Electricity Generation Power Plant Performance Program

Progress Report to the Legislature on the Implementation of Senate Bill SB 39 of the 2001-02 Second Extraordinary Session

Required by the Supplemental Report of the 2002 Budget Act to be submitted to the Chairs of the Joint Legislative Budget Committee and the Fiscal Committee of both Houses of the Legislature

California Public Utilities Commission

November 14, 2003

The Purpose of This Report

This report was requested by the legislature in the Supplemental Report of the 2002 Budget Act, which says,

> On or before October 15, 2003, the California Public Utilities Commission (CPUC) shall submit to the chairs of the JLBC and the fiscal committee of both houses of the legislature, a report that provides specific performance measurements for evaluating the Commission's power plant performance program and a workload justification utilizing actual data. The report should include, but not be limited to, the following information:
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> · The number of unplanned outages and significant events (including major outages, major equipment failures, and/or accidents involving personal injuries/death.
>
> · The number of power plant inspections performed, including the average time per inspection.
>
> · The number of investigations performed due to unplanned outages and/or other major events, including average time per investigation.

General Response

The Power Plant Productivity Program is a work in progress, and only limited performance data for the program is now available. This report describes the steps that the California Public Utilities Commission (Commission), in cooperation with the California Independent System Operator (CAISO), has taken to adopt and implement Maintenance and Operations Standards under Senate Bill 39 of the 2001-02 Second Extraordinary Session (SB 39xx); presents currently available performance data; and discusses additional sources of data that should become available as the program is fully implemented.

Implementation of SB 39xx

SB 39xx, which became effective August 7, 2002,[1] sets up a two-part process for the adoption and implementation of maintenance and operation standards. First, the legislation establishes the California Electric Generation Facilities Standards Committee (Committee), to adopt standards. Second, the legislation directed the Commission to implement and enforce those standards. The legislation also directed the Commission to enforce CAISO's rules (or "protocols") that govern when generators can schedule planned maintenance at their power plants.

Under Section 761.3 of the Public Utilities Code, the Committee is composed of two members nominated by the Commission and CAISO, respectively, and a third member chosen by them. CPUC Commissioner Carl Wood and Michael Kahn, Chairman of the CAISO Board of Governors, nominated Glenn Bjorklund, a former executive for the

[1] The bill took effect 90 days after May 9th, the close of the extended legislative session in which the bill passed.

Southern California Edison Company, as the third member of the Committee. The Committee has held six public meetings since December 2002, with full opportunity for public participation in development of standards. As required by the statute, both the Commission and the CAISO have provided staff to the Committee.

The Committee is adopting the standards systematically, dividing them into five different component standards. First, in order to set an overarching set of expectations for power plant owners, and recognizing that detailed standards would take some time to develop and implement, the Committee has adopted a set of umbrella "General Duty Standards" intended to take effect quickly. Second, the Committee has also approved a comprehensive and detailed set of Maintenance Standards, covering the plants mechanical and management systems. Third, the Committee has approved standards for records (logbooks) to be kept by thermal power plants. Because a good record of plant operations and maintenance activities is crucial to implementation of any standard, the Committee considers the Logbook standard to be an integral part of Maintenance and Operation Standards. Fourth, the Committee has issued draft Logbook Standards for hydroelectric plants and asked parties to confer and produce a final version for the Committee's consideration. Fifth and finally, the Committee has ordered its staff to develop a set of Operation Standards. Each of these standards is discussed in more detail below.

After the Committee adopts each standard, the Commission considers implementation methods and rules through Rulemaking 02-11-039, opened November 21, 2002. The Commission will also enforce Outage Coordination Protocols already adopted by the CAISO as required by SB 39xx. The Committee has adopted General Duty Standards, Maintenance Standards, and Logbook Standards for Thermal Plants; and has directed its staff to develop Operations Standards and Logbook Standards for Hydroelectric Plants. The Commission Staff released a draft General Order on implementation of committee-adopted standards on October 2, 2003, and will begin enforcement audits of generation facilities when the Commission adopts the General Order. On October 29, 2003, the Commission released a proposed decision on the implementation of Logbook Standards for Thermal Plants.

General Duty Standards

In order to set an overarching set of expectations for power plant owners, and recognizing that a full set of detailed standards would take some time to develop and implement, the Committee has adopted a set of umbrella "General Duty Standards." The Committee adopted an initial set of three standards on May 2, 2002, after receiving comments and reply comments from parties. The Committee adopted three additional standards June 3, 2002. The Commission took comments and reply comments on implementation of each set of standards, respectively, in the month following their adoption by the Committee.

Maintenance Standards

The Committee has adopted detailed maintenance standards that require generators to establish clear management controls, maintain safety and training programs, and maintain plant equipment. On December 20, 2002, the Committee met to review a draft of maintenance standards prepared by the CAISO. The Committee adopted eighteen Maintenance Standards, subject to legal review, on February 2, 2003. After legal review, the Committee adopted a revised document on May 2, 2003.[2] The Commission took comments and reply comments and held a workshop on implementation of the standards in March 2003.

Logbook Standards

A good record of plant operations and maintenance activities is crucial to implementation of Maintenance and Operation Standards. Therefore, the Committee adopted, as an integral part of those standards, requirements that generators keep detailed logbooks. The Committee circulated a draft of such Logbook Standards on January 31, 2003. The Committee revised the standards in response to comments and reply comments by parties, and adopted revised standards applicable to thermal plants on April 4, 2003. On October 29, 2003, the Commission released a proposed decision on the implementation of Logbook Standards for Thermal Plants. The Committee considered standards for hydroelectric plants on May 5 and May 6, and directed staff to meet with Pacific Gas and Electric Company and Southern California Edison Company (the active parties) to develop a consensus draft if possible. Staff and parties reached agreement on a consensus draft of Logbook Standards for hydroelectric plants in October 2003.

Operations Standards

At its meeting April 4, 2003, the Committee directed staff to develop detailed operating standards to assure that California's power plants deliver power when needed to serve California's consumers. Staff conducted a competitive request for proposals, and awarded a contract to a technical consultant on June 25th, 2003. After receiving approval of the contract from the Department of General Services in August, staff and the contractor began to develop standards in September. Staff plans to review draft standards in public workshops, before presenting the standards to the Committee for its consideration.

[2] The initial document contained not only standards for generators, but also voluntary guidelines on how generators could comply with the standards as well as details of implementation for the Commission. The final document adopted in May clarified the status of the various parts of the initial document. Standards applicable to generators (which were essentially unchanged) were declared to be standards under SBx2 039. The other parts of the documents were not adopted as standards, but as suggested guidelines for generators, and a suggested implementation plan for the Commission.

Data for Performance Evaluation

In particular, the Budget Report requests:

- The number of unplanned outages and significant events (including major outages, major equipment failures, and/or accidents involving personal injuries/death).
- The number of power plant inspections performed, including the average time per inspection.
- The number of investigations performed due to unplanned outages and/or other major events, including average time per investigation.

Unplanned Outages and Significant Events

Only limited data on plant outages is currently available. According to the CAISO, generators reported the following unplanned outages between 2001 and August 2003:

Unplanned Outages 2001-2003

Year	Total (Year)	Total (Jan Through Aug)
2001	**7974**	**4589**
2002	**7396**	**5305**
2003		**5778**

Source: California Independent System Operator (CAISO)

These figures include outages at nuclear plants and qualifying facilities that are within the ISO's service territory but exempted from SBx2 39. The Commission Staff has requested a breakdown of this data by the size of the outage, and will provide a supplemental report when this data becomes available.

In the future, the Commission will be able to track performance unit-by-unit using two sources of information. The first is the Generating Availability Data System (GADS), maintained by the North American Electric Reliability Council (NERC). GADs includes detailed information on plant availability, design, and events, including outages and outage-related equipment failures. The proposed General Order that would implement Maintenance Standards requires facility owners to report this detailed data to the NERC, and to authorize release of the data to the Commission. Since participation in the GADs system has been voluntary, the GADs database is currently incomplete. Second, the

Commission Staff is working with the CAISO to gain direct access to the CAISO's outage database.

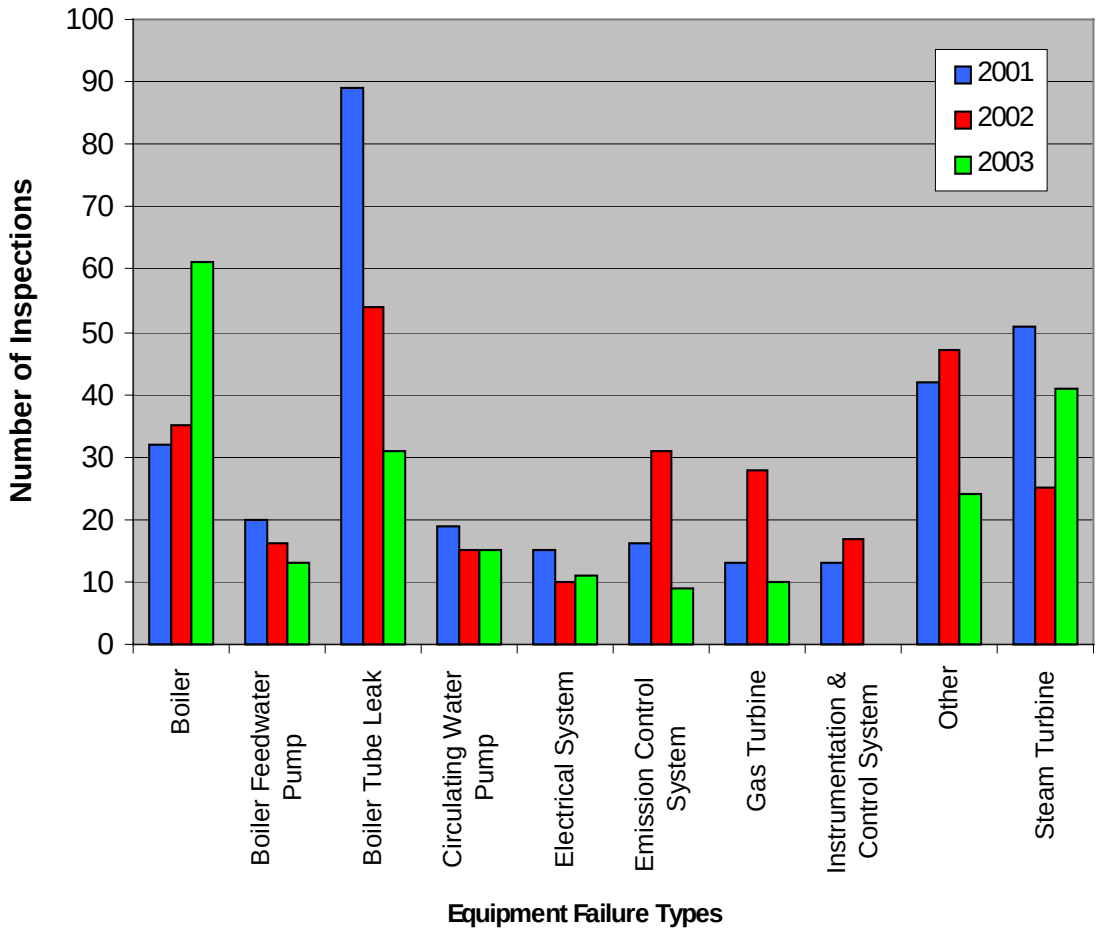
Major Equipment Failures

Data on equipment failures is available only when those failures lead to plant outages. The only currently available data on such outage-related failures comes from the Commission's ongoing power plant inspection program. Generally speaking, the Commission inspects plants owned by the state's largest independent generators when those plants lose more than 50 megawatts of capacity due to an outage or other problem.

Commission staff has found that the most common causes of outages and lost capacity in power plants are boiler-related problems such as boiler tube leaks. Plant age may be a contributing factor since the majority of the plants in California using boilers are at least 30 years old. As the boiler tubes age, they become more susceptible to corrosion leaks as a result of exposure to heat and water. Plants try to reduce corrosion by maintaining proper water chemistry. However, tubes will eventually need replacement.

Other common causes of power plant outages include problems with steam and gas turbines, circulating water pumps, emission control equipment, instrumentation and control systems and electrical systems. Figure 1 shows the most common failures in power plant equipment.

Figure 1
Common Equipment Failures
Encountered During Inspection



Source: CPSD Plant Inspection Reports

Based on information gathered during plant inspections, Commission staff has found that the most common cause of restoration delay is the unavailability of parts. In many instances, parts are ordered from suppliers in other states. In other instances, parts must be custom-built due to the age of the unit.

The Commission Staff will analyze any additional plant failure databases as they become available. As noted above, the Commission is working with the CAISO to gain access to the CAISO's outage database, which includes information on the cause of outages. Further, the NERC's GADs database includes information on outage-related equipment problems. Finally, the Commission has requested data directly from generators on events at power plants, which have led to property damage inside or outside the plants. The Commission will provide supplemental reports as this data becomes available.

Accidents Involving Personal Injury/Death:

Reliable information on accidents at generation plants is not yet available. Staff analyzed data from the federal Occupational Safety and Health Administration (OSHA) on accidents involving personal injury or death in the power production industry.

**Summary of Accidents for SIC Code 4911*
1/1/2001-10/7/2003**

Year	Fatalities	Injuries Requiring Hospitalization	Injuries Not Requiring Hospitalization
2001	**3**	**20**	**6**
2002	**6**	**28**	**7**
2003	**5**	**18**	**4**

Source: U.S. Department of Labor OSHA Inspection Database
*** "Establishments that engage in the generation, transmission, and/or distribution of electric energy for sale"**

This database, part of OSHA's enforcement program, was not designed to identify problems at power plants specifically. First, the reports identify the city where the accident occurred, but not the specific location within that city. Second, the reports lump power production, transmission, and generation together. Finally, the accident is classified according to the main business of the employer (rather than the owner of the location of the accident), which makes it difficult to track accidents involving specialized contractors who work at power plants. Therefore, the Commission is in the process of gathering directly from generators information on fatalities and injuries requiring hospitalization. The Commission Staff will submit this information, when available, in a supplemental report.

The Commission has noted a number of incidents reported in the press involving damage by and deaths of contractors working at California power plants, including the following:

- On May 12, 2003 at Calpine's Geysers facility, in Sonoma County, Gregory McVay, 43, a maintenance worker for X-Cell-Marley Construction of Overland Park, KS, died of multiple blunt force injuries after a 30 foot diameter fan inside a cooling tower in which he was working began revolving at up to 150 rpm. A colleague immediately detected the accident and turned off the fan. There are questions regarding how the fan could have been accidentally started.
- On July 8, at Duke's Moss Landing power plant, contactors removing an unused storage tank accidentally ignited more than a million gallons of oil, sending a heavy smoke plume across the surrounding area.
- July 1, 2003 at PG&E National Energy Group's La Paloma Power Plant in Kern County, Francisco Escobar-Serrano, 28, of Mexico, died when he fell into a live

generator breaker. A second unidentified man was injured in the incident. There are questions about why the breaker was live.

- On July 19, 2003 at The Geysers, Sonoma County (Calpine) Barry Carpenter, 44, of Farmington, NM, an "air jammer" for drilling company Air Comp, died of blunt force injuries after an air compressor exploded while he was cleaning a well shaft to prepare for conversion from extraction to reinjection of wastewater as part of a large artificial recharge project.[3]

It is possible that contractors are particularly vulnerable to mistakes, and resulting damage and injury, because they are relatively unfamiliar with their surroundings. Maintenance standards adopted by the Committee clearly require power plants to assure that contractors are adequately trained and act safely. The Commission will pay special attention to these programs in its enforcement efforts. It should be noted however, that Qualifying Facilities like The Geysers are specifically exempted from the Maintenance and Operations Standards.

Power Plant Inspections

Since January 2001, Commission staff has performed approximately 424 inspections associated with forced outages, 369 inspections of scheduled outages and 75 inspections involving units curtailed more than 50 megawatts, for a total of 868 inspections. Staff has spent an average of three hours and 45 minutes on each inspection, including time at the plant, travel, follow-up, and report preparation.

Investigations

Through March 2003, Commission staff conducted an investigation of California's energy crisis, focusing in part on power plant outages during the crisis. The investigation culminated in reports in September 2000 and January 2003, and also contributed to the California Parties' submission in one of FERC's proceedings on the crisis. After August 7, 2002 (when SB 39xx took effect) Commission staff spent roughly six person-years on this investigation.

In addition, the Commission staff conducted an assessment of the condition of California power plants. This investigation required roughly one person-month of work.

3 The San Francisco Chronicle (Tuesday, July 15, 2003, page a-16) reported that "Susan Gard of state Division of Occupational Safety and Health said the results of Cal/OSHA's investigations into the two accidents were not available…."We're investigating why that tank exploded," she said. "The fact that there were two Calpine fatalities is of concern to us. This is a sprawling, remote location with a bunch of different contractors working 24 hours a day in all kinds of weather. At the same time, we also know that Calpine has a progressive, active safety organization."