

CALIFORNIA ENERGY COMMISSION

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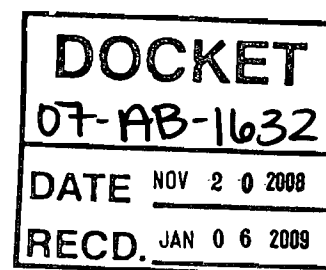
WEBSITES

Main website: www.energy.ca.gov
Children's website: www.energyquest.ca.gov
Consumer Information: www.ConsumerEnergyCenter.org



**STATE OF CALIFORNIA
ENERGY RESOURCES CONSERVATION
AND DEVELOPMENT COMMISSION**

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| In the Matter of: |) | Docket No. 07-AB-1632 |
| |) | Order No. 08-1120-9 |
| Preparation of the |) | |
| AB 1632 Committee Report: |) | Adoption Order |
| An Assessment of California's Nuclear |) | |
| Power Plants |) | |

**I. BACKGROUND**

As required by Assembly Bill 1632 (Blakeslee, Chapter 722, Statutes of 2006), the Energy Commission under the direction of the Energy Commission's Electricity and Natural Gas Committee has completed an assessment of the potential vulnerability of California's largest baseload power plants, Diablo Canyon Nuclear Power Plant and San Onofre Nuclear Generating Station (SONGS), to a major disruption due to a major seismic event or plant aging. The bill also directed the Energy Commission to assess the impacts of such a disruption on system reliability, public safety, and the economy; to assess the costs and impacts of nuclear waste accumulating at these plants; to evaluate other major issues related to the future role of these plants in the state's energy portfolio, and to include the AB 1632 assessment in the 2008 energy policy review.

This report, *An Assessment of California's Nuclear Power Plants: AB 1632 Committee Report*, provides findings and recommendations to policymakers and stakeholders about Diablo Canyon and SONGS and is included in the Energy Commission's *2008 Integrated Energy Policy Report Update (2008 IEPR Update)*. It considers the vulnerabilities of the nuclear plant sites, structures and spent fuel storage facilities to major seismic events and the vulnerability of the plants to age-related degradation. It considers the impacts of a major disruption of these plants on the reliability of California's transmission and power supply. Finally, it considers a number of policy areas related to California's operating nuclear power plants, including the cost, land use, and local economic impacts of nuclear waste accumulation at the plant sites; the economic and environmental tradeoffs among alternative power generation options; and the potential implications of renewing the operating licenses of these plants.

The AB 1632 Committee Report draws upon a consultant report entitled *AB 1632 Assessment of California's Operating Nuclear Plants*, which was prepared for the Energy Commission by an interdisciplinary Study Team led by MRW & Associates. Members of the public contributed by identifying studies for review in the AB 1632 assessment and by providing comments on the draft study plan, the draft consultant report, and the draft Committee Report. In addition, the plant owners, members of the public and interested stakeholders were provided the opportunity to submit written comments on the draft consultant report and the draft Committee Report and to participate in three public workshops held on December 12, 2007, September 25, 2008, and October 20, 2008. Based on comments received at these workshops and during the written comment period, the Committee issued the revised AB 1632 Consultant Report on October 24, 2008 and the revised AB 1632 Committee Report on October 31, 2008.

II. KEY REPORT FINDINGS AND RECOMMENDATIONS

The AB 1632 Committee report identified the following key findings:

- California's two operating commercial nuclear power plants, Pacific Gas and Electric's (PG&E) Diablo Canyon Power Plant and Southern California Edison's (SCE) San Onofre Nuclear Generating Station (SONGS), provide approximately 12 percent of the state's overall electricity supply and, by some measures, approximately 24 percent of the state's low-carbon electricity supply. Because they are important to the state's electricity supply, California needs a long-term plan to prevent or significantly reduce the risks of a major disruption of these plants and to be prepared should such a disruption occur or should one or both of these plants be shut down.
- These plants are located along California's seismically active coastline. Nearby offshore faults at Diablo Canyon and SONGS create seismic hazards at these plants. PG&E's ongoing Long Term Seismic Program (LTSP) has extensively studied Diablo Canyon's seismic setting.
- The non-safety related systems, structures and components (SSCs) of the plants are the most vulnerable to damage from earthquakes and are the source of the greatest seismic-related plant reliability risk for Diablo Canyon and SONGS. Seismic design standards for non-safety related SSCs have evolved significantly since the plants were issued construction permits in the late 1960s and early 1970s. An analysis is needed of the implications of changes in seismic design standards since these plants were designed and built.
- The experience in Japan of the Kashiwazaki-Kariwa Nuclear Power Plant (K-K NPP) following the 2007 Niigata Chuetsu-Oki earthquake provides important lessons for California's nuclear plants. The K-K NPP, which at 8,200 megawatts is the world's largest nuclear power plant, experienced ground motions significantly higher than the design basis ground motion and yet suffered no

significant damage to safety-related components. Nevertheless, more than a year after the earthquake, the KK NPP remains shut down and Japan has had to rely upon alternative energy resources.

- Diablo Canyon and SONGS have been operating for approximately half of their 40-year license periods. PG&E and SCE are exploring the feasibility of seeking 20-year license renewals for these plants. The operating licenses for Diablo Canyon Units 1 and 2 expire in 2024 and 2025 and the operating licenses for SONGS Units 2 and 3 expire in 2022. If approved, the license renewals could keep Diablo Canyon and SONGS in operation until the early to mid 2040s.
- The U.S. Nuclear Regulatory Commission (NRC) issues license renewals for commercial nuclear reactors and has renewed approximately half of the nation's 104 commercial nuclear reactors (49 reactors). To date, the NRC has not denied any license extension application.
- The NRC's safety review focuses on plant hardware and equipment and on identifying and managing the detrimental effects of plant aging. NRC considers other issues, including an examination of seismic hazards, plant operational issues, plant security, emergency preparedness, environmental review of spent nuclear fuel storage, and analysis of spent fuel storage options to be outside the scope of license renewal.
- The role of the State in a license renewal decision is limited by the NRC's regulatory authority over all radiological safety aspects of nuclear power. However, the State has much broader authority to set electricity generation priorities based on economic, reliability and environmental concerns. Plant reliability is clearly a state and ratepayer concern.
- The California Public Utilities Commission (CPUC) establishes the framework for considering the cost-effectiveness of license renewal and has the authority to approve ratepayer funding for a utility's license renewal feasibility study. In PG&E's 2007 General Rate Case (GRC) decision, the CPUC approved PG&E's request for \$16.8 million for a license renewal feasibility study. In this decision, the CPUC required PG&E to incorporate the Energy Commission's AB 1632 assessment, findings and recommendations into PG&E's study and to submit this study to the CPUC by June 11, 2011.
- The CPUC specified in PG&E's 2007 GRC decision that PG&E's license renewal feasibility study should address: (a) whether license renewal is cost-effective and is in the best interests of PG&E's ratepayers, (b) the AB 1632 assessment, and (c) any legislative framework that may be established for reviewing the costs and benefits of license renewal.

- The CPUC stated that PG&E's 2011 GRC will result in a decision on whether PG&E should pursue a license renewal, and would allow time (approximately 12 years) for the State and PG&E to develop alternate resources should the decision be made to forego Diablo Canyon's license renewal.
- SCE requested approval of \$17 million for a similar feasibility study for SONGS. A decision on this funding is expected as part of SCE's 2009 GRC. It can be expected that the CPUC will require SCE to seek CPUC approval before proceeding with an NRC license renewal application and will require SCE to incorporate the AB 1632 assessment, findings, and recommendations in its feasibility study, as the CPUC required for PG&E.

The AB 1632 assessment identified the following key recommendations as steps that are needed to help ensure that California does not lose these large baseload facilities for a year or more:

- It is the Energy Commission's expectation that the issues and areas identified in the AB 1632 assessment as needing additional work during license renewal, particularly the seismic studies, will be included in PG&E's and SCE's license renewal feasibility studies and will be reported to the CPUC. The reliability of these large base load plants and vulnerability to disruption is clearly a ratepayer and state issue of concern and should be an essential component of the license renewal feasibility studies for the CPUC.
- SCE should develop an active seismic hazards research program for SONGS similar to PG&E's Long Term Seismic Program. Further study using advanced technologies, for example, three-dimensional geophysical seismic reflection mapping, may resolve uncertainties about the nature of the offshore faults and estimates of seismic hazards at both plants.
- The Energy Commission, in cooperation with other agencies, should evaluate the degree to which new research programs should be pursued using three-dimensional seismic reflection mapping and other techniques, if warranted by a cost-benefit analysis, for resolving seismic uncertainties at Diablo Canyon and SONGS.
- As part of their license renewal feasibility studies for the CPUC, PG&E and SCE should describe the lessons learned from the K-K NPP experience and any implications for SONGS and Diablo Canyon.
- Beginning with the 2009 IEPR, PG&E and SCE should report on their findings on the extent to which their respective plants' non-safety-related SSCs comply with current building codes and seismic standards for non-nuclear plants.
- The Energy Commission and the CPUC, as part of the CPUC's authority to fund and oversee utilities' plant relicensing feasibility studies, should

develop criteria and issues that the utilities will be asked to address in their license renewal feasibility studies to help ensure that the utilities fully evaluate the costs and benefits of nuclear plant license extensions. Such studies should address the adequacy of the plants' maintenance programs and safety cultures; plans for waste storage, transport and disposal; seismic hazard and vulnerability assessments; the life cycle environmental and economic impact evaluation of the nuclear plants compared with alternative generating and transmission resources; contingency plans in the event the state's nuclear power plants have prolonged outages; implications for grid reliability if these plants shut down; and the overall economic and environmental costs and benefits of license extension.

- As part of upcoming IEPR assessments, beginning with the 2009 IEPR, PG&E and SCE should report to the Energy Commission on the status and results of their seismic research efforts and status of their license renewal feasibility studies.

The Energy Commission fully supports the findings and recommendations in the AB 1632 Committee Report. The CPUC unequivocally requires in PG&E's 2007 General Rate Case that PG&E incorporate the Energy Commission's AB 1632 assessment, findings and recommendations in PG&E's license renewal feasibility study for Diablo Canyon. The CPUC Decision required that PG&E defer to the extent feasible its own study until after the Energy Commission issues its AB 1632 findings and conclusions and that, "PG&E should incorporate the findings and recommendations of the CEC [Energy Commission] study in its own work."

The AB 1632 Committee report is based on existing scientific information and studies available at the time of the AB 1632 assessment. To the extent that new research information regarding plant seismic hazards and vulnerabilities become available, which are relevant to plant reliability, PG&E and SCE should expedite their geophysical studies, particularly with respect to studying offshore faults near the plant sites. The Energy Commission will give this new information full attention in the 2009 IEPR, as a supplement to the AB 1632 Committee Report.

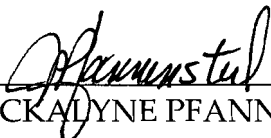
III. ACTION TAKEN

At a regularly scheduled business meeting on November 20, 2008, the Energy Commission, after receiving comments and discussing the item, voted unanimously to approve the AB 1632 Committee Report. It is hereby ordered that a final version of this document

shall be forwarded to the Governor for his review, as part of the *2008 IEPR Update*, and made available to the public and the Legislature.

Dated: November 20, 2008

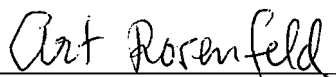
STATE ENERGY RESOURCES CONSERVATION
AND DEVELOPMENT COMMISSION



JACKALYNE PFANNENSTIEL
Chairman

(Absent)

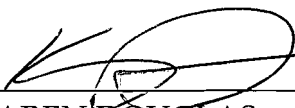
JAMES D. BOYD
Vice Chair



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JEFFREY D. BYRON
Commissioner



KAREN DOUGLAS
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