amount of Ancillary Services Capacity to be Certified (MW)	Maximum Ramp Rate to be Certified (MW/minute)
1				
2				
3				
4				
5				

Subsequent to the initial filing of this request for certification with the ISO, any prospective changes jointly made by the Parties may be filed with the Scheduling Coordinator's ISO Client Relations representative, who will acknowledge the receipt of such requested changes and indicate the date on which such changes may be tested and become effective if ISO testing proves successful. Such changes will be made by the ISO as soon as practicable, with reasonable efforts made to implement them within sixty (60) days of receipt of the requested changes.

This document \_\_\_\_\_ (does) \_\_\_\_\_ (does not) contain requested changes to previously effective certification.

Certification Requested By:

\_\_\_\_\_, as the Scheduling Coordinator

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

\_\_\_\_\_, as the Host Control Area Operator

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

CERTIFICATION REQUEST ACKNOWLEDGED by:

\_\_\_\_\_  
California Independent System Operator Corporation

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_