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**DOCKET**

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California Energy Commission  
Dockets Office, MS-4  
Re: Docket No. 07-AB-1632 and 08-IEP-1F  
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Sacramento, CA 95814-5512

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:

**Comments of the Alliance for Nuclear Responsibility, et al\*  
regarding the CEC's Assessment of AB 1632**

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**Seismic Hazards at Diablo Canyon**

The distinction is significant for the ground motion hazard at the Diablo Canyon site: a strike-slip fault is steeply (i.e. close to vertically) inclined, and a thrust fault has a shallower angle and extends diagonally beneath the surface. If the Hosgri Fault were a thrust fault with an eastward dip, the fault would extend closer to the Diablo Canyon site, and the ground motion from an earthquake could be greater.

While it is vital that this "significant distinction" be addressed *before* license renewal applications are allowed to be filed with the Nuclear Regulatory Commission, it is also in the state's best interest to ensure that any new scientific and/or technological developments that are discovered and/or developed post license renewal application be included in future IEPR's for our state's energy planning

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Current published geologic and seismologic research literature, much of which has been developed through PG&E's Long-Term Seismic Program (LTSP),<sup>5</sup> supports the interpretation that the Hosgri Fault is characterized by strike-slip faulting. Experts with the U.S. Geological Survey (USGS), the California Geological Survey, and the Southern California Earthquake Center have accepted the strike-slip characterization for the

Hosgri Fault. However, a minority of scientists disagree with this characterization and believe that the Hosgri Fault is a thrust fault.

It appears clear from the CEC analysis that the Commission believes the Hosgri fault is a strike-slip fault; yet a thrust component remains a concern. The percentage of thrust component in the NRC's "separate" evaluation of 33% cited in the following paragraph is assumed to ensure that the Diablo Canyon reactors are within sufficient safety margins. The Alliance for Nuclear Responsibility (A4NR, et al) has several concerns about the NRC's findings regarding safety margins in plant design. Many of these doubts were brought to the NRC's attention in original licensing proceedings. However, the CEC's recommendation to update seismic information to include current scientific and technological theories and capabilities is an excellent step to reduce those concerns and should be completed *before* the state allows license renewal applications to be filed. In addition, this should be an ongoing process until current licenses for Diablo Canyon expire.

PG&E has not published an analysis showing the implications of 100 percent thrust faulting on the safety of the plant, and such an interpretation is extreme in the context of the current professional consensus.

The CEC report finds 100 percent interpretation of a thrust fault extreme and while this may be true, the reason for this statement is unclear to the reader.

The deep geometry of faults that bound the San Luis-Pismo structural block, where Diablo Canyon sits, is not understood sufficiently to rule out a San Simeon-type earthquake directly beneath the plant. It is necessary to better define the deep geometry of bounding faults of the San Luis-Pismo block and to better understand the lateral continuity of these fault zones. Although these fault zones are unlikely to replace the Hosgri Fault as the dominant source of seismic hazard at the plant, improved characterizations of these fault zones would refine estimates of the ground motion that is likely to occur at different frequencies. This information may be significant for engineering vulnerability assessments.

The Alliance for Nuclear Responsibility, et al, encourages the state to request the USGS research the characterizations of the above fault zones *before* license renewal applications are allowed to be filed with the NRC. In addition, the aging process may have resulted in weaker safety margins should a 7.5 magnitude earthquake event occur on the Hosgri fault or in other faults yet to be analyzed. Both updated USGS characterizations and aging implications should be assessed for "engineering vulnerability assessments" *before* license renewal applications are allowed to be filed with the NRC for Diablo Canyon. However, this information should be reviewed again in future IEPR's as new information is gathered between now and the end of the current licenses for Diablo Canyon.

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**Recommendations**

1. The Energy Commission acknowledges PG&E's ongoing efforts to understand the seismic hazards affecting the Diablo Canyon site, and recommends that this work continue. As part of future IEPR assessments, PG&E should report to the Energy Commission on the results of its research efforts. As ground motion models are refined to account for a greater understanding of the motion near an earthquake rupture, it will be important for PG&E to consider whether the models indicate larger than expected seismic hazards at Diablo Canyon and, if so, whether the plant was built with sufficient design margins to continue operating reliably after experiencing these amplified ground motions.
2. The California Energy Commission, in cooperation with other appropriate state agencies and in coordination with PG&E, should evaluate the degree to which using three-dimensional geophysical seismic reflection mapping should be pursued, if warranted by a cost-benefit analysis, to supplement PG&E's ongoing seismic research programs to resolve uncertainties surrounding the seismic hazard at Diablo Canyon. Given the potential for an extended plant shutdown following a major seismic event, the Energy Commission, in consultation with appropriate state agencies, should evaluate whether these studies should be part of the Diablo Canyon license renewal feasibility study for the CPUC.

The Alliance for Nuclear Responsibility, et al, fully supports using three-dimensional geophysical seismic reflection mapping. Yet no matter the cost, the benefit of having a truer understanding of whether aging nuclear reactors will be able to withstand *all* faulting within 20 miles of the Diablo Canyon Nuclear Plant likely pales in comparison to the costs to the state of not fully understanding the risks of a large earthquake at Diablo Canyon. As many of our supporters live within the fallout zone of Diablo Canyon, this information is vital to understanding all ramifications of continued operation of PG&E's aging reactors to our community.

A4NR, et al, believe that in addition to an extended plant shutdown due to a seismic event, the costs of a radioactive release to homeowners, businesses and the state are additional unknowns and require analysis.

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1. PG&E should assess the implications of a San Simeon-type earthquake beneath Diablo Canyon. This assessment should include expected ground motions and vulnerability assessments for safety-related and non safety-related plant components that might be sensitive to long-period motions in the near field of an earthquake rupture.
2. The California Energy Commission, in cooperation with other appropriate state agencies, should consider the relevance of the USGS National Seismic Hazard Mapping Project models and the UCERF-2 database in the context of studies required as part of the license renewal feasibility assessment at Diablo Canyon for the CPUC. Updated seismic hazard analyses incorporating these inputs would

provide additional information for regulators and the public regarding the seismic hazard at the plant site.

3. As ground motion models are refined to account for a greater understanding of the motion near an earthquake rupture, it will be important for PG&E to consider whether the models indicate larger than expected seismic hazards at Diablo Canyon and, if so, whether the plant was built with sufficient design margins to continue operating reliably after experiencing these amplified ground motions.

A4NR, et al, fully supports the above recommendations and further requests that the state freeze any license renewal application filing until all these questions are resolved. Furthermore, we request that this information be updated in future IEPR's as new scientific and technological advances are made within the current operating licenses for Diablo Canyon.

### **Seismic Hazards at SONGS**

A recent review by the California Coastal Commission in connection with the construction of a proposed spent fuel storage facility states, "there is credible reason to believe that the design basis earthquake approved by U.S. Nuclear Regulatory Commission (NRC) at the time of the licensing of SONGS 2 and 3 ... may underestimate the seismic risk at the site."

This new information does not necessarily imply that the facility is unsafe. Since the plant was engineered with a large margin of safety, it likely would withstand earthquakes of greater magnitude and frequency than originally expected. However, the possibility that the safety margin is shrinking suggests that further study is necessary to characterize the seismic hazard at the site, especially since much less is known about the seismic setting of SONGS than the seismic setting of Diablo Canyon. While SCE periodically evaluates the implications of new seismic data that become available, there is no ongoing program at SONGS similar to PG&E's Long-Term Seismic Program at Diablo Canyon.

There is nothing in the previous two or the following two paragraphs--filled with qualifying words--that eases the public's mind that the SONGS aging reactors are adequately engineered to withstand a design basis earthquake. Therefore, A4NR, et al, requests that further independent scientific analyses, including three-dimensional seismic reflection and mapping, be completed and all seismic issues resolved *before* any further funding for license renewal studies is charged to ratepayers. Absent the CPUC's willingness to withhold these funds, A4NR, et al, requests that the state prohibit the filing of license renewal applications until all seismic issues at SONGS are resolved. Furthermore, we request that this information be updated in the CEC's IEPR as new scientific and technological advances are made until current licenses expire.

The major uncertainties regarding the seismology of the SONGS site relate to the continuity, structure, and earthquake potential of a nearby offshore fault zone (the South Coast Offshore Fault Zone) that connects faults in the Los Angeles and San Diego regions . There is also uncertainty regarding the potential for blind thrust faults near the plant. Well planned, high-quality three-dimensional seismic reflection data at strategically chosen locations may resolve many of the remaining uncertainties and might change current estimates of the seismic hazard at the plant.

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When SCE incorporated some of these developments into the seismic hazard assessment for SONGS, SCE found that the safety margins at the plant are less than previously believed. SCE is currently assessing the applicability of updated ground motion modeling for the SONGS site.

### **Recommendations**

1. SCE should develop an active seismic hazards research program for SONGS similar to PG&E's LTSP to assess whether there are sufficient design margins at the nuclear plant to avoid major power disruptions. The research program should prioritize and include further investigations into the seismic setting at SONGS and should assess whether recent or current seismic, geologic, or ground motion research in the vicinity of SONGS has implications for the long-term seismic vulnerability of the plant. As part of the Energy Commission's future IEPR assessments, SCE should report to the Energy Commission on the results of its seismic research efforts.
2. The California Energy Commission, in cooperation with other appropriate state agencies and in coordination with SCE, should evaluate the degree to which new research programs should be pursued using three-dimensional seismic reflection mapping and a permanent GPS array for resolving seismic uncertainties offshore near SONGS, if warranted by a cost-benefit analysis. Given the potential for an extended plant shutdown following a major seismic event, the Energy Commission, in consultation with appropriate state agencies, should evaluate whether these studies should be required as part of the SONGS license renewal feasibility assessments for the CPUC.
3. The California Energy Commission, in cooperation with other appropriate state agencies, should consider the relevance of the USGS National Seismic Hazard Mapping Project models and the UCERF-2 database in the context of studies required as part of the license renewal assessments at SONGS for the CPUC. Updated seismic hazard analyses incorporating these inputs would provide additional information for regulators and the public regarding the seismic hazard at the plant site.

A4NR, et al, requests that all recommendations should be required, completed and resolved *before* the state allows license renewal applications to be filed. In addition, we

request that this information be updated in CEC IEPR's until current licenses for SONGS expire.

## **Tsunami Hazards at Diablo Canyon and SONGS**

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currently available tsunami studies for both plants are at least 10 years old and do not take advantage of modern tools that could improve the quality of the assessments, such as probabilistic hazard assessments, inundation modeling, and new data from the National Oceanic and Atmospheric Administration. Second-generation tsunami run-up maps being prepared by the University of Southern California for evacuation planning purposes may also provide relevant information for tsunami hazard assessments at the plant sites.

SCE does not have plans to reassess the tsunami hazard at SONGS and has not reassessed this hazard since the plant was designed.

The fact that the NRC did not and has yet to require coastal reactors to update tsunami hazards after the 2004 Indonesian tsunami is yet another indication to the public that the state must mandate these studies be completed and any modifications in place *before* license renewal applications are allowed to be filed with the NRC.

### **Recommendation**

1. PG&E and SCE should review the tsunami hazard at their nuclear plants in light of recent research and improved scientific understanding of tsunamis. SCE should assess SONGS' tsunami vulnerability after new data from the National Oceanic and Atmospheric Administration for the SONGS site and adjacent coastal areas become available. SCE should also assess the relevance of the University of Southern California second-generation tsunami run-up maps for the tsunami hazards at their nuclear plant sites. PG&E should provide to the Energy Commission the results of the updated Diablo Canyon tsunami hazard study as part of a future IEPR assessment.

A4NR, et al, supports the CEC's recommendation and would further request that no license renewal study money be granted to SCE from its ratepayers *before* SCE's tsunami hazard study is resolved. Absent the CPUC's will do withhold funding for the license renewal study, no license renewal applications should allowed to be filed by either PG&E or SCE until studies are complete and issues identified are resolved.

A4NR, et al, would add that although PG&E's Humboldt nuclear plant is no longer operating the site will be storing highly radioactive waste and this site also should be included in updated tsunami hazard studies to determine economic impacts to the community and the state should a radioactive release result from a tsunami hazard.

### **Vulnerability of Power Plant Buildings and Structures**

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Damage to non-safety related SSCs could pose risks of injury and loss of life to plant workers and occupants but damage would not pose a direct safety hazard to the public; however, it could result in extended outages for repairs lasting weeks or months. The seismic-related reliability risk of non-safety related SSCs is not well understood in large part because the nuclear industry and the NRC historically have focused on safety-related SSCs. PG&E's representatives recognized this information gap at the Energy Commission's September 25, 2008 public workshop on the draft consultant report, and SCE confirmed in written comments to the Energy Commission that there are no studies that assess the seismic vulnerability of non-safety related SSCs at SONGS.

A4NR, et al, wonders which agency in California has the authority to require that non-safety related SSCs are completed and the results implemented *before* SCE and/or PG&E can file applications to the NRC for license renewals. Whichever agency this may be, A4NR, et al, requests these studies begin immediately.

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For Diablo Canyon, the switchyard through which the plant's energy is transmitted out into the grid is located on deep fill and therefore is particularly vulnerable to damage. ..In short, an earthquake could cause damage resulting in the failure of a switchyard that would cause a loss of power from the plants to the transmission grid, but the reactor units would continue to have a source of off-site power in addition to the onsite emergency diesel generators.

A4NR, et al, is aware of the industry-wide failure of onsite emergency diesel generators and requests that the CEC disclose how many failures have occurred at reactors nationwide in the past 10 years. In addition, as failures occur in the future at the nation's aging reactors the CEC should request to be notified and this information incorporated in the Commission's IEPR's.

Given the evolution of seismic design standards since these reactors were designed in the 1970s and early 1980s, non-safety related SSCs at Diablo Canyon and SONGS may be less seismically robust than if those same SSCs were built to current standards. A full understanding of the vulnerability of Diablo Canyon and SONGS to a major disruption of operations as a result of seismic events is incomplete without an analysis of the implications of the evolution of seismic design standards since these plants were designed and built. Such an analysis would need to consider any retrofits to SSCs that PG&E and SCE may have completed.

A4NR, et al, fully supports an analysis of the implications of the evolution of seismic design standards since Diablo Canyon and SONGS were designed and built-including retrofits. This analysis should be completed and all components updated to current standards *before* license renewals are allowed to be filed for either reactor facility.



. Estimates of time to repair or replace nuclear plant components are very uncertain since this information is not readily available.

A4NR, et al, has little doubt that public or regulatory concerns would, not “could” delay a restart of the power plant. Historical data on state and public concerns have resulted in safer operations and demonstrated that delays in operation of California’s reactors would occur. We request “could” be replace with would.

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Nevertheless, more than a year after the earthquake, the KK NPP remains shut down. Extensive investigations and a re-evaluation of the seismic design standards for the plant appear to be the primary cause of the lengthy shut-down, suggesting that repairing or replacing damaged components may be just one factor in how long a nuclear power plant is shut down following a major seismic event. Research and investigations into the earthquake and the root causes of damage at the nuclear power plant are ongoing; the Energy Commission and California’s nuclear plant owners should stay informed as new information becomes available.

As the CEC has reported, Japan is a recent example of outages lasting longer than a year due to an earthquake. Even though most nuclear industry insiders reported that the reactors shutdown safely at the Kashiwazaki-Kariwa plant, the plant’s owner, Tepco, stated it could cost Tepco 200 billion yen (\$1.9 billion), halving its projected pre-tax profits for fiscal year (2007). Updates for Tepco’s losses must be known, but A4NR, et al, does not have citations, we request the CEC to investigate the full costs today of the Kashiwazaki-Kariwa quake. The eight reactors were not expected to be back on line for two years –if ever.<sup>1</sup>

As of July 21, 2007, TEPCO had identified a total of 63 problems. Fifteen of these were related to radioactivity. The spent fuel pools of all 7 units overflowed, although it is reported that only unit 6 involved a release of radioactivity to the environment, yet the ducts in the exhaust stack of all reactors were displaced. There was also some radioactivity found in a massive pool of water from damaged pipes in the fire extinguishing system of unit 1 (40 cm deep (1,670 m3), fifth floor basement, auxiliary building). These certainly sound like safety-related impacts to A4NR, et al.<sup>2</sup> A4NR, et al, requests the CEC closely and continually monitor information from the K-K quake in IEPR’s until the end of current licenses for Diablo Canyon and SONGS>

A4NR requests that the CEC include all costs from the Kashiwazaki-Kariwa earthquake driven outage in its next IEPR and update it yearly as an example of known expenditures related to earthquake-related outages..

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<sup>1</sup> [http://theaustralian.news.com.au/story/0,,22120063-36375,00.html?from=public\\_rss](http://theaustralian.news.com.au/story/0,,22120063-36375,00.html?from=public_rss)

<sup>2</sup> Citizens' Nuclear Information Center 2F-B Akebonobashi Coop, 8-5 Sumiyoshi-cho, Shinjuku-ku, Tokyo, 162-0065, Japan Phone: +81-3-3357-3800 Fax: +81-3-3357-3801 Email: [cnic@nifty.com](mailto:cnic@nifty.com) Web: <http://cnic.jp/english/>



## Recommendations

The Energy Commission recommends that PG&E and SCE do the following and report on their progress as part of future IEPR assessments:

1. Investigate and report their findings on the extent to which their respective plants' non-safety-related systems, structures, and components (SSCs) comply with current building codes and seismic design standards for non-nuclear power plants.

While it would be impossible to know what updated building codes seismic design standards for non-nuclear power plants may require, grandfathering Diablo Canyon and SONGS non-safety related systems into "current" building codes without analyzing the implications from new requirements could prove costly to the state's economy and understate future reliability of both aging nuclear and onsite waste facilities. Therefore, A4NR requests that new building codes and seismic designs for non-nuclear plants be analyzed in future IEPR's.

2. Evaluate the implications for the seismic vulnerability of the nuclear plants' non-safety related SSCs of seismic design standard changes that have occurred since the plants were designed and built. Such an analysis should consider any retrofits that the plant owners may have undertaken and should focus on those plant systems or components whose failure could lead to an extended outage.
3. Provide a description of plant component repair/replacement plans including initial estimates of time needed to repair or replace key plant systems or components that could cause a prolonged plant outage as a result of being damaged. This should include the time to repair or replace components that are likely to fail during an earthquake, and should consider the fragility of components both in their operating positions and when removed from the reactor for refueling or plant maintenance.
4. Using research on lessons learned from the 2007 earthquake at the Kashiwazaki-Kariwa nuclear plant, evaluate the implications for California's operating nuclear power plants, including whether any additional pre-planning could minimize plant outage times following a major seismic event. As part of their license renewal feasibility analyses for the CPUC, PG&E and SCE should summarize the lessons learned from the KK NPP experience in response to the 2007 earthquake and any implications for Diablo Canyon and SONGS .

A4NR, et al, requests that the current known costs of this "successful shutdown" to the Japanese economy be included in the CEC's final report and in consequent IEPR's until/if the reactors are placed back in service..

A4NR et al, supports the above recommendations and requests that these updates continue as part of the IEPR. Furthermore, until these studies are complete and reviewed by independent experts and all problems have been resolved no license renewal applications should be allowed to be filed with the NRC for Diablo Canyon or SONGS.

## Vulnerability of Spent Fuel Storage Facilities to Seismic and Terrorist Events

After nuclear fuel has been used (spent), it must be stored safely prior to disposal. There are two types of storage for spent fuel: pool and dry cask storage. SCE uses both pools and dry cask storage facilities to store the spent fuel from SONGS. PG&E is currently using pools to store all of the Diablo Canyon spent fuel and is constructing dry cask storage facilities for future use. The spent fuel pools and dry cask storage facilities at Diablo Canyon and SONGS have been designed to sustain a design basis ("safe shutdown") earthquake at the plants, and they are unlikely to fail due to an earthquake.

A4NR submits that the contention to review the seismic adequacy for the dry cask storage facility for highly radioactive waste was denied and that the NRC merely accepted PG&E's testimony that the earthquake capability of the dry cask site was equal to that of the reactor site, allowing no hearing on differing opinions.

### A. Contention TC-1 (Seismic)

An appeal may not be based on new arguments not raised before the Board.<sup>12</sup> SLOMFP, however, has attacked the Board's decision on seismic issues -- *i.e.*, its rejection of Contention TC-1 -- for reasons raised for the first time in its petition for review. Our rules state that for sites that have been evaluated under the criteria for nuclear power plants, the design earthquake must be equivalent to the safe shutdown earthquake for a nuclear power plant.<sup>13</sup> Accordingly, in Contention TC-1, SLOMFP addressed alleged inadequacies of the seismic source characterization for the design basis earthquake at the Diablo Canyon power plant site. The Board reasonably found that SLOMFP's concerns do not show the original seismic findings "inaccurate to some meaningful degree."<sup>14</sup>

Nevertheless, in its petition for review, SLOMFP contends that the Board's ruling that, absent new information sufficient to alter the original site evaluation, the design earthquake for a nuclear power plant constitutes the design earthquake for any co-located ISFSI has no support in the regulations. SLOMFP makes a weak semantic argument based on the choice of article ("a" versus "the") used in 10 C.F.R. § 72.102(f). We need not consider SLOMFP's new semantic argument, first raised in the petition for review. In any event, SLOMFP's interpretation of the regulation is strained and illogical. The Board correctly interpreted the regulation as addressing the design earthquake for a power plant at the same site as the ISFSI.

That being the case, A4NR et al, asserts that there is no independent, including the NRC, verification that the footprint of the storage site is seismically qualified.

The more densely configured spent fuel pools are considered to have greater risk than a spent fuel pool that has a more open racking arrangement

A4NR, et al, asks that the state file a request to the NRC to review its policy on radioactive fuel pool designs and incorporate the findings of the National Academy of Sciences to return to original design configuration. Absent NRC action on this request, A4NR, et al, believes the CEC should contact the NRC oversight committee's in Congress to investigate the dangers of tightly configured radioactive fuel pools.

Dry cask storage probabilistic risk analyses performed by the NRC and the Electric Power Research Institute (EPRI) concluded that there is a greater risk of an event leading to public harm during cask loading and transportation, which occur primarily during the first year of operation, than from routine operations.

It is A4NR et al, understand that this risk from cask loading and transportation will continue as radioactive fuel rods are removed from pools to make room for new rods at virtually every refueling outage until reactors are decommissioned. Therefore, the state should request that all fuel assemblies that have been stored in pools over five years be removed as soon as possible, thereby reducing this continual risk.

The design of Diablo Canyon's dry cask storage facility incorporated a number of seismic safety features.

Again the contention that the dry cask facility may not be sufficiently designed to withstand seismic events was denied by the NRC.

Limited information is available on the vulnerability of dry cask storage to sabotage or terrorist attack, which is consistent with the National Academies' findings in its 2006 study of commercial spent fuel storage safety and security. While terrorist scenarios have been postulated that could release large quantities of radioactive materials into the environment, an assessment of the likelihood of such scenarios occurring has not been publicly released. Such information is needed for state planning for emergency response and consequence mitigation.

## **Recommendations**

1. PG&E and SCE should return their spent fuel pools to open racking arrangements as soon as possible and report to the Energy Commission on their progress in doing so.
2. The Energy Commission should continue to work with the Nuclear Regulatory Commission to obtain the necessary security clearances for selected California officials to review studies that assess the vulnerability of California's nuclear plants, spent fuel storage facilities, and spent fuel shipments to terrorist attacks or sabotage and the consequences of such attacks.

A4NR et al, supports the CEC's recommendations and requests that the state allow no license renewal applications to be filed with NRC until these recommendations have been adopted and the radioactive fuel pools have been reconfigured.

## **Vulnerability of Roadways and Transmission Systems**

The primary concern with seismic vulnerability of roadways serving Diablo Canyon and SONGS is reduced ability for emergency personnel to reach the plants and for the local community and plant workers to evacuate.

Diablo Canyon is served by a two-lane asphalt road and a separate emergency access road. Although an emergency could result in traffic congestion and increase the potential for traffic accidents and further congestion, the two separate points of access to the plant ameliorate the risk to some extent. At SONGS, access roadways have a large capacity to bring in emergency

A4NR et al, are well aware of impacts that could occur in the event of a major earthquake near either nuclear facility. Bridge collapses could impede both of these reactor sites and the NRC has steadfastly refused to consider a seismic event that could result in a radioactive release at reactor sites and simultaneously impact emergency planning routes. This is a major concern and it is the non-reactor site, which is not under NRC jurisdiction that the state must ensure to be able to withstand a quake equal to 7.5 to address the NRC's lack of foresight on seismic impacts within our state.

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For example, during the October 2007 wildfires in southern California, state and local authorities coordinated access to the SONGS site for plant personnel.

During the 2007 wildfires the reverse 911 system and other communications systems were operable. However, in the 2003 San Simeon quake and the 2008 Chino Hills quake this was not the case. Either cell phone towers were not functioning, or the number of calls made by concerned residents jammed the lines. This issue deserves additional scrutiny by state officials. In addition, depending on time and season of a potential release and need to evacuate, the access roads can be severely overburdened by traffic.

## **Recommendation**

1. As part of license renewal efforts, PG&E and SCE should reassess the adequacy of access roads to the plants and surrounding roadways for allowing emergency personnel to reach the plants and local communities and plant workers to evacuate. The assessments should consider changes to the local populations since the plants were constructed.

A4NR, et al, supports this recommendation, however, we would further request that no license renewals be approved for filing to the NRC *before* this information is complete and all issues resolved.

## **Vulnerability to Plant Aging-Related Degradation**

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In the 1990s, NRC-sponsored research found that piping, steam generators, and passive components of the reactor pressure vessel comprised over half of nearly 500 reported degradation occurrences at nuclear plants in the U.S...In addition, EPRI's groundwater protection guidelines **should** be followed to prevent inadvertent releases of tritium due to degraded materials or operational failures.

A4NR et al, ask that California requests that the NRC **require** that EPRI guidelines are followed to protect groundwater sources. In addition, the NRC sponsored research was done in the 1990's when many of the nation's PWR's were just a decade or so into operation. It would seem reasonable in light of the NRC's current aggressive relicensing program that this research be updated. In addition, as the NRC has already relicensed 45 reactors focusing primarily on aging components where updated information is available and would be valuable for future IEPR's.

First, the same unanticipated age-related degradation of some plant components or systems **could** be occurring at the California plants. Second, a serious incident or the identification of a safety hazard at one plant **could** result in a regulatory requirement for more extensive inspections, repairs, and even outages at similar plants nationwide.

As SCE and PG&E have either received or requested funding from ratepayers for replacement of steam generators, reactor vessel heads, turbine rotors, etc..., that were designed to last the full design life of their reactors, the words "could result" should be amended to "is occurring" at the California plants. Furthermore, there is some industry evidence that these components will need to be replaced again if license renewals are granted. A4NR et al, requests that the CEC track the industry's re-replacement of degraded components or systems following license renewal approval in future IEPR's.

Also historical data has shown that serious accidents, or near misses, have occurred (ex. Davis-Besse) resulting in replacement of reactor vessel heads (RVH) in California reactors that were *not* degraded, but according to the utility the inspections of the RVH's were too time consuming to be cost-effective.

These reports include SONGS' unsatisfactory response to the failure of an emergency diesel generator at the plant, as well as certain willful violations of

On page 12 of the CEC report it states that "In short, an earthquake could cause damage resulting in the failure of a switchyard that would cause a loss of power from the plants to the transmission grid, but the reactor units would continue to have a source of off-site power in addition to the onsite emergency diesel generators. However, in the above paragraph the CEC discloses that SONGS emergency diesel generator(s) have failed. We believe this has also been the case at Diablo Canyon and know this to be the case at reactors nationwide, however time constraints to meet filing dates for comments has not allowed A4NR, et al, to do adequate research to site examples. Nevertheless, it remains uncertain whether emergency diesel generators can be counted on to provide back up power in the event of loss of onsite power.

The Diablo Canyon Independent Safety Committee provides one means for verifying that PG&E maintains a strong safety culture. This helps facilitate the involvement of the local community in reviewing major plant safety and performance issues. There is no similar independent safety oversight committee for SONGS.

The public living in the shadow of Diablo Canyon fully participated in original rate proceedings and were largely responsible for the creation of the DCISC. Furthermore, this same public was fully responsible for removing PG&E from involvement in the nomination and screening process, providing a modicum of independence. However, the committee still consists of those who currently promote nuclear power. Due to a concern for conflict of interest the former Atomic Energy Commission was divided into the regulator—the NRC—and the promoter—the DOE. It seems the state does not acknowledge this inherent conflict and until it does the Alliance for Nuclear Responsibility, et al, do not support the creation of a similar committee for SONGS.

Over the years the public has brought numerous safety concerns to the DCISC, not always with respect or appreciation from committee members. A recent meeting highlights the unsatisfactory respect for public participation and is highlighted in the comments of the San Luis Obispo Mothers for Peace. The Alliance for Nuclear Responsibility, et al, fully supports their comments on this issue.

A4NR et al, strongly believes that without full public participation the DCISC would be worthless, in fact, it would not exist. Absent an informed public willing to take the time to do its own research and attend these meetings (often unfriendly, sometimes hostile to the public in the past) a similar committee at SONGS would be a waste of ratepayer funding.

It is critical to the ongoing reliability and safety of the plants that adequate staffing levels are maintained, that programs to transfer knowledge from retiring workers to new workers are successful, and that strong safety cultures are maintained throughout this shift in the plants' workforces.

A4NR et al, wonders how the state will ensure the above statement, especially in light of the state, nation and worldwide financial woes and international shortage of qualified nuclear workers.

In addition, it is not inappropriate to question the NRC's safety culture. For example, the Attorney representing the Oyster Creek intervenors reported:

"...under recommendation 4 that contrary to previous promises "the staff appears to have institutionalized the current practice of DLR technical reviewers evaluating the operating experience in the application, which does not meet the intent of OIG's recommendation." In other words, the Staff are still not doing any independent checking of what in the license renewal applications.

This undercuts NRC's finding regarding our petition that all the actions recommended by OIG have been taken. Even for ongoing inspections there are problems. Also remember that nothing at all was done to upgrade inspections



that were completed before the OIG report came out, like the inspections for Oyster Creek and around 44 other plants.

Overall, it is quite amazing how resistant the NRC is to making obvious improvements in their approach. Please feel free to use the NRC Staff attorney's candid statements (extract below) about what they will do with the drywell analysis to show how poor the safety culture is within the agency. Just in case, the transcript is attached.”<sup>3</sup>

Statements such as these have been repeated by local organizations, state agencies, state attorneys general and state representatives in many license renewal proceedings. While A4NR et al, realizes that California does not have authority over the NRC, the state has every right to ask the NRC or its oversight committees in Congress to investigate what appears to be a failure of the agency to follow the recommendations of its own Office of Investigation to improve both the process and the safety of reactors nationwide. Safety-related issues remain in the purview of the NRC, but where there is a lapse of safety culture in that agency that could impact the economy and reliability of our generation systems it is incumbent on California to bring this issue to those who can resolve the problem.

A4NR et al, requests the CEC to monitor license renewal proceedings in other state's to ensure that any applications filed for license renewal in California have incorporated all recommendations of the agency's Office of Investigation and complies with all current rules, regulations and policies of the NRC.

## **Recommendations**

17. To support the long-term reliability of Diablo Canyon and SONGS as the plants age, effective safety culture and maintenance programs must be maintained at the plants in conjunction with enhanced oversight mechanisms, including:

a. The state should consider requiring an independent safety oversight committee at SONGS similar to the Diablo Canyon Independent Safety Committee.

If this recommendation is adopted, A4NR et al, requests the state ensure that members are not promoters of new reactors and that a member of the public is included on this committee. The DCISC has not participated in the CEC process. Again it is the public that has been providing volumes of information to make certain that the economic impacts to the state's future energy supplies are reliable and cost-effective. It has been the public providing this information and doing the research necessary to provide a full record at these meetings, with no compensation, not the ratepayer funded DCISC.

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<sup>3</sup> NEAL R. GROSS COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W. (202) 234-4433  
WASHINGTON, D.C. 20005-3701 [www.nealrgross.com](http://www.nealrgross.com) (DATE)

b. The Energy Commission should work with federal and state regulators, nuclear plant owners, and INPO to develop a means for usefully incorporating results of INPO reviews and ratings of reactor operations into a meaningful public process while maintaining the value of these reviews as confidential and candid assessments.

Whenever possible this information should be transparent.

c. The Energy Commission should continue to closely monitor NRC actions and reviews of Diablo Canyon's and SONGS' performance. In particular, the state should monitor the NRC's responses to safety culture lapses at SONGS and require SCE to provide evidence of achieving and maintaining a strong plant safety culture prior to SCE's submitting a license renewal application.

A4NR supports this recommendation and adds that this monitoring continue in all IEPR's as these reactors age.

## PAGE 19

1. The Energy Commission recommends that the California Public Utilities Commission continue to recognize the importance of PG&E's and SCE's plant worker training and recruiting programs and approve adequate funding for such programs. On a **periodic** basis, the state should assess the adequacy and success of PG&E and SCE recruiting and training programs for replacing retiring plant workers and ensuring that knowledge and strong safety cultures are instilled in new workers.

A4NR et al, supports the above recommendations and requests that the state disallow license renewal applications to be filed until these issues are resolved. Furthermore, we believe that funding for the license renewal study should be withheld until these actions are complete. In this time of financial uncertainty ratepayers should not be responsible for expenses that are at best premature. We would also like to see a definition of "periodic" in the above paragraph.

## IMPACTS OF A MAJOR DISRUPTION

Each of these alternative scenarios would lead to a different conclusion about the sudden disruption of output from one or both of the nuclear facilities.

It would seem that the state should decided on the scenario from the above choices that makes for the most responsible energy planning and work towards reducing assumptions.

## PAGE 20

### The Comprehensive West-Wide Resource Adequacy Vantage Point

This scenario imagines that policy makers continue the general trend of examining future needs from a reliability perspective that not only extends capacity requirements forward, but also adds an evaluation of energy needs relative to loss of resource, such as the nuclear units, that provide large amounts of energy. Such a framework is codified into planning and procurement standards, and utilities and other load serving entities (LSE) generally live up to such requirements.

A4NR, et al, supports filings of environmental organizations that have a fuller understanding of renewable generation and efficiency technologies.

SONGS, on the other hand, is a more integral part of the Southern California transmission system, and when it is shut down, imported power flows are also restricted.

A4NR et al, request that a study be completed of transmission needs to keep California generation reliable without SONGS and then work diligently to implement a transmission system that has been recognized to be inadequate for well over a decade.

## **Recommendations**

1. The existing CAISO-organized Stakeholder Study of Aging Power Plants and Once-Through Cooling Mitigation should be completed as quickly as feasible using sound analytic techniques, and the results should be closely reviewed to determine whether further studies are needed to understand the issues resulting from unplanned outages of Diablo Canyon and SONGS. To the extent such supplemental studies are needed, they should be commissioned and completed in a timely manner.

On Oct 21<sup>st</sup> as A4NR, et al, were finalizing their comments an NRC notice appeared disclosing that: "Operators [at Diablo Canyon] manually actuated the Unit 2 reactor protection system (RPS/reactor trip) due to high differential pressure (DP) across the circulating water pumps' intake traveling screens. The high DP resulted from a rapid influx of jellyfish."<sup>4</sup> The CEC should consider requesting that the CAISO-organized Stakeholder Study of...Once-Through-Cooling include the relationship with thermal pollution and this influx of jellyfish or other thermal conditions that shut reactors down, reducing generation and increasing maintenance costs. These costs would be averted over time if nuclear reactors were phased out within current license terms.

2. The Energy Commission, CPUC, and CAISO should further evaluate the unique uncertainties of losing the electricity provided by Diablo Canyon and SONGS over an extended period, identify how resources might be acquired that have an energy supply capability beyond that used in normal market conditions, and modify the long-term planning and procurement process at the CPUC to ensure that these resources are acquired in a timely manner.
- 3.

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<sup>4</sup> <http://www.nrc.gov/reading-rm/doc-collections/event-status/event/en.html>

Recommendation #2 should be amended to ensure public participation in the evaluation of uncertainties of losing electricity provided by Diablo Canyon and SONGS. Furthermore, until both recommendations are complete the state should disallow license renewal applications to be filed with the NRC for Diablo or SONGS.

## ECONOMIC, ENVIRONMENTAL, AND POLICY ISSUES

### PAGE 24

If the new energy resources were built in California, the total economic benefit from employment and taxes statewide could be comparable to the benefits currently provided by the nuclear plants.

If examples in Germany are replicated the benefits could be exceeded.

A key uncertainty in assessing the economic benefits to keeping Diablo Canyon and SONGS operating through a 20-year license extension is the reliability of the plants as they age. If the plants continue to operate reliably and do not require additional large capital improvements, the cost of power from the nuclear plants will likely remain lower than the cost of power from new renewable resources. However, significant equipment failures could result in extended outages and expensive repairs. As discussed earlier, effective plant maintenance and a strong safety culture are critical to keeping the plants operating safely and reliably as they age.

The unknown costs in the above paragraph highlight the concern of environmental and consumer advocates. Californians deserve to know the full costs of continued dependence on aging nuclear reactors and the one huge missing piece in the CEC analysis is cost information that is certainly known in some form. For instance; what was the cost of the Davis-Besse reactor vessel head problem, not only to Davis-Besse and Ohio ratepayers, but to the nuclear industry and ratepayers in general?

### Recommendation

1. As part of the license renewal feasibility studies for Diablo Canyon and SONGS, the CPUC should require PG&E and SCE to conduct a detailed study of the local economic impacts of shutting down the nuclear plants compared with alternate uses of the site.

A4NR et al, support this recommendation though we would change “should require” to “must require” and would add that studies of alternative generation within the county could be supplied by independent sources removing the bias of a purely utility study. As for other uses at Diablo Canyon, the CEC should direct PG&E to include: wind capacity, innovative wave and tidal technology and solar and compare the costs of implementing those sources to the costs incurred to date from the earthquake damaged Kashiwazaki Nuclear site.

## NUCLEAR WASTE ACCUMULATION

Spent nuclear fuel, which is extremely radioactive and remains so for thousands of years, must be stored at the nuclear power plant in a spent fuel pool for a minimum of five years following removal from the reactor core to shield plant workers against high levels of radiation.

A4NR et al, requests that the CEC amend “thousands of years” in the above paragraph to “hundreds of thousands of years.”

They also continue to contribute to the Nuclear Waste Fund. As of September 2008, the fund contained \$31.4 billion, with \$1.4 billion from California

A4NR finds this number confusing. There are 104 reactors operating and only \$31.4 billion in the waste fund, which recently disclosed a need for \$96 billion to complete the Yucca Mountain site. The math doesn’t appear to work for equal contributions from all reactor sites. There may be a simple explanation, but it is not cited in the CEC report.

California must plan for continued accumulation and interim storage of high-level radioactive waste at existing reactor sites, even though none of the sites were originally designed for such long-term storage.

A4NR recommends that NRC and the state criteria for siting new reactors should be followed in license renewal applications. California’s reactors are operating on highly active fault zones, neither was meant to be a permanent storage site for highly radioactive waste, but by default they have become just that for an undefined length of time. It seems apparent to those who live in the shadow of these reactors that license renewals should not be allowed for the exact reason the state does not allow the siting of new reactors—no solution to safe permanent storage of highly radioactive waste exists in our county..

As previously discussed, lacking a federal spent fuel disposal repository, Diablo Canyon and SONGS lack sufficient spent fuel pool capacity to store the quantity of spent fuel produced over the period of their operating licenses, which extend into the 2020s. As a result, PG&E and SCE have been forced to increase the on-site storage capacity for spent fuel by constructing dry cask storage facilities.

PG&E has designed and permitted a dry cask storage facility for Diablo Canyon that will allow the utility to transfer most of the spent fuel produced during the current operating license. SCE has designed and permitted and is constructing a dry cask storage facility for SONGS with capacity to store 36 percent of the spent fuel generated during the current license period (with additional storage available in the SONGS spent fuel pool). Both utilities may need to develop additional on-site storage or secure offsite storage to store all the spent fuel that will be produced over the plants’ current operating licenses. Sufficient land area is available for the utilities to develop more storage capacity.

A4NR et al, would like to place in the record the decision of the NRC in denying the contention of San Luis Obispo organizations relating to seismic adequacy of PG&E's high-level radioactive waste facility at Diablo Canyon. This denial was not appealed due to a lack of funding and not from a lack of need to know if this facility is truly capable of withstanding a 7.5 magnitude earthquake. We believe the state should mandate this analysis and until it is complete deny a license renewal application that PG&E may intend to file until resolution of this matter.

#### A. Contention TC-1 (Seismic)

An appeal may not be based on new arguments not raised before the Board.<sup>12</sup> SLOMFP, however, has attacked the Board's decision on seismic issues -- *i.e.*, its rejection of Contention TC-1 -- for reasons raised for the first time in its petition for review. Our rules state that for sites that have been evaluated under the criteria for nuclear power plants, the design earthquake must be equivalent to the safe shutdown earthquake for a nuclear power plant.<sup>13</sup> Accordingly, in Contention TC-1, SLOMFP addressed alleged inadequacies of the seismic source characterization for the design basis earthquake at the Diablo Canyon power plant site. The Board reasonably found that SLOMFP's concerns do not show the original seismic findings "inaccurate to some meaningful degree."<sup>14</sup>

Nevertheless, in its petition for review, SLOMFP contends that the Board's ruling that, absent new information sufficient to alter the original site evaluation, the design earthquake for a nuclear power plant constitutes the design earthquake for any co-located ISFSI has no support in the regulations. SLOMFP makes a weak semantic argument based on the choice of article ("a" versus "the") used in 10 C.F.R. § 72.102(f). We need not consider SLOMFP's new semantic argument, first raised in the petition for review. In any event, SLOMFP's interpretation of the regulation is strained and illogical. The Board correctly interpreted the regulation as addressing the design earthquake for a power plant at the same site as the ISFSI.<sup>5</sup>

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Utility dry cask storage is an interim solution for waste disposal. PG&E's facility is designed for a lifetime of 50 years, and the canisters used in SCE's facility are designed for a lifetime of 40 years.

A4NR et al, takes scant comfort in the fact that storage casks for highly radioactive waste are "designed for a lifetime of 50 years" at Diablo and "40 years" at SONGS. Reactor vessel heads, steam generators, turbine rotors and other large components were originally designed to last the full forty year life of the plant, yet failed in twenty-plus years. The costs of repair and replacement should be included in costs that will likely be needed to continue to safely store highly radioactive waste for an indefinite period of time. These costs should be determined *before* California allows license renewal application to be filed for Diablo Canyon or SONGS.

DOE has proposed designing and developing a new TAD canister packaging system, but has not yet established federal TAD packaging requirements, forcing PG&E and

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<sup>5</sup> CLI-03-12 MEMORANDUM AND ORDER



SCE to move forward with dry cask storage cask designs that may not be compatible with the federal TAD requirements.

California has claimed that the proposed federal program may be insufficient, both in the planned timing of the grant program and the amount of the proposed grants for state planning and for training emergency response personnel to respond to potential accidents involving California's spent fuel shipments.

According to the Nuclear Waste Task Force in Nevada, the DOE has decided that if a federal repository is established at Yucca Mountain, spent fuel will need to be packaged for transport at the reactor sites by the utilities. According to the current DOE policy, waste would only be accepted for delivery to Yucca Mountain if it is contained in a transport, aging, and disposal (TAD) canister that does not exist yet. DOE has written specifications for such canisters and has contracted with vendors to design and license the canisters according to the specifications. The options for the utilities to consider are:

- 1) Purchase casks before TADs are available for on-site dry storage and then later transfer waste from those casks to TADs for it to be accepted by DOE for transport and storage or disposal.;
- 2) Hold waste in the pool until TADs become available and then buy them from DOE for use in storage of waste at the reactor site until DOE can accept and transport it to a repository. The costs of the TADs would be reimbursed to the utility at the time the waste is transported away from the site.
- 3) Keep waste in the pool until TADs and a repository are available. DOE will provide TAD canisters for waste to be packaged at the utility site if it is immediately accepted for transport to the repository rather than stored at the reactor site.

PG&E and SCE would most likely be forced to move forward with dry cask storage in currently available casks that are not compatible with the DOE's TAD requirements in terms of size and capacity. The costs for emergency preparedness during transport will be substantial.

Issues in California that will be difficult to solve will be:

1. Shipments from Humboldt Bay will be made by heavy-haul truck over very rough terrain to a rail line in Redding. It is not clear if this is even possible. The only other option would be for waste to leave Humboldt Bay by barge from a port that is shallow and may not be safe.
2. All reactor sites must examine how waste would be shipped away in TADs or dual-purpose (storage and transport) casks. Those with rail access are probably

not heavily impacted but if waste must be heavy-hauled or barged, there are many safety issues.

The unknowns of radioactive waste storage at California's aging nuclear plants, is a risk that the state should investigate. These risks leave our state's economy and generation reliability in peril. The planning of a sufficient program to transport waste away from reactor sites will only be exacerbated in this uncertain economic times.

as of June 30, 2008, only the Energy Solutions facility in Clive, Utah, accepts low-level waste from Diablo Canyon and SONGS. It is expected that Class A waste will continue to be shipped to Clive, Utah, but that Class B and C wastes (waste with higher levels of radioactivity) will be stored on-site at Diablo Canyon and SONGS until a new or existing facility agrees to accept this waste. This does not pose a significant problem at present because the volume of this waste is relatively small, and the waste can be safely stored on site. However, the plants cannot be fully decommissioned until the waste is removed from the plant sites. The NRC is currently reviewing its policies regarding on-site low-level waste storage and expects to complete this task by the end of 2008.

A4NR et al, requests that this report and subsequent IEPR's include the status of full funding of the decommissioning trust fund and policies regarding on-site low-level waste storage are complete *before* license renewal applications prohibited from filing with the NRC.

## PAGE 27

### Recommendations

1. During the upcoming California Public Utilities Commission proceeding on decommissioning costs, PG&E and SCE should provide estimates of the amounts of low-level waste to be generated and ultimately disposed of during plant operation and decommissioning and the cost of this disposal based on current and projected market prices.
2. As part of license renewal feasibility studies, PG&E and SCE should assess the costs of disposing of low-level waste that will be generated during a 20-year license extension. The assessments should include the cost to dispose of low-level waste that would be generated from major capital projects that might be required over this period. PG&E and SCE should also provide information on their plans for storage and disposal of low-level waste and spent fuel through plant decommissioning.

A4NR et al, supports the CEC recommendations and further asks that the state withhold permission for license renewal applications to be filed with the NRC for Diablo or SONGS until these issues are fully resolved.

## LAND USE AND ECONOMIC IMPLICATIONS OF ON-SITE WASTE STORAGE

There is considerable uncertainty as to when and if a geologic repository or other interim waste storage facility will allow the removal of spent fuel from the Diablo Canyon and SONGS plant sites. This raises questions about the land use and local economic implications of extended on-site waste storage. It is widely assumed that long-term storage of spent fuel at the plant sites will have a negative effect on future land uses, local property values, business, and tourism. Underlying this presumption is the perception that spent fuel storage creates health and safety risks that preclude certain land uses or depresses economic conditions

The storage of highly radioactive waste on California's irreplaceable coast provides virtually no economic benefit to the surrounding communities, while leaving these communities at risk.

## **PAGE 28**

Residents of San Luis Obispo County expressed a strong preference that the Diablo Canyon plant site be converted to recreational use, but PG&E has not identified any priorities as to future plans for the plant site.

A4NR also believes that San Luis Obispo County would be amenable to a state-of-art generation facility at Diablo Canyon –showing the world that aging reactors can be phased out and that new innovative generation and efficiency programs can replace radioactive generation sources.

Camp Pendleton, where SONGS is located, is a Marine base, A4NR questions whether SCE really leases from the Navy?

An analysis of property sales data and other economic indicators in areas where a dry cask storage facility is operating would provide a useful starting point to assess potential economic impacts of extended spent fuel storage at California's nuclear plants.

A4NR supports this analysis of property sales date and other economic indicators in areas where radioactive waste is stored in a cask system. We also support and updated analysis be included in future IEPR's to ensure data is current.

## **POWER GENERATION OPTIONS**

As the Energy Commission stated in the 2007 *Integrated Energy Policy Report*, "AB 32 forces California to determine how to meet its electricity needs in a way that leaves an ever-shrinking *greenhouse gas* footprint."

Investing in new alternative energy sources and innovative technology would increase jobs, property taxes, economic incentives to communities. A4NR fully supports these efforts.

## **PAGE 29**

Replacing the nuclear plants with an equal mixture of in-state wind, solar thermal, geothermal, and biomass power could result in roughly the same overall tax and employment benefits to the state as provided by the nuclear plants

A4NR et al, believe that the benefits could far outweigh the losses from phasing out California's aging reactors. If both nuclear facilities operate until the end of their licenses all jobs remain. In addition, many jobs are still needed to safely shut these reactors down, transferring radioactive waste from pools to casks (or in the unlikely event Yucca opens offsite) decommission and dismantle; plus security will be needed forever. Meanwhile alternative generation sources could be sited in the impacted communities; thereby increasing any losses from phasing out nuclear reactors.

## **PAGE 30**

### **Recommendation**

1. A more detailed study of alternative power generation options is needed to quantify the reliability, economic, and environmental impacts of replacement power options. This is being done under the replacement power assessments, which are being initiated by the utilities under CPUC guidance.

A4NR et al, support this recommendation. In addition, A4NR et al, requests that the state prohibit the filing of license renewal applications until these studies are completed and recommendations have been implemented.

### **LICENSE RENEWAL ISSUES FOR STATE POLICYMAKERS**

## **PAGE 31**

The NRC Office of the Inspector General completed an audit of the license renewal process in 2007 and concluded that improvements were needed in reporting.

A4NR requests that the state prohibit the filing of license renewal applications until the NRC has improved its license renewal process.

This timeframe is intended to provide the state and PG&E with sufficient time (approximately 12 years) to develop alternate resources should the decision be to forego Diablo Canyon license renewal.

A4NR requests that the CEC consider the four year time frame for license renewal at the Vermont Yankee nuclear plant. Twelve years is more than sufficient time to responsibly determine the full costs of continued operation and phasing out California's aging reactors by end of current license terms.

## **PAGE 32**

SCE requested approval of \$17 million for a similar feasibility study for SONGS. A decision on this funding is expected in the coming months as part of SCE's 2009 General Rate Case. It can be expected that the CPUC will require SCE to seek CPUC approval before proceeding with an NRC license renewal application, as required for PG&E.

A4NR, Sierra Club, Environment California Research and Policy Center, CALPIRG, and Cal Church IMPACT are filed in opposition to SCE's request. Furthermore, we believe it is important to understand the full costs of the current steam generator replacement, in which a 28 ft by 28 ft hole must be cut to remove defective steam generators and replace with new generators. This process would have to be repeated if a license renewal is approved and the new steam generators need to be replaced again – placing the public at additional risk.

If the CPUC determines that license renewal is not cost effective for either Diablo Canyon or SONGS, the CPUC could use its rate authority to effectively restrict the operation of the plant through an extended license period, even if a license renewal is granted. Such an action would not conflict with the NRC's regulatory authority over the radiological aspects of nuclear power.

Vermont provides an example of state legislation aimed at either denying license renewal or limiting the renewal period. It would be valuable for the CEC to speak directly with Vermont legislators who have been analyzing the impacts of these decisions for several years.

The decision whether or not to renew the Diablo Canyon and SONGS operating licenses will have a significant impact on the state's power supply portfolio and on the communities located near the reactors.

A4NR believes that the significant impacts can also be significant opportunities if licenses are not renewed for California's aging nuclear reactors, these opportunities have not been fully analyzed or the costs disclosed.

The cost of power from the nuclear plants over the license renewal period will be linked to the performance of the plants.

A4NR adds that the cost of California's nuclear plants over the license renewal period will also be impacted by the performance of nuclear reactors nationwide. These costs understood and the impacts resolved before any license renewal applications are allowed to be filed for Diablo Canyon or SONGS with the NRC

In addition, it is important to consider the environmental impacts from plant operations over an extended 20-year license period, including once-through cooling ocean impacts and impacts from continuing waste accumulation at these plants.

A4NR supports full disclosure of all environmental impacts: once-through- cooling, thermal pollution in a Climate-impacted environment, especially in times of El Nino conditions. An Excerpt from SCE's GRC draft testimony identifies the climate impact that could be exacerbated if oceans temperatures rise. SCE-2, vol. 5 at p. 11 states, "The typical thermal power plant produces heat to make steam which turns a steam

turbine and generator. The total amount of heat produced can be expressed as a Thermal Megawatt (MWT). SONGS 2 produces 3,458 MWTs at 100 percent Reactor Power. Approximately 34 percent of this thermal energy becomes electricity (1,180 MWe total). The remaining 66 percent of generated heat, or approximately 2,318 MWT is absorbed by the main condenser which uses sea water to cool the turbine exhaust steam down and turns it back into water. Sea water absorbs most of this heat and is discharged to the Pacific Ocean with a small portion of the remaining heat dissipating to the atmosphere through the piping and equipment insulation."

A4NR et al, requests that the long-term impacts of thermal pollution be monitored yearly in the CEC's IEPR. In addition, The SWRCB estimates that Diablo Canyon entrains over 1.8 billion fish but impinges relatively few biological specimens (around 400 pounds, plus 1 large marine animal) on a yearly basis. Thermal impacts from Diablo Canyon, which discharges into a natural rocky cove, have resulted in significant changes to 150 species of marine algae and invertebrates and have greatly altered 1.4 miles of shoreline intertidal and subtidal communities.. Consideration should be given to the Cease and Desist order that the California Regional Water Board (should be Central Coast Regional Water Quality Control Board) prepared that stated the 1.4 mile sited above is closer to 2 miles.

Two points made in the Ocean Protection Council's April 2008 report imply that improvements in the state's transmission system could reduce the impacts of phasing out nuclear reactors to reduce the impacts of once through cooling:

The study emphasizes that "transmission upgrades" should be part of the solution to dealing with closing OTC plants. Elsewhere, it explains what is rarely discussed: transmission facilities are inadequate, are a big part of the state's energy shortcomings and need to be upgraded regardless of what else happens.

So it conclude that even if there were "mass OTC plant retirements," the effect would be "relatively modest" because transmission upgrades would permit wide distribution of the remaining availability of electricity. The bottom line, I think, is that all the fear of a presumed catastrophe if the nuclear plants were among those shut down is unwarranted, according to the study. Page 48

The study shows there are substantial other sources of energy outside of California to replace the loss of OTC plants' electricity. I realize that the Western U.S. energy may or will involve coal plants, a source that is undesirable and unsupportable, but if you want to make the argument that loss of OTC plants' power, if that were to occur as a worst case scenario, is not unthinkable because once again the study illustrates that this fear of disaster if most OTC plants are lost is unwarranted. I think it serves to put nuclear plant OTC retrofitting on the table for serious consideration. And again, in the second paragraph cited on that page, the incentive for nuclear plant owners to replace OTC is pointed out. Page 56<sup>6</sup>

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<sup>6</sup> Electric Grid Reliability Impacts from Regulation of Once-Through Cooling in California



The impact that shutting down one or both of the plants would have on the reliability of California's electricity grid is unclear at this time. In addition, these plants contribute toward meeting the state's lowered greenhouse gas emission goals. The overall impact of shutting down one or both plants will depend on what other generating and transmission resources are built or retired over the next two decades and on the pattern of population growth in the regions near the plants. This is an area that needs to be investigated further prior to any decision on license renewal.

A4NR fully supports the previous statement and requests that the CEC recommend withholding permission for license renewal applications for Diablo Canyon or SONGS until completion of analyses and studies mentioned throughout this report and the resolution of identified issues.

The loss of the plants would mean the loss of jobs and tax revenues for the communities located near the plants.

A4NR recommends that the CEC consider the costs of phasing out these aging reactors, including the continuation jobs, infrastructure and property taxes to communities from the utility for many years during phase out and after closure at the end of current licenses. In addition the CEC should consider the creation of jobs, infrastructure and new property taxes of various clean generation sources within the same communities, if possible. This would allow SLO and to a lesser extent, San Diego and Orange county to plan for this change without having to anticipate loss of jobs or revenues.

## **PAGE 33**

### **Recommendation**

1. The Energy Commission, working with the CPUC as part of the CPUC's authority to fund and oversee utilities' plant relicensing feasibility studies, should develop a plan for reviewing the costs and benefits of nuclear plant license extensions, scope of evaluation, and the criteria for assessment. This review should include the adequacy of the plants' maintenance programs and safety cultures; plans for waste storage, transport and disposal; seismic hazard assessments; the cradle-to-grave 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.

A4NR et al, support this recommendation, but would request that the local communities and NGO's that have been involved in this subject for many decades be included in the process. This information is of value, not only to California, but to all reactor states and therefore should be transparent and to the extent possible not be considered privileged.

Addressing the CEC Oct 20<sup>th</sup> workshop presentation my Mr. Galati, who appears to represent PG&E, A4NR et al, disagrees with each of his statements that the CEC may

not have jurisdiction to recommend studies or other research that is the purview of the NRC. This simply is not the case. If the NRC's decisions result in higher costs for ratepayers and economic and reliability risks for the state, the CEC has not only the jurisdiction, but the responsibility to further investigate. If the NRC, not the utilities, have a problem with this they can advise the state of their concern. The state is then free to take their position to the federal court or Congress as has been done by community organizations nationwide for many decades.

As for ongoing programs that PG&E believes should not be linked to license renewal, again A4NR, et al, strongly disagrees. We are responsibly asking that all issues that could impact the economy of the state and the reliability of generation be resolved *before* license renewal applications can be submitted to the NRC.

### **Conclusion**

PG&E and SCE have historically fought to preclude local communities and the state from addressing issues designated as the sole jurisdiction of the Nuclear Regulatory Commission. However, California and other states have paid a significant price in backing away from these jurisdictional issues. The NRC is simply not doing an adequate job and this has financial implications. Since the beginning of commercial operation of nuclear reactors the NRC has consistently ignored or downplayed safety-related problems that have resulted in costly maintenance and retrofits to ratepayers and taxpayers.

A4NR, et al, has seen a pattern of tactics used by the legal representatives of nuclear utilities to bully reactor communities and state's into backing away from both protecting their citizens and their pocketbooks. It is not the utilities responsibility to declare that communities and states cannot decide what is in their interest. If the NRC advises California that it is not within their jurisdiction to require changes that would decrease financial and reliability risks to the state, it is Congress, not the courts, who should settle this disagreement. The cost of litigation to protect the state's assets is prohibitive and should be deferred to Congress whose responsibility it is oversee NRC actions.

Responsible energy planning has begun in California and the Energy Commission and Assemblyman Blakeslee should be proud of their contribution to that goal.

Respectfully submitted

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\*Co-signers are national organizations or reactor community organizations and are greatly interested in the CEC AB 1632 Assessment.

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