

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

Table of Contents

INTRODUCTION	5
PURPOSE	5
AFFECTED PARTIES	5
REFERENCES	6
POLICY	6
DEFINITIONS	6
RESPONSIBILITIES	8
GENERATING UNIT CERTIFICATION PROCEDURE	9
1. TECHNICAL INFORMATION REGARDING ANCILLARY SERVICES TESTING AND CERTIFICATION	9
1.1. Test Duration	9
1.2. Test Energy	9
1.3. Response Time and Communication Time	9
1.4. Testing Sequence	9
1.5. Multiple Use of Test Data	9
1.5.1. Use of Spin test data for Non-Spin certification	10
1.5.2. Use of Non-spin test data for Replacement Reserves certification	10
1.6. Decimal Places	10
1.7. Test Periods	11
1.7.1. Recording	11
1.7.2. Test termination	11
1.7.3. Two-hour tests	11
1.8. Visibility 11	
1.9. Exceptions	11
1.9.1. PX Resources	11
1.9.2. Physical Scheduling Plants and aggregated resources	11
1.10. Re-testing	11
1.10.1. At SC request	11
1.10.2. At ISO request	11
1.11. RMR Unit Capacity	12
1.12. Regulation Requirements	12
1.12.1. Response time delay	12
1.12.2. Symmetrical Regulation certification	12
1.13. Required Forms and Screen-prints	12
1.13.1. Ancillary Services Certification Request and Testing Form	12
1.13.2. Screen-prints	12
2. SCHEDULING THE TEST	13
2.1. OSAT Test Administrator Blocks dates	13
2.2. Scheduling Coordinator Submits A/S Certification Request and Testing Form	
13	
2.3. Client Representative Schedules Test Date	13

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

2.4.	OSAT Test Administrator Accepts Test Date.....	13
2.5.	Client Representative Notifies Scheduling Coordinator	13
2.6.	Scheduling Coordinator Schedules With Outage Coordination	13
3.	PERFORMING THE TEST(S)	13
3.1.	Generating Units.....	14
3.1.1.	P-max P-min or RMR Capacity for Availability Test.....	14
3.1.2.	Regulation Ramp Rate Test	16
3.1.3.	Spin Ramp Rate Test	17
3.1.4.	Non-Spin Ramp Rate Test.....	19
3.1.5.	Replacement Ramp Rate Test	21
4.	CALCULATING TEST RESULTS.....	23
5.	PROCESSING OF CERTIFICATION VALUES	25
5.1.	Approval 25	
5.1.1.	Client Relations – Client Representative review data	25
5.1.2.	Operations Engineering and Maintenance – Operations Engineer review data 25	
5.2.	Master File Update	25
5.2.1.	Client Relations – Client Representative enter change request.....	25
5.2.2.	Market Operations – Master File Engineer update Master File.....	25
5.3.	Notification.....	25
5.3.1.	Client Relations – Client Representative notifies SC	25
5.3.2.	Client Relations – Client Representative notifies ISO Operations	25
5.4.	PGA Schedule 1 Revision	25
5.4.1.	Scheduling Coordinator notifies resource owner	25
5.4.2.	Contracts and Compliance – Compliance Analyst file with FERC	25
6.	COMPLIANCE MANAGEMENT	26
6.1.	Contracts and Compliance – Compliance Analyst conduct periodic review ..	26
CURTAILABLE DEMAND CERTIFICATION PROCEDURE		27
7.	TECHNICAL INFORMATION REGARDING ANCILLARY SERVICES TESTING AND CERTIFICATION	27
7.1.	Test Duration	27
7.2.	Test Energy	27
7.3.	Response Time and Communication Time.....	27
7.4.	Multiple Use of Test Data	27
7.4.1.	Use of Non-spin test data for Replacement Reserves certification.....	27
7.5.	Decimal Places.....	27
7.6.	Test Periods	27
7.6.1.	Recording	27
7.7.	Visibility 28	
7.8.	Re-testing	28
7.8.1.	At SC request	28
7.8.2.	At ISO request.....	28
7.9.	Required forms and screen-prints	28

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

7.9.1. Ancillary Services Certification Request and Testing Form	28
7.9.2. Screen-prints	28
8. SCHEDULING THE TEST	29
8.1. OSAT Test Administrator Blocks dates	29
8.2. Scheduling Coordinator Submits Test and Request Form.....	29
8.3. Client Representative Schedules Test Date	29
8.4. OSAT Test Administrator Accepts Test Date.....	29
8.5. Client Representative Notifies Scheduling Coordinator	29
8.6. Scheduling Coordinator Schedules With Outage Coordination	29
9. PERFORMING THE TEST(S)	30
9.1. Curtailable Demand	30
9.1.1. Curtailable Demand Ramp Rate Test.....	30
10. CALCULATING TEST RESULTS.....	32
11. PROCESSING OF CERTIFICATION VALUES	34
11.1. Approval 34	
11.1.1. Client Relations – Client Representative review data.....	34
11.1.2. Operations Engineering and Maintenance – Operations Engineer review data 34	
11.2. Master File Update	34
11.2.1. Client Relations – Client Representative enter change request	34
11.2.2. Market Operations – Master File Engineer update Master File	34
11.3. Notification.....	34
11.3.1. Client Relations – Client Representative notifies SC.....	34
11.3.2. Client Relations – Client Representative notifies ISO Operations	34
12. PROCEDURE COMPLIANCE MANAGEMENT	35
12.1. Contracts and Compliance – Compliance Analyst conduct periodic review ..	35
SYSTEM RESOURCE CERTIFICATION PROCEDURE	36
13. TECHNICAL INFORMATION REGARDING ANCILLARY SERVICES TESTING AND CERTIFICATION	36
13.1. Test Duration	36
13.2. Response Time and Communication Time.....	36
13.3. Testing Sequence.....	36
13.4. Decimal Places.....	36
13.5. Test Periods	36
13.5.1. Recording.....	36
13.5.2. Test termination	37
13.5.3. Two-hour tests	37
13.6. Exceptions	37
13.6.1. System Resources	37
13.7. Re-testing	37
13.7.1. At SC request.....	37
13.7.2. At ISO request.....	37

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

13.8. Initial SC/Control Area Certification of Spin, Non-spin, and Replacement Imports 37

13.9. Initial SC/Control Area Certification for Regulation Imports38

13.10. ISO issuance of certification.....38

13.11. Regulation Requirements.....38

13.11.1. Symmetrical Regulation certification38

13.12. Required forms and screen-prints38

13.12.1. The Import Regulation Certification Test Request form38

13.12.2. Screen-prints.....39

14. SCHEDULING THE TEST.....39

14.1. OSAT Test Administrator Blocks dates39

14.2. Scheduling Coordinator Submits Test and Request Form.....39

14.3. Client Representative Schedules Test Date39

14.4. OSAT Test Administrator Accepts Test Date.....39

14.5. Client Representative Notifies Scheduling Coordinator39

14.6. Scheduling Coordinator Schedules With Outage Coordination39

15. PERFORMING THE TEST(S)40

15.1. System Resources41

15.1.1. Compliance Test for Imported Spinning, Non-Spinning and Replacement Reserves 41

15.1.2. Response Test for Imported Regulation Services42

16. CALCULATING TEST RESULTS.....44

17. PROCESSING OF CERTIFICATION VALUES46

17.1. Approval 46

17.1.1. Client Relations – Client Representative review data.....46

17.1.2. Operations Engineering and Maintenance – Operations Engineer review data 46

17.2. Master File Update46

17.2.1. Client Relations – Client Representative enter change request46

17.2.2. Market Operations – Master File Engineer update Master File46

17.3. Notification.....46

17.3.1. Client Relations – Client Representative notifies SC.....46

17.3.2. Client Relations – Client Representative notifies ISO Operations46

18. PROCEDURE COMPLIANCE MANAGEMENT46

18.1. Contracts and Compliance – Compliance Analysts conduct periodic review ...46

APPENDIX48

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

INTRODUCTION

Purpose

This procedure describes the process that will be used by the ISO to certify resources, including Generating Units, Curtailable Demand, and System Resources to provide Ancillary Service (A/S) to the ISO Controlled Grid.

A Generating Unit is an individual electric generator that is physically located within the ISO Control Area.

Curtailable Demand is demand from a participating load that can be curtailed at the direction of the ISO in the real time dispatch of the ISO Controlled Grid.

A System Resource is an individual or group of resources located outside the ISO Control Area capable of providing Energy and/or A/S to the ISO Controlled Grid.

For provision of Regulation into the ISO Control Area, a System Resource is a generating unit or generating plant or any portion thereof located within a host Control Area or imported into a host Control Area or an allocated portion of the host Control Area's EMS/AGC which is directly responsive to, and it's Control Area generation level is controlled by, the host Control Area EMS/AGC.

A resource's capability to provide A/S is determined by measuring the resource's ability to respond to a variety of Dispatch instructions. Actual test performance of a resource will result in certified values for the resource, which are then used in the ISO's operating systems to validate A/S which are bid or self-provided.

Affected Parties

- California ISO
 - Grid Operations
 - Operations Support and Training
 - Operations Engineering and Maintenance
 - Outage Coordination
 - Client Relations
 - Metering: MDAS
 - Contracts and Compliance
 - Market Operations
 - Application Services
- Scheduling Coordinators
- Resource Owners

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

References

- ISO Tariff Periodic Testing of Units
- ISO Tariff Metering Infrastructure
- ISO Protocol Ancillary Services Requirement Protocol (ASRP) of the ISO Tariff
- ISO Operating Procedure G-203: Reliability Must Run Unit Commitment and Dispatch

Policy

The ISO Tariff gives the ISO the authority to test resources that desire to bid or self-provide Ancillary Services (A/S).

The ISO must assure that all Resources providing A/S meet the ISO's technical requirements and that Market Participants are fairly compensated for A/S provided. Therefore the ISO testing process must achieve the following:

- Assure consistent evaluation techniques
- Determine the Resource capabilities such that the full range of A/S can be identified
- Accurately identify service specific limitations
- Validate data provided by requestor on A/S Certification Request and Testing Form

The ISO will test resource capabilities for both initial certifications and validation of existing certification to ensure that the standards for performance and associated operating values are properly represented in the ISO operating systems.

Definitions

Unless the context otherwise indicates, any word or expression defined in the Master Definitions Supplement to the ISO Tariff shall have the same meaning wherever capitalized in this procedure.

The following additional terms, if any, are capitalized in this document when used as defined below:

Certified Value

The specific value of P-max, P-min, or ramp rate used by the ISO, the PX, the SCs, and the resource owners for bidding and bid validation of A/S. Certified Values may vary for different A/S on a single Generating Unit.

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

Start Time	For non-Regulation A/S certification tests, the instant that both the time and the starting point (i.e. start data) are recorded by a screen-print (and/or flagged on a trend chart) and the test administrator notifies the SC that the test is started. For Regulation certification tests, the time that the REGULATION set point is changed as indicated on EMS or PI (Plant Information system) trend.
Stated P-max	The maximum MW level that a given Generating Unit, Curtailable Demand, or System Resource is capable of sustaining for a determined period of time as stated by the resource Owner and/or SC on the A/S Certification Request and Testing Form.
Stated P-min	The lowest MW level not less than zero that a given Generating Unit, Curtailable Demand, or System Resource is capable of sustaining for a determined period of time as stated by the Generator and/or SC on the A/S Certification Request and Testing form.
Stated Ramp Rate	The rate at which a resource can increase or decrease output for a particular A/S as stated by the resource owner and/or SC on the A/S Certification Request and Testing form. The Stated Ramp Rate may vary for different MW ranges on a given Generating Unit, Curtailable Demand, or System Resource. Ramp Rate is measured in MW/minute.
Tested P-max	The maximum sustainable MW level for a given Generating Unit, Curtailable Demand, or System Resource as demonstrated during tests and reflected on the ISO EMS. The Tested P-max must be sustainable for a power factor range between .95 leading to .90 lagging.
Tested P-min	The lowest sustainable MW level for a given Generating Unit, Curtailable Demand, or System Resource as demonstrated during tests and reflected on the ISO EMS.

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

Tested Ramp Rate

The rate at which a resource can increase or decrease output for a particular A/S as tested and calculated by the ISO. The Tested Ramp Rate may vary for different MW ranges on a given Generating Unit, Curtailable Demand, or System Resource. Ramp Rate is measured in MW/minute.

Responsibilities

**Client Relations –
Client Representative**

Arrange for certification of the values submitted by the Scheduling Coordinator on the A/S Certification Request and Testing Form. Coordinate testing and exchange of data between the Scheduling Coordinator (SC), Grid Operations, Outage Coordination (O/C), and the Market Operations Master File Coordinator.

**Contracts and
Compliance -
Compliance Analyst**

Ensure a nondiscriminatory testing process. Initiate spot test for compliance. Direct review of testing procedures

**OSAT Test
Administrator**

Perform tests and manage test data. Coordinate with ISO Operations, SC, and resource owner to perform tests

**Outage Coordination
Scheduling
Coordinators (SC)**

Approve and schedule testing
Submit requests for testing and coordinate between ISO and resource owner for test scheduling, testing, and data management

**Operations
Engineering &
Maintenance**

Check test data for reasonability and approve Master File changes

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

GENERATING UNIT CERTIFICATION PROCEDURE

1. TECHNICAL INFORMATION REGARDING ANCILLARY SERVICES TESTING AND CERTIFICATION

1.1. Test Duration

The time typically allocated to perform testing will be one to two hours, as specified in the ASRP of the ISO Tariff. The complete test time will depend upon the A/S being tested, the type of Generating Unit, and the system conditions at the time of the test.

1.2. Test Energy

Energy over or under produced due to testing is accounted for as Balancing Energy. Appropriate log entries will be made to assure that “no-pay” settlements and penalties are not assessed during the testing period.

1.3. Response Time and Communication Time

For non-Regulation tests, the specified test periods (10 or 60 minutes) include the SC and Generating Unit operator response time as well as all communication time. That is, the test period begins with the initial contact between the ISO and the SC.

For Regulation tests, the specified test periods (10 minutes) include time required for real-time and control telemetry to affect change in Generating Unit output.

1.4. Testing Sequence

For a given resource certifying multiple values, it is not necessary to perform the tests in any particular order. The order should be determined by a combination of:

- System conditions
- Generation Dispatcher needs and restrictions; and
- Coordination between the Generating Unit, the SC and the ISO (for certification tests)

1.5. Multiple Use of Test Data

It is not always necessary to test for each A/S requested for certification as some test results can be used as demonstration for multiple A/S.

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

1.5.1. Use of Spin test data for Non-Spin certification

At times it is impractical to separate a Generating Unit from the grid for testing if the Generating Unit is intended to bid for Non-Spinning Reserves only when it is on-line.

Generating Units will be certified to bid for Non-Spinning Reserves as tested:

1) On line Non-Spinning Reserve Testing

If a given Generating Unit is tested for Non-Spinning Reserves while synchronized to the grid (on line), the Spinning Reserves test data can be used for Non-Spinning A/S certification. Additional testing is not necessary. The Non-Spinning Reserve test results shall be identical to the Spinning Reserve test results. Test data shall include notice that the Generating Unit was tested in this manner and is qualified only for on-line bidding of Non-spinning Reserve.

2) Off line Non-Spinning Reserve Testing

In the event it is reasonably certain that a Generating Unit will be bid for Non-Spinning Reserves when it is off-line, the test for Non-Spinning Reserve must start with the Generating Unit off-line. The Spin test data shall not be used as a demonstration of adequate ability to provide Non-spinning Reserve.

1.5.2. Use of Non-spin test data for Replacement Reserves certification

If the Generating Unit, ramping at the Tested Ramp Rate determined by the Non-spin test, would clearly reach P-max in less than 30 minutes, the Non-spin test data can be used for Replacement Reserves certification. (This 30-minute criteria allows for a broad margin of error that can be encountered in an actual 60-minute test.) Otherwise, the Generating Unit must be tested either from off-line to P-max or for 60 minutes to determine how much power can actually be delivered within 60 minutes. If it is anticipated that the Generating Unit will ever be off-line when bid for this service, it must be tested starting off-line (or use data from a Non-spin test that started off-line).

1.6. Decimal Places

Observed and stated data are recorded to one decimal place accuracy. Calculations of ramp rates are stated and recorded to two decimal places.

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

1.7. Test Periods

1.7.1. Recording

The calculations performed on the data will be valid as long as the start and stop times are recorded to the one tenth of a second. Therefore, if the available operating range of a Generating Unit is less than the range that would be covered by a ten-minute ramp, a shorter test period may be used. Also, if the test does not end at exactly the correct time, results will be valid as long as a screen-print can be taken by the ISO at the exact end time.

1.7.2. Test termination

Ramp rate test termination is either the end of the specified test time (10 minutes or 60 minutes) or the time the resource reaches a limit.

1.7.3. Two-hour tests

Any A/S provider must be capable of providing such Energy or Reserve in the way of a Load for as long as two hours.

1.8. Visibility

In order to facilitate reliable testing, any Generating Unit bidding A/S must be directly visible to ISO operations EMS. The OSAT Test Administrator will confirm Generating Unit visibility prior to administering the test.

1.9. Exceptions

1.9.1. PX Resources

For testing purposes, PX controlled resources are dispatched directly through the Scheduling Coordinators or plant operators.

1.9.2. Physical Scheduling Plants and aggregated resources

Test Generating Units as a group if they will be bid as a group.

1.10. Re-testing

1.10.1. At SC request

If changes have occurred in the status of the facilities that substantially affect the facility's ability to deliver A/S, re-testing shall be accommodated. The re-test values will replace previous test results for certification, even if they result in reductions in certification values.

1.10.2. At ISO request

The ISO will schedule re-testing of resources on a non-discriminatory basis.

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

1.11. RMR Unit Capacity

Generating Units that are RMR Units will be tested using this procedure for market and A/S values only. RMR Unit capacity for availability is not equivalent to A/S P-max. The RMR Contract defines the RMR Capacity for Availability.

1.12. Regulation Requirements

1.12.1. Response time delay

Delayed response time (the time between receiving a control signal indicating a change in REGULATION set point and the instant the Generating Unit initiates changes to MW output) is a significant factor to ISO reliability. If tests indicate that Regulation is not reliable on certain Generating Units or in specific ranges, Regulation service will not be certified on those Generating Units or in those ranges.

1.12.2. Symmetrical Regulation certification

Symmetrical Regulation Up and Regulation Down (Regulation up ramp rate and Regulation down ramp rate must be equal) values are necessary for proper operation of EMS. Total Regulation Up Ramp Rates need to be equal to Total Regulation Down Ramp Rates or control will be biased in one direction. Therefore the single "Certified Value" for Regulation will be the lesser of Regulation Up and Regulation Down ramp rates.

1.13. Required Forms and Screen-prints

1.13.1. Ancillary Services Certification Request and Testing Form

The A/S Certification Request and Testing Form (see Attachment A) is the official documentation of test requests, performed test data, and certification values. The data is supported by and based upon visible test results and screen-prints. It may be completed and signed by either the test administrator or other ISO staff evaluating test results.

1.13.2. Screen-prints

The ISO will make EMS display screen-prints **or** PI trend printouts of the following:

- the appropriate Generating Unit Station one-line,
- the AGC (Automatic Generation Control) page
- the Generation page
- prepared EMS trend charts, including MW output and set points (see Attachment C: Trend Chart Setup),
- PI trend

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

2. SCHEDULING THE TEST

2.1. OSAT Test Administrator Blocks dates

Periodically update test calendar to block out unavailable test dates.

2.2. Scheduling Coordinator Submits A/S Certification Request and Testing Form

E-mail Client Representative completed A/S Certification Request and Testing Form (Attachment A) and request testing. See 2.5 for minimum completion requirements.

2.3. Client Representative Schedules Test Date

Check calendar for available date and submit Test Form to OSAT Test Administrator. Allow a minimum 10 calendar days of lead-time.

2.4. OSAT Test Administrator Accepts Test Date

Accept or decline test date. Give reason for decline. E-mail response to Client Representative.

2.5. Client Representative Notifies Scheduling Coordinator

Contact Scheduling Coordinator with accepted or revised test date. Confirm receipt of A/S Certification Request and Testing Form (Attachment A) completed with at least:

- Agency and contact telephone number
- Resource ID
- All “Yes” boxes checked (Attachment A)
- Stated Values included in test data block

2.6. Scheduling Coordinator Schedules With Outage Coordination

Schedule test date with ISO Outage Coordination. Submit Owner resource owner Outage Request form (Attachment D to this Procedure also posted on Client Relations A/S web site). Outage Coordination requires 72 work-week hours to schedule the testing. For example, requests must be submitted by Thursday noon for testing to occur on the following Tuesday. A/S tests not scheduled through ISO Outage Coordination will not be conducted.

3. PERFORMING THE TEST(S)

The steps listed in the following tables comprise standardized testing procedures:

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

3.1. Generating Units

3.1.1. P-max P-min or RMR Capacity for Availability Test

		P-MAX P-MIN TEST
	STEP	INSTRUCTIONS FOR TEST ADMINISTRATOR (GENERATION DISPATCHER OR OTHER GRID OPS STAFF)
1	Review A/S Certification Request and Testing Form	Confirm (Mandatory-if not included, cancel test): <ul style="list-style-type: none"> • Agency and phone number included. • Resource ID included. • All "Yes" boxes checked. • Scheduled and approved by ISO Outage Coordination. • Stated Values included in test data block.
2	Confirm scheduled certification test	Contact the SC to clarify the schedule and nature of the tests to be performed.
3	Determine whether system conditions support test	Check available Regulation to compensate for fluctuation of Generating Units being tested. Final approval for testing must be obtained from the ISO Generation Dispatcher and Shift Manager. If testing an RMR Unit for A/S Certification, check with Alhambra Generation Dispatcher. The ISO will not dispatch additional RMR Units to facilitate A/S testing.
4	Position Generating Unit start point for optimum response	Order SC to adjust to upper or lower limit.
5	Start test	Notify SC of start time (this contact is the Start Time) and request: P-max – to maintain maximum output for 15 minutes. P-min – to maintain minimum output for 15 minutes.
6	Record start data	Request/Test Sheet – Note time (hr:mn:sc) and MW level (recorded to one decimal place). Screen-print – Capture MW level and start time.

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

7	Monitor MW level	<p>P-max – for 15 minutes, noting minimum level during the 15 minute period (take additional screen-prints if necessary to record MW level variations)</p> <p>While maintaining P-max, <u>if system conditions allow</u>, instruct SC to adjust Generating Unit power factor. For .95 leading power factor, the Generating Unit should try to take in (buck) an amount of MVAR equal to 33% of its MW output. For .90 lagging power factor, the Generating Unit should try to produce (boost) an amount of MVAR equal to 48.5% of its MW output.</p> <p>If the required MVAR output is unattainable at a given P-max, the limiting factor (such as terminal voltage limit reached, or field current limit is reached) is to be noted and the test repeated at a lower P-max. Operations Engineering and Maintenance will evaluate the data to determine pass or failure of the test.</p> <p>The SC may adjust MVAR of other Generating Units to accommodate the MVAR test.</p> <p>P-min – for 15 minutes, noting highest level during the 15 minute period (take additional screen-prints if necessary to record MW level variations).</p> <p>RMR capacity for availability – for four full scheduling hours.</p>
8	End test	<p>P-max, P-min – after 15 minutes.</p> <p>ISO calls end of complete timed test.</p>
9	Record end time and MW level.	<p>Screen-print – showing MW level and end time.</p> <p>Test Sheet – Record time (hr:mn:sc) and MW level.</p>
10	Follow-up	<p>SLIC: Log tests in SLIC, close out outage cards.</p> <p>Notify: Notify all parties that testing is complete and systems should be returned to normal (including removal of Manual Replacement Values and artificial schedule information).</p>
11	Send Data to OSAT Test Administrator	<p>A/S Certification Request and Testing Form: Complete at least Test Administrator and contacts Name. Include any other recorded data.</p> <p>Screen-prints: Sequence Chronologically and note purpose of each screen-print. For example:” Begin Reg Up.”</p>

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

3.1.2. Regulation Ramp Rate Test

		REGULATION RAMP RATE TEST
	STEP	INSTRUCTIONS FOR TEST ADMINISTRATOR (GENERATION DISPATCHER OR OTHER GRID OPS STAFF)
1	Review A/S Certification Request and Testing Form	Confirm (Mandatory-if not included, cancel test): <ul style="list-style-type: none"> Agency and phone number included. Resource ID included. All "Yes" boxes checked. Scheduled and approved by ISO Outage Coordination. Stated Values included in test data block.
2	Confirm scheduled certification test	Contact SC to clarify the schedule and nature of the tests to be performed.
3	Determine whether system conditions support test	Check available regulation to compensate for fluctuation of Generating Units being tested. Final approval for testing must be obtained from the ISO Generation Dispatcher and Shift Manager. If testing an RMR Unit for A/S Certification, check with Alhambra Generation Dispatcher. The ISO will not dispatch additional RMR Units to facilitate A/S testing.
4	Position Generating Unit start point for optimum response	Allow enough room for ten minutes of ramping in the Stated Ramp Range. Preferably start at bottom or top of REGULATION range.
5	Prepare Generating Unit	Assure: <ul style="list-style-type: none"> Generating Unit on REGULATION. Unit blocks are clear from testing range.
6	Prepare EMS	Request Alhambra Generation Dispatcher to Assure: <ul style="list-style-type: none"> Control flag is on (REGULATION---see ACC Unit Summary). Reg limits are outside of testing range. "ISO Ramp Rate" is above Stated Ramp Rate (see AGC---ACC Unit Summary).
7	Start test	Notify SC of testing. Manually replace Set Point to a level at least 10 times the Stated Ramp Rate above or below start point. (Start Time is the time that the Set Point is changed, as indicated on EMS or PI trend).
8	Record start data	Request/Test Sheet – Note time (hr:mn:sc) and MW level (recorded to one decimal place). Screen-print – Capture MW level and start time.
9	Monitor MW level	For 10 minutes or until Generating Unit reaches upper or lower REGULATION limit.

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

10	End test	<p>After 10 minutes or when Generating Unit reaches upper or lower REGULATION limit.</p> <p>ISO calls end of complete timed test.</p> <p>SC calls end if limit is reached.</p>
11	Record end time and MW level.	<p>Screen-print – showing MW level and end time.</p> <p>Test Sheet – Record time (hr:mn:sc) and MW level.</p>
12	Repeat test	Repeat test if necessary.
13	Additional Regulation testing	<p>Range validation: Generating Unit may be required to control across entire REGULATION range to verify the reliability of the upper and lower limits.</p> <p>Response time: Note the length of time between Set Point change and Generating Unit response. This additional data will be used to evaluate the performance and reliability of the Generating Unit for Regulation.</p>
14	Follow-up	<p>SLIC: Log tests in SLIC, close out outage cards</p> <p>Notify: Notify all parties that testing is complete and systems should be returned to normal (including removal of Manual Replacement Values and artificial schedule information)</p>
15	Send Data to OSAT Test Administrator	<p>A/S Certification Request and Testing Form: Complete at least Test Administrator Name. Include any other recorded data.</p> <p>Screen-prints: Sequence Chronologically and note purpose of each screen-print. For example: "Begin Reg Up."</p>

3.1.3. Spin Ramp Rate Test

SPIN RAMP TEST		
	STEP	INSTRUCTIONS FOR TEST ADMINISTRATOR (GENERATION DISPATCHER OR OTHER GRID OPS STAFF)
1	Review A/S Certification Request and Testing Form	<p>Confirm (Mandatory-if not included, cancel test):</p> <ul style="list-style-type: none"> • Agency and phone number included. • Resource ID included. • <u>All</u> "Yes" boxes checked. • Scheduled and approved by ISO Outage Coordination. • Stated Values included in test data block.
2	Confirm scheduled certification test	Contact SC to clarify the schedule and nature of the tests to be performed.
3	Determine whether system conditions support test	Check available regulation to compensate for fluctuation of Generating Units being tested. Final approval for testing must be obtained from the ISO Generation

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

		Dispatcher and Shift Manager. If testing an RMR Unit for A/S Certification, check with Alhambra Generation Dispatcher. The ISO will not dispatch additional RMR Units to facilitate A/S testing.
4	Position Generating Unit start point for optimum response	Allow enough room for ten minutes of ramping at the Stated Ramp Rate.
5	Start test	Notify SC of start time (this contact is the Start Time) and request to increase output at maximum allowable rate until instructed to stop (will be in 10 minutes for Spin and Non-Spin, 60 minutes for Replacement) or P-max is reached. (see Section 1.3).
6	Record start data	Request/Test Sheet – Note time (hr:mn:sc) and MW level (recorded to one decimal place). Screen-print – Capture MW level and start time.
7	Monitor MW level	For 10 minutes or until Generating Unit reaches P-max.
8	End test	After 10 minutes or when Generating Unit reaches P-max.
9	Record end time and MW level.	Screen-print – showing MW level and end time. Test Sheet – Record time (hr:mn:sc) and MW level.
10	Follow-up	SLIC: Log tests in SLIC, close out outage cards. Notify: Notify all parties that testing is complete and systems should be returned to normal (including removal of Manual Replacement Values and artificial schedule information).
11	Send Data to OSAT Test Administrator	A/S Certification Request and Testing Form: Test Administrator to sign form. Include any other recorded data. (Screen-prints, etc.) Screen-prints: Sequence Chronologically and note purpose of each screen-print. For example: "Begin Reg Up."

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

3.1.4. Non-Spin Ramp Rate Test

		NON-SPIN RAMP RATE TEST
	STEP	INSTRUCTIONS FOR TEST ADMINISTRATOR (GENERATION DISPATCHER OR OTHER GRID OPS STAFF)
1	Review A/S Certification Request and Testing Form	Confirm (Mandatory-if not included, cancel test): <ul style="list-style-type: none"> Agency and phone number included. Resource ID included. All "Yes" boxes checked. Scheduled and approved by ISO Outage Coordination. Stated Values included in test data block.
2	Confirm scheduled certification test	Contact SC to clarify the schedule and nature of the tests to be performed.
3	Determine whether system conditions support test	Check available regulation to compensate for fluctuation of Generating Units being tested. Final approval for testing must be obtained from the ISO Generation Dispatcher and Shift Manager. If testing an RMR Unit for A/S Certification, check with Alhambra Generation Dispatcher. The ISO will not dispatch additional RMR Units to facilitate A/S testing.
4	Position Generating Unit start point for optimum response	Start off-line or use Spin data. (see Section 1.5).
5	Start test	Notify SC of start (this contact is the Start Time) and request to increase output at maximum allowable rate until instructed to stop (will be in 10 minutes) or P-max is reached. (see Section 1.3).
6	Record start data	Request/Test Sheet – Note time (hr:mn:sc) and MW level (recorded to one decimal place). Screen-print – Capture MW level and start time.
7	Monitor MW level	For 10 minutes or until Generating Unit reaches P-max (or until Curtailable Demand is fully reduced).
8	End test	After 10 minutes or when Generating Unit reaches P-max (or when Curtailable Demand is fully reduced). ISO calls end of complete timed test. SC calls end if limit is reached.
9	Record end time and MW level.	Screen-print – showing MW level and end time. Test Sheet – Record time (hr:mn:sc) and MW level.

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

10	Follow-up	<p>SLIC: Log tests in SLIC, close out outage cards.</p> <p>Notify: Notify all parties that testing is complete and systems should be returned to normal (including removal of Manual Replacement Values and artificial schedule information).</p>
11	Send Data to OSAT Test Administrator	<p>A/S Certification Request and Testing Form: Test Administrator to sign form. Include any other recorded data.</p> <p>Screen-prints: Sequence Chronologically and note purpose of each screen-print. For example: "Begin Reg Up."</p>

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

3.1.5. Replacement Ramp Rate Test

REPLACEMENT RAMP RATE TEST		
STEP	INSTRUCTIONS FOR TEST ADMINISTRATOR (GENERATION DISPATCHER OR OTHER GRID OPS STAFF)	
1	Review A/S Certification Request and Testing Form	Confirm (Mandatory-if not included, cancel test): <ul style="list-style-type: none"> Agency and phone number included. Resource ID included. All "Yes" boxes checked. Scheduled and approved by ISO Outage Coordination. Stated Values included in test data block.
2	Confirm scheduled certification test	Contact SC to clarify the schedule and nature of the tests to be performed.
3	Determine whether system conditions support test	Check available regulation to compensate for fluctuation of Generating Units being tested. Final approval for testing must be obtained from the ISO Generation Dispatcher and Shift Manager. If testing an RMR Unit for A/S Certification, check with Alhambra Generation Dispatcher. The ISO will not dispatch additional RMR Units to facilitate A/S testing.
4	Position Generating Unit start point for optimum response	Start off-line or at minimum, or use NSP data. (see Section 1.5)
5	Start test	Notify SC of start time (this contact is the Start Time) and request to increase output at maximum allowable rate until instructed to stop (will be in 10 minutes for Spin and Non-Spin, 60 minutes for Replacement) or P-max is reached. (see Section 1.3).
6	Record start data	Request/Test Sheet – Note time (hr:mn:sc) and MW level (recorded to one decimal place). Screen-print – Capture MW level and start time.
7	Monitor MW level	For 60 minutes or until Generating Unit reaches P-max. ALSO: Note Time Generating Unit Starts.
8	End test	After 60 minutes or when Generating Unit reaches P-max. ISO calls end of complete timed test. SC calls end if limit is reached.
9	Record end time and MW level.	Screen-print – showing MW level and end time. Test Sheet – Record time (hr:mn:sc) and MW level.

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

10	Follow-up	<p>SLIC: Log tests in SLIC, close out outage cards.</p> <p>Notify all parties that testing is complete and systems should be returned to normal (including removal of Manual Replacement Values and artificial schedule information)</p>
11	Send Data to OSAT Test Administrator	<p>A/S Certification Request and Testing Form: Test Administrator to sign form. Include any other recorded data.</p> <p>Screen-prints: Sequence Chronologically and note purpose of each screen-print. For example: "Begin Reg Up."</p>

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

4. CALCULATING TEST RESULTS

The processing of test data occurs, all or in part, after the testing procedure has been completed and may be performed by a party other than the test administrator and at a later time. The test administrator may send the documentation, including test forms and screen-prints, to the data manager or other personnel for some or all of the following steps:

1	Calculate results	<p>Ramp rates and P-max/min levels are recorded to two decimal places.</p> <p>REFER TO DATA BLOCK ON A/S CERTIFICATION REQUEST AND TESTING FORM.</p> <p>Complete: “Start Time,” “Start MW,” “End Time,” and “End MW” in the data block with data from the test screen-prints.</p> <p>Calculate results: From data recorded in “Starting Time,” “Starting Point,” “Ending Time,” and “Ending Point,” calculate and indicate in “Certified Value”.</p> <p>MW Change: = {End MW – Start MW} (one decimal place).</p> <p>MW Range: Indicates various test ranges (completed by SC).</p> <p>Stated P-max, P-min, or Ramp Rate: (completed by SC).</p> <p>Certified P-max: = Lowest level during the 15-minute test period (tenths of a MW).</p> <p>Certified P-min: = Highest level during the 15-minute test period (tenths of a MW).</p> <p>Certified Ramp Rate: = {MW change/(End time – Start time*)} (two decimal places).</p> <p>Note for Regulation: Symmetrical Reg Up and Reg Down values are necessary for proper operation of EMS. Therefore the single “Certified Value” for Reg will be the lesser of Reg Up and Reg Down.</p> <p>*Convert seconds to hundredths of minutes by dividing seconds by 60.</p>
2	Organize documentation packet	<p>Fasten documents: in the following order:</p>

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

3	Record data and results	<p>In Certification Data file – The format and structure of the Certification Data file is similar to the data blocks on the Request forms. The test data accumulated during testing along with the calculations performed above should be entered in the Certification Data file exactly as on the Request forms. Note: The lesser of Reg Up and Reg Down ramp rates from the “Observed” field becomes the “Service Specific Certification” value for both.</p> <p>Certified Values – The values derived from the tests and entered in the Certification Data file, once approved by the Operations Engineer, are used as the certified values for bidding and validation.</p>
4	Archive Data	<p>The OSAT Test Administrator will file the data package in the particular file for the appropriate Generating Unit.</p>
5	Forward Data and Calculations to Client Representative	<p>The OSAT Test Administrator will notify the Client Representative of the Certification Data file changes and additions.</p>

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

5. PROCESSING OF CERTIFICATION VALUES

5.1. Approval

5.1.1. Client Relations – Client Representative review data

Review Certification Data file test data for consistency with established procedure. Extract test data and calculations and send to Operations Engineer.

5.1.2. Operations Engineering and Maintenance – Operations Engineer review data

Evaluate test data and calculated certification values for reasonability and accuracy, and approve data to be used as Certified Values.

Forward Certified Values to Client Representative.

5.2. Master File Update

5.2.1. Client Relations – Client Representative enter change request

Enter a change request into the ISO's Change Management system to be routed to Market Operations for processing.

5.2.2. Market Operations – Master File Engineer update Master File

Coordinate with Market Participants and ISO Operations, enter the Certified Values into the ISO Master File, and notify the Client Representative of new data effective date.

5.3. Notification

5.3.1. Client Relations – Client Representative notifies SC

Notify SC of Master File update and effective date. Provide SC with appropriate certification documentation, including test data and calculations.

5.3.2. Client Relations – Client Representative notifies ISO Operations

Notify ISO Operations of new A/S resources.

5.4. PGA Schedule 1 Revision

5.4.1. Scheduling Coordinator notifies resource owner

Have resource owner submit a revised Participating resource owner Agreement Schedule 1 reflecting new Certified Values to the ISO

5.4.2. Contracts and Compliance – Compliance Analyst file with FERC

Receive revised Participating Generator Agreement Schedule 1 from resource owner, and file it at FERC for information purposes.

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

6. COMPLIANCE MANAGEMENT

6.1. Contracts and Compliance – Compliance Analyst conduct periodic review

Conduct periodic review of test results and the certification process to ensure nondiscriminatory testing.

Monitor the bidding and provision of A/S, and develop market-based methods and techniques to foster quality A/S provision and fair remuneration.

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

CURTAILABLE DEMAND CERTIFICATION PROCEDURE

7. TECHNICAL INFORMATION REGARDING ANCILLARY SERVICES TESTING AND CERTIFICATION

7.1. Test Duration

The time typically expected to perform this testing will be one hour, including set-up and preparation. If multiple elements are tested separately, it may take longer.

7.2. Test Energy

Energy over or under produced due to testing is accounted for as Balancing Energy. Appropriate log entries will be made to assure that “no-pay” penalties are not assessed during the testing period.

7.3. Response Time and Communication Time

For non-Regulation tests, the specified test periods (10 or 60 minutes) include SC and Curtailable Demand operator response time and all communication time. That is, the test period begins with the initial contact between the ISO and the SC.

7.4. Multiple Use of Test Data

It is not always necessary to test for each A/S requested for certification as some test results can be used as demonstration for multiple A/S.

7.4.1. Use of Non-spin test data for Replacement Reserves certification

If the total Demand curtailment is accomplished in the 10-minute Non-spin certification test period. It is not necessary to retest the Demand for Replacement Reserves. The ISO will simply re-enter the test data and results for Replacement Reserve certification.

7.5. Decimal Places

Observed and stated data are recorded to one decimal place. Calculations of ramp rates are stated and recorded to two decimal places.

7.6. Test Periods

7.6.1. Recording

The calculations performed on the data will be valid as long as the start and stop times are recorded to the one tenth of a second. Therefore, if the full Demand is curtailed in less than ten minutes, the test results will be calculated using that shorter time.

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

7.7. Visibility

In order to facilitate reliable testing, any Curtailable Demand bidding A/S must be directly visible to ISO operations EMS. The OSAT Test Administrator will confirm visibility prior to administering the test.

7.8. Re-testing

7.8.1. At SC request

If changes have occurred in the status of the facilities that substantially affect the facility’s ability to deliver A/S, re-testing will be accommodated. The re-test values will replace previous test results for certification, even if they result in reductions in certification values.

7.8.2. At ISO request

The ISO will schedule re-testing of resources on a non-discriminatory basis.

7.9. Required forms and screen-prints

7.9.1. Ancillary Services Certification Request and Testing Form

The A/S Certification Request and Testing Form (see Attachment A) is the official documentation of test requests, performed test data, and certification values. The data is supported by and based upon visible test results and screen-prints. It may be completed and signed by either the OSAT Test Administrator or other ISO staff evaluating test results.

7.9.2. Screen-prints

Make EMS display screen-prints **or** PI trend printouts of the following:

- the appropriate Curtailable Demand one-line,
- prepared EMS trend charts, including MW output (see Attachment C: Trend Chart Setup),
- PI trend

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

8. SCHEDULING THE TEST

8.1. OSAT Test Administrator Blocks dates

Periodically update test calendar to block out unavailable test dates.

8.2. Scheduling Coordinator Submits Test and Request Form

E-mail Client Representative completed A/S Certification Request and Testing Form (Attachment A) and request testing. See Section 8.5 for minimum completion requirements.

8.3. Client Representative Schedules Test Date

Check calendar for available date and submit Test Form to OSAT Test Administrator. Allow a minimum of 10 calendar days of lead-time.

8.4. OSAT Test Administrator Accepts Test Date

Accept or decline test date. Give reason for decline. E-mail response to Client Representative.

8.5. Client Representative Notifies Scheduling Coordinator

Contact Scheduling Coordinator with accepted or revised test date. Confirm receipt of A/S Certification Request and Testing Form (Attachment A) completed with at least:

- Agency and contact telephone number
- Resource ID
- All "Yes" boxes checked (Attachment A)
- Stated Values included in test data block

8.6. Scheduling Coordinator Schedules With Outage Coordination

Schedule test date with ISO Outage Coordination. Submit Owner Generator Outage Request form (Attachment D to this Procedure also posted on Client Relations A/S web site). Outage Coordination requires 72 work-week hours to schedule the testing. For example, requests must be submitted by Thursday noon for testing to occur on the following Tuesday. A/S tests that are not scheduled through ISO Outage Coordination Office will not be conducted.

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

9. PERFORMING THE TEST(S)

The steps listed in the following tables comprise standardized testing procedures:

9.1. Curtailable Demand

9.1.1. Curtailable Demand Ramp Rate Test

		CURTAILABLE DEMAND RAMP RATE TEST
	STEP	INSTRUCTIONS FOR TEST ADMINISTRATOR (GENERATION DISPATCHER OR OTHER GRID OPS STAFF)
1	Review A/S Certification Request and Testing Form	Confirm (Mandatory-if not included, cancel test): <ul style="list-style-type: none"> Agency and phone number included. Resource ID included. All "Yes" boxes checked. Scheduled and approved by ISO Outage Coordination. Stated Values included in test data block.
2	Confirm scheduled certification test	Contact SC to clarify the schedule and nature of the tests to be performed.
3	Determine whether system conditions support test	Check available regulation to compensate for fluctuation of Curtailable Demand being tested. Final approval for testing must be obtained from the ISO Generation Dispatcher and Shift Manager.
4	Position Curtailable Demand start point for optimum response	Demand – Adjust Demand to maximum.
5	Start test	Notify SC of start time (this contact is the Start Time) and request: Demand – to curtail demand. Aggregated Load Resource: The Aggregated Load Resource must be represented by a single EMS point that can be monitored by the tester for testing purposes and by Operations for real-time implementation.
6	Record start data	Request/Test Sheet – Note time (hr:mn:sc) and MW level (recorded to one decimal place). Screen-print – Capture MW level and start time.
7	Monitor MW level	For 10 minutes or until Demand is fully curtailed.
8	End test	ISO calls end of complete timed test. SC calls end if limit is reached.

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

9	Record end time and MW level.	Screen-print – Showing MW level and end time. Test Sheet – Record time (hr:mn:sc) and MW level .
10	Follow-up	SLIC: Log tests in SLIC, close out outage cards. Notify: Notify all parties that testing is complete and systems should be returned to normal (including removal of Manual Replacement Values and artificial schedule information).
11	Send Data to OSAT Test Administrator	A/S Certification Request and Testing Form: Test Administrator to sign form. Include any other recorded data. Screen-prints: Sequence chronologically and note purpose of each screen-print. For example: "Begin Curtail Test."

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

10. CALCULATING TEST RESULTS

The processing of test data occurs, all or in part, after the testing procedure has been completed and may be performed by a party other than the test administrator and at a later time. The test administrator may send the documentation, including test forms and screen-prints, to the data manager or other personnel for some or all of the following steps:

1	Calculate results	<p>Ramp rates and P-max/min levels are recorded to two decimal places.</p> <p>REFER TO DATA BLOCK ON A/S CERTIFICATION REQUEST AND TESTING FORM.</p> <p>Complete: "Start Time," "Start MW," "End Time," and "End MW" in the data block with data from the test screen-prints.</p> <p>Calculate results: From data recorded in "Starting Time," "Starting Point," "Ending Time," and "Ending Point," calculate and indicate in "Certified Value".</p> <p>MW Change: = {End MW – Start MW} (one decimal place).</p> <p>MW Range: Indicates various test ranges (completed by SC).</p> <p>Stated P-max, P-min, or Ramp Rate: (completed by SC).</p> <p>Certified P-max: = Lowest level during the 15-minute test period (tenths of a MW).</p> <p>Certified P-min: = Highest level during the 15-minute test period (tenths of a MW).</p> <p>Certified Ramp Rate: = {MW change/(End time – Start time*)} (two decimal places).</p>
2	Organize documentation packet	<p>Fasten documents: in the following order:</p>

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

3	Record data and results	<p>In Certification Data file – The format and structure of the CERT data file is similar to the data blocks on the Request forms. The test data accumulated during testing along with the calculations performed above should be entered in the Certification Data file exactly as on the Request forms. Note: The lesser of Reg Up and Reg Down ramp rates from the “Observed” field becomes the “Service Specific Certification” value for both.</p> <p>Certified Values – The values derived from the tests and entered in the Certification Data file, once approved by the Operations Engineer, are used as the certified values for bidding and validation.</p>
4	Archive Data	The OSAT Test Administrator will file the data package in the particular file for the appropriate Curtailable Demand.
5	Forward Data and Calculations to Client Representative	The OSAT Test Administrator will notify the Client Representative of the Certification Data file changes and additions.

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

11. PROCESSING OF CERTIFICATION VALUES

11.1. Approval

11.1.1. Client Relations – Client Representative review data

Review Certification Data file test data for consistency with established procedure. Extract test data and calculations and send to Operations Engineer.

11.1.2. Operations Engineering and Maintenance – Operations Engineer review data

Evaluate test data and calculated certification values for reasonability and accuracy, and approve data to be used as Certified Values.

Forward Certified Values to Client Representative.

11.2. Master File Update

11.2.1. Client Relations – Client Representative enter change request

Enter a change request into the ISO's Change Management system to be routed to Market Operations for processing.

11.2.2. Market Operations – Master File Engineer update Master File

Coordinate with Market Participants and ISO Operations, enter the Certified Values into the ISO Master File, and notify the Client Representative of new data effective date.

11.3. Notification

11.3.1. Client Relations – Client Representative notifies SC

Notify SC of Master File update and effective date. Provide SC with appropriate certification documentation, including test data and calculations.

11.3.2. Client Relations – Client Representative notifies ISO Operations

Notify ISO Operations of new A/S resources.

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

12. PROCEDURE COMPLIANCE MANAGEMENT

12.1. Contracts and Compliance – Compliance Analyst conduct periodic review

Conduct periodic review of test results and the certification process to ensure nondiscriminatory testing.

Monitor the bidding and provision of A/S, and develop market-based methods and techniques to foster quality A/S provision and fair remuneration.

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

SYSTEM RESOURCE CERTIFICATION PROCEDURE

13. TECHNICAL INFORMATION REGARDING ANCILLARY SERVICES TESTING AND CERTIFICATION

13.1. Test Duration

The time typically allocated to perform testing will be one to two hours. The complete test time will depend upon the A/S being tested, the type of System Resource, and the system conditions at the time of the test.

13.2. Response Time and Communication Time

For non-Regulation tests, the specified test periods (10 or 60 minutes) include the SC and System Resource operator response time as well as all communication time. That is, the test period begins with the initial contact between the ISO and the SC.

For Regulation tests, the specified test periods (10 minutes) include time required for real-time and control telemetry to affect change in dynamic interchange.

13.3. Testing Sequence

For a given resource certifying multiple values, it is not necessary to perform the tests in any particular order. The order should be determined by a combination of:

- System conditions
- Generation Dispatcher needs and restrictions; and
- Coordination between the host Control Area operator, the SC and the ISO (for certification tests)

13.4. Decimal Places

Observed and stated data are recorded to one decimal place accuracy. Calculations of ramp rates are stated and recorded to two decimal places.

13.5. Test Periods

13.5.1. Recording

The calculations performed on the data will be valid as long as the start and stop times are recorded to the one tenth of a second. Therefore, if the available operating range of a System Resource is less than the range that would be covered by a ten-minute ramp, a shorter test period may be used. Also, if the test does not end at exactly the correct time, results will be valid as long as a screen-print can be taken by the ISO at the exact end time.

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

13.5.2. Test termination

Ramp rate test termination is either the end of the specified test time (10 minutes or 60 minutes) or the time the System Resource reaches a limit.

13.5.3. Two-hour tests

Any A/S provider must be capable of providing such Energy or Reserve in the way of a Load for as long as two hours.

13.6. Exceptions

13.6.1. System Resources

For testing purposes, System Resources are dispatched directly through the Scheduling Coordinator and in coordination with the host Control Area.

13.7. Re-testing

13.7.1. At SC request

If changes have occurred in the status of the facilities that substantially affect the facility's ability to deliver A/S, re-testing shall be accommodated. The re-test values will replace previous certification test results, even if they result in reductions in certification values.

13.7.2. At ISO request

The ISO will schedule re-testing of System Resources on a non-discriminatory basis.

13.8. Initial SC/Control Area Certification of Spin, Non-spin, and Replacement Imports

The SC for the System Resource certifies its ability to deliver Spinning Reserve, Non-Spinning Reserve, and/or Replacement Reserve services by completing the Scheduling Coordinator Certification of External Imports of A/S form (See Attachment B). On the form the SC indicates the amounts deliverable and the points of interchange. With that certification, the SC acknowledges that the ISO Tariff and Protocols require the SC to respond to ISO Dispatch instructions ordering the delivery of Energy associated with bid A/S at any time during the operating hour. The SC further certifies that any and all A/S bid or self-provided as external imports of System Resources will be delivered over non-interruptible, non-recallable transmission rights, from the source of the A/S to the point of interchange with the ISO Control Area.

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

13.9. Initial SC/Control Area Certification for Regulation Imports

In submitting the Scheduling Coordinator & Host Control Area Operator Request for Certification of External Imports of Regulation form (see Attachment E), the SC for the System Resource and its host Control Area jointly request Certification for Imports of Regulation from the external System Resource(s) into the ISO Control Area utilizing the A/S Certification Request and Testing form (see Attachment A). On the form the SC and host Control Area indicate the maximum amounts of regulating capacity deliverable at specific points of interchange at which such delivery can be scheduled into the ISO. With the certification request, the SC and host Control Area acknowledge that the ISO Tariff, Protocols and standards for Imports of Regulation impose and require certain specific levels of performance. The specific performance requirements include, but are not limited to, the response time of the System Resource to the ISO's EMS/AGC control signals, ramp rate, and operating range limitations. The SC and host Control Area further state that Regulation service, whether bid as imports or self-provided as imports of System Resources, will be delivered over non-interruptible, non-recallable transmission rights, from the source of the A/S to the point of interchange with the ISO Control Area.

13.10. ISO issuance of certification

Upon favorable conclusion of the tests and ISO evaluation of the SC certification and related data, the ISO shall provide written notification of acceptance of the SC's ability to deliver A/S to the points of interchange with the ISO Control Area in the amounts indicated in the applicable request form.

13.11. Regulation Requirements

13.11.1. Symmetrical Regulation certification

Symmetrical Regulation Up and Regulation Down (Regulation up ramp rate and Regulation down ramp rate must be equal) values are necessary for proper operation of EMS. Total Regulation Up Ramp Rates need to be equal to Total Regulation Down Ramp Rates or control will be biased in one direction. Therefore the single "Certified Value" for Regulation will be the lesser of Regulation Up and Regulation Down ramp rates.

13.12. Required forms and screen-prints

13.12.1. The Import Regulation Certification Test Request form

The Import Regulation Certification Test Request form (see Attachment A) is the official documentation of test requests, performed

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

test data, and certification values. The data is supported by and based upon visible test results and screen-prints. It may be completed and signed by either the test administrator or other ISO staff evaluating test results.

13.12.2. Screen-prints

The ISO will make EMS display screen-prints or PI trend printouts of the following:

- the AGC (Automatic Generation Control) page
- PI trend

Note: Regulation tests require trending of both REGULATION set point (telemetry/control sent) and MW level (telemetry received).

14. SCHEDULING THE TEST

14.1. OSAT Test Administrator Blocks dates

Periodically update test calendar to block out unavailable test dates.

14.2. Scheduling Coordinator Submits Test and Request Form

E-mail Client Representative A/S Request and Testing Form (Attachment A) and request testing. See Section 14.5 for minimum completion requirements.

14.3. Client Representative Schedules Test Date

Check calendar for available date and submit Test Form to OSAT Test Administrator. Allow a minimum 10 calendar days of lead-time.

14.4. OSAT Test Administrator Accepts Test Date

Accept or decline test date. Give reason for decline. E-mail response to Client Representative.

14.5. Client Representative Notifies Scheduling Coordinator

Contact Scheduling Coordinator with accepted or revised test date. Confirm receipt of A/S Request and Testing Form (Attachment A) completed with at least:

- Agency and contact telephone number
- Resource ID
- All "Yes" boxes checked (Attachment A)
- Stated Values included in test data block

14.6. Scheduling Coordinator Schedules With Outage Coordination

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

Schedule test date with ISO Outage Coordination Office. Submit Owner Generator Outage Request form (Attachment D to this Procedure also posted on Client Relations A/S web site). Outage Coordination requires 72 work week hours to schedule the testing. For example, requests must be submitted by Thursday noon for testing to occur on the following Tuesday. A/S tests not scheduled through ISO Outage Coordination will not be conducted.

15. PERFORMING THE TEST(S)

The steps listed in the following tables comprise standardized testing procedures:

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

15.1. System Resources

15.1.1. Compliance Test for Imported Spinning, Non-Spinning and Replacement Reserves

		SPIN, NON-SPIN, REPLACEMENT RAMP TEST
	STEP	INSTRUCTIONS FOR TEST ADMINISTRATOR (GENERATION DISPATCHER OR OTHER GRID OPS STAFF)
1	Review NERC Tag associated with A/S Schedule	If no tag: Test result is fail. If tag: Confirm Schedule amounts.
2	Determine whether system conditions support test	Check available internal resources to compensate for fluctuation of System Resource being tested. Final approval for testing must be obtained from the ISO Generation Dispatcher and Shift Manager.
3	Start test	Notify SC of start time (this contact is the Start Time) and demand Energy Schedule adjustment effective within ten minutes. (Declaration of test is optional.)
4	Record start data	Request/Test Sheet – Note time (hr:mn:sc) and Energy Schedule MW level before demand.
5	Contact Path Operator (Control Area Operator)	Confirm Energy Schedule Adjustment.
6	End test	Upon successful completion of Energy Schedule adjustment and confirmation of other Control Area operator.
7	Record end time and MW level.	Test Sheet – Record time (hr:mn:sc) and new Energy Schedule MW level.
8	Follow-up	SLIC: Log tests in SLIC, close out outage cards. Notify all parties that testing is complete and systems should be returned to normal (including removal of Manual Replacement Values and artificial schedule information).

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

15.1.2. Response Test for Imported Regulation Services

		REGULATION RAMP RATE TEST
	STEP	INSTRUCTIONS FOR TEST ADMINISTRATOR (GENERATION DISPATCHER OR OTHER GRID OPS STAFF)
1	Review A/S Certification Request and Testing Form	Confirm (Mandatory-if not included, cancel test): <ul style="list-style-type: none"> Agency and phone number included. Resource ID included. All "Yes" boxes checked. Scheduled and approved by ISO Outage Coordination. Stated Values included in test data block.
2	Confirm scheduled certification test	Contact SC to clarify the schedule and nature of the tests to be performed.
3	Review NERC Tag associated with A/S Schedule	If no tag: Test result is fail. If tag: Confirm Schedule amounts.
4	Determine whether system conditions support test	Check available internal resources to compensate for fluctuation of System Resource being tested. Final approval for testing must be obtained from the ISO Generation Dispatcher and Shift Manager.
5	Position System Resource at start point for optimum response	Allow enough room for ten minutes of ramping in the Stated Ramp Range. Preferably start at bottom or top of REGULATION range.
6	Prepare System Resource	Assure: <ul style="list-style-type: none"> System Resource on REGULATION. Unit blocks are clear from testing range. Host Control Area is prepared.
7	Prepare EMS	Request Alhambra to Assure: <ul style="list-style-type: none"> Control flag is on (REGULATION---see ACC Unit Summary). Reg limits are outside of testing range. "ISO Ramp Rate" is above Stated Ramp Rate (see AGC---ACC Unit Summary).
8	Start test	Manually replace Set Point to a level at least 10 times the Stated Ramp Rate above or below start point. (Start Time is the time that the Set Point is changed, as indicted on EMS or PI trend.)
9	Record start data	Request/Test Sheet – Note time (hr:mn:sc) and MW level (recorded to one decimal place). Screen-print – Capture MW level and start time.

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

10	Monitor MW level	For 10 minutes or until System Resource reaches upper or lower REGULATION limit.
11	End test	After 10 minutes or when System Resource reaches upper or lower REGULATION limit. ISO calls end of complete timed test. SC calls end if limit is reached.
12	Record end time and MW level.	Screen-print – Showing MW level and end time. Test Sheet – Record time (hr:mn:sc) and MW level.
13	Repeat test	Repeat test if necessary.
14	Additional Regulation testing	Range validation: System Resource may be required to control across entire REGULATION range to verify the reliability of the upper and lower limits. Response time: Note the length of time between Set Point change and System Resource response. This additional data will be used to evaluate the performance and reliability of the System Resource for Regulation.
15	Follow-up	SLIC: Log tests in SLIC, close out outage cards. Notify all parties that testing is complete and systems should be returned to normal (including removal of Manual Replacement Values and artificial schedule information).
16	Send Data to OSAT Test Administrator	A/S Certification Request and Testing Form: Complete at least Test Administrator Name. Include any other recorded data. Screen-prints: Sequence chronologically and note purpose of each screen-print. For example: "Begin Reg Up."

 CALIFORNIA ISO <small>California Independent System Operator</small>		Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

16. CALCULATING TEST RESULTS

The processing of test data occurs, all or in part, after the testing procedure has been completed and may be performed by a party other than the OSAT Test Administrator and at a later time. The OSAT Test Administrator may send the documentation, including test forms and screen-prints, to the Data Manager or other personnel for some or all of the following steps:

1	Calculate results	<p>Ramp rates and P-max/min levels are recorded to two decimal places.</p> <p>REFER TO DATA BLOCK ON A/S CERTIFICATION REQUEST AND TESTING FORM.</p> <p>Complete: “Start Time,” “Start MW,” “End Time,” and “End MW” in the data block with data from the test screen-prints.</p> <p>Calculate results: From data recorded in “Starting time,” “Starting Point,” “Ending Time,” and “Ending point,” calculate and indicate in “Certified Value”.</p> <p>MW Change: = {End MW – Start MW} (one decimal place).</p> <p>MW Range: indicates various test ranges (completed by SC).</p> <p>Stated P-max, P-min, or Ramp Rate: (completed by SC).</p> <p>Certified P-max: = lowest level during the 15 minute test period (tenths of a MW).</p> <p>Certified P-min: = the highest level during the 15 minute test period (tenths of a MW).</p> <p>Certified Ramp Rate: = {MW change/(End time – Start time*)} (two decimal places).</p> <p>Note for Regulation: Symmetrical Reg Up and Reg Down values are necessary for proper operation of EMS. Therefore the single “Certified Value” for Reg will be the lesser of Reg Up and Reg Down.</p> <p>*Convert seconds to hundredths of minutes by dividing seconds by 60.</p>
2	Organize documentation packet	Attach documents: in the following order:

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

3	Record data and results	<p>In CERT data file – The format and structure of the CERT data file is similar to the data blocks on the Request forms. The test data accumulated during testing along with the calculations performed above should be entered in the CERT data file exactly as on the Request forms. Note: The lesser of Reg Up and Reg Down ramp rates from the “Observed” field becomes the “Service Specific Certification” value for both.</p> <p>Certified Values – The values derived from the tests and entered in the CERT data file, once approved by the Operations Engineer, are used as the certified values for bidding and validation.</p>
4	Archive Data	The OSAT Test Administrator will file the data package in the particular file for the appropriate System Resource.
5	Forward Data and Calculations to Client Representative	The OSAT Test Administrator will notify the Client Representative of the CERT data file changes and additions.

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

17. PROCESSING OF CERTIFICATION VALUES

17.1. Approval

17.1.1. Client Relations – Client Representative review data

Review Certification Data file test data for consistency with this procedure. Extract test data and calculations and send to Operations Engineer.

17.1.2. Operations Engineering and Maintenance – Operations Engineer review data

Evaluate test data and calculated certification values for reasonability and accuracy, and approve data to be used as Certified Values.

Forward Certified Values to Client Representative.

17.2. Master File Update

17.2.1. Client Relations – Client Representative enter change request

Enter a change request into the ISO's change management system to be routed to Market Operations for processing.

17.2.2. Market Operations – Master File Engineer update Master File

Coordinate with Market Participants and ISO Operations, enter the Certified Values into the ISO Master File, and notify the Client Representative of new data effective date.

17.3. Notification

17.3.1. Client Relations – Client Representative notifies SC

Notify SC of Master File update and effective date. Provide SC with appropriate certification documentation, including test data and calculations.

17.3.2. Client Relations – Client Representative notifies ISO Operations

Notify ISO Operations of new A/S resources.

18. PROCEDURE COMPLIANCE MANAGEMENT

18.1. Contracts and Compliance – Compliance Analysts conduct periodic review

Conduct periodic review of test results and the certification process to ensure nondiscriminatory testing.

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	5/19/2000

Monitor the bidding and provision of A/S, and develop market-based methods and techniques to foster quality A/S provision and fair remuneration.

 CALIFORNIA ISO <small>California Independent System Operator</small>	ISO OPERATING PROCEDURE	Procedure No.	G-213
		Version No.	1.0
Management of Ancillary Services Certification Testing		Effective Date	4/17/00

APPENDIX

- Attachment A: Ancillary Services Request and Testing Form**
- Attachment B: Scheduling Coordinator Certification of External Imports of Ancillary Services**
- Attachment C: Trend Chart Setup**
- Attachment D: ISO/Owner Generator Availability Notice and Outage Request**
- Attachment E: Scheduling Coordinator & Host Control Area Operator Request for Certification of External Imports of Regulation**