



# Registration Standards Applicability List for Coordinated Functional Registration (CFR) JRO00010

(Formerly JRO Type 2)

Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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Last Update 6/22/2011

Member Entities

Original CFR Effective Registration Date

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NCR05048 - California Independent System Operator	9/11/2008
NCR05299 - Pacific Gas and Electric Company	9/11/2008



## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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Standard: BAL-005-0.1b

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**Requirements:**

- R1. All generation, transmission, and load operating within an Interconnection must be included within the metered boundaries of a Balancing Authority Area.

**Responsible Members:**

NCR05048 California Independent System Operator



## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: CIP-001-1

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#### Requirements:

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- R1. Each Reliability Coordinator, Balancing Authority, Transmission Operator, Generator Operator, and Load-Serving Entity shall have procedures for the recognition of and for making their operating personnel aware of sabotage events on its facilities and mult

#### Responsible Members:

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- R2. Each Reliability Coordinator, Balancing Authority, Transmission Operator, Generator Operator, and Load-Serving Entity shall have procedures for the communication of information concerning sabotage events to appropriate parties in the Interconnection.

#### Responsible Members:

NCR05299 Pacific Gas and Electric Company

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- R3. Each Reliability Coordinator, Balancing Authority, Transmission Operator, Generator Operator, and Load-Serving Entity shall provide its operating personnel with sabotage response guidelines, including personnel to contact, for reporting disturbances due t

#### Responsible Members:

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- R4. Each Reliability Coordinator, Balancing Authority, Transmission Operator, Generator Operator, and Load-Serving Entity shall establish communications contacts, as applicable, with local Federal Bureau of Investigation (FBI) or Royal Canadian Mounted Police

#### Responsible Members:

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## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: CIP-002-3

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#### Requirements:

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R1. Critical Asset Identification Method — The Responsible Entity shall identify and document a risk-based assessment methodology to use to identify its Critical Assets.

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R2. Critical Asset Identification — The Responsible Entity shall develop a list of its identified Critical Assets determined through an annual application of the risk-based assessment methodology required in R1. The Responsible Entity shall review this list

#### Responsible Members:

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R3. Critical Cyber Asset Identification — Using the list of Critical Assets developed pursuant to Requirement R2, the Responsible Entity shall develop a list of associated Critical Cyber Assets essential to the operation of the Critical Asset. Examples at co

#### Responsible Members:

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R4. Annual Approval — The senior manager or delegate(s) shall approve annually the risk-based assessment methodology, the list of Critical Assets and the list of Critical Cyber Assets. Based on Requirements R1, R2, and R3 the Responsible Entity may determine

#### Responsible Members:

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## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: CIP-003-3

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#### Requirements:

- R1. Cyber Security Policy — The Responsible Entity shall document and implement a cyber security policy that represents management's commitment and ability to secure its Critical Cyber Assets. The Responsible Entity shall, at minimum, ensure the following:

#### Responsible Members:

NCR05299 Pacific Gas and Electric Company

- R2. Leadership — The Responsible Entity shall assign a single senior manager with overall responsibility and authority for leading and managing the entity's implementation of, and adherence to, Standards CIP-002-3 through CIP-009-3.

#### Responsible Members:

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- R3. Exceptions — Instances where the Responsible Entity cannot conform to its cyber security policy must be documented as exceptions and authorized by the senior manager or delegate(s).

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- R4. Information Protection — The Responsible Entity shall implement and document a program to identify, classify, and protect information associated with Critical Cyber Assets.

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- R5. Access Control — The Responsible Entity shall document and implement a program for managing access to protected Critical Cyber Asset information.

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- R6. Change Control and Configuration Management — The Responsible Entity shall establish and document a process of change control and configuration management for adding, modifying, replacing, or removing Critical Cyber Asset hardware or software, and impleme

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## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: CIP-004-3

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#### Requirements:

R1. Awareness — The Responsible Entity shall establish, document, implement, and maintain a security awareness program to ensure personnel having authorized cyber or authorized unescorted physical access to Critical Cyber Assets receive on-going reinforcement

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R2. Training — The Responsible Entity shall establish, document, implement, and maintain an annual cyber security training program for personnel having authorized cyber or authorized unescorted physical access to Critical Cyber Assets. The cyber security tra

#### Responsible Members:

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R3. Personnel Risk Assessment —The Responsible Entity shall have a documented personnel risk assessment program, in accordance with federal, state, provincial, and local laws, and subject to existing collective bargaining unit agreements, for personnel havin

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R4. Access — The Responsible Entity shall maintain list(s) of personnel with authorized cyber or authorized unescorted physical access to Critical Cyber Assets, including their specific electronic and physical access rights to Critical Cyber Assets.

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## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: CIP-005-3

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#### Requirements:

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R1. Electronic Security Perimeter — The Responsible Entity shall ensure that every Critical Cyber Asset resides within an Electronic Security Perimeter. The Responsible Entity shall identify and document the Electronic Security Perimeter(s) and all access poi

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R2. Electronic Access Controls — The Responsible Entity shall implement and document the organizational processes and technical and procedural mechanisms for control of electronic access at all electronic access points to the Electronic Security Perimeter(s).

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R3. Monitoring Electronic Access — The Responsible Entity shall implement and document an electronic or manual process(es) for monitoring and logging access at access points to the Electronic Security Perimeter(s) twenty-four hours a day, seven days a week.

#### Responsible Members:

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R4. Cyber Vulnerability Assessment — The Responsible Entity shall perform a cyber vulnerability assessment of the electronic access points to the Electronic Security Perimeter(s) at least annually. The vulnerability assessment shall include, at a minimum, th

#### Responsible Members:

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R5. Documentation Review and Maintenance — The Responsible Entity shall review, update, and maintain all documentation to support compliance with the requirements of Standard CIP-005-3.

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Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: CIP-006-3

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#### Requirements:

R1. Physical Security Plan — The Responsible Entity shall document, implement, and maintain a physical security plan, approved by the senior manager or delegate(s) that shall address, at a minimum, the following:

#### Responsible Members:

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R2. Protection of Physical Access Control Systems — Cyber Assets that authorize and/or log access to the Physical Security Perimeter(s), exclusive of hardware at the Physical Security Perimeter access point such as electronic lock control mechanisms and badge

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R3. Protection of Electronic Access Control Systems — Cyber Assets used in the access control and/or monitoring of the Electronic Security Perimeter(s) shall reside within an identified Physical Security Perimeter.

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R4. Physical Access Controls — The Responsible Entity shall document and implement the operational and procedural controls to manage physical access at all access points to the Physical Security Perimeter(s) twenty-four hours a day, seven days a week. The Re

#### Responsible Members:

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R5. Monitoring Physical Access — The Responsible Entity shall document and implement the technical and procedural controls for monitoring physical access at all access points to the Physical Security Perimeter(s) twenty-four hours a day, seven days a week. U

#### Responsible Members:

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R6. Logging Physical Access — Logging shall record sufficient information to uniquely identify individuals and the time of access twenty-four hours a day, seven days a week. The Responsible Entity shall implement and document the technical and procedural mec

#### Responsible Members:

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R7. Access Log Retention — The Responsible Entity shall retain physical access logs for at least ninety calendar days. Logs related to reportable incidents shall be kept in accordance with the requirements of Standard CIP-008-3.

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Applicable Regional Entity: WECC

Applicable Function: TOP

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Standard: CIP-006-3

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**Requirements:**

- R8. Maintenance and Testing — The Responsible Entity shall implement a maintenance and testing program to ensure that all physical security systems under Requirements R4, R5, and R6 function properly. The program must include, at a minimum, the following:

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**Applicable Regional Entity: WECC**

**Applicable Function: TOP**

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**Standard: CIP-007-3**

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**Requirements:**

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R1. Test Procedures — The Responsible Entity shall ensure that new Cyber Assets and significant changes to existing Cyber Assets within the Electronic Security Perimeter do not adversely affect existing cyber security controls. For purposes of Standard CIP-0

**Responsible Members:**

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R2. Ports and Services — The Responsible Entity shall establish, document and implement a process to ensure that only those ports and services required for normal and emergency operations are enabled.

**Responsible Members:**

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R3. Security Patch Management — The Responsible Entity, either separately or as a component of the documented configuration management process specified in CIP-003-3 Requirement R6, shall establish, document and implement a security patch management program

**Responsible Members:**

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R4. Malicious Software Prevention — The Responsible Entity shall use anti-virus software and other malicious software (“malware”) prevention tools, where technically feasible, to detect, prevent, deter, and mitigate the introduction, exposure, and propagation

**Responsible Members:**

NCR05299 Pacific Gas and Electric Company

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R5. Account Management — The Responsible Entity shall establish, implement, and document technical and procedural controls that enforce access authentication of, and accountability for, all user activity, and that minimize the risk of unauthorized system access

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R6. Security Status Monitoring — The Responsible Entity shall ensure that all Cyber Assets within the Electronic Security Perimeter, as technically feasible, implement automated tools or organizational process controls to monitor system events that are related

**Responsible Members:**

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R7. Disposal or Redeployment — The Responsible Entity shall establish and implement formal methods, processes, and procedures for disposal or redeployment of Cyber Assets within the Electronic Security Perimeter(s) as identified and documented in Standard CIP

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## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: CIP-007-3

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#### Requirements:

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R8. Cyber Vulnerability Assessment — The Responsible Entity shall perform a cyber vulnerability assessment of all Cyber Assets within the Electronic Security Perimeter at least annually. The vulnerability assessment shall include, at a minimum, the following

#### Responsible Members:

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R9. Documentation Review and Maintenance — The Responsible Entity shall review and update the documentation specified in Standard CIP-007-3 at least annually. Changes resulting from modifications to the systems or controls shall be documented within thirty c

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## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: CIP-008-3

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#### Requirements:

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- R1. Cyber Security Incident Response Plan — The Responsible Entity shall develop and maintain a Cyber Security Incident response plan and implement the plan in response to Cyber Security Incidents. The Cyber Security Incident response plan shall address, at

#### Responsible Members:

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- R2. Cyber Security Incident Documentation — The Responsible Entity shall keep relevant documentation related to Cyber Security Incidents reportable per Requirement R1.1 for three calendar years.

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## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: CIP-009-3

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#### Requirements:

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R1. Recovery Plans — The Responsible Entity shall create and annually review recovery plan(s) for Critical Cyber Assets. The recovery plan(s) shall address at a minimum the following:

#### Responsible Members:

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R2. Exercises — The recovery plan(s) shall be exercised at least annually. An exercise of the recovery plan(s) can range from a paper drill, to a full operational exercise, to recovery from an actual incident.

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R3. Change Control — Recovery plan(s) shall be updated to reflect any changes or lessons learned as a result of an exercise or the recovery from an actual incident. Updates shall be communicated to personnel responsible for the activation and implementation

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R4. Backup and Restore — The recovery plan(s) shall include processes and procedures for the backup and storage of information required to successfully restore Critical Cyber Assets. For example, backups may include spare electronic components or equipment,

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R5. Testing Backup Media — Information essential to recovery that is stored on backup media shall be tested at least annually to ensure that the information is available. Testing can be completed off site.

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## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: COM-001-1.1

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#### Requirements:

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R1. Each Reliability Coordinator, Transmission Operator and Balancing Authority shall provide adequate and reliable telecommunications facilities for the exchange of Interconnection and operating information:

#### Responsible Members:

NCR05048 California Independent System Operator

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R2. Each Reliability Coordinator, Transmission Operator, and Balancing Authority shall manage, alarm, test and/or actively monitor vital telecommunications facilities. Special attention shall be given to emergency telecommunications facilities and equipment

#### Responsible Members:

NCR05048 California Independent System Operator

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R3. Each Reliability Coordinator, Transmission Operator and Balancing Authority shall provide a means to coordinate telecommunications among their respective areas. This coordination shall include the ability to investigate and recommend solutions to telecom

#### Responsible Members:

NCR05048 California Independent System Operator

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R4. Unless agreed to otherwise, each Reliability Coordinator, Transmission Operator, and Balancing Authority shall use English as the language for all communications between and among operating personnel responsible for the real-time generation control and op

#### Responsible Members:

NCR05048 California Independent System Operator

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R5. Each Reliability Coordinator, Transmission Operator, and Balancing Authority shall have written operating instructions and procedures to enable continued operation of the system during the loss of telecommunications facilities.

#### Responsible Members:

NCR05048 California Independent System Operator

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## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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Standard: COM-002-2

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**Requirements:**

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- R1. Each Transmission Operator, Balancing Authority, and Generator Operator shall have communications (voice and data links) with appropriate Reliability Coordinators, Balancing Authorities, and Transmission Operators. Such communications shall be staffed an

**Responsible Members:**

NCR05048 California Independent System Operator

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- R2. Each Reliability Coordinator, Transmission Operator, and Balancing Authority shall issue directives in a clear, concise, and definitive manner; shall ensure the recipient of the directive repeats the information back correctly; and shall acknowledge the r

**Responsible Members:**

NCR05299 Pacific Gas and Electric Company



## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: EOP-001-0

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#### Requirements:

R2. The Transmission Operator shall have an emergency load reduction plan for all identified IROLs. The plan shall include the details on how the Transmission Operator will implement load reduction in sufficient amount and time to mitigate the IROL violation

#### Responsible Members:

NCR05048 California Independent System Operator

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R3. Each Transmission Operator and Balancing Authority shall:

#### Responsible Members:

NCR05048 California Independent System Operator

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R4. Each Transmission Operator and Balancing Authority shall have emergency plans that will enable it to mitigate operating emergencies. At a minimum, Transmission Operator and Balancing Authority emergency plans shall include:

#### Responsible Members:

NCR05048 California Independent System Operator

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R5. Each Transmission Operator and Balancing Authority shall include the applicable elements in Attachment 1-EOP-001-0 when developing an emergency plan.

#### Responsible Members:

NCR05048 California Independent System Operator

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R6. The Transmission Operator and Balancing Authority shall annually review and update each emergency plan. The Transmission Operator and Balancing Authority shall provide a copy of its updated emergency plans to its Reliability Coordinator and to neighborin

#### Responsible Members:

NCR05048 California Independent System Operator

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R7. The Transmission Operator and Balancing Authority shall coordinate its emergency plans with other Transmission Operators and Balancing Authorities as appropriate. This coordination includes the following steps, as applicable:

#### Responsible Members:

NCR05048 California Independent System Operator

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## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: EOP-003-1

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#### Requirements:

R1. After taking all other remedial steps, a Transmission Operator or Balancing Authority operating with insufficient generation or transmission capacity shall shed customer load rather than risk an uncontrolled failure of components or cascading outages of t

#### Responsible Members:

NCR05048 California Independent System Operator

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R2. Each Transmission Operator and Balancing Authority shall establish plans for automatic load shedding for underfrequency or undervoltage conditions.

#### Responsible Members:

NCR05299 Pacific Gas and Electric Company

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R3. Each Transmission Operator and Balancing Authority shall coordinate load shedding plans among other interconnected Transmission Operators and Balancing Authorities.

#### Responsible Members:

NCR05048 California Independent System Operator

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R4. A Transmission Operator or Balancing Authority shall consider one or more of these factors in designing an automatic load shedding scheme: frequency, rate of frequency decay, voltage level, rate of voltage decay, or power flow levels.

#### Responsible Members:

NCR05299 Pacific Gas and Electric Company

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R5. A Transmission Operator or Balancing Authority shall implement load shedding in steps established to minimize the risk of further uncontrolled separation, loss of generation, or system shutdown.

#### Responsible Members:

NCR05048 California Independent System Operator

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R6. After a Transmission Operator or Balancing Authority Area separates from the Interconnection, if there is insufficient generating capacity to restore system frequency following automatic underfrequency load shedding, the Transmission Operator or Balancing

#### Responsible Members:

NCR05048 California Independent System Operator

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R7. The Transmission Operator and Balancing Authority shall coordinate automatic load shedding throughout their areas with underfrequency isolation of generating units, tripping of shunt capacitors, and other automatic actions that will occur under abnormal f

#### Responsible Members:

NCR05299 Pacific Gas and Electric Company



## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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Standard: EOP-003-1

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**Requirements:**

- R8. Each Transmission Operator or Balancing Authority shall have plans for operator-controlled manual load shedding to respond to real-time emergencies. The Transmission Operator or Balancing Authority shall be capable of implementing the load shedding in a

**Responsible Members:**

NCR05048 California Independent System Operator



## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: EOP-004-1

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#### Requirements:

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R2. A Reliability Coordinator, Balancing Authority, Transmission Operator, Generator Operator or Load-Serving Entity shall promptly analyze Bulk Electric System disturbances on its system or facilities.

#### Responsible Members:

NCR05048 California Independent System Operator

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R3. A Reliability Coordinator, Balancing Authority, Transmission Operator, Generator Operator or Load-Serving Entity experiencing a reportable incident shall provide a preliminary written report to its Regional Reliability Organization and NERC.

#### Responsible Members:

NCR05048 California Independent System Operator



## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: EOP-005-1

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#### Requirements:

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- R1. Each Transmission Operator shall have a restoration plan to reestablish its electric system in a stable and orderly manner in the event of a partial or total shutdown of its system, including necessary operating instructions and procedures to cover emerge

#### Responsible Members:

NCR05048 California Independent System Operator

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- R10. The Transmission Operator shall demonstrate, through simulation or testing, that the blackstart generating units in its restoration plan can perform their intended functions as required in the regional restoration plan.

#### Responsible Members:

NCR05048 California Independent System Operator

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- R11. Following a disturbance in which one or more areas of the Bulk Electric System become isolated or blacked out, the affected Transmission Operators and Balancing Authorities shall begin immediately to return the Bulk Electric System to normal.

#### Responsible Members:

NCR05048 California Independent System Operator

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- R2. Each Transmission Operator shall review and update its restoration plan at least annually and whenever it makes changes in the power system network, and shall correct deficiencies found during the simulated restoration exercises.

#### Responsible Members:

NCR05048 California Independent System Operator

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- R3. Each Transmission Operator shall develop restoration plans with a priority of restoring the integrity of the Interconnection.

#### Responsible Members:

NCR05048 California Independent System Operator

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- R4. Each Transmission Operator shall coordinate its restoration plans with the Generator Owners and Balancing Authorities within its area, its Reliability Coordinator, and neighboring Transmission Operators and Balancing Authorities.

#### Responsible Members:

NCR05048 California Independent System Operator

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- R5. Each Transmission Operator and Balancing Authority shall periodically test its telecommunication facilities needed to implement the restoration plan.

#### Responsible Members:

NCR05048 California Independent System Operator

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## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: EOP-005-1

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#### Requirements:

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R6. Each Transmission Operator and Balancing Authority shall train its operating personnel in the implementation of the restoration plan. Such training shall include simulated exercises, if practicable.

#### Responsible Members:

NCR05048 California Independent System Operator

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R7. Each Transmission Operator and Balancing Authority shall verify the restoration procedure by actual testing or by simulation.

#### Responsible Members:

NCR05048 California Independent System Operator

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R8. Each Transmission Operator shall verify that the number, size, availability, and location of system blackstart generating units are sufficient to meet Regional Reliability Organization restoration plan requirements for the Transmission Operator's area.

#### Responsible Members:

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R9. The Transmission Operator shall document the Cranking Paths, including initial switching requirements, between each blackstart generating unit and the unit(s) to be started and shall provide this documentation for review by the Regional Reliability Organi

#### Responsible Members:

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## Registration Status as of 1/26/2012

**Applicable Regional Entity: WECC**

**Applicable Function: TOP**

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**Standard: EOP-008-0**

**Requirements:**

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- R1. Each Reliability Coordinator, Transmission Operator and Balancing Authority shall have a plan to continue reliability operations in the event its control center becomes inoperable. The contingency plan must meet the following requirements:

**Responsible Members:**

NCR05048 California Independent System Operator



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Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: FAC-014-2

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#### Requirements:

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- R2. The Transmission Operator shall establish SOLs (as directed by its Reliability Coordinator) for its portion of the Reliability Coordinator Area that are consistent with its Reliability Coordinator's SOL Methodology.

#### Responsible Members:

NCR05048 California Independent System Operator

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- R5. The Reliability Coordinator, Planning Authority and Transmission Planner shall each provide its SOLs and IROLs to those entities that have a reliability-related need for those limits and provide a written request that includes a schedule for delivery of t

#### Responsible Members:

NCR05048 California Independent System Operator



## Registration Status as of 1/26/2012

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Applicable Function: TOP

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Standard: INT-004-2

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**Requirements:**

- R1. At such time as the reliability event allows for the reloading of the transaction, the entity that initiated the curtailment shall release the limit on the Interchange Transaction tag to allow reloading the transaction and shall communicate the release of

**Responsible Members:**

NCR05048 California Independent System Operator



## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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Standard: IRO-001-1.1

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**Requirements:**

- R8. Transmission Operators, Balancing Authorities, Generator Operators, Transmission Service Providers, Load-Serving Entities, and Purchasing-Selling Entities shall comply with Reliability Coordinator directives unless such actions would violate safety, equip

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Applicable Function: TOP

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Standard: IRO-002-1

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**Requirements:**

- R3. Each Reliability Coordinator - or its Transmission Operators and Balancing Authorities - shall provide, or arrange provisions for, data exchange to other Reliability Coordinators or Transmission Operators and Balancing Authorities via a secure network.

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NCR05048 California Independent System Operator



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Applicable Function: TOP

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### Standard: IRO-004-1

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#### Requirements:

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- R3. Each Reliability Coordinator shall, in conjunction with its Transmission Operators and Balancing Authorities, develop action plans that may be required, including reconfiguration of the transmission system, re-dispatching of generation, reduction or curta

#### Responsible Members:

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- R4. Each Transmission Operator, Balancing Authority, Transmission Owner, Generator Owner, Generator Operator, and Load-Serving Entity in the Reliability Coordinator Area shall provide information required for system studies, such as critical facility status,

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- R7. Each Transmission Operator, Balancing Authority, and Transmission Service Provider shall comply with the directives of its Reliability Coordinator based on the next day assessments in the same manner in which it would comply during real time operating eve

#### Responsible Members:

NCR05048 California Independent System Operator



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Applicable Function: TOP

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### Standard: IRO-005-2

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#### Requirements:

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R12. Whenever a Special Protection System that may have an inter-Balancing Authority, or inter-Transmission Operator impact (e.g., could potentially affect transmission flows resulting in a SOL or IROL violation) is armed, the Reliability Coordinators shall be

#### Responsible Members:

NCR05048 California Independent System Operator

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R13. Each Reliability Coordinator shall ensure that all Transmission Operators, Balancing Authorities, Generator Operators, Transmission Service Providers, Load-Serving Entities, and Purchasing-Selling Entities operate to prevent the likelihood that a disturba

#### Responsible Members:

NCR05048 California Independent System Operator

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R8. Each Reliability Coordinator shall monitor system frequency and its Balancing Authorities' performance and direct any necessary rebalancing to return to CPS and DCS compliance. The Transmission Operators and Balancing Authorities shall utilize all resourc

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## Registration Status as of 1/26/2012

**Applicable Regional Entity: WECC**

**Applicable Function: TOP**

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**Standard: IRO-STD-006-0**

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**Requirements:**

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WR1. Curtailment of Contributing Schedules WECC's Unscheduled Flow Mitigation Plan (Plan), which is on file with FERC and has been accepted by FERC (most recently prior to the date hereof on November 20, 2001 in Docket No. ER01-3085-000), 1/ specifies that mem

**Responsible Members:**

NCR05048 California Independent System Operator



## Registration Status as of 1/26/2012

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Applicable Function: TOP

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### Standard: MOD-001-1

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#### Requirements:

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R1. Each Transmission Operator shall select one of the methodologies listed below for calculating Available Transfer Capability (ATC) or Available Flowgate Capability (AFC) for each ATC Path per time period identified in R2 for those Facilities within its Tr

#### Responsible Members:

NCR05048 California Independent System Operator

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R6. When calculating Total Transfer Capability (TTC) or Total Flowgate Capability (TFC) the Transmission Operator shall use assumptions no more limiting than those used in the planning of operations for the corresponding time period studied, providing such pl

#### Responsible Members:

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## Registration Status as of 1/26/2012

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### Standard: MOD-029-1

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#### Requirements:

R1. When calculating TTCs for ATC Paths, the Transmission Operator shall use a Transmission model which satisfies the following requirements: [Time Horizon: Operations Planning]

#### Responsible Members:

NCR05048 California Independent System Operator

R2. The Transmission Operator shall use the following process to determine TTC: [Time Horizon: Operations Planning]

#### Responsible Members:

NCR05048 California Independent System Operator

R3. Each Transmission Operator shall establish the TTC at the lesser of the value calculated in R2 or any System Operating Limit (SOL) for that ATC Path. [Time Horizon: Operations Planning]

#### Responsible Members:

NCR05048 California Independent System Operator

R4. Within seven calendar days of the finalization of the study report, the Transmission Operator shall make available to the Transmission Service Provider of the ATC Path, the most current value for TTC and the TTC study report documenting the assumptions us

#### Responsible Members:

NCR05048 California Independent System Operator



## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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Standard: NUC-001-2

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**Requirements:**

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R2. The Nuclear Plant Generator Operator and the applicable Transmission Entities shall have in effect one or more Agreements that include mutually agreed to NPIRs and document how the Nuclear Plant Generator Operator and the applicable Transmission Entities

**Responsible Members:**

NCR05048 California Independent System Operator

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R4. Per the Agreements developed in accordance with this standard, the applicable Transmission Entities shall: [Risk Factor: High]

**Responsible Members:**

NCR05048 California Independent System Operator

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R6. Per the Agreements developed in accordance with this standard, the applicable Transmission Entities and the Nuclear Plant Generator Operator shall coordinate outages and maintenance activities which affect the NPIRs. [Risk Factor: Medium]

**Responsible Members:**

NCR05048 California Independent System Operator

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R8. Per the Agreements developed in accordance with this standard, the applicable Transmission Entities shall inform the Nuclear Plant Generator Operator of actual or proposed changes to electric system design, configuration, operations, limits, protection sy

**Responsible Members:**

NCR05048 California Independent System Operator

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R9. The Nuclear Plant Generator Operator and the applicable Transmission Entities shall include, as a minimum, the following elements within the agreement(s) identified in R2: [Risk Factor: Medium]

**Responsible Members:**

NCR05048 California Independent System Operator

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## Registration Status as of 1/26/2012

**Applicable Regional Entity: WECC**

**Applicable Function: TOP**

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**Standard: PER-001-0**

**Requirements:**

- 
- R1. Each Transmission Operator and Balancing Authority shall provide operating personnel with the responsibility and authority to implement real-time actions to ensure the stable and reliable operation of the Bulk Electric System.

**Responsible Members:**

NCR05048 California Independent System Operator



## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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Standard: PER-002-0

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**Requirements:**

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R1. Each Transmission Operator and Balancing Authority shall be staffed with adequately trained operating personnel.

**Responsible Members:**

NCR05299 Pacific Gas and Electric Company

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R2. Each Transmission Operator and Balancing Authority shall have a training program for all operating personnel that are in:

**Responsible Members:**

NCR05299 Pacific Gas and Electric Company

---

R3. For personnel identified in Requirement R2, the Transmission Operator and Balancing Authority shall provide a training program meeting the following criteria:

**Responsible Members:**

NCR05299 Pacific Gas and Electric Company

---

R4. For personnel identified in Requirement R2, each Transmission Operator and Balancing Authority shall provide its operating personnel at least five days per year of training and drills using realistic simulations of system emergencies, in addition to other

**Responsible Members:**

NCR05299 Pacific Gas and Electric Company



## Registration Status as of 1/26/2012

**Applicable Regional Entity: WECC**

**Applicable Function: TOP**

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**Standard: PER-003-0**

**Requirements:**

- 
- R1. Each Transmission Operator, Balancing Authority, and Reliability Coordinator shall staff all operating positions that meet both of the following criteria with personnel that are NERC-certified for the applicable functions:

**Responsible Members:**

NCR05299 Pacific Gas and Electric Company



## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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Standard: PER-005-1

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Requirements:

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- R3. At least every 12 months each Reliability Coordinator, Balancing Authority and Transmission Operator shall provide each of its System Operators with at least 32 hours of emergency operations training applicable to its organization that reflects emergency

Responsible Members:

- NCR05048 California Independent System Operator  
NCR05299 Pacific Gas and Electric Company



## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: PRC-001-1

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#### Requirements:

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R1. Each Transmission Operator, Balancing Authority, and Generator Operator shall be familiar with the purpose and limitations of protection system schemes applied in its area.

#### Responsible Members:

NCR05048 California Independent System Operator

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R2. Each Generator Operator and Transmission Operator shall notify reliability entities of relay or equipment failures as follows:

#### Responsible Members:

NCR05048 California Independent System Operator

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R3. A Generator Operator or Transmission Operator shall coordinate new protective systems and changes as follows.

#### Responsible Members:

NCR05299 Pacific Gas and Electric Company

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R4. Each Transmission Operator shall coordinate protection systems on major transmission lines and interconnections with neighboring Generator Operators, Transmission Operators, and Balancing Authorities.

#### Responsible Members:

NCR05299 Pacific Gas and Electric Company

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R5. A Generator Operator or Transmission Operator shall coordinate changes in generation, transmission, load or operating conditions that could require changes in the protection systems of others:

#### Responsible Members:

NCR05048 California Independent System Operator

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R6. Each Transmission Operator and Balancing Authority shall monitor the status of each Special Protection System in their area, and shall notify affected Transmission Operators and Balancing Authorities of each change in status.

#### Responsible Members:

NCR05048 California Independent System Operator

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## Registration Status as of 1/26/2012

**Applicable Regional Entity: WECC**

**Applicable Function: TOP**

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**Standard: PRC-007-0**

**Requirements:**

- R2. The Transmission Owner, Transmission Operator, Distribution Provider, and Load-Serving Entity that owns or operates a UFLS program (as required by its Regional Reliability Organization) shall provide, and annually update, its underfrequency data as needed.

**Responsible Members:**

NCR05299 Pacific Gas and Electric Company



## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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Standard: PRC-009-0

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**Requirements:**

- 
- R1. The Transmission Owner, Transmission Operator, Load-Serving Entity, and Distribution Provider that owns or operates a UFLS program (as required by its Regional Reliability Organization) shall analyze and document its UFLS program performance in accordance

**Responsible Members:**

NCR05299 Pacific Gas and Electric Company

- 
- R2. The Transmission Owner, Transmission Operator, Load-Serving Entity, and Distribution Provider that owns or operates a UFLS program (as required by its Regional Reliability Organization) shall provide documentation of the analysis of the UFLS program to it

**Responsible Members:**

NCR05299 Pacific Gas and Electric Company



## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: PRC-010-0

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#### Requirements:

- 
- R1. The Load-Serving Entity, Transmission Owner, Transmission Operator, and Distribution Provider that owns or operates a UVLS program shall periodically (at least every five years or as required by changes in system conditions) conduct and document an assess

#### Responsible Members:

NCR05299 Pacific Gas and Electric Company

- 
- R2. The Load-Serving Entity, Transmission Owner, Transmission Operator, and Distribution Provider that owns or operates a UVLS program shall provide documentation of its current UVLS program assessment to its Regional Reliability Organization and NERC on requ

#### Responsible Members:

NCR05299 Pacific Gas and Electric Company



## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: PRC-022-1

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#### Requirements:

- 
- R1. Each Transmission Operator, Load-Serving Entity, and Distribution Provider that operates a UVLS program to mitigate the risk of voltage collapse or voltage instability in the BES shall analyze and document all UVLS operations and Misoperations. The analysis shall include:

#### Responsible Members:

NCR05299 Pacific Gas and Electric Company

- 
- R2. Each Transmission Operator, Load-Serving Entity, and Distribution Provider that operates a UVLS program shall provide documentation of its analysis of UVLS program performance to its Regional Reliability Organization within 90 calendar days of a request.

#### Responsible Members:

NCR05299 Pacific Gas and Electric Company



## Registration Status as of 1/26/2012

**Applicable Regional Entity: WECC**

**Applicable Function: TOP**

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**Standard: PRC-STD-001-1**

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**Requirements:**

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WR1. Each Transmission Operator or Transmission Owner identified in Section 4.1 must submit documentation that an officer of the organization certifies that: a. All protective relay applications are appropriate for the Bulk Power Transmission Paths (“BPTP”) i

**Responsible Members:**

NCR05048 California Independent System Operator



## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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Standard: PRC-STD-003-1

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**Requirements:**

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WR1. Owners of protective relays and Remedial Action Schemes (RAS) applied to path elements of selected WECC major transmission path facilities (listed in Attachment A - Table 2) and RAS (listed in Attachment B - Table 3) must take the following action for each

**Responsible Members:**

NCR05299 Pacific Gas and Electric Company



## Registration Status as of 1/26/2012

**Applicable Regional Entity: WECC**

**Applicable Function: TOP**

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**Standard: PRC-STD-005-1**

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**Requirements:**

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WR1. All bulk power transmission elements (i.e. lines, stations and rights of way) included as part of the transmission facilities (or required to maintain transfer capability) impacting each of the transmission paths listed in Attachment A - WECC Table 2 shall

**Responsible Members:**

NCR05299 Pacific Gas and Electric Company



## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: TOP-001-1

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#### Requirements:

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R1. Each Transmission Operator shall have the responsibility and clear decision-making authority to take whatever actions are needed to ensure the reliability of its area and shall exercise specific authority to alleviate operating emergencies.

#### Responsible Members:

NCR05048 California Independent System Operator

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R2. Each Transmission Operator shall take immediate actions to alleviate operating emergencies including curtailing transmission service or energy schedules, operating equipment (e.g., generators, phase shifters, breakers), shedding firm load, etc.

#### Responsible Members:

NCR05048 California Independent System Operator

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R3. Each Transmission Operator, Balancing Authority, and Generator Operator shall comply with reliability directives issued by the Reliability Coordinator, and each Balancing Authority and Generator Operator shall comply with reliability directives issued by

#### Responsible Members:

NCR05048 California Independent System Operator

---

R5. Each Transmission Operator shall inform its Reliability Coordinator and any other potentially affected Transmission Operators of real-time or anticipated emergency conditions, and take actions to avoid, when possible, or mitigate the emergency.

#### Responsible Members:

NCR05048 California Independent System Operator

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R6. Each Transmission Operator, Balancing Authority, and Generator Operator shall render all available emergency assistance to others as requested, provided that the requesting entity has implemented its comparable emergency procedures, unless such actions wo

#### Responsible Members:

NCR05048 California Independent System Operator

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R7. Each Transmission Operator and Generator Operator shall not remove Bulk Electric System facilities from service if removing those facilities would burden neighboring systems unless:

#### Responsible Members:

NCR05048 California Independent System Operator

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R8. During a system emergency, the Balancing Authority and Transmission Operator shall immediately take action to restore the Real and Reactive Power Balance. If the Balancing Authority or Transmission Operator is unable to restore Real and Reactive Power Ba

#### Responsible Members:

NCR05048 California Independent System Operator

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## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: TOP-002-2

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#### Requirements:

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R1. Each Balancing Authority and Transmission Operator shall maintain a set of current plans that are designed to evaluate options and set procedures for reliable operation through a reasonable future time period. In addition, each Balancing Authority and Tr

#### Responsible Members:

NCR05048 California Independent System Operator

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R10. Each Balancing Authority and Transmission Operator shall plan to meet all System Operating Limits (SOLs) and Interconnection Reliability Operating Limits (IROLs).

#### Responsible Members:

NCR05048 California Independent System Operator

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R11. The Transmission Operator shall perform seasonal, next-day, and current-day Bulk Electric System studies to determine SOLs. Neighboring Transmission Operators shall utilize identical SOLs for common facilities. The Transmission Operator shall update the

#### Responsible Members:

NCR05048 California Independent System Operator

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R16. Subject to standards of conduct and confidentiality agreements, Transmission Operators shall, without any intentional time delay, notify their Reliability Coordinator and Balancing Authority of changes in capabilities and characteristics including but not

#### Responsible Members:

NCR05048 California Independent System Operator

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R17. Balancing Authorities and Transmission Operators shall, without any intentional time delay, communicate the information described in the requirements R1 to R16 above to their Reliability Coordinator.

#### Responsible Members:

NCR05048 California Independent System Operator

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R18. Neighboring Balancing Authorities, Transmission Operators, Generator Operators, Transmission Service Providers, and Load-Serving Entities shall use uniform line identifiers when referring to transmission facilities of an interconnected network.

#### Responsible Members:

NCR05048 California Independent System Operator

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R19. Each Balancing Authority and Transmission Operator shall maintain accurate computer models utilized for analyzing and planning system operations.

#### Responsible Members:

NCR05048 California Independent System Operator

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## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: TOP-002-2

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#### Requirements:

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R2. Each Balancing Authority and Transmission Operator shall ensure its operating personnel participate in the system planning and design study processes, so that these studies contain the operating personnel perspective and system operating personnel are awa

#### Responsible Members:

NCR05048 California Independent System Operator

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R4. Each Balancing Authority and Transmission Operator shall coordinate (where confidentiality agreements allow) its current-day, next-day, and seasonal planning and operations with neighboring Balancing Authorities and Transmission Operators and with its Rel

#### Responsible Members:

NCR05048 California Independent System Operator

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R5. Each Balancing Authority and Transmission Operator shall plan to meet scheduled system configuration, generation dispatch, interchange scheduling and demand patterns.

#### Responsible Members:

NCR05048 California Independent System Operator

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R6. Each Balancing Authority and Transmission Operator shall plan to meet unscheduled changes in system configuration and generation dispatch (at a minimum N-1 Contingency planning) in accordance with NERC, Regional Reliability Organization, subregional, and

#### Responsible Members:

NCR05048 California Independent System Operator



## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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Standard: TOP-003-0

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**Requirements:**

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R1. Generator Operators and Transmission Operators shall provide planned outage information.

**Responsible Members:**

NCR05048 California Independent System Operator

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R2. Each Transmission Operator, Balancing Authority, and Generator Operator shall plan and coordinate scheduled outages of system voltage regulating equipment, such as automatic voltage regulators on generators, supplementary excitation control, synchronous c

**Responsible Members:**

NCR05048 California Independent System Operator

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R3. Each Transmission Operator, Balancing Authority, and Generator Operator shall plan and coordinate scheduled outages of telemetering and control equipment and associated communication channels between the affected areas.

**Responsible Members:**

NCR05048 California Independent System Operator



**Registration Status as of 1/26/2012**

**Applicable Regional Entity: WECC**

**Applicable Function: TOP**

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**Standard: TOP-004-2**

---

**Requirements:**

---

R1. Each Transmission Operator shall operate within the Interconnection Reliability Operating Limits (IROLs) and System Operating Limits (SOLs).

**Responsible Members:**

NCR05048 California Independent System Operator

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R2. Each Transmission Operator shall operate so that instability, uncontrolled separation, or cascading outages will not occur as a result of the most severe single contingency.

**Responsible Members:**

NCR05048 California Independent System Operator

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R3. Each Transmission Operator shall operate to protect against instability, uncontrolled separation, or cascading outages resulting from multiple outages, as specified by its Reliability Coordinator.

**Responsible Members:**

NCR05048 California Independent System Operator

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R4. If a Transmission Operator enters an unknown operating state (i.e. any state for which valid operating limits have not been determined), it will be considered to be in an emergency and shall restore operations to respect proven reliable power system limit

**Responsible Members:**

NCR05048 California Independent System Operator

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R5. Each Transmission Operator shall make every effort to remain connected to the Interconnection. If the Transmission Operator determines that by remaining interconnected, it is in imminent danger of violating an IROL or SOL, the Transmission Operator may t

**Responsible Members:**

NCR05048 California Independent System Operator

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R6. Transmission Operators, individually and jointly with other Transmission Operators, shall develop, maintain, and implement formal policies and procedures to provide for transmission reliability. These policies and procedures shall address the execution a

**Responsible Members:**

NCR05048 California Independent System Operator

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## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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Standard: TOP-005-1.1

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**Requirements:**

- R1. Each Transmission Operator and Balancing Authority shall provide its Reliability Coordinator with the operating data that the Reliability Coordinator requires to perform operational reliability assessments and to coordinate reliable operations within the

**Responsible Members:**

NCR05048 California Independent System Operator

- 
- R3. Upon request, each Balancing Authority and Transmission Operator shall provide to other Balancing Authorities and Transmission Operators with immediate responsibility for operational reliability, the operating data that are necessary to allow these Balanc

**Responsible Members:**

NCR05048 California Independent System Operator



## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: TOP-006-1

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#### Requirements:

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R1. Each Transmission Operator and Balancing Authority shall know the status of all generation and transmission resources available for use.

#### Responsible Members:

NCR05048 California Independent System Operator

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R2. Each Reliability Coordinator, Transmission Operator, and Balancing Authority shall monitor applicable transmission line status, real and reactive power flows, voltage, load-tap-changer settings, and status of rotating and static reactive resources.

#### Responsible Members:

NCR05048 California Independent System Operator

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R3. Each Reliability Coordinator, Transmission Operator, and Balancing Authority shall provide appropriate technical information concerning protective relays to their operating personnel.

#### Responsible Members:

NCR05048 California Independent System Operator

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R4. Each Reliability Coordinator, Transmission Operator, and Balancing Authority shall have information, including weather forecasts and past load patterns, available to predict the system's near-term load pattern.

#### Responsible Members:

NCR05048 California Independent System Operator

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R5. Each Reliability Coordinator, Transmission Operator, and Balancing Authority shall use monitoring equipment to bring to the attention of operating personnel important deviations in operating conditions and to indicate, if appropriate, the need for correct

#### Responsible Members:

NCR05048 California Independent System Operator

---

R6. Each Balancing Authority and Transmission Operator shall use sufficient metering of suitable range, accuracy and sampling rate (if applicable) to ensure accurate and timely monitoring of operating conditions under both normal and emergency situations.

#### Responsible Members:

NCR05048 California Independent System Operator

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R7. Each Reliability Coordinator, Transmission Operator, and Balancing Authority shall monitor system frequency.

#### Responsible Members:

NCR05048 California Independent System Operator

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## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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Standard: TOP-007-0

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**Requirements:**

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R1. A Transmission Operator shall inform its Reliability Coordinator when an IROL or SOL has been exceeded and the actions being taken to return the system to within limits.

**Responsible Members:**

NCR05048 California Independent System Operator

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R2. Following a Contingency or other event that results in an IROL violation, the Transmission Operator shall return its transmission system to within IROL as soon as possible, but not longer than 30 minutes.

**Responsible Members:**

NCR05048 California Independent System Operator

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R3. A Transmission Operator shall take all appropriate actions up to and including shedding firm load, or directing the shedding of firm load, in order to comply with Requirement R2.

**Responsible Members:**

NCR05048 California Independent System Operator



## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: TOP-008-1

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#### Requirements:

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- R1. The Transmission Operator experiencing or contributing to an IROL or SOL violation shall take immediate steps to relieve the condition, which may include shedding firm load.

#### Responsible Members:

NCR05048 California Independent System Operator

---

- R2. Each Transmission Operator shall operate to prevent the likelihood that a disturbance, action, or inaction will result in an IROL or SOL violation in its area or another area of the Interconnection. In instances where there is a difference in derived ope

#### Responsible Members:

NCR05048 California Independent System Operator

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- R3. The Transmission Operator shall disconnect the affected facility if the overload on a transmission facility or abnormal voltage or reactive condition persists and equipment is endangered. In doing so, the Transmission Operator shall notify its Reliabilit

#### Responsible Members:

NCR05048 California Independent System Operator

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- R4. The Transmission Operator shall have sufficient information and analysis tools to determine the cause(s) of SOL violations. This analysis shall be conducted in all operating timeframes. The Transmission Operator shall use the results of these analyses t

#### Responsible Members:

NCR05048 California Independent System Operator



## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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Standard: TOP-STD-007-0

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**Requirements:**

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WR1. Operating Transfer Capability Limit Criteria Actual power flow and net scheduled power flow over an interconnection or transfer path shall be maintained within Operating Transfer Capability Limits (“OTC”). The OTC is the maximum amount of actual power tha

**Responsible Members:**

NCR05048 California Independent System Operator



## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: VAR-001-1

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#### Requirements:

R1. Each Transmission Operator, individually and jointly with other Transmission Operators, shall ensure that formal policies and procedures are developed, maintained, and implemented for monitoring and controlling voltage levels and Mvar flows within their i

#### Responsible Members:

NCR05048 California Independent System Operator

---

R10. Each Transmission Operator shall correct IROL or SOL violations resulting from reactive resource deficiencies (IROL violations must be corrected within 30 minutes) and complete the required IROL or SOL violation reporting.

#### Responsible Members:

NCR05048 California Independent System Operator

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R11. After consultation with the Generator Owner regarding necessary step-up transformer tap changes, the Transmission Operator shall provide documentation to the Generator Owner specifying the required tap changes, a timeframe for making the changes, and tech

#### Responsible Members:

NCR05299 Pacific Gas and Electric Company

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R12. The Transmission Operator shall direct corrective action, including load reduction, necessary to prevent voltage collapse when reactive resources are insufficient.

#### Responsible Members:

NCR05048 California Independent System Operator

---

R2. Each Transmission Operator shall acquire sufficient reactive resources within its area to protect the voltage levels under normal and Contingency conditions. This includes the Transmission Operator's share of the reactive requirements of interconnecting

#### Responsible Members:

NCR05048 California Independent System Operator

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R3. The Transmission Operator shall specify criteria that exempts generators from compliance with the requirements defined in Requirement 4, and Requirement 6.1.

#### Responsible Members:

NCR05048 California Independent System Operator

---

R4. Each Transmission Operator shall specify a voltage or Reactive Power schedule at the interconnection between the generator facility and the Transmission Owner's facilities to be maintained by each generator. The Transmission Operator shall provide the vol

#### Responsible Members:

NCR05299 Pacific Gas and Electric Company



## Registration Status as of 1/26/2012

Applicable Regional Entity: WECC

Applicable Function: TOP

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### Standard: VAR-001-1

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#### Requirements:

R6. The Transmission Operator shall know the status of all transmission Reactive Power resources, including the status of voltage regulators and power system stabilizers.

#### Responsible Members:

NCR05048 California Independent System Operator

R7. The Transmission Operator shall be able to operate or direct the operation of devices necessary to regulate transmission voltage and reactive flow.

#### Responsible Members:

NCR05048 California Independent System Operator

R8. Each Transmission Operator shall operate or direct the operation of capacitive and inductive reactive resources within its area - including reactive generation scheduling; transmission line and reactive resource switching; and, if necessary, load shedding

#### Responsible Members:

NCR05048 California Independent System Operator

R9. Each Transmission Operator shall maintain reactive resources to support its voltage under first Contingency conditions.

#### Responsible Members:

NCR05048 California Independent System Operator