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California Energy Commission
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Re: Docket No. 11-IEP-1J
1516 Ninth Street
Sacramento, CA 95814-5512

Re: Docket No. 11-IEP-1J, California Nuclear Power Plant Issues

Please find attached PG&E's comments on the July 26, 2011 Committee Workshop on California Nuclear Power Plant Issues. Should you have any questions or need additional information, please contact me at 415/973-3839

Sincerely,

Enclosure

PACIFIC GAS AND ELECTRIC COMPANY
COMMENTS ON CALIFORNIA ENERGY COMMISSION QUESTIONS ON
CALIFORNIA NUCLEAR POWER PLANT ISSUES
AS DISCUSSED AT JULY 26, 2011 COMMITTEE WORKSHOP

Pacific Gas and Electric Company (PG&E) appreciates the opportunity to provide feedback on the key issues and questions set forth by the California Energy Commission (CEC) at its July 26, 2011 Committee Workshop. The CEC's questions are in black font; PG&E's responses are shown in blue font.

1. Seismic/Tsunami Scenarios and Uncertainties for Diablo Canyon, SONGS and Humboldt Bay

a. What is the current understanding of the major onshore and offshore fault systems and the largest magnitude tsunamis, earthquakes, and ground shaking potential calculated at or near Diablo Canyon, SONGS and Humboldt Bay for these facilities in relation to their existing plant or Independent Spent Fuel Storage Installation design?

Response:

A. Diablo Canyon Ground Motion

For ground motions at Diablo Canyon Power Plant (DCPP), there are four main faults that contribute to the seismic hazard: Hosgri, Los Osos, Shoreline, and San Luis Bay. The tectonic model for the region and the detailed models for these four faults are described in the PG&E 2011 Shoreline Fault Report. The source parameters for deterministic hazard analysis are listed in Table 1. The resulting 84th percentile ground motions are shown in Figure 1 and are compared to the 1977 HE design spectrum.

Table 1. Deterministic Earthquake Scenarios (from the PG&E 2011 Shoreline Fault Report)

Fault Source	Magnitude	Dip	Distances			Sense of Slip	Hanging Wall or Foot Wall
			R_{Rup} (km)	R_{JB} (km)	R_x		
Hosgri	7.1	80	4.9	2.3	4.9	SS	HW
Hosgri & San Simeon*	7.3	80	4.9	2.3	4.9	SS	HW
Los Osos	6.8	45	7.6	0.0	9.9	RV/OBL	HW
San Luis Bay (not linked)	6.3	50	1.9	0.0	2.5	RV	HW
Shoreline	6.5	90	0.6	0.6	0.6	SS	N/A

* The Hosgri and San Simeon Rupture case was not considered in the PG&E 2011 Shoreline Fault Report. The M7.3 value is from the UCERF2 model.

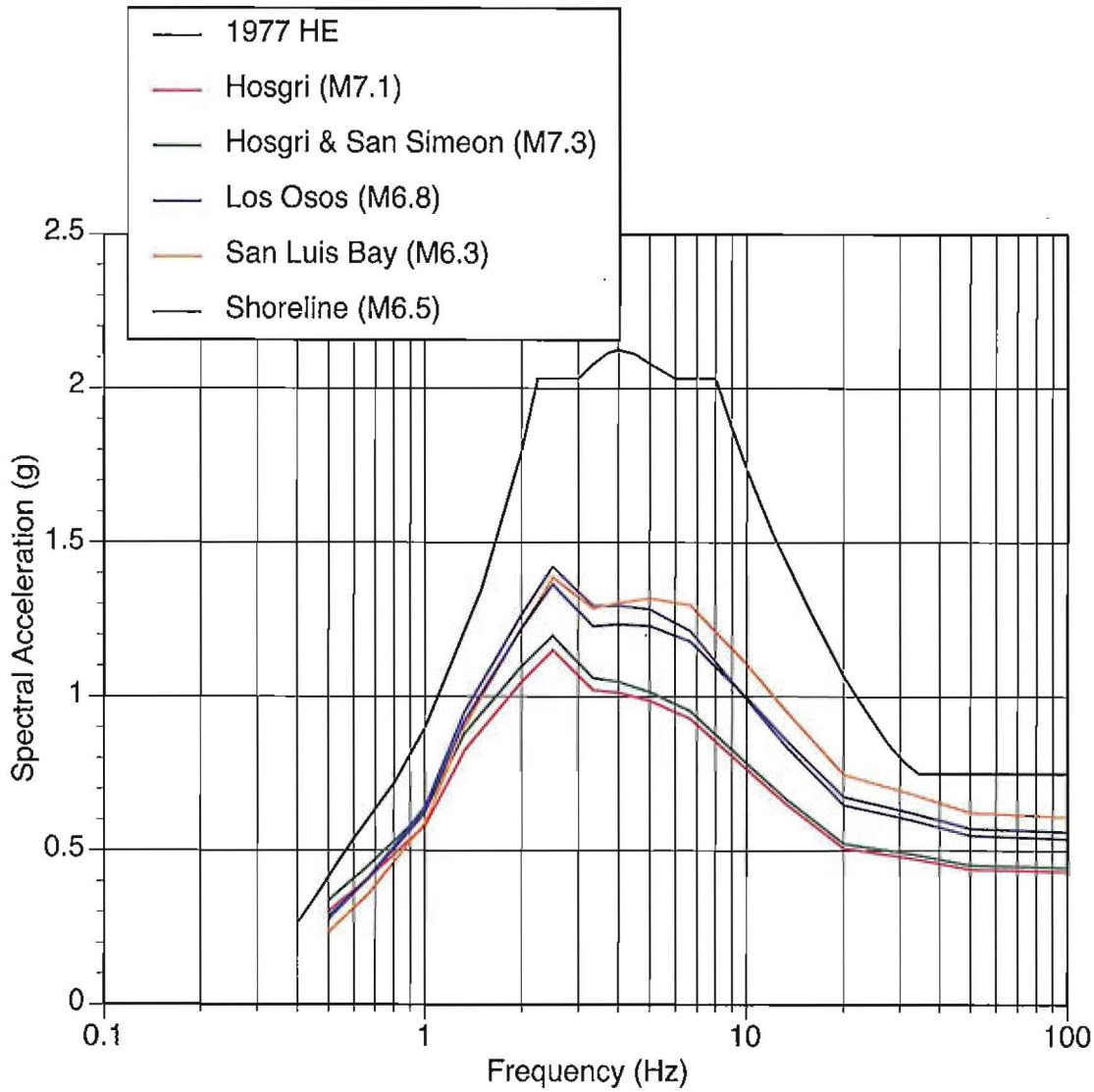

Figure 1. Comparison of the current estimates of the deterministic ground motion (84th percentile) for DCPP with the 1977 HE design spectrum. All spectra are for 5% damping.

B. Diablo Canyon Tsunami

The tsunami hazard at DCPP was evaluated using numerical modeling of tsunami waves from distant earthquakes, local earthquakes, and offshore landslides. The tsunami hazard is summarized in the 2010 PG&E tsunami report.

For the distant earthquakes, large subduction earthquakes along the Alaska/Aleutian subduction zone (M9.2) and along the Kamchatka subduction zone (M9.0) lead to the largest tsunami wave heights of 0.9 to 1.2 m at DCPP. For the local offshore earthquakes, earthquakes (M7) along the Santa Lucia Banks fault lead to tsunami wave heights of 1.0 m at DCPP.

Large offshore landslides in the DCPP occur much less frequently than the large distant earthquakes, but they can cause larger tsunami wave heights. Based on the numerical modeling, the largest wave height at DCPP is 6.9m (above MSL) from a large slide on the ECZ section of the Santa Lucia Escarpment. These large slides are rare but there is high uncertainty in the recurrence intervals. For the ECZ, the mean recurrence intervals were estimated to be between 75,000 and 300,000 years. Other offshore slide regions that can cause large wave heights at DCPP are the Southern Santa Lucia Basin zone (SSL) and the Santa Maria Slope Break Zone (SMSB). The largest simulated wave heights for these slides are 3.4m (above MSL) for SSL and 2.4m (above MSL) for SMSB.

For comparison, the existing design tsunami water level for DCPP is 10.5 m above MLLW (9.8 m above MSL).

C. Humboldt Bay Ground Motion

The ground motion at Humboldt Bay is summarized in the 2003 ISFSI report (PG&E, 2003).[1] The ground motion at Humboldt Bay is dominated by three sources: offshore Gorda plate, the Little Salmon Fault, and the Cascadia subduction zone. The Gorda plate has a high activity rate and dominates the hazard in the moderate ground motion level, but the design ground motions are controlled by the closer Little Salmon Fault and the Cascadia subduction zone.

As described in PG&E (2003), the Little Salmon fault (M7.8) is located 0.5 km from the Humboldt Bay Power Plant (HBPP) site and the Cascadia interface (M9.0) is located 7 km from the HBPP site. The Little Salmon Fault is likely a splay fault off of the Cascadia interface leading to a possible synchronous rupture of these two sources. The design ground motion for the HBPP ISFSI was developed by first computing the 84th percentile rock motion from synchronous rupture of the Little Salmon fault and the Cascadia interface including near fault directivity effects. The design ground motion on soil was then computed by applying non-linear soil amplification factors to the rock motion. The resulting horizontal design spectrum in the fault normal direction is shown in Figure 2.

[1] PG&E, 2003, Humboldt Bay ISFSI safety analysis report, December 2003: Pacific Gas and Electric Company report to the Nuclear Regulatory Commission, Washington D.C.

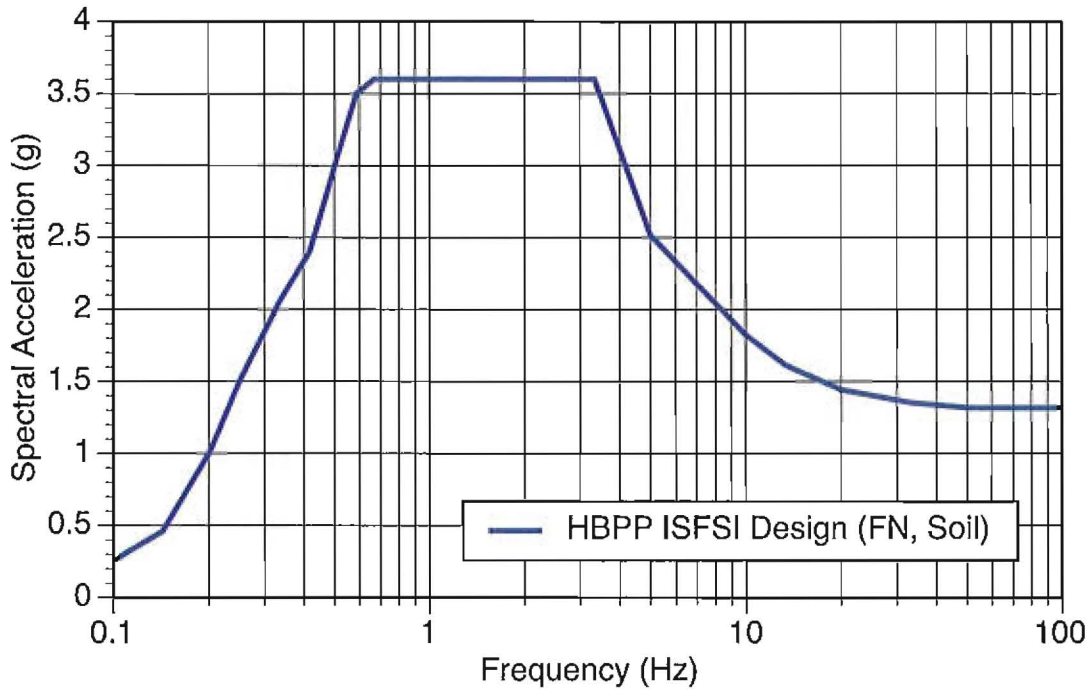

Figure 2. Design spectrum (5% damping) for the fault normal component for the Humboldt Bay ISFSI (from PG&E, 2003).

D. Humboldt Bay Tsunami

The tsunami hazard at Humboldt Bay is controlled by large earthquakes (M9) on the Cascadia subduction zone. For the ISFSI, the design tsunami values were developed based on judgment using geologic evidence of the tsunami waves from past Cascadia events. The wave heights were estimated to have been between 8 and 13 m above MLLW if the tsunami occurred during high tide. The HBPP ISFSI is located on Buhne Hill at an elevation of 13.4m. For added protection from tsunami waves, the ISFSI was put in a vault below grade. In addition, the fuel is stored in HI-STAR transportation certified casks which have an external design pressure of 300 psig. This allows for submergence well in excess of any postulated tsunami event.

Additional studies of the tsunami hazard at Humboldt Bay have been conducted using numerical modeling of the wave heights, similar to the approach used at DCPP. Preliminary results from the numerical modeling shows that the wave height from a M9.0 Cascadia earthquake is 4-5 m above MSL, indicating that the geologic based estimates used for the HBPP ISFSI are conservative.

b. The Tohoku earthquake and tsunami in Japan on March 11 greatly exceeded Japan's predictions and design for the Fukushima Daiichi plant with catastrophic results. What are the significant areas of uncertainty associated with earthquake/tsunami predictions for Diablo Canyon, SONGS, and Humboldt Bay, and what studies or mitigating activities are underway to address these uncertainties?

Response:

A. DCPP Ground Motion

There are two inputs required for evaluating the ground motion: source characterization (earthquake magnitudes, locations, style-of-faulting, and rates) and ground motion characterization (ground motion given the earthquake magnitude, location, style-of-faulting, and the site condition).

For the source characterization for DCPP, the most significant uncertainties are the slip-rate of the Hosgri Fault, the dip of the Hosgri Fault, and the dip of the Los Osos Fault. The ongoing program to conduct additional geophysical surveys is targeted to address these uncertainties.

For the ground motion characterization for DCPP, the most significant uncertainties are the hanging wall effects, near-fault directivity effects, and the magnitude dependence to the standard deviation. PG&E is participating in the ongoing research program at the Pacific Earthquake Engineering Research (PEER) Center to develop new ground motion models that will reduce the uncertainties in these topics. In addition, PG&E is also participating in the ongoing research at the Southern California Research Center (SCEC) to improve the methods for numerical simulations of near fault ground motions for application to the high frequency range that is important for nuclear power plants.

B. DCPP Tsunami

The main uncertainties for the distant tsunamis are the maximum magnitudes of the megathrust earthquakes and the size of the aleatory variability (standard deviation) of the wave heights from the numerical simulations. Currently, there is planning underway to establish a tsunami research program (through PEER and/or SCEC) to address these uncertainties. PG&E will be a participant in this program.

The main uncertainties for the offshore landslide generated tsunamis are the dimensions of the slides (area and thickness) and the occurrence rates of the slides. The additional offshore data collected as part of the 3-D seismic studies will provide improved data for evaluating the landslide potential offshore DCPP. This data will then be used to revaluate the tsunami hazard from offshore landslides in the DCPP region.

C. Humboldt Bay Ground Motion

The main uncertainties for the ground motion characterization at Humboldt Bay are the Hanging Wall effects from the Little Salmon Fault, near fault directivity effects from the Little Salmon Fault, and the ground motion model from M9 megathrust earthquakes. The PEER studies, mentioned earlier, will address the hanging wall effects and near-fault effects. For the ground motion from M9 megathrust earthquakes, the ground motion data from the 2010 Chile (M8.8) and 2011 Tohoku (M9.) earthquakes are currently being evaluated to revise the currently available subduction ground motion models. PEER is also planning for a major project to develop new ground motion models for subduction earthquakes that is expected to begin next year.

D. Humboldt Bay Tsunami

The main uncertainty for the tsunami hazard at Humboldt Bay is the lack of updated numerical simulations of the tsunami waves from Cascadia earthquakes. The tsunami modeling issues identified above for DCPP also apply to Humboldt Bay.

c. A recent USGS study in April 2011 concluded that, "There's no objective evidence for any discontinuities or segmentation of the Shoreline Fault," in contrast to PG&E's conclusion in January 2011 the Shoreline Fault is segmented. An important "unanticipated" phenomenon in relation to the Mw 9.0 earthquake in Japan was that five segments along the subduction zone ruptured together, rather than independently as scientists had earlier predicted. What are the expected consequences of the assumptions regarding segmentation versus non-segmentation of the Shoreline Fault when estimating earthquake potential?

Response:

The USGS April 2011 study was based on an evaluation of best fitting planes to the microseismicity data offshore DCPP. We agree with the USGS that, based on only this April 2011 USGS study, there is no evidence for segmentation of the Shoreline fault. However, the evaluation of segmentation of the Shoreline fault by PG&E as described in the 2011 Shoreline Fault Report was based on additional data including differences in the geologic and geomorphic expression of surface and near-surface faulting, intersections with other mapped structures, features observed in the high-resolution magnetic field data, and variations in the continuity, trend, and depth of the seismicity along the lineament.

The PG&E model for the 2011 Shoreline fault report identified three possible segments (Southern, Central, and Northern). The model included alternative segmentation models in which the segments ruptured individually, two at a time, or all three at once. The earthquake magnitude used for the deterministic seismic hazard analysis was set at the 90% fractile (magnitude larger than 90% of the weighted alternatives considered). This leads to M=6.5 for the Shoreline fault, which corresponds to rupture of all three segments at once. Therefore, the deterministic ground motions at DCPP from the Shoreline fault developed by PG&E are based on the unsegmented assumption for the Shoreline fault.

Because the deterministic ground motions from the 2011 Shoreline Fault Report used for DCPP is based on rupture of all three segments, there are no consequences of the segmentation of the Shoreline fault on the estimated earthquake potential.

2. Progress in Completing the AB 1632 Report/2008 IEPR and 2009 IEPR Recommendations for Plant License Renewal Reviews

a. What is the status of PG&E and SCE's completion of recommendations in the AB 1632 Report, *2008 IEPR Update and 2009 IEPR* including studies and actions related to seismic and tsunami hazards, plant buildings and structures, spent fuel storage, quantifying replacement power options, and reassessing the adequacy of access roads surrounding the plants?

Response:

The following AB 1632 recommendations have been completed:

- Local Economic Impacts of Decommissioning the Diablo Canyon Power Plant
- Evacuation Update
- Tsunami Hazard Analysis
- Kashiwazaki-Kariwa Nuclear Plant (KKNP) Lessons Learned Evaluation
- Low Level Radioactive Waste
- Reliability of Power Plant Buildings and Structures

The following AB 1632 recommendations are currently in progress

- Additional Seismic Surveys
- Spent Fuel Storage Facilities – for additional information see response to question 2d.

b. How will PG&E and SCE ensure that these additional seismic analyses reflect the most recent USGS and Uniform California Earthquake Rupture Forecast data base and 2-D imaging study results, that the study plans and findings are provided in a timely manner to the California Geologic Survey (CGS) and the Independent Peer Review Panel (IPRP) for review, and that the study plans and analyses will take into consideration the CGS' and the IPRP's comments and recommendations?

Response:

The study plans and findings will be provided to the Independent Peer Review Panel (IPRP) for review. The IPRP includes members of the California Geologic Survey (CGS). When the IPRP and CGS members receive a document for review, they have 30 days to provide any comments to PG&E. PG&E will consider the comments and recommendations provided.

c. How will these studies be provided in a timely manner to the U.S. Nuclear Regulatory Commission (NRC) and California agencies, e.g., the Energy Commission, CPUC, CGS, and the California Coastal Commission (CCC), so that these studies can be considered as part of Diablo Canyon's and SONGS' ongoing and future license renewal cost/benefit evaluations and the CCC's evaluation of consistency of the projects with the Coastal Zone Management Act?

Response:

Copies of seismic studies will be made available to interested state and local agencies for their consideration in any license renewal evaluations.

d. The National Academies in 2006 reported on the risk of fire from overheated spent fuel rods in spent fuel pools. The *2008 IEPR Update* recommended that California's nuclear power plants return their spent fuel pools to less dense arrangements. Fires were reported in the spent fuel pools at Fukushima Daiichi. Nuclear plants are storing spent fuel in pools in configurations at far greater densities than the original plant design. What progress has been made in returning the spent fuel pools to less dense arrangements? If no action has been taken to modify the spent fuel pool racking to a less dense configuration, please explain why.

Response:

The Nuclear Regulatory Commission (NRC) near-term task force review of the Fukushima Daiichi accident, which was issued on July 12, 2011, provided recommendations for enhancing spent fuel pool makeup capability and instrumentation for the spent fuel pool. PG&E is in the process of evaluating these recommendations and will respond to the NRC's requirements regarding additional spent fuel enhancements. PG&E will provide copies of responses to the NRC on actions taken for spent fuel pool enhancements to the California Energy Commission.

The NRC's 2002 interim compensatory measures order and subsequently in 10 CFR 50.54 (hh) (2) required mitigation capabilities for spent fuel pools. These mitigation measures include:

1. Additional sources of cooling water for and methods to inject or spray into the spent fuel pools
2. Methods to control leakage from damage to the spent fuel pools
3. Dispersal of higher decay power fuel assemblies among older lower decay power assemblies

The National Academy of Sciences (NAS) report in 2006 recommended reconfiguring of spent fuels to more evenly distribute decay heat loads. The NAS report notes that the potential for zirconium cladding fires can be reduced substantially by surrounding freshly discharged spent fuel assemblies with older spent fuel assemblies in checkerboard patterns. The 2006 report notes that such arrangements might even be more effective for reducing the potential for zirconium cladding fires than removing this older spent fuel from the pools.

PG&E believes that the mitigation capabilities for the spent fuel pools which were implemented in response to the NRC's 2002 compensatory measures order are responsive and consistent with the NAS 2006 spent fuel pool recommendations.

In addition PG&E is in the process of providing additional dry cask spent fuel storage capabilities on site. An additional 12 storage cask, each capable of storing 32 spent fuel assemblies, arrived at DCPP in June 2011. An order has been placed for an additional 10 cask with delivery dates in 2012 and 2013. The third campaign to move spent fuel from wet to dry storage is scheduled to start in January 2012. Seven casks will be loaded with 224 fuel assemblies.

3. Implications of Events at the Fukushima Daiichi Plant for California's Operating Nuclear Plants

a. Should older nuclear power plants, particularly in high seismic hazard areas, be held to more stringent standards during plant license renewal reviews than are applied to new reactors, based on insights from the Fukushima Daiichi plant disaster?

Response:

The NRC near-term task force completed its review of the Fukushima Daiichi accident and issued a report on July 12, 2011. Several of these recommendations pertain to improved seismic capability for existing nuclear plants. PG&E and the industry will work with the Nuclear Regulatory Commission regarding these recommendations to ensure we are responsive to the lessons learned from the Fukushima Daiichi Plant. PG&E will provide copies of any responses to the NRC's recommendations to the California Energy Commission.

b. Extreme events have been considered so highly unlikely at U.S. nuclear plants that they are covered by voluntary "severe accident management guidelines" to plant operators rather than mandatory actions. NRC plant inspections in March revealed failures at some plants to keep these emergency guidelines and training up-to-date. Are current federal rules for "beyond design basis events" adequate or should they be changed?

Response:

The NRC near-term task force report issued July 12, 2011 recommended that the NRC strengthen regulatory oversight of licensee safety performance by focusing more attention on defense-in-depth requirements.

c. How is the possibility of extreme events affecting multiple reactors at a single site or multiple threats to nuclear plants, such as a fire and an earthquake, or flooding and an earthquake, that cut off power for a plant's emergency equipment and spent fuel cooling handled at Diablo Canyon and SONGS?

Response:

Response to extreme events affecting both Diablo Units is managed in accordance with the plant's safety analysis and licensing basis requirements. Some of these requirements (e.g., station blackout and earthquakes) require both of the plant units to respond to common events. Currently some of the licensing basis events require only postulating the effects on a single unit.

The NRC near-term task force review of the Fukushima Daiichi accident, which was issued on July 12, 2011, provided recommendations for responding to multi-unit events. PG&E is in the process of evaluating these recommendations and will respond to the NRC's requirements. PG&E will provide copies of responses to the NRC on actions taken to the California Energy Commission.

d. How do the original seismic and tsunami design requirements and expected ground motions for Fukushima Daiichi compare with the observed shaking and tsunami impacts following the Tohoku earthquake and tsunami? In light of the findings about the Tohoku Earthquake event, what studies are underway at Diablo Canyon, SONGS and Humboldt Bay to validate the data and parameters for the predicted seismic/tsunami hazards for these California plants?

Response:

Fukushima Daiichi License/Design Basis	Fukushima Daiichi Reported	DCPP License/Design Basis
Original Design Ground Acceleration: 0.36 g Upgrade Design Ground Acceleration: 0.6g	Foundation Acceleration: 0.3 – 0.5 g Estimated Free Field Ground Acceleration: 0.4 – 0.7g	Ground Acceleration: 0.75 g Note: In addition, Diablo Canyon has been evaluated for ground motions beyond the design basis as part of a probabilistic risk analysis. The risk analysis shows that DCPP has-adequate seismic margin (extra strength) to withstand beyond design basis ground motions. As part of our license to operate the plant, PG&E has a Long-Term Seismic Program, which continually evaluates seismic issues, and applies new information to help assure that the plant is seismically safe. We are partnering with the United States Geological Survey (USGS) to update the earthquake hazards along the Central Coast and throughout our service territory.
Tsunami Wave Height: 6.0 m (~21 ft)	Tsunami Wave Height: 10 – 14 m (~33 – 46 ft)	Combined Tsunami, Storm Waves and Tides Wave Height: ~35 ft

The NRC Near-Term Task Force provided recommendations for enhancing seismic and flooding protection for structures systems and components. PG&E is in the process of evaluating these recommendations and will respond to the NRC's requirements. PG&E will provide copies of responses to the NRC on actions taken to the California Energy Commission.

See PowerPoint discussion for our response to the AB 1632 recommendations regarding additional seismic/tsunami studies.

e. The Fukushima Daiichi crisis was significantly worsened by having multiple damaged reactors in close proximity in the same area, radiation levels too high to allow workers safe access to crucial equipment, hydrogen explosions, inability to assess real-time reactor and spent fuel pool conditions, and losing emergency diesel generators and batteries and spent fuel cooling. What should be done or has been done to avoid and mitigate similar conditions and problems at Diablo Canyon and SONGS?

Response:

The NRC Near-Term Task Force has provided recommendations for enhancements regarding mitigating multi-unit events. PG&E is in the process of evaluating these recommendations and will respond to the NRC's requirements. PG&E will provide copies of responses to the NRC on actions taken to the California Energy Commission.

f. What are some of the likely major environmental, safety and economic implications for Diablo Canyon, SONGS, and Humboldt Bay from the lessons learned reviews following events in Japan by the NRC, International Atomic Energy Agency, Institute of Nuclear Power Operations and others? For example, what are the likely impacts on spent fuel pool management, preparing for beyond design basis threats, the estimated costs for new and existing nuclear power plants, license renewal reviews, plans for providing back-up emergency power and water cooling for reactor cores and spent fuel pools, and protection from hydrogen explosions?

Response:

The NRC Near-Term Task Force Report has provided recommendations regarding the Fukushima Daiichi Plant accident implications. PG&E is in the process of evaluating these recommendations and will respond to the NRC's requirements. PG&E will provide copies of responses to the NRC on actions taken to the California Energy Commission.

g. What are the areas of uncertainty regarding the condition of the spent fuel and packaging after decades of storage at a reactor site before being transported offsite to a storage or disposal facility? What are the intergenerational equity considerations (net risks and benefits) of extended spent fuel storage at reactor sites, e.g., decades or up to 100 years, prior to transport offsite for storage or permanent disposal?

Response:

The DCPP Independent Spent Fuel Storage Installation (ISFSI) is licensed by the Nuclear Regulatory Commission (NRC) to store spent nuclear fuel for a period of 20 years. This license can currently be extended for an additional 40 years. The NRC is currently conducting studies to validate the capabilities of the existing storage systems to validate that the length of time that spent fuel is in interim storage can be extended for up to 100 years.

Relicensing of existing ISFSI's will require aging management programs to validate the material condition of the storage containers.

The intergenerational equity considerations that must be evaluated are associated with the risk for continued localized storage verses transportation related risk for moving the fuel to an interim federal facility prior to movement to a federal repository. The decision to move or continue to store the spent fuel within the DCPP ISFSI is not a PG&E decision. It is a Department of Energy decision. PG&E will continue to safely store and protect the spent fuel as mandated by DOE and as licensed by the NRC.

h. What are some of the recommendations to reduce the likelihood of and mitigate potential station blackouts (loss of offsite power and onsite emergency power) and loss of cooling lasting longer than plant design assumptions? The practice of providing four- and eight-hour batteries assumes that outside power can be promptly restored. Please describe the plans and

preparation for an extended station blackout and/or loss of emergency cooling, regardless of the initiating event, at Diablo Canyon and SONGS.

Response:

The NRC Near-Term Task Force Report has provided recommendations regarding mitigation of potential station blackout and loss of cooling lasting longer than plant design assumptions. PG&E is in the process of evaluating these recommendations and will respond to the NRC's requirements. PG&E will provide copies of responses to the NRC on actions taken to the California Energy Commission.

i. The Kashiwazaki-Kariwa plant in Japan was badly damaged in 2007 and four years later, three of the seven reactors remain offline with cumulative energy replacement costs estimated to be in the billions of dollars. Most, if not all, of the six reactors at the Fukushima Daiichi plant will never resume operation. What are the California utilities' plans for replacement power if there are any significant long-term outages at Diablo Canyon and SONGS?

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.

PG&E also purchases accidental outage extra expense coverage for DCPP from NEIL. The maximum coverage is $490 million for a single unit outage. In the event of an outage involving both units, the maximum coverage is $784 million. The coverage has a waiting period or deductible of 12 weeks.

j. Tokyo Electric Power likely will face billions of dollars in compensation and mitigation costs following the Fukushima nuclear plant accident. If a similar crisis were to occur at Diablo Canyon or SONGS, what is the available liability coverage in the U.S. and who likely would be ultimately responsible for covering these costs?

Response:

PG&E purchases four types of nuclear liability coverage from American Nuclear Insurers (ANI):

- Facility Form Policy
- Secondary Financial Protection (SFP) Policy
- Master Worker Policy
- Supplier and Transporters Policy

ANI Facility Form Policy is purchased by all commercial nuclear power plant operators in the United States and satisfies the Price-Anderson Act requirement for primary financial protection.

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 $375 million. PG&E purchases the maximum limits for Diablo Canyon Power Plant as required based on criteria in 10CFR140.11.

PG&E purchases $53 million 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 1 & 2 each have 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 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.

It is expected that the utilities that operate nuclear generating stations will jointly be responsible for covering these costs in addition to their insurers.

k. Given NRC's recommended evacuation zone of a 50-mile radius surrounding the Fukushima Daiichi plant, are current emergency plans and emergency planning zones, adequate for Diablo Canyon and SONGS?

The NRC Near-Term Task Force Report has provided recommendations regarding emergency plans. PG&E is in the process of evaluating these recommendations and will respond to the NRC's requirements. PG&E will provide copies of responses to the NRC on actions taken to the California Energy Commission.