APPENDIX E

Operation Standards
for
Generating Asset Owners

OPERATION STANDARDS FOR GENERATING ASSET OWNERS

Operating Standards (OS) 1 though 28 apply to each covered generating asset. (See GO 167, §§ 3 and 8.) A separate document containing recommended guidelines may be obtained from the Commission's Consumer Protection and Safety Division (or successor entity). (See GO 167 § 15.2.) The guidelines are intended to assist each generating asset owner determine how it may comply with these OS.

1. OS 1 - Safety

The protection of life and limb for the work force is paramount. GAOs have a comprehensive safety program in place at each site. The company behavior ensures that personnel at all levels of the organization consider safety as the overriding priority. This is manifested in decisions and actions based on this priority. The work environment and the policies and procedures foster such a safety culture, and the attitudes and behaviors of personnel are consistent with the policies and procedures.

2. OS 2 - Organizational Structure and Responsibilities

The organization with responsibility and accountability for establishing and implementing an operation strategy to support company objectives for reliable plant operation is clearly defined, communicated, understood and is effectively implemented. Reporting relationships, control of resources, and individual authorities support and are clearly defined and commensurate with responsibilities.

3. OS 3 - Operations Management and Leadership

Operations management establishes high standards of performance and aligns the operations organization to effectively implement and control operations activities.

4. OS 4 - Problem Resolution and Continuing Improvement

The GAO values and fosters an environment of continuous improvement and timely and effective problem resolution.

5. OS 5 - Operations Personnel Knowledge and Skills

Operations personnel are trained and qualified to possess and apply the knowledge and skills needed to perform operations activities that support safe and reliable plant operation.

6. OS 6 - Training Support

A systematic approach to training is used to achieve, improve, and maintain a high level of personnel knowledge, skill, and performance. Each GAO provides a site-specific training program including on-the-job training, covering operations, including reasonably anticipated abnormal and emergency operations. Personnel are trained commensurate with their duties.

7. OS 7 - Operation Procedures and Documentation

Operation procedures exist for critical systems and states of those systems necessary for the operation of the unit including startup, shutdown, normal operation, and reasonably anticipated abnormal and emergency conditions. Operation procedures and documents are clear and technically accurate, provide appropriate direction, and are used to support safe and reliable plant operation. Procedures are current to the actual methods being employed to accomplish the task and are comprehensive to ensure reliable energy delivery to the transmission grid.

8. OS 8 - Plant Status and Configuration

Station activities are effectively managed so plant status and configuration are maintained to support safe, reliable and efficient operation.

9. OS 9 - Engineering and Technical Support

Engineering activities are conducted such that equipment performance supports reliable plant operation. Engineering provides the technical information necessary for the plant to be operated and maintained within the operating parameters defined by plant design. Engineering provides support, when needed, to operations and maintenance groups to resolve operations and maintenance problems.

10. OS 10 - Environmental Regulatory Requirements

Environmental regulatory compliance is paramount in the operation of the generating asset. Each regulatory event is identified, reported and appropriate action taken to prevent recurrence.

11. OS 11 - Operations Facilities, Tools and Equipment

Facilities and equipment are adequate to effectively support operations activities.

12. OS 12 - Operations Conduct

To ensure safety, and optimize plant availability, the GAO conducts operations systematically, professionally, and in accordance with approved policies and procedures. The GAO takes responsibility for personnel actions, assigns personnel to tasks for which they are trained, and requires personnel to follow plant and operation procedures and instructions while taking responsibility for safety. Among other things:

A. All personnel follow approved policies and procedures. Procedures are current, and include a course of action to be employed when an adopted procedure is found to be deficient.
B. All operations are performed in a professional manner. Basic rules of conduct apply throughout the plant at all times.
C. All personnel on-duty are trained, qualified, and capable of performing their job functions. Personnel are assigned only to duties for which they are properly trained and qualified.
D. Personnel take immediate actions to prevent or correct unsafe situations.

13. OS 13 - Routine Inspections

Routine inspections by plant personnel ensure that all areas and critical parameters of plant operations are continually monitored, equipment is operating normally, and that routine maintenance is being performed. Results of data collection and monitoring of parameters during routine inspections are utilized to identify and resolve problems, to improve plant operations, and to identify the need for maintenance. All personnel are trained in the routine inspections procedures relevant to their responsibilities. Among other things, the GAO creates, maintains, and implements routine inspections by:

A. Identifying systems and components critical to system operation (such as those identified in the guidelines to Standard 28).

B. Establishing procedures for routine inspections that define critical parameters of these systems, describe how those parameters are monitored, and delineate what action is taken when parameters meet alert or action levels.

C. Training personnel to conduct routine inspections.

D. Monitoring routine inspections.

14. OS 14 - Clearances

Work is performed on equipment only when safe. When necessary**,** equipment is taken out of service, de-energized, controlled, and tagged in accordance with a clearance procedure. Personnel are trained in the clearance procedure and its use, and always verify that equipment is safe before any work proceeds. Among other things:

A. The GAO prepares and maintains a clearance procedure. The clearance procedure contains requirements for removing a component from service and/or placing a component back into service.

B. The GAO ensures that personnel are trained in and follow the clearance procedure.

15. OS 15 - Communications and Work Order Meetings

The availability of the generating asset and safety of personnel is ensured during the execution of work orders by adequate communications and meetings, which may be scheduled or as needed, to review work plans with all affected personnel before work begins. Clear lines of communication exist between personnel responsible for operations, maintenance and engineering groups. Among other things:

A. The GAO prepares and maintains a procedure for review of work plans through communications and work order meetings at the facility.

B. Work is analyzed to determine what personnel, components, and systems are affected.

C. Affected personnel meet before work begins to define the work, identify safety issues, to minimize the impact on plant operation, and to determine the need for further meetings.

D. Personnel are trained in and follow the procedure.

16. OS 16 - Participation by Operations Personnel in Work Orders

Operations personnel identify potential system and equipment problems and initiate work orders necessary to correct system or equipment problems that may inhibit or prevent plant operations. Operations personnel monitor the progress of work orders affecting operations to ensure timely completion and closeout of the work orders, so that the components and systems are returned to service. Among other things:

A. Operations personnel identify problems requiring work orders, and initiate work orders to correct those problems

B. The operations manager or other appropriate operating personnel periodically review work orders that affect operations to ensure timely completion and closeout of the work orders, so that components and systems are returned to service.

C. Personnel responsible for prioritizing work orders consult operations personnel to assure that work orders affecting the operations of the plant are properly prioritized.

D. Appropriate personnel are trained in and follow procedures applicable to work orders.

17. OS 17 - Records of Operation

The GAO assures that data, reports and other records reasonably necessary for ensuring proper operation and monitoring of the generating asset are collected by trained personnel and retained for at least five years, and longer if appropriate

18. OS 18 - Unit Performance Testing

The GAO conducts periodic performance tests as appropriate to identify trends and possible improvements in unit operation. The GAO responds to test results with changes to equipment, policies, routines, or procedures necessary to maintaining unit availability and the unit's ability to support grid operations consistent with the Unit Plan.

19. OS 19 - Emergency Grid Operations

The GAO prepares for conditions that may be reasonably anticipated to occur during periods of stress or shortage on the state's electric grid. During such periods of stress or shortage, the GAO makes operational decisions to maximize each unit's availability and ability to support grid operations. Among other things the GAO:

A. Takes reasonable steps to maintain the ability to communicate with the Control Area Operator all times.

B. In preparing for periods of stress or shortage, takes steps to clarify the regulatory requirements, such as emissions, water discharge temperature, etc., which will apply during emergencies.

C. When emergencies appear imminent, seeks regulatory relief from those regulatory requirements that reduce output.

D. Assists the Control Area Operator in responding to the various kinds of possible problems on the electrical grid, including restoration of service after a disturbance.

E. When practical, during periods of stress or shortage, consults with the Control Area Operator before derating a unit or taking a unit off line and defers outages and derates at the Control Area Operator's request when continued operation is

1. Possible and practical,
2. Safe to plant personnel and to the public,
3. In accordance with applicable law and regulations, and
4. Will not cause major damage to the plant.

20. OS 20 - Preparedness for On-Site and Off-Site Emergencies

The GAO plans for, prepares for, and responds to reasonably anticipated emergencies on and off the plant site, primarily to protect plant personnel and the public, and secondarily to minimize damage to maintain the reliability and availability of the plant. Among other things, the GAO:

A. Plans for the continuity of management and communications during emergencies, both within and outside the plant,

B. Trains personnel in the emergency plan periodically, and

C. Ensures provision of emergency information and materials to personnel.

21. OS 21 - Plant Security

To ensure safe and continued operations, each GAO provides a prudent level of security for the plant, its personnel, operating information and communications, stepping up security measures when necessary.

22. OS 22 - Readiness

Until a change in a unit's long-term status, except during necessary maintenance or forced outages, the GAO is prepared to operate the unit at full available power if the Control Area Operator so requests, after reasonable notice, when such operation is permitted by law and regulation. Among other things, the GAO:

A. Maintains contingency plans to secure necessary personnel, fuel, and supplies, and

B. Prepares facilities for reasonably anticipated severe weather conditions.

23. OS 23 - Notification of Changes in Long-Term Status of a Unit

The GAO notifies the Commission and the Control Area Operator in writing at least 90 days prior to a change in the long-term status of a unit. The notification includes a description of the planned change.

24. OS 24 - Approval of Changes in Long-Term Status of a Unit

The GAO maintains a unit in readiness for service in conformance with Standard 22 unless the Commission, after consultation with the Control Area Operator, affirmatively declares that a generation facility is unneeded during a specified period of time. This standard is applicable only to the extent that the regulatory body with relevant ratemaking authority has instituted a mechanism to compensate the GAO for readiness services provided.

25. OS 25 - Transfer of Ownership

The GAO notifies the Commission and the Control Area Operator in writing at least 90 days prior to any change in ownership.

26. OS 26 - Planning for Long-Term Unit Storage

At least 90 days before a change in the long-term status of an electric generation unit, other than permanent shutdown and/or decommissioning, the GAO shall submit to the Commission plans and procedures for storage, reliable restart, and operation of the unit.

27. OS 27 - Flow Assisted Corrosion

Where circumstances require it, the GAO has a flow-assisted corrosion program, which identifies vulnerable equipment, provides for regular testing of that equipment, and responds appropriately to prevent high energy pipe failures.

28. OS 28 - Equipment and Systems

GAO complies with these Operation Standards (1-27) considering the design bases (as defined in the Appendix) of plant equipment and critical systems. The GAO considers the design basis of power plant equipment when as required by other standards it, among other things:

A. Establishes procedures for the operation of critical systems at each unit (Ref. Standard No. 7).
B. For each system, identifies critical parameters that require monitoring (Ref. Standard No. 8 and 13).
C. For each critical parameter, establishes values at which to increase observation of the system or take actions to protect it (Ref. Standard No. 8 and 13).
D. Assures that systems are monitored and actions are taken (Ref. Standard 8 and 13).
E. Establishes parameters for operation during periods of stress or shortage on the state's electric grid (Ref. Standard No. 9 and 19).
F. Assures that personnel operating critical systems are trained and qualified (Ref. Standard No. 6).

Appendix

A. Definitions

Design Basis Documents – Vendor and engineering documents used in the design, or used to instruct in the correct operation and maintenance, of the systems and equipment used in the power plant. Design basis documents consist of OEM Manuals, vendor documents, industry standards, codes and documented engineering assessments.

Documented deviations from the above documents are also considered part of the design basis documents provided there is documented reasoning for those deviations. Documented reasoning includes the benefit of the deviation and why the deviation is consistent with the Unit Plan.

B. Industry Codes Standards and Organizations

ASME Boiler and pressure vessel code, Section 1, (including all amendments)

ASME Boiler and pressure vessel code, Section V111

ANSI/ASME B 31.1 Power Piping

Note on Codes: Any boiler designed and approved to an earlier issue and amendment of these standards is maintained and repaired to the design as originally issued. However, advances in engineering knowledge and experience reflected in the subsequent issues of the codes are taken into consideration in operation and maintenance of the boiler.

Weld repairs and alterations of boilers designed to ASME Boiler and Pressure Vessel Code, Section 1, is carried out in accordance with the rules of the National Board Inspection Code, published by the National Board of Boiler and Pressure Vessel Inspectors.

These standards are intended to augment and not conflict with other standards, which are pertinent to specific components and systems at each facility such as standards issued by organizations including but not limited to:

A& WMA	Air & Waste Management Association
AAQS	Ambient Air Quality Standard
ABMA	American Boiler Manufacturer's Association
AMCA	Air Movement and Control Association
ANSI	American National Standards Institute
APCD	Air Pollution Control District
API	American Petroleum Institute
ARB	Air Resources Board (see CARB)
ASME	American Society of Mechanical Engineers
ASNT	American Society for Nondestructive Testing
ASTM	American Society for Testing and Materials

AWS	American Welding Society
CAISO	California Independent System Operator
CAL OSHA	California Occupational Safety and Health Administration
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CPUC	California Public Utilities Commission
CEC	California Energy Commission
CCR	California Code of Regulations
CSA	Canadian Standards Association
EPA	Environmental Protection Administration
GAO	Generating Asset Owner
HEI	Heat Exchange Institute
HI	Hydraulic Institute
IEEE	Institute of Electrical and Electronics Engineers
ISA	The Instrumentation, Systems, and Automation Society
NEC	National Electrical Code
NERC ES-IC	North American Reliability Council Information Sharing and Analysis Center
NEMA	National Electrical Manufacturer's Association
NIPC	National Infrastructure Protection Center
NFPA	National Fire Protection Association
NRTL	Nationally Recognized Testing Laboratories
OSHA	Occupational Safety and Health Administration
PFI	Pipe Fabrication Institute
SSPC	Steel Structures Painting Council
TEMA	Tubular Exchanger Manufacturer's Association
UBC	Uniform Building Code
UL	Underwriters' Laboratories
UPC	Uniform Plumbing Code

C. Summary of Abbreviations and Acronyms

ACC	Air-Cooled Condenser
AODTM	A trademark of Environmental Elements Corporation for a urea to ammonia system
AVG, avg	Average
BACT	Best Available Control Technology
BMS	Burner Management System
BTA	Best Technology Available
BTU, Btu	British Thermal Unit
BCW	Bearing Cooling Water
CA	California
CAM	Compliance Assurance Monitoring
CEM, CEMS	Continuous Emissions Monitoring System (also referred to as CEMs)
CFR	Code of Federal Regulations
CO2	Carbon Dioxide
CO	Carbon Monoxide
CT	Combustion turbine
CTM	Conditional Test Method
CWP, CWS	Circulating Water Pump, Circulating Water System
DC	Direct Current
DLN	Dry Low-Nox
EOH	Equivalent Operating Hour
^{o}F	Degree Fahrenheit
ft3	Cubic Feet
GAO	Generation Asset Owner
gpm	Gallons per minute
H2SO4	Sulfuric Acid
HAP	Hazardous Air Pollutant

HHV	High Heating Value
Hp	Horsepower
HR, hr	Hour
Inj	Injection
kWe	Kilowatt electrical
LAER	Lowest Achievable Emission Rate
LEC	Low Emission Combustor
LB, LBs, lbs	Pound, Pounds
MACT	Maximum Achievable Control Technology
MMBtu	Million British Thermal Units
MW	Megawatt
MWe	Megawatt electrical
MWh	Megawatt-hour
NH3	Ammonia
Nm	Nanometer
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen or Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
O&M	Operation & Maintenance
O_2	Oxygen
OEM	Original Equipment Manufacturer
PM10, PM10	Particulate Matter (10 microns or less)
PM2.5 or PM2.5	Particulate Matter (2.5 microns or less)
PM	Particulate Matter
Ppm	Parts per Million
ppmvd	Parts per Million by Volume, Dry
PSD	Prevention of Significant Deterioration

QA/QC	Quality Assurance/Quality Control
RATA	Relative Accuracy Test Audit
RMP	Risk Management Plan
S/S	Startup and Shutdown
SCR	Selective Catalytic Reduction
SNCR	Selective Non-Catalytic Reduction
SO_2	Sulfur Dioxide
SOTA	State-of-the-Art
SOx	Sulfur Oxides
TDS	Total Dissolved Solids
UPS	Uninterruptible Power Supply
UV	Ultraviolet
VOC	Volatile Organic Compound
Yr	Year
ZAT	Zero Ammonia Technology

(END OF APPENDIX E)

(END OF ATTACHMENT 4)