



ALLIANCE FOR NUCLEAR RESPONSIBILITY

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California Energy Commission
Docket Office, MS-4
Re: Docket No. 11-IEP-1J
1516 Ninth Street
Sacramento, CA 95814

RE: Comments and Recommendations of the Alliance for Nuclear Responsibility (A4NR) in response to the Nuclear Data Requests of Pacific Gas & Electric (PG&E) in the 2011 Integrated Energy Policy Report, Docket 11-IEP-1J

The following comments are drawn from the questions asked of the utility by the CEC and include below the question, the answer provided by the utility, and additional questions and or recommendations regarding the utility's answer posed by A4NR.

A.6 Please report on progress in assessing the implications of a San Simeon-type earthquake beneath Diablo Canyon, including expected ground motions and vulnerability assessments for safety- and non safety-related plant systems and components that might be sensitive to long-period motions in the vicinity of an earthquake rupture. (Diablo Canyon)

Response for DCP:

The 2003 M6.5 San Simeon was a predominately reverse earthquake. The closest distance from the San Simeon rupture plane to DCP power block was 35 kilometers. Diablo Canyon Power Plant is located on the hanging wall of the main thrust of the San Simeon rupture plane. Best estimates of the dip of the main thrust in the San Simeon earthquake ranged from 45 to 60 degrees.

The scenarios run in the 2011 seismic hazard update address the ground motions that could potentially be generated from a San Simeon type of an event beneath DCP. All of the earthquake spectra resulting from the SLB and LO earthquake scenarios (considering varying dips) were enveloped by the 1977 Hosgri Earthquake Design Spectrum at all spectral periods.

In the 2011 seismic hazard update (Report on the Analysis of the Shoreline Fault Zone, Central Coast California, 2011), deterministic earthquake scenarios were run for a M6.8 Los Osos (LO) earthquake and a M6.3 San Luis Bay (SLB) earthquake. The Los Osos fault is

located northeast of DCPD and is a southwest dipping reverse fault. The San Luis Bay fault is southwest of DCPD and is a northeast dipping reverse fault. For the LO and SLB fault locations and geometry, DCPD is on the hanging wall. Various earthquake scenarios were included in the seismic hazard analyses using alternative fault dips. All dips considered (50, 70, and 80 degrees) for the M6.3 SLB earthquake resulted in the fault plane passing directly under DCPD. The shortest distance to from the SLB fault plane to DCPD is 1.9 km for the 50 degree dip. For the M6.8 LO earthquake scenario, three alternative dips were considered, 45, 60, and 75 degrees, with the 45 degree dip passing directly underneath DCPD at a shortest distance to the fault plane of 7.6 km.

A4NR: Have the conclusions reached by PG&E for the various scenarios presented in paragraph 3 (above) been independently peer reviewed by any state regulatory agency with a seismic staff and/or the US Geological Survey? If yes, please provide copies of independent reviews. If not, with PG&E's controversial history of faulty assumptions (Diablo and San Bruno) how can the state rely on unreviewed reports for investment in future generation reliability.

A.11 Please report on the status of any reassessments of whether emergency plans and access roads to the plants and surrounding roads are adequate for allowing emergency response personnel to reach the plants and local communities and plant workers to evacuate following a major seismic event/ plant emergency to protect the public, workers and plant assets and allow for timely evacuation following such an event. Please take into account changes to the local population and traffic density/congestion since the plants were constructed and the possible loss of some of the roads due to a major seismic event or other plant emergency.

Response for DCPD: Diablo Canyon recently performed an updated analysis assessing the estimated evacuation times following a combined earthquake and radiological emergency at the Diablo Canyon Power Plant (DCPD). In 2010 PG&E contracted with MMI Engineering to develop the "HAZUS® Analysis of a Hosgri Fault Earthquake Scenario in Support of the Diablo Canyon Power Plant Earthquake Emergency damage to the large majority of bridges and roadways. The overall extent of estimated damage is lower than predicted in past studies. Traffic flow and potential delays were compared for scenarios with "normal" roadway capacity, and with reduced capacity based on anticipated damage. The results of these assessments are:

- The overall extent of estimated damage to roads and bridges is lower than predicted in past studies.

A4NR: How does PG&E's analysis presented above, completed in 2010, square with the more recent post-Fukushima NRC inspection that identified the following problem at Diablo Canyon regarding emergency planning:

"Other issues identified in the inspection include:

- **Reliance on state highways and access roads that may be inaccessible after an earthquake."**

In the wake of this more recent NRC analysis, does the 2010 HAZUS study quoted above need to be revised and updated? If yes, will PG&E agree to update the study within the same timeframe as current AB 1632 seismic studies? If no, explain why.

B.3 A problem at Fukushima was that monitors were not available during the emergency to indicate spent fuel pool conditions (e.g., water levels and temperature) as problems unfolded. Do the spent fuel pools have monitors or instrumentation that would be available and reliable under severe accident conditions? (Diablo Canyon, SONGS)

Response for DCP: There is a common spent fuel pool (SFP) annunciator for each unit in the main Control Room which actuates to indicate abnormal level (high or low) and temperature (high/rate of change). The associated annunciator response procedure directs local actions to confirm the abnormal conditions and take remedial actions. There is also indication of SFP temperature available to the control room and other locations on the plant computer. *The instruments which supply signals to the annunciator and the plant computer are not environmentally qualified and are subject to failure in a harsh temperature or radiation environment. (A4NR emphasis added)*

PG&E will evaluate improvement to the instrumentation associated with spent fuel pool and take appropriate actions based on lessons learned from Fukushima.

A4NR: It would seem that the lesson from Fukushima has already been learned in this instance, and PG&E admits the instruments in question “are subject to failure in harsh temperature or radiation environmentl.” Is PG&E’s answer to “evaluate improvement” a direct response or only a decision to consider making the appropriate changes? Why would such an evaluation not be launched immediately? What further lesson from Fukushima is PG&E awaiting? What will be the cost to update this instrumentation?

B.6 Given the lessons learned from the Fukushima plant in Japan and overheating problems in spent fuel pools, what are the estimated costs and potential risks of relying indefinitely upon onsite interim storage facilities? Please provide a copy of any cost/benefit study on the costs and risks of long-term or indefinite onsite spent fuel storage in pools and dry cask storage. (Diablo Canyon; SONGS; Humboldt Bay)

Response for DCP:

The operational cost of maintaining the dry storage facility is approximately \$2.5 million (M) annually. This cost includes security and operational support. We do not have specific numbers for the cost to maintain and operate the systems that support the spent fuel pool operation.

Cost/benefit studies have not been developed for the long term storage of spent nuclear fuel at the DCP site. It is assumed in budget development, that PG&E will store spent nuclear fuel on site until the Department of Energy is ready to perform the removal. Estimates of Direct Cost for movement of spent nuclear fuel into dry storage have been developed and planned for the near term operating budgets. PG&E has developed a dry storage facility that is licensed and permitted to store all of the spent nuclear fuel generated during the 40 year licensed life of

DCPP. It is still our position that the facility is an interim solution until the Department of Energy assumes their responsibility and collects the fuel for reprocessing or long term storage.

A4NR: Why is PG&E able to provide the CEC with a cost of \$2.5 million annually for the dry storage facility, and yet when requested to do so by A4NR as a data request in the CPUC proceeding 10-01-022 in October, 2010, provided the following non-response in document *DiabloLicenseRenewal_DR_ANR_009-Q01-03*?

QUESTION 1

What is the actual itemized annual operations and maintenance cost of the DCNPP ISFSI facility as experienced in its first years of actual operation 2008-2010?

ANSWER 1

This information is not available. While the actual cost is included in the total O&M cost the DCPP accounting system has not collected annual operations and maintenance cost of the DCPP ISFSI facility at this level of detail.

Does the \$2.5 million include security, O&M, replacements for 60 years beyond the operation of Diablo Canyon? If so, why was this number not included in PG&E's license renewal funding application?

A4NR recommend these costs be identifiable for energy planning purposes. If the information was not available in October 2010, when did it become available

D.5 What are the annual spent fuel pool operating and maintenance costs? Are any major capital investment projects planned and/or anticipated for the spent fuel pools, particularly in light of events at the Fukushima Daiichi plant? If so, what are the anticipated costs? (Diablo Canyon, SONGS)

Response for DCPP: Diablo Canyon does not collect cost in the accounting system in a manner that allows for operating and maintenance cost by system (such as spent fuel pool) to be extracted. Cost are collected and reported by organizational department. The spent fuel pool operating and maintenance costs are included in the total O&M cost and forecasts.

D.7 What is the current amount of spent fuel being stored and planned for storage (number of assemblies and metric tons of uranium) in the ISFS through the end of the operating license as well as through a 20-year license extension? What are the plans for increasing onsite storage capacity to accommodate all of the spent fuel generated during the current operating license and through a 20-year license extension? (Diablo Canyon, SONGS)

Response for DCPP: As noted in the answer to D.6, the ISFSI can accommodate up to 138 storage cask, each with 32 fuel assemblies. This equates to approximately 1,898.88 metric tons of uranium. The additional spent fuel assemblies discharged from the reactors during a subsequent 20-year license extension would be stored in the Spent Fuel Pools until DOE collects spent fuel from the ISFSI or the ISFSI is expanded beyond the current licensed size of 138

storage casks. ISFSI expansion, if necessary, is not anticipated to take place until plant decommissioning.

A4NR: As the costs of maintaining a spent fuel pool for the 20 year period of relicensing should be considered in a cost/benefit risk analysis of relying on nuclear power, PG&E should be made to do the accounting to separate out the costs of operating, maintaining and securing the active spent fuel pool system. PG&E states above that it intends to keep the pools full of wastes for the duration of the 20 year extension (absent DOE intervention in the interim). It is only with that cost data that the costs of pool storage can be compared to an accelerate transfer to dry cask storage.

D.13 What are the current annual and total estimated costs for the maintenance, operation, and security for the ISFSI? What are the estimated costs for storing spent fuel in the ISFSIs through the end of the plant's current operating licenses? What would be the additional operations, maintenance, and security costs resulting from delays in shipment to offsite storage lasting up to 25 years (for example, through the year 2034)?

Response for DCPD and HBPP: Diablo Canyon does not collect cost in the accounting system in a manner that allows for operating and maintenance and security cost by system (such as the ISFSI) to be extracted. Cost are collected and reported by organizational department. The ISFSI operating and maintenance costs are included in the total O&M cost and forecasts.

A4NR: How does the answer PG&E provides to D.13 square with the answer previously provided in B.6:

Response for DCPD:

The operational cost of maintaining the dry storage facility is approximately \$2.5 million (M) annually. This cost includes security and operational support. We do not have specific numbers for the cost to maintain and operate the systems that support the spent fuel pool operation.

Is the "dry storage facility" not the ISFSI?? Is the number given not \$2.5 million annually? Is this not a current number? How is this note the answer to D.13?

E.1. ...Please explain the apparent discrepancies between this USGS report and PG&E's assertions about the Shoreline and Hosgri Faults, i.e., whether the Shoreline Fault is segmented and its potential interaction with the Hosgri Fault, implications for seismic hazard for Diablo Canyon, and any planned seismic research to address these questions. (Diablo Canyon)

Response for DCPD: ...“As part of the offshore 3-D seismic surveys, PG&E will perform a check on this assumption. The intersection of the Shoreline and Hosgri fault zones will be studied to help further understand the interaction of these two fault zones at depth.”

A4NR: The state of California should reserve all judgment of the potential interaction between the fault systems mentioned in E.1 until not only have the 3-D studies been completed so that PG&E can “perform a check on this assumption,” but until the Independent Peer Review Panel convened under the CPUC has provided its analysis as well. It is prudent to remember the 1967 decision by the CPUC that relied solely on PG&E’s assurances that there was no active earthquake faulting in the vicinity of the plant. A very costly oversight and one recognized and documented by CPUC staff in 1988.

F.2 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 or SONGS? Please describe the contingency plans to maintain reliability and grid stability in the event of an extended shutdown at the plant. (Diablo Canyon, SONGS)

PG&E Response PG&E maintains adequate reserves to replace power from a Diablo Canyon unit if an outage lasts longer than 90 days. PG&E would either dispatch its own resources or purchase market power, if lower cost, to provide replacement power during the outage. PG&E may also rely on the forward markets to provide replacement power if the cost was lower than its own resources. For prolonged outages at Diablo Canyon, PG&E would seek longer-term replacement power generation from the market through a request for offers (RFO). Depending on the offers it receives, PG&E would provide replacement power during the outage from a mix of its own resources, market purchases and procurement through the RFO.

PG&E does not expect that an outage at Diablo Canyon would require any additional transmission facilities to maintain voltage support or system or local reliability.

A4NR: PG&E’s response relies on possible dispatching of PG&E’s own resources to replace lost power from Diablo Canyon on a short or long term basis. However, it may also rely on markets and external power sources. These types of “forward markets” proved volatile and costly during the California energy crisis of 2000. Should not the utility be required by the state to begin studying and planning for in-state utility generation that both meets the state’s renewable energy portfolio goals as well as providing economic incentives with local benefits—including job replacement—rather than placing the state at the jeopardy of merchant generators?

G.1 Please provide current information summarizing the insurance policies concerning nuclear liability claims for the facilities including what is the current maximum liability for secondary financial protection for your facility. (Diablo Canyon; SONGS; Humboldt Bay)?

Response for DCP and HBPP: Coverage under this policy is limited to liability for bodily injury or offsite property damage caused by nuclear material at the defined location. No coverage is afforded for damage to any property on site. The policy also excludes coverage for workers’ compensation or employers’ liability.

The maximum limit written under the Facility Form Policy is \$375M. PG&E purchases the maximum limits for Diablo Canyon Power Plant as required based on criteria in 10CFR140.11. PG&E purchases \$53M of nuclear liability coverage for the Humboldt Bay Power Plant. This amount is based on criteria in 10CFR140.12 “Amount of financial protection required for other reactors”.

The Secondary Financial Protection (SFP) Policy is used by the operators of nuclear power plants that produce >100 MWe to meet financial protection requirements under the Price-Anderson Act. The policy provides “following form” Coverage for losses that exceed the primary limit available under the Facility Form Policy and the Master Worker Policy. Diablo Canyon Units 1 and 2 each has a certificate to the SFP program. There are currently 104 power reactors in the SFP program and the \$117.495M per reactor maximum retrospective premium call results in an approx \$12.2 billion (B) layer of insurance. The total protection amount for nuclear claims at Diablo Canyon is equal to the primary and SFP program for a total of approximately \$12.6B.

A4NR: Given that, according to the County of San Luis Obispo TAX RATE INFORMATION & ASSESSED VALUATIONS 2010 – 2011 (Prepared under the direction of Gere W Sibbach, Auditor-Controller) the locally assessed San Luis Countywide Gross Secured Assessed Value of property is \$38,984,933,517, how can the total SFP (Price-Anderson) insurance cap of \$12.6 billion be considered adequate, if an event of the magnitude of Fukushima occurred at Diablo Canyon? The initial claims in the first months after the Fukushima disaster (in this predominantly rural and undeveloped prefecture) are totaling over \$23.6 billion in property damage and liability?