



COMMENTS OF THE ALLIANCE FOR NUCLEAR REESPONSIBILITY (hereinafter “A4NR”) regarding all nuclear power related sections of the 2009 IEPR. Direct quotes from the IEPR (09-IEP-1A) are indented; A4NR comments (as noted) begin at the left margin.

***From pages 10-11***

***Nuclear Power Plants***

As part of the *2008 Integrated Energy Policy Report Update*, the Energy Commission developed *An Assessment of California’s Nuclear Power Plants: AB 1632 Report*, as directed by Assembly Bill 1632 (Blakeslee, Chapter 722, Statutes of 2006). The report addressed seismic and plant aging vulnerabilities of California’s in-state nuclear plants —Pacific Gas and Electric Company’s Diablo Canyon Power Plant and Southern California Edison’s San Onofre Nuclear Generating Station — including reliability concerns. In addition, the report identified a number of other issues important for the state’s nuclear policy and electricity planning, including concerns about the “safety culture” at the San Onofre Nuclear Generating Station, evolving federal policy on long-term nuclear waste disposal, costs and benefits of nuclear power compared to other resources, and potential conversion from once-through cooling to closed-cycle wet cooling. The Nuclear Regulatory Commission is responsible for relicensing nuclear power plants. Its license renewal application process determines only whether a plant meets its own criteria for license renewal. It is left up to state regulatory agencies to determine whether it is in the best interest of ratepayers for the nuclear plants to continue operating for an additional 20 years. The California Public Utilities Commission proceeding will consider those matters that are within the state’s jurisdiction, including the economic, reliability, and environmental implications of relicensing.

**A4NR Question:** The chronology of relicensing procedures is not made clear in this paragraph. Is not the CPUC required to “determine whether it is in the best interest of ratepayers for the plants to continue operating for an additional 20 years,” BEFORE a utility may file for license renewal with the NRC? What other state regulatory agencies are consulted in order to “determine whether it is in the best interest of ratepayers for the plants to continue operating for an additional 20 years?” What state agencies are consulted, or have the ability to make decisions on behalf of California ratepayers *after* an NRC license renewal is granted? Does the California legislature have any input in this determination?

The *AB 1632 Report* made a number of recommendations for additional studies that Pacific Gas and Electric Company and Southern California Edison should undertake as part of their license renewal feasibility studies for the California Public Utilities Commission, and also directed the utilities to provide a status report on their efforts in the *2009 Integrated Energy Policy Report*. In June 2009, the California Public Utilities Commission sent letters to both utilities emphasizing

the need to address issues raised in the *AB 1632 Report* as part of the their license renewable feasibility assessments, such as seismic and tsunami hazards, local economic impacts of shutting down the plants, and waste storage and disposal. However, based on information submitted by the utilities in response to the Energy Commission's data request as part of the Integrated Energy Policy Report proceeding, *it appears **that the utilities are not on schedule to complete these activities in time for consideration by the California Public Utilities Commission** and that they may not intend to make all their studies available.*

The comprehensiveness, completeness, and timeliness with which the utilities provide the information identified in the *AB 1632 Report* will be critical to assess whether or not the utilities should apply to the Nuclear Regulatory Commission for license renewals for their nuclear plants. (NOTE: A4NR emphasis added)

**A4NR Question:** Who assesses whether utilities should apply? Will this be the CPUC, the CEC, the legislature or a combination of entities? With regard to the tardiness of utility studies listed above, does the CEC have a date certain by which these studies are to be completed by the utilities?

**A4NR Recommendation:** A4NR recommends that, since the results of these studies are foreseeable, the CPUC and/or CEC mandate a date certain by which they *must* be completed, and the resulting recommendations be adopted and implemented before any utility can file for license renewal with the NRC.

### **Recommendations**

To help ensure plant reliability and minimize costs, Pacific Gas and Electric Company and Southern California Edison should complete and report in a timely manner on the studies recommended in the *Assembly Bill 1632 Report* that the California Public Utilities Commission identified for completion as part of license renewal review. These reports should be made available to the Energy Commission, as part of the Integrated Energy Policy Report process, and to the California Public Utilities Commission for its license renewal review. Once a utility completes the required studies and makes them available to the Energy Commission and the California Public Utilities Commission for review, *the utility **may then file license renewal applications** with the California Public Utilities Commission CPUC and the United States Nuclear Regulatory Commission.* (NOTE: A4NR emphasis added)

**A4NR Question:** Regarding the statement "Once a utility completes the required studies and makes them available to the Energy Commission and the California Public Utilities Commission for review, *the utility **may then file license renewal applications** with the California Public Utilities Commission CPUC and the United States Nuclear Regulatory Commission*" A4NR asks—is this a legal requirement with which the utilities must comply, and if so, where is the citation in California law? If it is not in current law, will this action require a legislative mandate? In addition, the paragraph quoted states that the studies will be made available to the CEC and CPUC for "review" but does not define what is meant by "review." Will recommendations result from this review? What outcome or results are expected from this review?

**A4NR Recommendation:** A4NR recommends that the sentence in the above paragraph be amended to read: "These reports should be made available to the Energy

Commission, as part of the Integrated Energy Policy Report process, and to the California Public Utilities Commission for its license renewal review **and to the California Legislature.**”

The California Public Utilities Commission should assess the need to establish a San Onofre Nuclear Generating Station Independent Safety Committee patterned after the Diablo Canyon Independent Safety Committee.

**A4NR Recommendation:** While the DCISC has no authority over operations at Diablo Canyon, the information solicited and responses given to the public and viewed on public access television provide transparency that is often missing in nuclear power plant proceedings (both official and unofficial). This may be of use at San Onofre. For instance, a telling, but relevant quote by PG&E chief seismic consultant, Lloyd Cluff, at the June 10, 2009 DCISC meeting (transcribed below) is a valuable gauge of the seismic realities of the Diablo site.

JANE SWANSON (Mothers for Peace):

“...if there were no nuclear power plant there now, but you had all this knowledge that you have right now about seismicity, would this site be qualified, would it meet Nuclear Regulatory Commission guidelines for siting a nuclear plant or would it be unacceptable for siting a plant given the knowledge you have now?”

LLOYD CLUFF (Seismologist, Pacific Gas and Electric):

Yes, it would be acceptable but it would be a real difficult thing to get licensed. What can I say? We’ve had the most difficult licensing in the world and it’s still a safe site. There are a lot of other places that are safer but I have no question that this is a safe site.”

The Energy Commission, California Public Utilities Commission, and the California Independent System Operator should assess the reliability implications and impacts from implementing California’s proposed once-through cooling policy and regulations for California’s operating nuclear plants. To support the state’s long-term energy planning, Southern California Edison and Pacific Gas and Electric Company should report, as part of the *2010 IEPR Update*, what new generation and/or transmission facilities would be needed to maintain voltage support and system and local reliability in the event of a long-term outage. The utilities should develop contingency plans to maintain reliability and grid stability in the event of an extended shutdown at San Onofre Nuclear Generating Station, Diablo Canyon Power Plant, or the Palo Verde Nuclear Generating Station in Arizona.

The Energy Commission should continue to update information on the comprehensive economic and environmental impacts of nuclear energy generation compared with alternatives. These economic and environmental assessments should consider through or lifecycle impacts. (A4NR emphasis added)

**A4NR Recommendation:** Following NEPA, all foreseeable environmental, economic and reliability impacts should be analyzed to determine if the continued operation of aging reactors and storage of highly radioactive waste on a seismically active coast is in the state’s best interest.

***From pages 27-29***

The following are key policies affecting natural gas and nuclear power plants:

**State Water Resources Control Board's (SWRCB) Once-Through Cooling (OTC) Resolution (2006):** The SWRCB passed a resolution to reduce marine impacts from OTC systems used by 21 coastal power plants in California, including natural gas and nuclear plants. This began a coordinated process between several government agencies to phase out the use of OTC.

- **Assembly Bill 1632 (Blakeslee, Chapter 722, Statutes of 2006):** This legislation directed the Energy Commission to assess the vulnerability of PG&E's Diablo Canyon Nuclear Power Plant (Diablo Canyon) and SCE's San Onofre Nuclear Generating Station (SONGS) to an extended shutdown due to a major seismic event or aging. AB 1632 also called for an examination of potential impacts from the accumulation of nuclear waste at both locations and an exploration of other key issues such as plant relicensing and worker safety

- **Senate Bill 1368 (Perata, Chapter 598, Statutes of 2006):** This bill limited long-term investments in baseload generation by the state's utilities to power plants that meet an emissions performance standard (EPS) jointly established by the Energy Commission and the CPUC.

- **2005 and 2007 IEPR Policy on Aging Power Plants:** In both reports, the Energy Commission recommended that the CPUC require IOUs to procure enough capacity from long-term contracts to allow for the orderly retirement or repowering of aging plants by 2012. In the 2007 IEPR, the Energy Commission recommended that California's utilities adopt all cost-effective energy efficiency measures for natural gas, including replacement of aging power plants with new efficient power plants. In addition, the 2007 IEPR recommended the Energy Commission, the CPUC, the California ISO, and other interested agencies work together to complete studies on the impacts of retiring, repowering, and replacing aging power plants, particularly in Southern California.

The federal government's Clean Water Act (CWA), enacted in 1972, is the primary law governing water pollution in the United States. The CWA implemented a permit system for regulating point sources (for example, industrial facilities) of pollution to be overseen by the U.S. Environmental Protection Agency (U.S. EPA) or states with approved permitting programs, such as California. Section 316(b) of the CWA addresses the adverse environmental impacts caused by cooling water intake structures from power plants and other industrial sources. This section requires that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impacts.

In April 2006, the SWRCB issued a resolution to reduce OTC impacts from existing power plants to comply with the CWA. The SWRCB issued a preliminary proposal to phase out OTC cooling and provided it for review to the Energy Commission, California ISO, and the CPUC. The SWRCB received pertinent feedback from the energy agencies about the ability to maintain reliability while complying with OTC policy. The SWRCB issued a second proposal, but the

energy agencies still had concerns under the proposed schedule. In June 2008, the SWRCB formed the Interagency Working Group to foster communication among seven government agencies. The three energy agencies --the Energy Commission, CPUC, and the California ISO-- were encouraged to propose alternatives to the fixed compliance schedule.

The energy agencies submitted a final strategy in May 2009 that calls for replacing existing OTC facilities with some combination of repowered technologies onsite, new generation located in other areas, and/or upgrades to the transmission system. The SWRCB accepted the proposal and included references to it in its draft OTC policy on June 30, 2009.<sup>14</sup> The OTC concerns relating to grid reliability, with emphasis on Southern California, are discussed in more detail in Chapter 3.

In addition to marine impacts from OTC, the primary concerns regarding the state's nuclear plants relate to the potential for extended outages at the plants from seismic events or plant aging and the absence of a repository for storing the high-level radioactive waste produced at the plants. In addition, the plants pose a small risk of potentially severe impacts from acts of terrorism or accidents.

**A4NR Recommendation:** Regarding the final paragraph in the above quoted section, A4NR recommends that the CEC investigate the nexus between OTC **and** nuclear waste storage issues. Both nuclear utilities will need to maintain OTC to keep their spent fuel pools appropriately cool during the varying 5-10 year cool-down period required before the high-level waste can be placed in on-site dry cask storage. The utilities provided varying responses (conflicting answers remain unresolved) to the exact amount of time required, and the long-term schedule for fully offloading the existing spent fuel pools. The spent fuel pools do require OTC to maintain their correct temperature, and although not using as much OTC water as the primary reactor cooling systems, would still be affected by any legislation or court decisions affecting OTC. Thus, decisions regarding OTC use may be impacted, especially if the extended timeline of a license renewal is considered. A4NR recommends that the CEC review the current NRC GEIS for license renewal and file appropriate comments to reflect the conclusions reached in its IEPR report. At this time, it is unclear if the NRC is planning to consider OTC issues as site specific in the GEIS on license renewal. The CEC should perform further inquiry.

The Energy Commission's report, *An Assessment of California's Nuclear Plants: AB 1632 Report*,<sup>15</sup> adopted as part of the *2008 IEPR Update*, recommended that PG&E and SCE update studies on the seismic hazard at their nuclear plants, investigate plant seismic safety compliance with current codes and standards, describe plant repair plans and timeframes in the event of an earthquake, provide evidence of strong safety cultures (especially at SONGS), and report findings from these studies as part of their license renewable feasibility studies for the CPUC and in future IEPRs.

**A4NR Recommendation:** These studies were *recommended*, but as mentioned earlier on pages 10-11, the utilities **are not on time** to complete these studies. What then are the ramifications? Recommendation: Schedules with dates certain for completion of the studies should be mandated, and no license renewal applications can be filed with NRC until studies are complete, adopted and implemented.

**From pages 41 - 42**

### **Electricity Supply**

The second component of California's electricity system is the power plants that provide electricity supplies. California's system operators must constantly balance supply and demand in real time to provide reliable energy. The availability of generating resources depends on the lead-time involved. Some generators may need a full day to start up while others may be available within minutes. Other generators operate as "spinning reserves," generating less than their capacity but able to ramp up their generation relatively quickly to meet increased demand for electricity. Some resources, like nuclear, coal, geothermal, biomass, and cogeneration, usually run at or near full capacity when operating because of technical constraints, economics, or contracts. Other resources, like hydroelectric, wind, and solar, operate when conditions allow.

To match supply with demand, electricity systems rely on a portfolio of power plants with different operating characteristics. California relies on generating resources that include large hydroelectric, natural gas, nuclear, cogeneration, and renewables (see Figure 2). This mix can vary year-to-year, seasonally, daily, and even hourly.

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<b>Table 1: 2008 Total System Power (GWhs) Fuel Type</b>	<b>In-State</b>	<b>Northwest Imports</b>	<b>Southwest Imports</b>
Coal	3,977	8,581	43,271
Large Hydro	21,040	9,334	3,359
Natural Gas	122,216	2,939	15,060
Nuclear	32,482	747	11,039
Renewables	28,804	2,344	1,384
Biomass	5,720	654	3
Geothermal	12,907	0	755
Small Hydro	3,729	674	13
Solar	724	0	22
Wind	5,724	1,016	591
			0
<b>Total</b>	<b>208,519</b>	<b>23,945</b>	<b>74,113</b>

**A4NR Recommendation:** As noted on the above chart, system wide, the total renewable generation for 2008 is approximately 7/8 that of nuclear power, approaching quality—notable in that most renewables are in a more nascent state than the mature nuclear industry. A4NR recommends that an additional chart should be created indicating the MW added to system power from renewables in the past 1-10 years (year by year) versus MW added from nuclear. It should also indicate MW in projected growth in the next 1-10 years (year by year) for renewables versus nuclear.

**From pages 44-45**

### **Nuclear**

Generation from nuclear power plants represented 44,268 GWhs of California's total system power in 2008. California relies on three nuclear power plants for about 14 percent of the state's overall electricity supply:

**A4NR Question:** What is peak percentage of nuclear power generated in peak versus off-peak periods? A4NR recommends seeing a chart showing the wide fluctuation in nuclear power generation versus demand based on seasonally variability, as ratepayers are affected by pricing differentials based on time of day and season of use.

Diablo Canyon Power Plant: Pacific Gas and Electric owns and operates Diablo Canyon, which has a total generating capacity of 2,220 MW in two units. The Diablo Canyon facility is located near San Luis Obispo, along the coast between San Francisco and Los Angeles....

These plants have been operating for roughly 20 years and are licensed to continue operating for through 2022 (SONGS) and 2024 and 2025 (Diablo Canyon Units 1 and 2, respectively). They provide benefits to California in the form of resource diversity, low operating costs, *relatively low GHG emissions*, and enhanced grid reliability. However, they also pose risks associated with nuclear waste storage, transport, and disposal, as well as potentially severe effects from accidents, acts of nature like earthquakes or tsunamis, or terrorism. (NOTE: A4NR emphasis added)

**A4NR Question:** A4NR requests clarification on how the CEC arrived at the conclusion that nuclear power has “low operating costs.” What criteria were used to arrive at this fiscal conclusion? Do “low operating costs” simply imply a low cost of uranium fuel, or does that take into account the expensive high-cost “O&M” operations and maintenance procedures as evidenced (in the past 5 years) by the replacement of steam generators, reactor vessel heads and turbine rotors at a cost of billions of dollars in ratepayer funded repairs? In another example of potential risks to economical operation and reliability, A4NR requests the CEC to demand clarification from the utilities on the wide discrepancies to their responses to questions on the future costs and availability of uranium fuel supplies. In their data responses to question J4, SCE states that, “it does not anticipate any potential shortage of uranium.” This answer is in direct opposition to PG&E, whose answer to the same question was: “By 2015 there could be a serious shortage of uranium supply to cover the base worldwide requirements.”

**A4NR Recommendation:** With such divergent answers from California’s two major IOUs, the CEC should require backup documentation for these predictions AND should require independent studies of future uranium supplies and projected costs.

California has a moratorium on building new nuclear power plants until a means for the permanent disposal or reprocessing of spent nuclear fuel has been demonstrated and approved in the United States. In 1978, the Energy Commission found that neither of these conditions had been met. In 2005, the Energy Commission reaffirmed these findings and also found that reprocessing remains substantially more expensive than waste storage and disposal and has substantially adverse implications for nuclear non-proliferation efforts.

**A4NR Question:** SINCE 2005, the last CEC update, has there been any significant evidence presented that would change the CEC’s conclusions on waste disposal or the cost of reprocessing?

***From page 79***

***Climate Change Effects on Renewable Infrastructure***

Changes in the environment can also affect renewable energy. Renewable energy depends on natural resources like water, biomass, wind, and the sun, so it can be more sensitive to climate variability than fossil or nuclear energy that relies on geological stores.

**A4NR Recommendation:** Nuclear power has also been affected by climate change internationally due to its dependence on water (inadequate supplies, overheated inland waterways, sea-level rises). For example, in January 2009 inadequate water issues emerged in new reactor plants evidenced in the headline, “Having enough water to cool two more reactors at the Jenkinsville nuclear plant emerged as a top environmental concern of area residents in Columbia, S.C.” (Jan 30, 2009 - The State (Columbia, S.C.). In August 2008, TVA had to reduce power production at the other two Browns Ferry reactors because a power problem in the plants' cooling systems threatened to overheat the Tennessee River. And April 15, 2008, the International Panel on Climate Change forecast that sea levels could rise by up to one-and-a-half metres by the end of this century. (BBC, 4/15/09 UK, Richard Black). On July 4, 2009 the North County Times reported the “San Onofre Beach is eroding at an average rate of close to 2 meters per year. A4NR recommends that the IEPR statement on effects of climate change be modified to indicate that these climate change variables be included as mitigating against continued use and development of nuclear power.

***From page 104***

Marine impacts from once-through cooling (OTC) power plants are another major environmental concern with the state's natural gas and nuclear power plants. As part of an interagency working group, the Energy Commission, CPUC, and California ISO have been working with the State Water Resources Control Board (SWRCB) to outline a proposal to maintain electric grid reliability while reducing OTC in California's 21 coastal power plants. These plants together pump up to 17 billion gallons of ocean, bay, or estuary water each day.<sup>102</sup> The pumping process impinges on fish, invertebrates, and crustaceans, and destroys thousands of fish eggs and larvae, and the heated discharge water also harms marine organisms by increasing the water temperature. The SWRCB has issued a compliance schedule for retiring, refitting, or repowering OTC plants to comply with the federal water policy.

***From pages 108-121 Nuclear Power Plants***

Major policy decisions that will be made in the coming years will shape the next three decades of nuclear energy policy in California. Nuclear plant owners and state officials will face decisions about plant license renewal and OTC at the same time that the federal government is reassessing its approach to nuclear waste disposal. In addition, California is addressing critical environmental issues associated with the electricity sector. The costs and benefits of nuclear power are being reexamined in California and nationwide because of major shifts in policies to limit GHG emissions and encourage new non-fossil fueled electric generation sources.



Nuclear power plants play a significant role in California's energy mix, providing about 14 percent of the state's total electricity in 2008 from two operating in-state facilities, PG&E's Diablo Canyon Power Plant (Diablo Canyon) and SCE's San Onofre Nuclear Generating Station (SONGS), and from the Palo Verde Nuclear Generating Station in Arizona. As part of the *2008 IEPR Update*, the Energy Commission developed *An Assessment of California's Nuclear Power Plants: AB 1632 Report*, which addressed seismic and plant aging vulnerabilities of California's in-state nuclear plants, including reliability concerns. In addition, the report identified a number of other issues important for the state's nuclear policy and electricity planning. These include:

Continuing Nuclear Regulatory Commission (NRC) concerns over safety culture, plant performance, and management issues at SONGS.

The evolving federal policy on long-term waste disposal.

Costs and benefits of nuclear power compared to other resources.

Potential conversion from once-through cooling to closed-cycle wet cooling.

An overarching issue with the state's nuclear facilities is plant license renewal. The NRC operating licenses for California's nuclear plants are set to expire in 2022 (SONGS Units 2 and 3) and 2024 and 2025 (Diablo Canyon Units 1 and 2, respectively).<sup>108</sup> It is unknown whether the NRC will approve applications by PG&E and SCE for 20-year license renewals, but it has yet to deny a single application and has issued license renewals for 54 of the nation's 104 nuclear power reactors. SCE plans to file a SONGS license renewal application in late 2012. PG&E expects to be prepared to file the Diablo Canyon application in early 2010 but has not stated if it will make the filing in 2010 or at some future date.

The NRC license renewal application process determines whether a plant meets the NRC renewal criteria, not whether it should continue to operate.

**A4NR Question:** After reviewing the NRC's draft Generic Environmental Impact Statement for License Renewal (NRC-GEIS), A4NR questions the veracity of the final statement from the excerpt cited above. In NUREG-1437, Revision 1, July 2008 (Docket ID NRC – 2008-0608) the criteria for challenging issues determined to be "generic" or site specific are unclear. A4NR questions the determining threshold for action in recategorizing an issue from generic to site specific if new information comes to light that would make it site-specific. A4NR also questions what design criteria the renewal application is based upon in determining the operating "worthiness" of a plant when there have been over 200 amendments, waivers, temporary orders that alter design criteria at Diablo Canyon and over 400 at SONGS. A4NR also questions the criteria for inclusion of issues (security, spent fuel storage, etc) that are currently being decided in other NRC proceedings, and are at best unclear. The Alliance has reviewed the NRC's Revision and will file comments by new Jan 12, 2010 deadline.

The NRC states, "Once an [operating license] is renewed, state regulatory agencies and the owners of the plant will ultimately decide whether the plant will continue to operate based on factors such as the need for power or other matters within the state's jurisdiction or the purview of the owners."

**A4NR Recommendation:** While A4NR agrees with the NRC statement that state regulatory agencies “...ultimately decide whether the plant will continue to operate,” we believe the order is not set in concrete. And as it will be ratepayers who bear the costs whether the reactors are relicensed or not, A4NR recommends that the state review the results of all studies and reports recommended in the AB 1632 analysis, adopt and implement the recommendations, and only then allow the utilities to file with the NRC for license renewal. This will streamline the process, ensure all state issues are addressed, and reduce unnecessary charges to PG&E and SCE ratepayers. A4NR requests that the CEC obtain estimates or actual costs of what it has cost the public—through state funded challenges—to challenge NRC relicensing proceedings involving issues in which the relicensing criteria was either vague or absent.

The NRC license renewal proceeding focuses on plant aging issues, such as metal fatigue or the degradation of plant components, as well as environmental impacts related to an additional 20 years of plant operation. The NRC has consistently excluded from its proceedings issues raised by states and public interest groups that are not directly related to plant aging or to deficiencies in the environmental impact assessment. For example, during the license renewal proceeding for the Indian Point Power Plant in New York, the NRC dismissed from the proceeding most of the State of New York’s contentions, including those regarding seismic vulnerability, plant vulnerability to terrorist attack...

**A4NR Recommendation:** A4NR requests the CEC, as part of the determining the costs, risks and benefits of continued reliance on nuclear power in California (per AB 1632), to research and present data on the costs to ratepayers in the case of Indian Point (as mentioned above) and for Oyster Creek in New Jersey as well as Vermont Yankee in Vermont, for the use public funds to challenge or defend against the NRC on issues that these states felt were vital to protect the interest of their citizens.

The NRC is in the final stages of considering changes in the way it assesses the probability of a crack forming through the wall of a reactor pressure vessel. If such a crack occurred, it could damage the reactor core or, in rare cases, release radioactive materials into the environment. The probability of crack formation relates directly to the extent of reactor pressure vessel embrittlement, which is the ability of metals that make up the reactor pressure vessel to withstand stress without cracking.

Current regulations require licensees to demonstrate that reactor pressure vessel embrittlement does not exceed a screening limit corresponding to a one-in-200,000-year probability of through-wall crack formation. NRC’s proposed regulations would expand this requirement to a one-in-a-million-year probability, but it would allow for the use of a less conservative methodology for assessing the probability. **The NRC reports that, under the current methodology, ten reactors, including Diablo Canyon Unit 1, are likely to exceed the screening limit during the course of a 20-year license renewal, and, therefore, would not be eligible for license renewal unless they could reduce the embrittlement rate or demonstrate that operating the reactor would not pose an undue public risk.** (NOTE: emphasis added by A4NR)

**A4NR Question:** Although the CEC provided a citation and NRC document discussing embrittlement issues (NUREG 1806), A4NR cannot find in that document specific wording that matches the description by the CEC highlighted in the paragraph cited

above. A4NR requests the specific paragraphs, sentences or charts from which the CEC draws their conclusion that Diablo Canyon Unit 1 is “likely to exceed the screening limit during the course of a 20-year license renewal, and, therefore, would not be eligible for license renewal...” Furthermore, A4NR asks if this embrittlement issue is further complicated by the presence of the increased seismic risk at the Diablo Canyon site.

Both utilities must obtain CPUC approval to pursue license renewal before receiving California ratepayer funding to cover the costs of the NRC license renewal process.<sup>110</sup> The CPUC proceeding will determine whether it is in the best interest of ratepayers for the nuclear plants to continue operating for an additional 20 years. The proceeding will address issues that are important for electricity planning but are not included in the NRC’s application review.

**A4NR recommendation:** A4NR recommends that the CEC, on behalf of California ratepayers and residents, take an active role in the NRC’s GEIS review process. The NRC should review the GEIS and cross reference it with issues of relevance related to the 2005-2009 IEPR for the purpose of determining if the NRC’s categorizing of issues as either site specific or generic is accurate, fair, and in California’s best interest.

The purpose of the CPUC license renewal review is to consider matters within the state’s jurisdiction, including the economic, reliability, and environmental implications of relicensing. For example, the CPUC will consider the cost-effectiveness of license renewal, the role of nuclear power within the state’s loading order, and replacement power options.

To initiate the CPUC license renewal review, PG&E and SCE are required to submit license renewal feasibility assessments to the CPUC.<sup>111</sup> In letters to SCE and PG&E in June 2009, the CPUC emphasized that the utilities must address in their feasibility assessments all the issues raised in the *AB 1632 Report*.<sup>112</sup> The CPUC specifically directed the utilities to undertake the following activities:

Report on the findings from updated seismic and tsunami hazard studies and assess the long-term seismic vulnerability and reliability of the plants.  
Summarize the implications for Diablo Canyon and SONGS of lessons learned from the response of the Kashiwazaki-Kariwa nuclear plant to the 2007 earthquake.

Reassess whether access roads surrounding the plants are adequate for emergency response and evacuation following a major seismic event.

**A4NR Recommendation:** The NRC has an open rulemaking on emergency planning (NOTICES Proposed Generic Communication: NRC Regulatory Issue Summary 2005–02, Revision 1, Clarifying the Process for Making Emergency Plan Changes, 50840–50845 [E9–23683]), and comments are due October 15, 2009. A4NR recommends that the CEC take an active role in evaluating and commenting on the NRC’s proposed rule making.

Study the local economic impact of shutting down the plants as compared to alternative uses for the plant sites.

Report on plans and costs for storing and disposing of low-level waste and spent fuel through 20-year license extensions and plant decommissioning.

Quantify the reliability, economic, and environmental impacts of replacement power options.

**A4NR Recommendation:** It is San Luis Obispo County that will be most heavily impacted by decisions on license renewal. Jobs and revenues could be lost if the state decides it is not in the best interest to relicense Diablo Canyon. Yet opportunities for new renewable jobs, increased revenue from new renewable generation and alleviating the uncertainty of operating aging reactors requiring costly replacements, maintenance and upgrades and storing increasing tons of highly radioactive waste on the County's seismically active coast could far outweigh the losses. A4NR recommends that the CEC direct PG&E to study and report on the potential amount of renewable energy generation and job creation that could be created at the Diablo Canyon site, including possibilities for studying and developing conservation and efficiency programs.

Report on efforts to improve the safety culture at SONGS and on the NRC's evaluation of these efforts and the plant's overall performance (SCE only).

The comprehensiveness, completeness, and timeliness of these activities will be critical to the CPUC's ability to assess whether or not the utilities should apply to the NRC for license renewals. **However, the utilities' reports to date indicate they are not on schedule to complete these activities in time for CPUC consideration** and that they may not be planning to make all their studies available to the CPUC. (NOTE: emphasis added A4NR)

**A4NR recommendation:** All CEC mandated studies and activities must be completed, adopted and implemented before utilities can file license renewal applications with the NRC. It seems appropriate to remind the CEC that Oyster Creek's license renewal process began in July 2004 and the facility received its renewal in spring, 2009, a period of under five years. Therefore, the arbitrary filing dates of 2010 for Diablo and 2012 for SONGS should not place the state or ratepayers at risk from inadequate information.

In October 2008, PG&E commented to the Energy Commission on the draft *AB 1632 Report* that it does not interpret the requirement to submit a license renewal feasibility study to the CPUC as including seismic safety, which it considers to be "outside the scope of license renewal," or those issues "that are not within the CPUC's jurisdiction."

**A4NR Recommendation:** A4NR reminds this Commission and the CPUC that allowing PG&E's interpretation that seismic safety is "outside the scope of license renewal" has the potential to repeat what has proven to be a costly mistake for ratepayers in the past. Original estimates of under \$500 million for the completion of the units had morphed into a final price tag of \$5.7 billion due in large part to corrections for seismic safety concerns.

PG&E also articulated its belief that the plan for the Energy Commission and the CPUC to review the costs and benefits of license renewal and to assess whether or not the utilities should pursue license renewal *"improperly infringes upon the sole jurisdiction of the NRC to determine whether or not nuclear license should be extended."* (NOTE: emphasis added by A4NR)

**A4NR Question:** From which document does PG&E derive their notion of interference with the “sole jurisdiction” of the NRC? In the current NRC GEIS for license renewal, we quote from GEIS Section S.1:

The purpose and need for NRC’s proposed action is to provide an option to continue plant operations beyond the current licensing term to meet future system generating needs. These needs and, ultimately, the decision to operate a nuclear power plant under a renewed operating license are to be determined by State, utility, system, and, where authorized, Federal (other than NRC) decision makers. Unless there are findings in the safety or the environmental reviews that would lead the NRC to reject a license renewal application, **the NRC has no role in energy planning decisions. State regulatory agencies, system operators, power plant owners, and, in some cases other Federal agencies, ultimately decide whether the plant should continue to operate.** From the perspective of the licensee and the State or system regulatory authorities, the purpose of renewing an operating license is to maintain the availability of the nuclear to meet system energy requirements beyond the term of the plant’s current license.

114 PG&E reiterated this point in a letter to the CPUC, specifying that it would provide the information requested in the *AB 1632 Report*, subject CPUC’s jurisdiction.<sup>115</sup> In its letter to PG&E, the CPUC indicated that the requested information is all subject to CPUC jurisdiction since it informs procurement planning

PG&E has not clarified whether it agrees or will refrain from submitting certain studies on account of jurisdictional concerns.

**A4NR Recommendation:** Based on both the above quoted NRC passage, as well as the requirements of AB 1632, A4NR recommends that the CEC and CPUC have every right to request that the required studies be performed, and as the studies are ratepayer funded, that the results of said studies be released to the public.

PG&E is required to submit its license renewal feasibility assessment to the CPUC by June 30, 2011,<sup>117</sup> but does not expect to complete updates to the seismic hazard model and the seismic vulnerability assessment until 2012 and 2013, respectively.<sup>118</sup> Furthermore, PG&E said that it will require ratepayer funding to undertake the 3-D seismic mapping surveys recommended in AB 1632 and that it may use the CPUC license renewal review proceeding as an opportunity to request this funding. If this occurs, the results of these studies will likely not be available for CPUC consideration during this proceeding.

**A4NR recommendation:** The CEC must mandate that all studies, activities and reports recommended by the AB 1632 analysis be complete, adopted and implemented *before* license renewal applications can be filed with the NRC.

A similar issue arises with SCE. The utility plans to submit an application to the CPUC in late 2010 for funding to pursue an NRC license renewal application and to address issues from the *AB 1632 Report* and the CPUC.<sup>119</sup> However, SCE anticipates using this application to also request funding for completing AB 1632 recommended studies.

**A4NR recommendation:** All CEC recommend studies, activities and report recommended by the AB 1632 analysis must be completed, adopted and implemented *before* license renewal applications can be filed with the NRC.

Furthermore, SCE anticipates filing its CPUC application in the third quarter of 2010,<sup>120</sup> but does not anticipate completing the bulk of its studies until the end of 2010. As a result, SCE acknowledges that the application will likely not include results from all of the AB 1632 studies

**A4NR recommendation:** The inability of the utility to complete the required studies in a timely manner—using ratepayer funding—is unacceptable to stakeholders and ratepayers. A4NR recommends that the CEC provide and require a firm schedule with dates certain for completion of the studies before any utility may file for license renewal with the CPUC or the NRC.

### ***Nuclear Waste Issues***

After decades of federal efforts to establish a permanent geologic repository for spent nuclear fuel and high-level waste at Yucca Mountain, Nevada, development of the Yucca Mountain Repository Program is expected to be suspended in 2010. The program has long been challenged by scientific and technical uncertainty about its suitability for isolating the wastes from the environment and has faced staunch political and legal opposition.<sup>122</sup>

President Barak Obama's budget proposal eliminates all funding for development of Yucca Mountain, including further land acquisition, transportation development, and site engineering,<sup>123</sup> and the appropriations bills approved by the House of Representatives and the Senate both adopt his proposal.<sup>124</sup> These bills, which require conference committee reconciliation, would provide the DOE with \$196.8 million in fiscal year 2010 for costs related to oversight activities and participation in the DOE's repository licensing application proceeding before the NRC. This resulted in a nuclear waste management budget cut of \$91.6 million compared with fiscal year 2009,<sup>125</sup> demonstrating the Obama Administration's belief that the Yucca Mountain repository is not a workable solution to the problem of nuclear waste disposal.<sup>126</sup> This represents a major shift in U.S. nuclear waste policy.<sup>127</sup>

Halting development of Yucca Mountain would mean that the federal government has no clear policy in place for the long-term disposal of nuclear waste. Possible options include long-term dry cask storage either at reactor sites or at a few centralized storage facilities, and/or the development of commercial reprocessing.

Secretary of Energy Steven Chu announced in early 2009 that he intends to establish a Blue-Ribbon Commission of experts to investigate alternative solutions to nuclear waste disposal and make recommendations to the Administration. *It is not clear how the Commission will be chosen and how extensive their investigations will be*—the House Appropriations bill provides \$5 million in funding for this commission, but the Senate bill is silent on the matter.<sup>128</sup>

**A4NR recommendation:** The CEC should request that Energy Secretary Chu include seismic experts on the Blue-Ribbon Commission to investigate alternative solutions to nuclear waste disposal. Seismic issues are not exclusively a California issue, but have affected plants from New York State to Ohio and portions of the Midwest as well.

The uncertainty surrounding U.S. nuclear waste disposal policy means that nuclear reactor operators, including PG&E and SCE, can no longer count on transferring spent fuel to a federal nuclear waste repository in the near or medium-term future. As a result, the utilities must continue to store spent nuclear fuel on-site. For California, this means that the 6,700 assemblies of spent fuel (2,600 metric tons of uranium) currently being stored at operating and decommissioned nuclear plants in-state will remain at these sites for the foreseeable future.<sup>129</sup>

**A4NR recommendation:** The CEC must define “the foreseeable future” in a measurable and exact chronological time frame to give an accurate perspective on how long California will allow radioactive waste to be produced on its seismically active and/or eroding coast.

PG&E and SCE have built intermediate-term waste storage facilities at their plants, known as independent spent fuel storage installations (ISFSIs). The ISFSIs at Diablo Canyon and SONGS are currently licensed for 20 years, but they may be eligible for multiple license extensions. The NRC allows spent fuel to be stored at reactor sites in above-ground storage for 100 years and is considering extending that limit by 20 years.

**A4NR Question:** The CEC should provide a citation for the statement “The NRC allows spent fuel to be stored at reactor sites in above-ground storage for 100 years and is considering extending that limit by 20 years. A4NR believes the current policy licenses spent fuel storage canister systems for an initial period of 20 years with a possible extension of 20 additional (total: 40 years).

PG&E and SCE report enough storage space at their respective nuclear plants for all spent fuel generated through the plants’ current licenses.

The utilities have not reported plans to modify their spent fuel pools’ racking to a less dense orientation, as the Energy Commission recommended.<sup>130</sup> However, the density of the spent fuels should decrease as the utilities move assemblies into dry cask storage. Thus far, PG&E has transferred 96 spent fuel assemblies to the Diablo Canyon ISFSI, and SCE has transferred 827 spent fuel assemblies to the SONGS ISFSI.

**A4NR Recommendation:** The CEC should note the following corollary to the above statement: SPENT FUEL POOL DENSITY WILL NOT DECREASE IF A LICENSE RENEWAL IS GRANTED, AND WILL REMAIN FULL FOR UP TO 5-10 YEARS AFTER CESSATION OF PRODUCTION TO ALLOW FINAL FUEL ELEMENTS TO COOL FOR MINIMUM PRE-CASK TRANSFER PERIOD.

With the federal nuclear waste program in limbo, at-reactor storage continues to be the de-facto federal spent fuel storage policy. If Yucca Mountain is permanently abandoned, a federal permanent geologic repository or centralized dry cask storage facility likely will not be available for decades. Consequently,

even if the plants' licenses are not renewed, it is likely that spent fuel will remain at the reactor sites for an extended period. As discussed in the *AB 1632 Report*, on-site ISFSIs would not necessarily restrict the decommissioning of the rest of the site and its conversion to commercial, retail, or other industrial purposes. (NOTE: emphasis added by A4NR)

**A4NR Question:** A4NR has not noticed any suggestions that the Diablo site might ultimately be used for retail purposes; can the CEC please provide a citation that offers retail as a possible conversion after decommissioning.

### ***Once-Through Cooling***

As discussed in the section on natural gas power plants, the SWRCB released a draft policy in June 2009 on the use of coastal waters for power plant cooling.<sup>132</sup> The cooling systems used by the state's operating nuclear power plants are viewed by the SWRCB as larger sources of biological harm to the marine environment than any of the cooling systems used by the state's other coastal plants. The proposed policy calls for coastal power plants to cut water intake by 95 percent to reduce the harmful impacts on marine life. To meet these requirements the nuclear plants would need to be retrofitted for wet cycled closed-cooling, dry cooling towers, or other cooling means. Previous studies have found that for California's nuclear plants, these options would be very expensive and possibly infeasible from an engineering perspective.<sup>133</sup> Therefore, the proposed policy would allow the nuclear plants to be exempted if the utilities demonstrated that the costs of compliance "are wholly disproportionate to the environmental benefits to be gained." The nuclear plants could also be exempted if the utilities demonstrated that full compliance would result in a conflict with the NRC's safety requirements. In both circumstances, the SWRCB could impose less stringent compliance requirements on the plants.

**A4NR Question:** A4NR would like to know which, if any, studies have been completed that indicate what types and what capacity of non-OTC energy could replace nuclear power after 2015 or the end of the current nuclear license periods?

If the SWRCB's policy is approved, the agency will direct PG&E and SCE to commission independent studies of the alternatives to meet the policy requirements. The studies would assess the costs of alternative options for SONGS and Diablo Canyon to meet the requirements of the SWRCB's policy. These studies would be completed within three years of the effective date of the policy. SCE reportedly has its own engineering study underway to assess the options and costs for complying with the proposed policy. The IEPR Committee believes that these studies should be included in the cost-benefit assessment of the plants' license renewal feasibility studies.

**A4NR Question:** On what basis is SCE information regarding OTC policies gathered? SCE failed to provide any answer to CEC question A.01 on the status of OTC in their draft answers made available to the public.

### ***Climate Change Impacts***

One final environmental issue is the potential impact of climate change on the nuclear facilities. The Energy Commission staff report, *Potential Impacts of Climate Change on California's Energy Infrastructure and Identification of*



*Adaptation Measures*, discussed potential impacts of climate change on power plant infrastructure. Power plants located along the coast could be impacted by sea level rise, with the Diablo Canyon nuclear power plant at greatest risk because it pumps cooling water through an intake pipe that takes the full brunt of northern swells from Pacific storms. To avoid shutting down or tripping the units, the facility has had to curtail power twice per storm season (on average) because of debris buildup on the intake screens. The shut downs can last anywhere from 18 hours to several days.

**A4NR Recommendation:** CEC should include in their analysis review of the new studies highlighting the increase in erosion at California beaches, specifically citing San Onofre. The work, by scientists Cheryl Hapke of the USGS, Dave Reid and Bruce Richmond was published in the Journal of Coastal Research. The article is titled "Rates and trends of coastal change in California and the regional behavior of the beach and cliff system."

### **Nuclear Plants and Reliability**

An issue of critical importance to the state for reliability planning is the possibility of a nuclear plant shutdown or even an extended outage, such as the multi-year outage at the Kashiwazaki-Kariwa plant in Japan following a major earthquake. The *AB 1632 Report* found that, given the current transmission system, a prolonged shutdown of SONGS could result in serious grid reliability shortfalls, whereas a prolonged shutdown of Diablo Canyon would generally not pose reliability concerns.<sup>134</sup> However, the *AB 1632 Report* also found that further reliability assessments are needed to fully understand the reliability implications of extended outages at the nuclear plants.

**A4NR Recommendation:** As "a prolonged shutdown of Diablo Canyon would generally not pose (sic) reliability concerns" PG&E's license renewal filing date of 2010 seems arbitrary. The CEC should recommend that all studies, activities, and reports recommended in the AB 1632 analysis be completed, adopted and implemented before ratepayer money can be expended before the utility may file for an NRC license renewal.

In a supporting document appended to the SWRCB's draft ocean cooling policy, the Energy Commission, CPUC, and California ISO noted the difficulties faced by regulators in evaluating the electric system reliability impacts of shutting down either SONGS or Diablo Canyon. Further studies are needed to understand what new generators, transmission lines, and/or demand response initiatives would be needed to prepare for the eventual shutdowns of the nuclear plants or to plan for possible extended outages while maintaining grid stability and local reliability. The need for and cost of these alternate resources should be considered in the cost-benefit assessment of the plants' license renewal feasibility studies and should also be considered in the context of CPUC and California ISO reliability planning. Given the long time frame required for permitting and building new generation and transmission resources, these studies **should** be completed soon. (NOTE: Emphasis added by A4NR)

**A4NR Recommendation:** The CEC should mandate a date certain for the completion of the above studies.

## **Seismic Issues**

Diablo Canyon and SONGS are located along California's seismically active coastline. The plants were designed to withstand large earthquakes without release of radiation or major damage; however, scientific understanding of the coastal fault zones has improved over the decades since the plants were designed, with a new fault discovered offshore of Diablo Canyon just last year. Plant components that do not serve a safety function were designed for less stringent seismic standards than the core of the nuclear plants. A large earthquake could cause enough damage to these components to necessitate extended plant shutdowns—five of the seven reactors at the Kashiwazaki-Kariwa plant in Japan remain shut down more than two years after being damaged by an earthquake.<sup>135</sup>

An extended plant shutdown would have economic, environmental, and reliability implications for ratepayers.<sup>136</sup> The CPUC will therefore consider the risk of an extended outage as part of its license renewal cost-benefit assessment. To support this assessment, the *AB 1632 Report* recommended that utilities update the nuclear plants' seismic assessments, including assessments of the earthquake and tsunami hazards at the plants, the vulnerability of non-safety related parts of the plants, and the time needed to repair the plants following an earthquake. It is crucial that the utilities complete these studies and submit them as part of the CPUC's license renewal review.

**A4NR Recommendation:** Language in the above paragraph needs to be clarified. The sentence reading, "The plants were designed to withstand large earthquakes without release of radiation or major damage" should be re-written to more accurately reflect that "the plants were redesigned to withstand large earthquakes..." In addition, A4NR requests the CEC provide citations that indicate that two reactors at Kashiwazaki-Kariwa are back in operation beyond an initial test period and are in fact generating commercial revenue for the utility. Further, the following information from World Nuclear News of August, 2009 should be evaluated by the CEC with particular attention paid to the cost of replacement energy necessitated by the seismic damage at Kashiwazaki-Kariwa: "Tepco posted a loss of JPY 150 billion (US\$ 1.68 billion) for FY2007 (to 31/3/08) due to the prolonged closure of the plant, followed by JPY 109 billion loss in the first half of FY2008. While no damage to the actual reactors has been found, detailed checks continue, and upgrading of earthquake resistance is required. Major civil engineering works are also required before the reactors resume operation. Overall, the FY2007 impact of the earthquake was projected to be JPY 603.5 billion (\$5.62 billion), three quarters of that being increased fuel costs to replace the 8000 MWe of lost capacity."

In July 2009, the utilities reported to the Energy Commission that they intend to complete these assessments. However, both utilities reported plans to use a probabilistic approach to their seismic hazard assessments rather than the deterministic approach recommended by the AB 1632 Report, and SCE did not commit to using some of the advanced mapping and survey techniques that were recommended.<sup>137</sup> Furthermore, SCE's tight schedule for completing the studies raises questions about how comprehensive its seismic assessment will be. As described above, **the utilities do not intend to complete all the studies in time for submittal to the CPUC with their license renewal feasibility studies.** (NOTE: emphasis added by A4NR)

**A4NR Recommendation:** There is no excuse for the utilities not to comply with the law. A4NR recommends that the CEC “recommendations” become firm mandates, via legislative process if necessary. The CEC must give the needs of ratepayers and stakeholders priority over the whims of the utilities.

PG&E has begun to update the Diablo Canyon seismic hazard and vulnerability assessments and expects these assessments to be completed in 2013.<sup>138</sup> PG&E is using a number of advanced techniques to identify and better characterize fault zones near Diablo Canyon, including multi-beam bathymetry, high-resolution marine magnetics, and aeromagnetic surveys, and is purchasing industry seismic data in the vicinity of the plant.<sup>139</sup> PG&E is also sponsoring research on numerical simulations of near fault ground motions to improve ground motion models.<sup>140</sup> In addition, PG&E is planning to request ratepayer funding to undertake the three- dimensional geophysical seismic reflection mapping surveys recommended in the AB 1632 Report and required by AB 42 (Blakeslee).<sup>141,142</sup> PG&E will not include the United States Geological Survey National Hazard Mapping Project models in its studies because the models do not include detailed information pertinent to the Diablo Canyon area. Instead, PG&E believes that information developed in its own studies will inform the USGS databases.<sup>143</sup>

**A4NR Recommendation:** As the public will be held fiscally responsible for seismic impacts and/or upgrades, and as this information is not a security or proprietary concern, A4NR requests that the CEC recommend that the results of all studies, reports, reviews, etc, be included in the public record before the CPUC, the CEC, the legislature (upon request) and/or the NRC.

PG&E has already completed initial assessments of two specific seismic hazards In the area of Diablo Canyon, concluding that seismic activity that could be generated by the newly discovered Shoreline Fault is within the design margins of Diablo Canyon. (The NRC’s preliminary assessment concurs with this conclusion.)<sup>144</sup> PG&E is conducting additional geophysical studies and will provide a final report in December 2010.<sup>145</sup> PG&E has similarly concluded that new estimates of the near fault ground motions from large strike-slip earthquakes, including directivity and maximum component effects, reveal a lower hazard than previously thought and therefore do not represent an increased hazard to Diablo Canyon.<sup>146</sup>

**A4NR Recommendation:** The CEC must include all **independent** reviews of PG&E’s interpretation of the newly discovered Shoreline fault used by the NRC in their preliminary assessment that concurs with PG&E’s conclusion that the fault is within the design margins of Diablo Canyon.

Research indicates that SONGS could experience larger and more frequent earthquakes than was anticipated in the original plant design and that additional research is needed to characterize the site’s seismic hazard at the site. The *AB 1632 Report* recommended that SCE develop an active seismic research program for SONGS, similar to PG&E’s Long Term Seismic Program, to assess whether the plant has sufficient design margins to avoid major power disruptions.

As of July 2009, SCE had not begun its updates to the SONGS seismic hazard and vulnerability assessments. Yet, the utility states that it expects to complete these by the end of 2010.<sup>147</sup> The studies are to include seismic source characterization, review of GPS data, probabilistic seismic hazard analysis modeling, review of earthquake recurrence relationships, ground motion updates for current attenuation relationships, review of new tsunami data from the University of Southern California and the National Oceanic and Atmospheric Administration, and an assessment of the reliability implications of the plant's non-safety related components.<sup>148</sup>

It is not clear whether SCE can complete all of these studies in a comprehensive manner by the end of 2010. Indeed, the utility has not committed to using three-dimensional geophysical seismic reflection mapping and other advanced techniques as part of these studies or to installing a permanent GPS array. Instead, SCE committed only to evaluating the costs and benefits of these techniques,<sup>149</sup> an evaluation the Energy Commission has determined should be conducted by state agencies, not the utilities.<sup>150</sup> It remains to be clarified whether SCE plans to collect any new data on the seismic hazards in the SONGS region or whether it is planning simply to review currently available data. (NOTE: Emphasis added by A4NR)

**A4NR Recommendation:** The CEC must demand clarification on SCE's intent to collect new seismic data. Absent that data, SCE appears to be flaunting the requirements of Ab 1632.

SCE established a Seismic Advisory Board to guide and review the SONGS seismic studies.<sup>151</sup> SCE plans for the board to periodically review the seismic hazard at SONGS and to determine the need for new research and investigations into the plant's seismic setting. As currently structured, the board includes geologists from PG&E and private consultants in geology, seismology, and structural engineering who are familiar with the SONGS plant from previous work for SCE.<sup>152</sup> It includes just one expert not previously employed by SCE or currently employed by PG&E. This is unfortunate since a more independent advisory board would likely contribute to stronger studies. (NOTE: emphasis added by A4NR)

**A4NR Recommendation:** A4NR agrees with the CEC's conclusion and recommends that more independent seismic experts without ties to the utilities in question be appointed to the SCE Seismic Advisory Board.

### ***Nuclear Plant Safety Culture***

The state is concerned with a number of other issues that may affect the decision on whether the utilities should pursue plant relicensing. These include the reliability implications of lapses in the safety culture at SONGS and plans for emergency evacuations from both plants.

In 2007, the NRC identified a number of concerns about the safety culture at SONGS, particularly with respect to human performance and problem identification and resolution. Since then, SCE's management put a new leadership team in place at SONGS and instituted a series of safety reforms and monitoring programs.<sup>153</sup> For example, SCE implemented safety improvement plans and conducted extensive evaluations to identify the root causes of safety

lapses. The utility also instituted weekly monitoring of core performance indicators, established weekly site-wide meetings on human performance and safety issues, set up a system for employees to voice their concerns regarding safety issues, and conducted a safety culture assessment.

The NRC recently concluded that these improvements were not adequate in addressing the overall safety culture at SONGS. The NRC was particularly concerned that it had identified problems in the areas of human performance and problem identification and resolution over the course of four consecutive assessments, including its most recent assessment in September

During the September 2009 assessment, the NRC also identified an additional safety-related issue of “failing to use conservative assumptions” in decision-making.<sup>155</sup>

As a result of these safety culture failures, the NRC intends to maintain the additional oversight that it initially imposed over SONGS in December 2008. At that time, the NRC discovered that a battery used to power a backup generator at the plant had been inoperable since 2004. Although the NRC ranked this as a finding of low to moderate safety significance, the agency noted that the persistence of the problem for four years pointed to inadequate maintenance procedures for the plant overall. The NRC also expressed dissatisfaction that SONGS’ self-evaluations had not identified seven other problems at the plant.<sup>156</sup>

In light of these performance lapses, Senator Barbara Boxer and California State Senator Christine Kehoe wrote to the NRC expressing concern about SCE’s fall 2009 steam generator replacement project. The NRC responded by expressing confidence in SCE’s ability to complete the project safely without any additional restrictions or NRC oversight. This is consistent with the NRC’s position that, while SONGS’ progress in improving safety culture has been inadequate, the plant continues to be operated in a safe manner.<sup>157</sup>

Lack of progress may also be evident in reduced plant performance. SONGS’s 2008 capacity factor was just 81 percent,<sup>158</sup> significantly lower than the 92 percent industry average.<sup>159</sup> This relatively low level of availability was partially the result of Unit 3’s refueling outage extending 66 days,<sup>160</sup> 28 days longer than the industry average.<sup>161</sup>

Improvements to the safety culture and plant performance at SONGS will be reflected in improved ratings by the NRC and INPO and by shorter outages and higher capacity factors. If sufficient improvements are not demonstrated in the coming years, the implications of sustained safety culture lapses and the possible impact on reliability of the plants will need to be considered as

An additional issue is emergency evacuation planning. The *AB 1632 Report* recommended that the utilities reassess the adequacy of plant roads for allowing access for emergency response teams and for allowing local communities and workers to evacuate. The report recommended that this reassessment be conducted as part of license renewal studies to ensure that plant assets would be protected in an emergency. PG&E has commissioned a study, to be completed in early 2010, on evacuation time estimates for Diablo Canyon.<sup>162</sup> SCE did not

indicate whether it plans to conduct a study on SONGS's access roads and evacuation times.

**A4NR Recommendation:** The NRC has set forth a rulemaking on Emergency Planning mentioned earlier in A4NR comments, and public comments are due October 15, 2009. A4NR requests that the CEC recommend that public comments on emergency planning and the NRC's final conclusion are included in any further studies, reports, analyses on nuclear power for the CEC. In addition, A4NR requests that the CEC require SCE to explain why, if PG&E is conducting a study on evacuation planning and access roads, SCE is not or cannot.

### **Nuclear Plants and the Economy**

Other cost issues relating to nuclear power plants include security (to protect sites from terrorism and theft), plant decommissioning, and nuclear waste storage, transport, and disposal. The federal Nuclear Waste Policy Act of 1982 made the federal government responsible for the permanent disposal of spent nuclear fuel and high-level waste....

If a federal repository is established, spent fuel will need to be packaged for transport, aging, and disposal (TAD). Dry cask storage, an interim storage solution, **could prove costly to utilities in the long-term**, especially if they need to pay to transfer their fuel from their dry casks into federally approved TAD casks. The nuclear plants will also need to dispose of a substantial quantity of low-level radioactive waste when they are decommissioned, and the cost to transport and dispose of this waste is expected to be hundreds of millions of dollars or more. (NOTE: emphasis added by A4NR)

**A4NR Recommendation:** As the AB1632 language calls for determining the **costs**, risks and benefits of relying on nuclear power, we request that actual costs begin to be estimated or placed on these potential economic pitfalls, as highlighted above. The CEC and their consultants have done a fairly thorough job of listing and evaluating the risks and benefits, but data so far has been scant on actual costs and estimates.

### ***From pages 224-226***

#### ***Nuclear Plants***

To help ensure plant reliability and minimize costs, PG&E and SCE should complete and report in a timely manner on the studies recommended in the *AB 1632 Report* which the CPUC identified for completion as part of their license renewal review. These reports should be made available to the Energy Commission, as part of the IEPR process, and to the CPUC for their license renewal review. Once a utility completes the required studies and makes them available to the Energy Commission and the CPUC **for review**, the utility may then file license renewal applications with the CPUC and the U.S. Nuclear Regulatory Commission (NRC). These studies should include: (NOTE: emphasis added by A4NR)

**A4NR Question:** What is meant by the use of the word "review" in the above paragraph. Beyond "review," A4NR requests that the CEC mandate that all studies recommended in the AB 1632 Report be completed, adopted and implemented before a license renewal application can be filed with the NRC.

- o Reporting on the findings from updated seismic and tsunami hazard studies, including results of 3D seismic imaging studies, and assessing the long-term seismic vulnerability and reliability of the plants.
- o Summarizing the implications for Diablo Canyon and San Onofre Nuclear Generating Station (SONGS) of lessons learned from the response of the Kashiwazaki-Kariwa nuclear plant to the 2007 earthquake.
- o Reassessing whether plans and access roads surrounding the plants, following a major seismic event and/or plant emergency, are adequate for emergency response to protect the public, workers and plant assets and for timely evacuation following such an event.
- o Studying the local economic impact of shutting down the plants as compared to alternative uses for the plant sites.
- o Reporting on plans and costs for storing and disposing of low-level waste and spent fuel through 20-year license extensions and plant decommissioning using current and projected market prices.
- o Quantifying the reliability, economic, and environmental impacts of replacement power options.

**A4NR Recommendation:** A4NR requests that the CEC define “quantifying” particularly with regards to specific “dollars and cents.”

- o Assessing the options and costs for complying with the proposed State Water Resources Control Board (SWRCB) once-through cooling policy. These studies should be included in the cost-benefit assessment of the plants’ license renewal feasibility studies.
- o Reporting on efforts to improve the safety culture at SONGS and on the NRC’s evaluation of these efforts and the plant’s overall performance (SCE only).
  - The CPUC should assess the need to establish a SONGS Independent Safety Committee patterned after the Diablo Canyon Independent Safety Committee.
  - The Energy Commission should continue to monitor Nuclear Regulatory Commission and the Institute of Nuclear Power Operations reviews of Diablo Canyon and SONGS, and in particular monitor plant performance and safety culture at SONGS.
  - The Energy Commission should continue to monitor the federal nuclear waste management program and represent California in the Yucca Mountain licensing proceeding to ensure that California’s interests are protected regarding potential groundwater and spent fuel transportation impacts in California.
  - The Energy Commission should continue to participate in DOE and regional planning activities for nuclear waste transportation.
  - The Energy Commission, CPUC, and the California ISO should assess the reliability implications and impacts from implementing California’s proposed once-through cooling policy and regulations for California’s operating nuclear plants

To support the state's long-term energy planning, SCE and PG&E should report, as part of the *2010 IEPR*, what new generation and/or transmission facilities would be needed to maintain voltage support and system and local reliability in the event of a long-term outage at Diablo Canyon, SONGS or Palo Verde. The utilities should develop contingency plans to maintain reliability and grid stability in the event of an extended shutdown at SONGS, Diablo Canyon, or Palo Verde.

- The Energy Commission should continue to update information on the comprehensive economic and environmental impacts of nuclear energy generation compared with alternatives. These economic and environmental assessments should consider “cradle to grave” or lifecycle impacts.
- The SONGS’ Seismic Advisory Board should include greater representation from independent seismic experts, such as university or government scientists and/or engineers, with no current or prior employment with the plant owners or their consultants.
- The Diablo Canyon Independent Safety Committee should evaluate reactor pressure vessel integrity at Diablo Canyon over a 20-0year license extension and recommend mitigation plans, if needed. This review should consider the reactor vessel surveillance reports for Diablo Canyon in the context of any changes to the predicted seismic hazard at the site.

**A4NR recommendation:** Regarding the final point, “The Diablo Canyon Independent Safety Committee should evaluate reactor pressure vessel integrity at Diablo Canyon over a 20-0year license extension and recommend mitigation plans, if needed,” A4NR reminds the CEC that the Diablo Canyon Independent Safety Committee has no authority to make any requests or requirements of PG&E and any such matter would fall under the purview of the NRC.

Respectfully Submitted

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