

**DOCKET NO. 09-IEP-1L****PG&E'S RESPONSES TO****CEC'S NUCLEAR POWER PLANT DATA REQUESTS****A. Environmental Impacts (Diablo Canyon, SONGS 2 and 3).**

*A.1. Please provide copies of any feasibility or cost/benefit studies completed within the past three years for devices, technologies, or procedures that would mitigate cooling water impacts on the marine environment. For PG&E, this would apply to any studies that have been completed besides the Diablo Canyon Cooling Tower Feasibility Study (March 2009) by Enercon Services, Inc. and PG&E's "Comments on the Workshop on Options for Maintaining Electric System Reliability when Eliminating Once-Through-Cooling Power Plants" (May 26, 2009).*

RESPONSE: The Tetra Tech study cooling tower feasibility report was prepared in 2008. Diablo Canyon is discussed in Chapter 7C. See the study on the following link:

[http://www.swrcb.ca.gov/water\\_issues/programs/npdes/alternativecoolingsystem.shtml](http://www.swrcb.ca.gov/water_issues/programs/npdes/alternativecoolingsystem.shtml)

PG&E's comments on the Tetra Tech study, Tetra Tech's response, and PG&E's follow-up response, are located on the attached CD:

PG E Comments on Tetra Tech Draft Alts Analysis (00061461).DOC

Tetra Tech response to PG E's comments (00061459).PDF

PG E Response to Tetra Tech Comments (00061462).DOC

From 2005 through 2006, PG&E commissioned a cost-benefit study and peer reviews; these files are located on the attached CD:

Triangle Benefits Valuation Study (00077758).PDF

Deacon - Peer Review of Triangle Cost-Benefit Analysis (00077746).PDF

Kolstad - Peer Review of Triangle Cost-Benefit Analysis (00077747).PDF

*A.2. Please provide copies of any studies, evaluations, or assessments of radioactive material leaks or other hazardous materials discharges, particularly tritium, from the plant since 2006. These include: (1) permitted discharges of hazardous materials through the facility NPDES permit, (2) radioactive liquid/gaseous releases within the guidelines and limits of the Federal Operating License, (3) any "un-permitted" or accidental releases or spills, and (4) general studies on routine plant discharges.*

RESPONSE for DCPD:

*(1) permitted discharges of hazardous materials through the facility NPDES permit,*

The plant generates and submits quarterly reports to the State & Regional Water Quality Control Board (RWQCB). It is questionable if the information in these reports actually constitute studies, evaluations, or assessments in the context of the request. In any event, the plant is really not permitted to 'discharge' hazardous materials through the NPDES Permit, as all systems/pathway releases are to meet permit constituent criteria, and not impart observable toxic effects at outfall.

Discharge Self Monitoring Annual Summary Reports (compilation of the 1st-4th Q reports for each year in summary format) for 2006, 2007, and 2008. See files on the attached CD:

2006 DCPD NPDES DSMR Annual Summary.PDF

2007 DCPD NPDES DSMR Annual Summary.PDF

2008 DCPD NPDES DSMR Annual Summary.PDF

*(2) radioactive liquid/gaseous releases within the guidelines and limits of the Federal Operating License,*

See file on the attached CD:

DCL09025.PDF

*(3) any "un-permitted" or accidental releases or spills,*

There were no reportable "Unpermitted" or Accidental Releases or Spills from 2006 through July 20, 2009.

*(4) general studies on routine plant discharges.*

There have been no general studies on routine plant discharges completed from 2006 through July 20, 2009.

*A.3. Please submit copies of any notices of violation received from local, state or federal regulatory or trustee agencies related to environmental, public health or natural resource issues from the power plant since 2006.*

2006: (a) DTSC - Class II Violation for Operating Log Documentation Deficiencies Associated with Permitted Waste Storage Unit Receiving Log Entries in March 2005. See files on the attached CD:

2006 DTSC Class II NOV Text (Inspection Logs).PDF

DTSC 2006-06-27 Letter February 22-24 2006 TSDF Inspection Report.PDF

(b) DTSC - Minor Administrative Violation For Alleged Failure to Submit Financial Assurance Mechanism Certificate of Acknowledgement in 2002. See file on the attached CD:

TSC 2006-04-05 Letter (NOV) Minor Violation FA Certificate 2002.PDF

2007 : No (0) NOVs/NOCs

2008: No (0) NOVs/NOCs

2009: No (0) NOVs/NOCs (as of July 20th)

**B. Spent Fuel Generation (Diablo Canyon and SONGS 1, 2, and 3).**

*B.1. Please update and complete any data gaps in the following Table 12 from the AB 1632 Assessment of California’s Operating Nuclear Plants: Final Report, October 2008 (CEC-100-2008-005-F, page 213).*

Table 12: Waste Generated at Diablo Canyon and SONGS (Unit 2 and Unit 3 only)

		Spent Fuel		Low-Level Waste			
		(No. of assemblies)	(Metric tons of Uranium)	Class A (ft3)	Class B (ft3)	Class C (ft3)	GTCC (ft3)
<b>Diablo Canyon</b>	Generated through 2007	2,642	1,136	8,130 ('02-'07)	804 ('02-'07)	563 ('02-'07)	Unknown
	2008 through Initial License	1,668	717	22,406	2,546	1,786	Unknown
	License Extension	2,112	908	17,480	2,680	1,880	Unknown
	Decommissioning	None	None	240,752	23,308	1,148	866
	<b>Total</b>	<b>6,422</b>	<b>2,761</b>	<b>288,768</b>	<b>29,338</b>	<b>5,377</b>	
<b>SONGS</b>	Generated through 2007	2,702	1,138	35,914 ('01-'07)	220 ('01-'07)	115 ('01-'07)	Unknown
	2008 through Initial License	2,270	988	SCE declined to provide this information.			Unknown
	License Extension	3,024	1,326				Unknown
	Decommissioning	None	None				~2,700
	<b>Total</b>	<b>7,996</b>	<b>3,452</b>				

RESPONSE for DCPD: DCPD data is complete in this table.

*B.2. For each of the years 2004-2008, how much spent nuclear fuel was generated by each unit (Diablo Canyon, SONGS 2 and 3, Palo Verde) and what is the average annual spent fuel generation rate for each unit over the lifetime of the plant?*

RESPONSE for DCPD: For the years 2004-2008, the following data is provided for generation of spent nuclear fuel per unit at DCPD (all numbers in MT):

Year	Unit 1	Unit 2
2004	35.85	38.78
2005	38.77	
2006		35.82
2007	32.01	
2008		33.79

DCPP operates on a three cycle fuel management plan consisting of cycle lengths of 19, 20 and 21 months. There is an outage on both units during every fifth calendar year. A rough estimate of the total amount of spent fuel generated to date is 1,160 MT. A rough estimate for the spent fuel generated from 2009 through end of plant life in 2025 is 650 MT.

**C. Spent Nuclear Fuel Storage**

*C.1. Please provide updates to Table 14 from page 217 of the AB 1632 Assessment of California's Operating Nuclear Plants: Final Report, October 2008 (CEC-100-2008-005-F): Please also provide the information in metric tons of uranium.*

RESPONSE for DCP:

Table 14: On-Site Spent Fuel Storage Capacity (number of assemblies)

	<b>Diablo Canyon</b>	<b>SONGS Units 2 &amp; 3</b>
ISFSI Capacity	1,280	312
Planned Expansions	3,136	1,488
Total Planned ISFSI Capacity	4,416	1,800
Spent Fuel Pool Capacity	2,648	3,084
Total On-site Storage Capacity	7,064	4,884
Assemblies Generated during Current Licensing period	4,310	4,972

*C.2. What is the current total amount of spent fuel (number of assemblies and metric tons of uranium) stored in storage pools at the plant?*

RESPONSE for DCP: Assuming that: Tally is based on information as of 7/21/09; 193 assemblies in the U1 core are not included in this tally; 193 assemblies in the U2 core are not included in this tally; 160 assemblies are in dry storage as of the date listed above and not included in this tally; 80 new fuel assemblies in the U2 SFP are not "spent" and not included in this tally; and masses (in MTU) are the sums of the initial uranium loadings for each fuel assembly, then 1) 1080 fuel assemblies in the U1 SFP with a weight of 467.6 MTU and 2) 1184 fuel assemblies in the U2 SFP with a weight of 513.3 MTU, resulting in a total of 2264 fuel assemblies with a weight of 980.9 MTU for the DCP site.

*C.3. What are the updated annual spent fuel pool operating and maintenance costs? Are any major capital investment projects anticipated for the spent fuel pools? If so, what are the anticipated costs?*

RESPONSE for DCP: The cost for operation and maintenance of the spent fuel pools (SFP) has not been segregated from plant O&M costs. There are no capital improvement projects currently planned for the SFP.

*C.4. What is the current status of the Interim Spent Fuel Storage Installation (ISFSI) and projected schedule for transfer of spent fuel to the ISFSI? (Diablo Canyon, SONGS 1, 2, and 3, Humboldt Bay).*

RESPONSE for HBPP: The Humboldt Bay ISFSI is fully operational as of December 11, 2008. The entire inventory of 390 fuel assemblies has been transferred from the spent fuel pool to five Holtec HI-STAR dual purpose casks and placed in the ISFSI vault.

RESPONSE for DCP: Licensing, permitting and construction of the ISFSI is complete. The NRC provided final approval to load fuel and loading of the first storage cask started in June 2009. Eight casks, containing a total of 256 fuel assemblies will be loaded during the summer of 2009. A second loading campaign will take place mid-year 2010.

*C.5. What is the current amount of spent fuel being stored and planned for storage at the ISFSI? (SONGS 1, 2, and 3, Diablo Canyon, Palo Verde).*

RESPONSE for DCP: The ISFSI is designed to accommodate all fuel discharged from both units during the current 40 year license. As of July 15, 2009, there are three casks containing 96 fuel assemblies stored in the ISFSI.

The facility will accommodate up to 38 casks containing 4,416 fuel assemblies. Additional foundations will be constructed as necessary.

*C.6. How long is the spent fuel cooled in the spent fuel pools before being transferred to the ISFSI? (Diablo Canyon, SONGS 2 and 3, Palo Verde).*

RESPONSE for DCP: Spent fuel is stored a minimum of 5 years before it becomes a candidate for movement to the ISFSI.

*C.7. What is the status of ongoing legal challenges regarding the Nuclear Regulatory Commission's (NRC) approval of Diablo Canyon's ISFSI license?*

RESPONSE: The San Luis Obispo Mothers for Peace filed a timely appeal of the NRC's order finding the supplemental environmental assessment prepared by NRC staff met the requirements of the National Environmental Policy Act. Written briefings were filed by all parties as of April 2009. Parties await a scheduling order from the Ninth Circuit Court of Appeals setting a date for oral argument.

*C.8. Should an offsite spent fuel storage or disposal facility becomes available, would the spent fuel stored onsite require repackaging before being transported offsite? How and where might spent fuel stored in dry casks at the reactor be repackaged, if needed, for transfer offsite to a storage or disposal facility? Please update information on the facilities that are available onsite to repackage, load and/or transport the spent fuel offsite by truck, rail and/or barge. (Diablo Canyon; SONGS 1, 2, and 3; Rancho Seco; Humboldt Bay; Palo Verde).*

RESPONSE for HBPP: The casks used at Humboldt Bay are Holtec HI-STAR dual purpose casks which are licensed by the NRC under 10CFR71 for transportation. As such, the fuel is ready for transport to any suitable facility without any further action on site. It is planned that the cask shipments would be transported by heavy-haul highway vehicle as there is no rail service at Humboldt Bay.

RESPONSE for DCP: The casks used at DCP are the Holtec HI-STORM 100SA system. The multipurpose canisters are designed to be transported in a HISTAR transportation cask licensed under 10CFR71 which would be loaded at the ISFSI cask transfer facility. No repackaging per-se is required at the DCP site. Actual transport of the fuel is the responsibility of the DOE.

*C.9. Please describe to what extent the ISFSI packaging is compatible with the Transportation Aging and Disposal (TAD) packaging system that DOE proposed for transport to Yucca Mountain and what modifications to the existing site facilities might be required to ensure compatibility? (Diablo Canyon; SONGS 1, 2, and 3; Humboldt Bay; Palo Verde).*

The storage system in use at DCP, HBPP, and all other nuclear facilities is not consistent with the requirements of the proposed TAD system. The proposed TAD system limits the number of fuel assemblies packaged in each canister to less than the currently licensed storage systems.

Any speculation concerning the DOE TAD system is premature at this point. Nothing in this realm has been finalized.

*C.10. Please provide updated information on the amount and status of any damaged spent fuel that is currently being stored at the plant. Please describe any special considerations or requirements for long-term storage of damaged spent fuel in the pools or ISFSI or for transport of damaged spent fuel offsite. (Diablo Canyon, SONGS, Humboldt Bay, Palo Verde).*

RESPONSE for HBPP: There are 129 assemblies categorized as damaged fuel at Humboldt Bay. These are contained in "damaged fuel containers" which were then placed into the casks as any other fuel assembly. These assemblies are fully transportable in this condition in the HI-STAR casks.

RESPONSE for DCP:

DCP Unit 1: No damaged fuel assemblies.

DCP Unit 2: Five fuel assemblies with failed rods.

There are no special requirements for storage in the spent fuel pool, and storage and transportation in the casks is accomplished by utilizing "damaged fuel containers" which are loaded into the casks as any other fuel assembly.

*C.11. Is any spent nuclear fuel generated by the plant unaccounted for by the plant owner? (Diablo Canyon; SONGS 1, 2, and 3; Humboldt Bay; Palo Verde).*

RESPONSE for HBPP: There are three, approximately 18-inch-long, segments of a single fuel rod that are considered unaccounted for from the Humboldt Bay fuel inventory. This was documented in PG&E letter to the NRC HBL-05-017 dated May 27, 2005.

RESPONSE for DCP: No. All DCP fuel is accounted for.

*C.12. 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 storage (Diablo Canyon; SONGS 1, 2, and 3; Humboldt Bay; Palo Verde).*

RESPONSE for HBPP: The annual cost for operating the Humboldt Bay ISFSI is \$4.4M in 2008 dollars. There is no significant risk for storage in the dual purpose casks in the ISFSI vault, as all postulated natural phenomenon have been accounted for in the design. PG&E has not prepared a cost-benefit study addressing the costs and risks of long-term or indefinite onsite storage.

RESPONSE for DCP: PG&E estimates the annual cost to operate the DCP ISFSI at \$1 million in 2009 dollars. PG&E has not prepared a cost benefit study addressing the costs and risks of long term or indefinite onsite storage.

*C.13. What are SCE's plans for increasing on-site storage capacity to accommodate all of the spent fuel generated during SONGS current operating license? (SONGS).*

RESPONSE: N/A

*C.14. What are the current estimates for how long spent fuel can be safely stored in the ISFSIs without repackaging or refurbishing any ISFSI components? For ISFSI components with design lives of less than 50 years, please specify the design life for each component and describe 1) what steps would be needed in order to continue to store spent fuel in the ISFSI beyond that design life, 2) the cost of these steps, and 3) the new design life of the component after these steps are taken (Diablo Canyon, SONGS, Humboldt Bay, Palo Verde).*

RESPONSE for HBPP: The ISFSI is currently licensed for 20 years. The NRC has granted license extensions for some of the early ISFSIs for an additional 40 years.

RESPONSE for DCP: The ISFSI is currently licensed for 20 years. The NRC has granted license extensions for some of the early ISFSIs for an additional 40 years.

Additional information on specific ISFSI components can be obtained from the cask vendor for both HBPP and DCP, Holtec International.

*C.15. What progress has been made in returning spent fuel pools to a more open racking configuration, while maintaining compliance with NRC cask and spent fuel storage requirements as recommended in the AB 1632 Report (p. 15)? (Diablo Canyon, SONGS).*

RESPONSE for DCP: A total of 256 spent fuel assemblies will be removed from the Unit 1 pool during the summer of 2009. An additional 256 fuel assemblies are scheduled to be removed from the Unit 2 spent fuel pool during the summer of 2010.

Fuel assembly storage in the spent fuel pools is in compliance with all NRC requirements. No action has been taken to modify the spent fuel pool racking to a less dense orientation.

*C.16. What are the current estimated total costs to construct and fill the Diablo Canyon and SONGS ISFSIs with all the spent fuel expected to be generated through the current operating license? What would be the estimated total cost to construct and fill the ISFSIs with all the spent fuel that is expected to be generated through a 20-year license extension? (Diablo Canyon, SONGS).*

RESPONSE for DCP: The cost to develop the DCP ISFSI and load the first 8 casks is expected to be approximately \$103,000,000. Procurement and loading of additional storage casks is expected to be approximately \$2,000,000 each (2009 dollars) going forward. The current facility has 2 of 7 storage pads in place. It is estimated that each additional storage pad will cost approximately \$5,000,000 (2009 dollars).

DCP has not estimated the cost of licensing and constructing an ISFSI to store fuel discharged during a 20-year license extension.

*C.17. What are the current 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 plants' 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)? (Diablo Canyon, SONGS, Humboldt Bay, Palo Verde).*

RESPONSE for HBPP: As stated in the response to C.12 above, the annual cost for operating the Humboldt Bay ISFSI is \$4.4M in 2008 dollars. The only added costs would be normal escalation of costs due to inflation, and the cost for licensing action to extend the NRC license beyond the original 20-year period.

RESPONSE for DCP: As stated in the response to C.12 above, PG&E estimates the annual cost to operate the ISFSI at \$1 M in 2009 dollars. The only added costs would be normal escalation of costs due to inflation and the cost for licensing action to extend the NRC license beyond the original 20-year period.



**D. Spent Nuclear Fuel Transport and Disposal Issues (Diablo Canyon; SONGS 1, 2, and 3; Palo Verde).**

*D.1. Given the possibility that the Yucca Mountain program will be terminated (except for the license application proceeding), what are the current plans for indefinite onsite storage of spent fuel?*

RESPONSE for DCP: PG&E has licensed, permitted and constructed a facility to store all fuel discharged from the plant during the current 40-year plant license. The ISFSI is currently licensed for 20 years. The NRC has granted license extensions for some of the early ISFSIs for an additional 40 years. PG&E will store the spent fuel on site in a responsible manner until the DOE can assume its contractual obligation to collect and dispose of the fuel.

*D.2. Please provide a description of the utilities' current understanding of the U.S. Department of Energy's (DOE) spent fuel acceptance schedule for a spent fuel repository or a federal centralized interim spent fuel storage facility.*

RESPONSE for DCP: The Department of Energy has no current schedule for fuel acceptance. The new Secretary of Energy has proposed establishing a 'blue ribbon commission' to study long-term spent nuclear fuel storage. Congress is studying the proposal.

*D.3. Please provide a copy of the most recent information provided to the DOE for the Delivery Commitment Schedule as part of the Standard Contract for Disposal of Spent Nuclear Fuel. This information should include shipping modes (truck, rail, or barge), delivery year, range of discharge dates listed from earliest to latest, and metric tons of uranium.*

RESPONSE for DCP: Under the terms of the contract, DOE assumes responsibility for spent nuclear fuel at the plant site. As such, DOE has the responsibility to plan and perform all spent fuel shipments from the power plant facility. PG&E has not addressed transportation of fuel from the DCP site.

The rate at which DOE actually removes fuel will be as determined by DOE. PG&E's understanding of the rate provided for under the contract is addressed in D.9.

*D.4. Please provide annual projections of the number of shipments of spent fuel offsite by truck, rail and/or barge that will be generated during the plant's operating license. Please provide the same projections through a 20-year license extension.*

RESPONSE for DCP: Under the terms of the contract, DOE assumes responsibility for spent nuclear fuel at the plant site. As such, DOE has the responsibility to plan and perform all spent fuel shipments from the power plant facility. PG&E has not addressed transportation of fuel from the DCP site.

The rate at which DOE actually removes fuel will be as determined by DOE. PG&E's understanding of the rate provided for under the contract is addressed in D.9.

*D.5. Regarding possible shipment offsite to a centralized interim spent fuel storage facility, to what extent is the shipment schedule the responsibility of DOE rather than the plant operator? Please explain the division of responsibilities between DOE and the plant operator regarding shipping schedule*

RESPONSE for DCP: DOE has full responsibility for the removal and shipment of fuel from the power plant facilities.

*D.6. What are the plans for spent nuclear fuel cooling before fuel is transported offsite once a storage or permanent disposal facility becomes available? For example, what is the minimum time that spent fuel must be cooled before being transported offsite? Will the "oldest fuel" be transported first? If not, why not?*

RESPONSE for DCP: Fuel must be stored in the spent fuel pools for a minimum of 5 years before it is a candidate for movement into dry storage or transportation. DOE will determine which fuel will be transported at what time.

*D.7. What is the total amount (in dollars) that California ratepayers (or the utility) have contributed to date to the Nuclear Waste Fund for electricity generated by the nuclear power plant?*

RESPONSE for DCP: PG&E contributions to the Waste Fund as of 6/30/09 total \$356,546,263.80

*D.8. What are the annual contributions in dollars to the Nuclear Waste Fund by each California utility for electricity generated by the plant? If the amount varies by year, please provide a year-by-year breakdown of the amounts contributed.*

RESPONSE for DCP:

<b>Year</b>	<b>Amount</b>
1985	\$ 5,497,100.00
1986	\$12,022,834.00
1987	\$12,864,530.00
1988	\$12,124,206.50
1989	\$16,174,747.00
1990	\$15,096,232.00
1991	\$14,802,681.67
1992	\$11,830,979.99
1993	\$10,097,866.08
1994	\$13,333,233.19
1995	\$15,533,345.00
1996	\$14,493,734.00
1997	\$15,348,744.00

Year	Amount
1998	\$16,031,057.00
1999	\$17,142,745.62
2000	\$17,788,695.61
2001	\$18,526,589.14
2002	\$19,987,417.00
2003	\$16,802,556.23
2004	\$17,251,322.57
2005	\$18,690,497.87
2006	\$18,856,101.84
2007	\$17,568,929.16
2008	\$16,116,447.57
2009	\$ 7,742,239.61 (year to date)

*D.9. Please update information provided in 2008 on the status of litigation associated with DOE's non-performance under the Standard Contracts. Please also provide a copy of any briefs (DOE's and the utilities) and any substantive court rulings specific to the power plant that have been filed since 2008.*

RESPONSE for HBPP: PG&E filed a lawsuit in the Federal Court of Claims against the Department of Energy (DOE) on January 22, 2004, regarding the DOE's breach of spent fuel contracts due to the DOE's failure to accept delivery of spent nuclear fuel from Diablo Canyon and Humboldt for storage in the Yucca Mountain federal nuclear waste storage repository beginning on January 31, 1998.

In October 2006, the U.S. Court of Federal Claims found that the DOE had indeed breached its contract and awarded PG&E approximately \$42.8 million of the \$92.1 million PG&E incurred through 2004 to construct and maintain on-site storage at Diablo Canyon and Humboldt Unit 3.

PG&E appealed the award, and on August 7, 2008, the U.S. Court of Appeals for the Federal Circuit reversed the lower court on issues relating to the calculation of damages and ordered the lower court to re-calculate the compensation. On remand, PG&E claims entitlement to \$90.6 million in damages based on the appellate decision. The government continues to contest a substantial portion of those damages. Discovery in the remand proceedings in the lower court is scheduled to be completed by July 28, and the court has scheduled another conference for July 30, 2009.

The following files apply to Questions D.9 through D.11, and can be found on the attached CD:

2009\_06\_29\_Defs\_Supp\_Resp\_1st\_Inter (00084681).PDF

PG E's statement of damages (00081628).PDF

PG&E Federal Circuit.PDF

US Response to PG E's statement of damages and issues (00079563).PDF

Following the Federal Circuit's August 7, 2008 reversal of Judge Hewitt's trial ruling, the case was remanded for retrial before Judge Hewitt. Discovery is nearly complete. Judge Hewitt has scheduled a status conference on July 30, at which time she may set a date for the retrial. In discovery, the Government has conceded that under the fuel acceptance schedule approved by the Federal Circuit, PG&E should recover its Humboldt Bay and Diablo Canyon ISFSI costs of approximately \$75 million. About \$15 million of additional costs, which mainly relate to onsite storage of Greater Than Class C waste at Humboldt, remain in dispute. This case covers PG&E's storage costs through 2004. This year or next, we expect to file a complaint for 2005-2009 damages.

*D.10. Please provide any damage estimate studies prepared by the utility as part of litigation regarding DOE performance of its obligations under the Standard Contract. (Diablo Canyon; SONGS 1, 2, and 3; Humboldt Bay; Palo Verde).*

Response for DCPD and HBPP: Refer to the files provided on the attached CD for this information:

2009\_06\_29\_Defs\_Supp\_Resp\_1st\_Inter (00084681).PDF

PG E's statement of damages (00081628).PDF

PG&E Federal Circuit.PDF

US Response to PG E's statement of damages and issues (00079563).PDF

DOE Litigation Backup Documents.PDF

*D.11. If a final ruling in the non-performance litigation suit is still pending, what is the amount of estimated damages being sought? How will a damage award be shared by ratepayers and shareholders?*

RESPONSE: As described above, a final ruling is still pending. Damages sought through the end of 2004 are approximately \$90 million. Any damages recovered will be credited to ratepayers as prescribed by the terms of the CPUC-approved DOE Litigation Balancing Account (DOELBA). Refer to the files provided on the attached CD:

2009\_06\_29\_Defs\_Supp\_Resp\_1st\_Inter (00084681).PDF

PG E's statement of damages (00081628).PDF

PG&E Federal Circuit.PDF

US Response to PG E's statement of damages and issues (00079563).PDF

Incremental Cost DOE Breach - 2004.PDF

**E. Low-Level Waste Storage, Transport and Disposal (Diablo Canyon; SONGS 1, 2, and 3; Humboldt Bay).**

*E.1. Please provide updated information, since provided in 2008, on the amount of low-level radioactive waste, as categorized as Class A, B, C, or Greater-than-Class C waste, that has been generated each year at the nuclear power plant since the start of the plant's operations. Please also provide updated information on the amount of each type of low-level radioactive waste that will be generated through the current operating license, through a 20-year license extension, and through the end of plant decommissioning.*

RESPONSE for DCPD: The only change is to report the actual amount of LLW generated in 2008. For 2008:

Buried 1,133.4 ft<sup>3</sup> of Class A waste at Clive, UT  
Buried 98.7 ft<sup>3</sup> of Class B waste at Barnwell, SC  
Buried 88 ft<sup>3</sup> of Class C waste at Barnwell, SC  
Stored on-site 186 ft<sup>3</sup> of Class C waste

RESPONSE for DCPD and HBPP:

End of Plant Decommissioning:

Humboldt Bay Power Plant Unit 3 (from TLG 2009 Cost Estimate)

Class A	655,237 cf
Class B	3,083 cf
Class C	566 cf
GTCC	17 cf

Diablo Canyon Unit 1 & 2 (from TLG 2009 Cost Estimate)

Class A	283,863 cf
Class B	11,272 cf
Class C	1,148 cf
GTCC	866 cf

*E.2. Please provide information, updating the information provided in 2008, on the transport and disposal costs through 2008 for each of these low-level waste types.*

RESPONSE for DCPD: No change from what we submitted in 2007.

RESPONSE for HBPP:

Disposal Cost of Each type of LLRW in 2008 dollars

Class A Bulk	\$61.20 / cf (HBPP and DCPD)
Class A General	\$251.11 / cf (HBPP and DCPD)
Class B & C	\$2,916.35 / cf (HBPP and DCPD)
GTCC	\$20,355 / cf @ HBPP \$20,675 @ DCPD.

*E.3. What are the current plans for where and how each class of waste will be stored or transported offsite for disposal? What percentage of each class of low-level waste was*

*transported by transport mode (e.g., rail, truck, or barge) in 2008? What percentage is estimated to be transported by mode through the end of the current license?*

RESPONSE for DCP: No change from what we submitted in 2007.

RESPONSE for HBPP: N/A.

*E.4. What are the current and projected total costs of low-level waste disposal through the term of the current operating license, through a 20-year license extension, and through the end of decommissioning based on current and projected market prices for low-level waste disposal?*

RESPONSE for DCP: No change from what we submitted in 2007.

RESPONSE for HBPP:

Decommissioning LLRW Pricing (excluding GTCC which is not LLRW)

HBPP Current Pricing	\$116.10 / cf
HBPP Escalated Pricing	\$216.40 / cf
DCP Current Pricing	\$387.05 / cf
DCP Escalated Pricing	\$3,401.85 / cf.

**F. Seismic and Tsunami Issues (Diablo Canyon, SONGS, Humboldt Bay).**

*The Energy Commission adopted in November 2008 several recommendations regarding Diablo Canyon and SONGS (See: An Assessment of California's Nuclear Power Plants: AB 1632 Report, CEC-100-2008-009-MF) related to seismic and tsunami issues. The following section includes requests for information on progress being made in carrying out these recommendations:*

*F.1. Please report on the seismic hazard and vulnerability assessments that are planned, in progress, or were recently completed (since last reported in 2008) and the significant findings and conclusions from these studies. What are the implications of this research in assessing whether plant design margins are sufficient to avoid major power disruptions due to a major earthquake or whether ISFSI design margins are adequate? (Diablo Canyon, SONGS, and Humboldt Bay).*

RESPONSE for DCP: PG&E is currently conducting two studies for the seismic hazard assessment at DCP: the Shoreline Fault Zone study, and the Long Term Seismic Program (LTSP) seismic hazard update study.

The current work plan (dated May 6, 2009) for the Shoreline fault zone study is given in the attachments. We are currently collecting additional offshore geophysical data to help constrain the location, geometry, and activity rate of the Shoreline fault zone. A progress

report will be completed in December 2009 and the final report will be completed in December 2010.

The second study is an update of the seismic hazard for DCP. This study includes development of a major update of the tectonic model in the central coastal California region and development of new ground motion models using both empirical model and numerical simulations. This work involves the broad earthquake community and includes researchers at the USGS, Southern California Earthquake Center (SCEC), and the Pacific Earthquake Engineering Research Center (PEER). This project is scheduled to be completed in 2012.

Initial findings from the tectonic model update were presented at a special session of the 2009 Seismological Society of America meeting held in Monterey. The presentations are listed in Table F1.1 and the abstracts from these presentations are given in the attachments.

Table F1.1. Presentations at the special session of 2009 Seismological Society of America on Central California Coast Earthquake Hazards

<b>Authors</b>	<b>Title</b>
Lettis, W. R, Unruh, R. J. and Hanson, K. L	Quaternary Tectonic Setting of South-Central Coastal California
Rosenberg, L.I., and Graymer, R.W.	From Monterey to Maricopa: A Seamless Digital Geologic Map Database for the Central California Coast.
Langenheim, V.E., Jachens, R.C., Graymer, R.W., Wentworth, C.M.	Constraints on 3-Dimensional Structure of the Central California Coast Ranges from Gravity and Magnetic Data.
Watt, J.T., Johnson, S.Y., Hardebeck, J.L., Scheirer, D.S., Fisher, M.A., Sliter, R.W., Hart, P.E.	Geophysical Characterization of the Hosgri Fault Zone, Central California.
Johnson, S.Y., Hart, P. E., Watt, J.T., and Sliter, R.W.	High Resolution, Seismic-Reflection Survey Offshore Central California Will Help Refine Regional Seismic Hazard Assessment.
Hardebeck, J. L.	Seismotectonics and Fault Structure of the California Central Coast.
Jachens, R.C., Simpson, R.W., Graymer, R.W., Langenheim, V.E., Wentworth, C.M., Stanley, R.G., and Colgan, J.P.	Construction of a Three-Dimensional Geologic, Tectonic, Kinematic Crustal Model of Coastal Central California.
Bawden, G.W., Wicks, C., McLaren, M.K., Hardebeck, J.L.	INSAR Deformation Patterns for the 22-December-2003 Moment Magnitude (Mw) 6.5 San Simeon Earthquake, Central California.
Johanson, I. A., and Burgmann, R.	Complex Rupture during and after the 2003 San Simeon Earthquake Determined from Multiple SAR Interferograms.
Thio, H.K., Somerville, P., and Polet, J.	Probabilistic Tsunami Inundation Maps for California.
Nishenko, S.P., Abrahamson, N., Hanson, K., Thio, H.K., Greene, H.G.	Central California Coast Tsunami Hazards.
Knudsen, K.L., Terra, F., and Wong, I.G.	Site-Specific Seismic Hazard Analyses for the Monterey Peninsula.
Murray-Moraleda, J., Svarc, J., Bawden, G.W., Nishenko, S.	GPS Measurement of Crustal Deformation in the Central California Coast Region.

Authors	Title
Catchings, R.D., Fuis, G.S., Goldman, M.R., and Rymer, M.J.	Pre-Stack Depth-Migrated Reflection Images of the Central California Coast Ranges: Profile SJ-6.
Ross, S.L., Conrad, J.E., Ryan, H.F., Chin, J.L., Dartnell, P., Edwards, B.D., Phillips, E.L., Sliter, R.W., and Wong, F.L.	Structure and Behavior of the San Gregorio Fault Offshore of Half Moon Bay, California.
Rosenberg, L. I.	Finding Fault Facts—The Monterey Bay Area Quaternary Fault Database. Rosenberg, L.I.
Loeffler, K., Gesell, J., and Mooney, W. D.	An Educational Video to Promote Tsunami Preparedness in California
Hardebeck, J. L., and Aron, A.	17. Seismicity Rate Changes along the Central California Coast Due to Stress Changes from the 2003 M6.5 San Simeon and 2004 M6.0 Parkfield Earthquakes.

See supporting documents on the attached CD, in file F.:

CentralCoastOralSession.pdf

CentralCoastPosterSession.pdf

As part of the PG&E/USGS CRADA, the USGS has completed Open File Reports documenting the aeromagnetic data for the central California coast ranges collected in 2008 (USGS OFR 2009-1044; see <http://pubs.usgs.gov/of/2009/1044/>) and the high resolution marine seismic reflection and magnetic data along the Hosgri fault collected in 2008 (USGS OFR 2009-1100; see <http://pubs.usgs.gov/of/2009/1100/>).

*F.2. What refinements, if any, have been achieved or are being conducted in ground motion models to account for ground motion near an earthquake rupture and what are the implications of these refinements to the design and reliable operation of Diablo Canyon considering both safety-related and non safety-related systems, structures and components (SSCs) of the plant? (Diablo Canyon).*

RESPONSE: Empirical studies of near fault ground motions were conducted by PEER leading to the NGA ground motion models published in February 2008 issue of Earthquake Spectra. These models are summarized in Abrahamson et al. (2008) (See [abrahamson\\_etal\\_2008.PDF](#) in file F on the attached CD). These ground motion models are based on a data base that includes a much larger number of near fault recordings than were available for the previous models. A key result of these new ground motion models is that the median ground motion close to large surface rupturing strike-slip or reverse earthquakes is reduced, but the median ground motion close to moderate buried reverse earthquake is increased as compared to the previous standard models. In addition, the standard deviation of the ground motion from large earthquakes is increased.

For DCP, the hazard is dominated by large strike-slip earthquakes on the Hosgri fault so there is a reduced median ground motion, but an increased standard deviation. The net impact on the 84th percentile ground motion is a reduction of the spectrum from the Hosgri earthquake as compared to the 1988 LTSP spectrum. This comparison is documented in



Calculation GEO.DCPP.09.01. (See ShorelineCalc\_V3.pdf located in file F on the attached CD.)

A second issue for near fault ground motion is directivity. As part of the PEER research, a new directivity model was developed by Spudich and Chiou (2008). (See spudich\_chiou\_20089.PDF in file F on the attached CD). This model shows reduced directivity effects as compared to those from previous models (e.g. Somerville et al, 1999 and Abrahamson, 2000).

A third issue for near fault ground motions is the ratio of the larger to average component. Huang and Whitiker (2008) developed new scaling factors to estimate the maximum component for near fault ground motions. (See huang\_whittier\_2008.PDF in file F on the attached CD). These factors are less than the factors previously used (e.g. Somerville et al., 1999).

The result of these new empirical studies of near fault ground motions is that the new estimates of the near fault ground motions from large strike-slip earthquakes, including directivity and maximum component effects, are lower than given in the previous generation of models.

Finally, as an alternative to using empirical recordings, PG&E is sponsoring research on improving numerical simulation of near fault ground motions. In 2008, as part of the PG&E/DOE cooperative research program on extreme ground motions, PG&E funded research to validate dynamic rupture models that can be used to constrain the earthquake source parameters. The results of this work was published by Harris et al (2009) in Seismological Research letters. (See harris\_etal\_2009.pdf.PDF in file F on the attached CD). These results will be used in subsequent work to constrain the inputs for use in the SCEC broadband simulation platform. The application of the results into the numerical simulations is planned for 2010.

*F.3. Please describe the seismic vulnerability assessments that are planned or are in progress for Diablo Canyon that supplement the Long Term Seismic Program (LTSP). What are the major findings and conclusions from these studies? (Diablo Canyon).*

RESPONSE: The LTSP hazard update described in the response to F.1 is in progress. The seismic vulnerability assessments, including updated fragility models, are planned following the completion of the initial updated seismic hazard analysis which is scheduled to be completed in early 2011. The final updated hazard is scheduled to be completed in 2012. The new seismic vulnerability assessments are expected to be completed in 2013.

*F.4. Recent high resolution seismic reflection data collected by the US Geological Survey (spring 2008) revealed a previously unknown but apparently active fault zone between the San Diego Trough fault zone (SDTFZ) and the San Pedro Basin fault (SPBF). The interpretation of this data is that the new fault connects the SDTFZ and the SPBF, forming a combined fault zone about 250 km in length and that the new combined fault zone may pose more significant seismic hazard than previously recognized. Has SCE assessed whether this recent research has implications for the long-term seismic/tsunami vulnerability of both*

*safety-related and non safety-related systems and components of SONGS? If so, what are the results of the assessment? (SONGS).*

RESPONSE: N/A

*F.5. The AB 1632 Report recommended that SCE 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 plant to avoid major power disruptions. The Report further recommended that such a program should prioritize and include further investigations into the seismic setting at SONGS and assess whether recent or current seismic, geologic or ground motion research near SONGS has implications for the long-term seismic vulnerability of the plant. Please report on the results of these seismic research efforts. (SONGS).*

RESPONSE: N/A

*F.6. Please report on PG&E's overall assessment of the Shoreline Fault including the results of additional geophysical surveys conducted in 2009. Do the ground motion models indicate larger than expected seismic hazards at Diablo Canyon? If so, was the plant built with sufficient design margins to continue operating reliably after experiencing these larger ground motions? (Diablo Canyon).*

RESPONSE: PG&E conducted an initial assessment of the ground motions from the Shoreline Fault zone using a deterministic approach. This assessment, documented in calculation GEO.DCPP.09.01 showed that the LTSP ground motions used for the margins assessment in the 1988 LTSP report are not exceeded by the Shoreline fault zone even using conservative assumptions regarding the length of individual rupture within the Shoreline fault zone. (See ShorelineCalc\_V3.pdf located in file F on the attached CD.) The NRC conducted an independent assessment of the ground motions from the Shoreline fault zone and reached a similar conclusion. (See nrc\_report\_SHorelineFlt.pdf located in file F. on the attached CD.)

Additional geophysical surveys are being conducted this summer (see response to F.7 below). The results from these surveys will be summarized in the December 2009 update report on the Shoreline Fault Zone.

*F.7. The AB 1632 Report recommended that PG&E and SCE use three-dimensional (3-D) geophysical seismic reflection mapping and other advanced techniques to explore fault zones near the plants. Please report on any progress in carrying out this recommendation and describe what advanced mapping techniques are being planned or initiated to study fault zones near Diablo Canyon and SONGS. Given that a major seismic event could result in an extended plant shutdown, please comment on the costs and benefits of such advanced studies. (Diablo Canyon, SONGS).*

RESPONSE for DCPP: PG&E has been using a number of advanced techniques to identify and better characterize fault zones near DCPP. These include:

- High resolution (2 m) multibeam bathymetry was collected offshore DCPD from Point Buchon to Pismo Beach, from close to shore out to west of the Hosgri fault, during the Spring of 2009 and is currently being processed and analyzed. These data provide a ‘base map’ for the collection and interpretation of other geologic and geophysical information for the region.
- New high resolution marine magnetics data is scheduled to be collected in July/August offshore DCPD and will compliment the data collected in the 2008 field season. Note, equipment malfunction prevented this data being collected during the 2008 field season.
- Aeromagnetic data for the central California coast ranges collected in 2008 has been published as a USGS Open File Report 2009 – 1044.

Langenheim, V.E., Jachens, R.C., and Moussaoui, K., 2009, Aeromagnetic survey map of the central California Coast Ranges: U.S. Geological Survey Open-File Report 2009-1044, scale 1:250,000 and database [<http://pubs.usgs.gov/of/2009/1044/>].

High resolution marine seismic reflection and magnetic data along the Hosgri fault collected in 2008 has been published as USGS Open File report 2009-1100. Sliter, Ray W., Triezenberg, Peter J., Hart, Patrick E., Watt, Janet T., Johnson, Samuel Y., and Scheirer, Daniel S., 2009, High-resolution seismic reflection and marine magnetic data along the Hosgri Fault Zone, central California: U.S. Geological Survey Open-File Report 2009-1100 [<http://pubs.usgs.gov/of/2009/1100/>].

In addition, we have identified, and are in the process of reviewing and purchasing, available industry seismic data in the vicinity of DCPD to help in the identification / characterization of faults and to plan for future 3-D seismic surveys and other advanced geophysical investigations.

*F.8. Please describe PG&E’s assessment of 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 SSCs that might be sensitive to ground motions in the near field of an earthquake rupture. (Diablo Canyon).*

RESPONSE: The *AB1632 Report* described a scenario in which the San Luis Bay fault ruptured with the Los Osos fault also rupturing as a back-thrust and recommended that it be treated deterministically. PG&E has not evaluated this specific scenario, but the Los Osos and San Luis Bay faults were previously considered as deterministic scenarios in the 1988 LTSP. The 1988 LTSP found that the Hosgri fault dominated the hazard at DCPD.

The LTSP update will include an improved characterization of the San Luis Bay and Los Osos faults, but the required additional geological and geophysical work on these two faults has not yet been conducted. This work is planned to begin in 2010.

*F.9. The AB 1632 Report recommended further assessments that consider such a San Simeon-type earthquake from a deterministic basis (i.e., using a probability of 1) to evaluate the full implications of this earthquake, particularly for non-safety related plant SSCs and reliability. Please report on the status of these recommended assessments. (Diablo Canyon).*

RESPONSE: For reliability studies, the probability of the scenario is a key part of the evaluation. PG&E plans to address San Simeon type earthquake and all other earthquakes using a probabilistic approach rather than the deterministic scenario approach recommended by the *AB1632 Report*.

*F.10. The AB 1632 Report noted that updated seismic hazard analyses incorporating the USGS National Seismic Hazard Mapping Project models and the UCERF-2 data base would provide additional information for regulators and the public regarding the seismic hazard at the plant sites. Please discuss the relevance of these models and the UCERF-2 database for the studies that might be required as part of the license renewal feasibility assessments for the plant. (Diablo Canyon, SONGS).*

RESPONSE for DCP: The USGS tectonic model for this region is based strongly on the 1988 LTSP. The USERF did not focus on the faults in this part of the state. Many of the faults in the DCP area are either not in the USGS or USERF databases or need to be updated based on new information. Rather than PG&E relying on these state-wide and national studies that cannot afford to focus on this region, we expect that the information developed during this study will make a substantial contribution to the USERF and USGS National Seismic Hazard Map databases in the future.

*F.11. What efforts are planned, in progress or have been completed to install a permanent GPS array for helping to resolve seismic uncertainties in the vicinity of SONGS? (SONGS).*

RESPONSE: N/A

*F.12. What efforts are planned, in progress or have been completed to review the tsunami hazard at the plant consistent with the Energy Commission's recommendation to assess tsunami vulnerability using new data from NOAA and second-generation tsunami run-up maps from the University of Southern California (USC)? Please provide the results of any tsunami hazard studies for the site that have been conducted in 2008 or 2009, and their implications for plant vulnerability and reliability. (Diablo Canyon, SONGS, Humboldt Bay).*

RESPONSE for DCP and HBPP: PG&E is updating both the DCP and HBPP tsunami reports and will include probabilistic as well as deterministic evaluations of tsunami hazard. These updates will be completed by December 2009. PG&E has approached Humboldt State University about conducting a workshop to compare and contrast tsunami inundation maps that have been produced by PG&E, CalTrans, and USC/CGS for the Eureka and San Luis Obispo areas.

Preliminary results of the probabilistic tsunami study in the DCPD region were presented at the 2009 SSA meeting as part of two presentations listed in Table F1.1: Thio et al and Nishenko et al. The abstracts for these two presentations are given in the supporting documents on the attached CD. (See CentralCoastOralSession.pdf located in file F on the attached CD.)

*F.13. What seismic design codes, standards and criteria were used in the design of these plants for the non safety-related SSCs? What key non-safety related SSCs, if damaged by an earthquake, could result in a prolonged plant outage? (Diablo Canyon, SONGS).*

RESPONSE for DCPD: PG&E will undertake a seismic reliability study of the non-safety-related SSCs as the CEC recommended, which will include identification of the information requested and determine which of the non-safety related SSCs, if any, if damaged by an earthquake could result in a prolonged plant outage. PG&E has completed a preliminary scoping document for that study and has begun the necessary activities to support completion. PG&E expects that study to be completed by the end of first quarter 2010.

*F.14. Please describe the investigations that are planned, are in progress or have been completed for Diablo Canyon and SONGS to address the question of SSC compliance with current building codes and other current seismic design standards for non safety-related plant SSCs. Please include in this description any investigations planned or underway to evaluate the vulnerability of non safety-related plant SSCs in light of the changes to seismic design codes and standards since these plants were built. (Diablo Canyon, SONGS).*

RESPONSE for DCPD: See the response to F.13.

*F.15. What are the estimated outage times to repair/replace these non-safety related SSCs and what are the repair/replacement plans to minimize plant outage time? (Diablo Canyon, SONGS).*

RESPONSE for DCPD: See response to F.13.

*F.16. Significant global warming issues for coastal nuclear power plants include sea level rise and increased storm activity in the form of hurricanes, cyclones, typhoons. Please describe any studies planned, underway or completed regarding global warming phenomena and their effects on the plant. (Diablo Canyon, SONGS, Humboldt Bay).*

RESPONSE for HBPP and DCPD: Global warming and sea level rise issues have been studied for Buhne Hill in Humboldt Bay in response to a request from the California Coastal Commission concerning the long-term stability of the PG&E ISFSI site. Sea level rise over periods of 100, 1,000, 10,000 and 100,000 years have been modeled incorporating the effects of long-term coastal uplift due to faulting and the 2001 UN Intergovernmental Panel for Climate Change report.

*F.17. Please provide a copy of any testimony or comments on seismic issues and tsunamis that have been provided in 2008 and 2009. (Diablo Canyon, SONGS, Humboldt Bay).*

RESPONSE for DCPD and HBPP: The comments made on seismic and tsunami issues for DCPD and HBPP in 2008 and 2009 are summarized in the material presented in response to requests F.1 through F.16.

**G. Steam Generator and Reactor Vessel Head Replacements (Diablo Canyon, SONGS and Palo Verde).**

*G.1. What is the current status of and schedule for steam generator replacement at each unit (SONGS and Palo Verde)?*

RESPONSE: N/A

*G.2. Please describe the completed steam generator replacement project at Diablo Canyon and any lessons learned. (Diablo Canyon).*

RESPONSE: The DCPD Steam Generator Replacement Project (SGRP) was completed by PG&E on schedule and under the CPUC authorized revenue requirement. The two Steam Generator Replacement Outages were completed in a total of 127 days off line - well under the 160 days presented in the Steam Generator Application for these two outages. The second outage for Unit 1 performed this year (2009) was completed in 58 days - the third shortest SGRO in history and the second shortest SGRO for similar scope including a Containment Building pressure test. PG&E met all requirements of the CPUC EIR and performed this work within the guidelines of San Luis Obispo County and the California Coastal Commission. Many local companies and individual workers were employed to assist with the performance of this project resulting in a large financial benefit to the area. All eight new steam generators are now fully functional and operating at 100 percent output.

After the Unit 2 SGRO in 2008 PG&E and Contractor project personnel developed about 600 Lessons Learned Action Items to be implemented during the preparation for the second SGRO. These items ranged from relocating people so they could interface more easily to developing and building new specialized equipment to machine keyway surfaces in place. These Action Items were assigned to Focus Teams and were used to develop and manage the SGRO differently.

Improvements were made by applying Lessons Learned in a systematic manner through use of four concepts:

- Managing the SGR Window as three separate schedule paths
- Using Focus Teams to improve the weak areas for each path
- Integrating the Teams' plans into one schedule
- Getting the right people involved early enough

The results of these actions are provided in the following table:

<b>Category</b>	<b>U1 2008</b>	<b>U2 2009</b>	<b>Improvement</b>
Safety Events	35	16	-55%
Rad Exp (Rem)	159	181	-13% (rate corrected)
Outage Days	69	58	-16%
SGR Window Days	54	40	-26%

*G.3. Please provide copies of quarterly or annual status reports or compliance filings that have been submitted to the NRC, the California Coastal Commission, or other state regulatory commission since 2006. (Diablo Canyon, SONGS, Palo Verde).*

RESPONSE for DCP: PG&E is not required to file, and has not filed, any quarterly or annual status reports or compliance filings with the NRC regarding the SGRP or the reactor vessel head replacement project.

The California Coastal Commission (CCC) issued a coastal development permit for the steam generator replacement project containing conditions to be met by the project in order to mitigate potential coastal impacts of the project. PG&E has satisfied each of the required conditions and informed the CCC by letter as each condition was satisfied. These were not required compliance filings, but can be provided upon request. As each Unit became operational after replacement of the steam generators, PG&E filed advice letters with the California Public Utilities Commission reflecting a total revenue requirement increase of \$695,069 million. Here are links to the steam generator Advice filings on the PG&E public website:

Unit 2: [http://www.pge.com/notes/rates/tariffs/tm2/pdf/ELEC\\_3259-E.PDF](http://www.pge.com/notes/rates/tariffs/tm2/pdf/ELEC_3259-E.PDF)

Unit 1: [http://www.pge.com/notes/rates/tariffs/tm2/pdf/ELEC\\_3448-E.PDF](http://www.pge.com/notes/rates/tariffs/tm2/pdf/ELEC_3448-E.PDF)

*G.4. What are the expected off-line dates for the power plant due to the steam generator replacement projects? (SONGS, Palo Verde).*

RESPONSE: N/A

*G.5. Please describe any lessons learned from other steam generator replacement projects requiring cutting holes in containment to exchange the new steam generators with the old ones? (SONGS).*

RESPONSE: N/A

*G.6. What is the current status of the reactor vessel head replacement project? Please provide copies of quarterly or annual status reports or compliance filings that have been submitted to the NRC, the California Coastal Commission, or a state regulatory commission. (Diablo Canyon, SONGS 2 and 3, Palo Verde).*

RESPONSE for DCP: Replacement of Reactor Vessel Heads

PG&E will replace the Unit 2 vessel head in 2009, and Unit 1 will be replaced in 2010. The capital expenditure forecast includes the costs to replace the reactor vessel heads, control rod drive mechanisms, and the design enhancements. Key reactor materials and components for which the supply and production worldwide is limited has been secured for Diablo Canyon Unit 1 & 2. Both Reactor Vessel Closure Head (RVCH) forgings are now in the United States.

The fabrication activities for the Unit 2 Reactor Vessel Closure Head (RVCH) at B&W facility in Mt. Vernon, Integrated Head Assemble (IHA) at Oscar Fields Inc. (OFI), and Control Rod Drive Mechanism (CRDM) and Rod Travel Housing at Jeumont, France (JSPM) are complete. All the Unit 2 key reactor materials and components are in the United States and are forecast to be delivered to Diablo Canyon by early-August 2009. On-site pre-outage project preparations have begun including a number of initial component assembly activities. Planning efforts are on schedule to support the upcoming October 2009 refueling outage.

The fabrication activities for the Unit 1 Reactor Vessel Closure Head (RVCH) at B&W facility in Mt. Vernon, Integrated Head Assemble (IHA) at Oscar Fields Inc. (OFI), and Control Rod Drive Mechanism (CRDM) and Rod Travel Housing at Jeumont, France (JSPM) are in various phases of operations. All the Unit 1 key reactor materials and components are forecast to be delivered to Diablo Canyon no later than August 2010. Planning efforts are on schedule to support an October 2010 refueling outage.

*G.7. Are any other major (greater than \$20 million) retrofit projects planned? If so, please describe. (Diablo Canyon, SONGS 2 and 3, Palo Verde).*

RESPONSE for DCP: The following projects qualify as retrofit projects greater than \$20 million:

Upgraded Dry Cask Storage pad: The estimate is very rough right now and not well scoped. Expenditures may begin as early as 2011 with a potential cost of up to \$50 million.

High Pressure Turbine retrofit: The estimate is still early with expenditures as early as 2010. For the combination of both units, the potential cost is up to \$45 million.

**H. Decommissioning (Diablo Canyon; SONGS 1, 2, and 3; Rancho Seco; Humboldt Bay; and Palo Verde).**

*H.1. Please describe the status of plant decommissioning plans/projects and provide updates on the estimated total plant decommissioning costs.*

RESPONSE for HBPP: PG&E HBPP is in the initial phases of decommissioning. Plans are being finalized. Projects in the field started in May and are continuing.



The present estimate is approximately \$500 million (in 2008 dollars), as identified in the most recent TLG estimate.

RESPONSE for DCPD: PG&E DCPD decommissioning is planned for Unit 1, November 2024, at a cost of \$1,828.3 million (in 2008 dollars); also for Unit 2, in August 2025, at a cost of \$1,916.6 million (in 2008 dollars).

*H.2. Please provide updated 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 for low-level waste transport and disposal.*

RESPONSE for DCPD and HBPP: See the responses to Questions E.1 and E.2.

*H.3. Please provide a copy of the application and associated work papers submitted to a state regulatory commission in the most recent decommissioning-related proceeding.*

RESPONSE for DCPD and HBPP: See files on the attached CD:

- 0. Cover for Chapter 2.PDF
- 0.1 Workpapers Cover.PDF
- 0.1 Workpapers MTOC.PDF
- 1. 2009 NDCTP Workpapers Ch\_2 Active.PDF
- 12. Cover for Chapter 6.PDF
- 13.%202009%20NDCTP%20Workpapers\_Ch6\_Cost%20Study.PDF
- 14. Cover for Chapter 8.PDF
- 15. 2009 NDCTP Workpapers\_Ch8.PDF
- 2. Cover for Chapter 3 Higham.PDF
- 3.0%202009%20NDCTP%20Workpapers%20Ch\_3%20Part%201%20of%203%20HB\_09NDCTP\_Qualified\_Application(1).PDF
- 3.1 2009 NDCTP Workpapers Ch\_3 Part 2 of 3 DCPD\_Funding\_09NDCTP\_Application.PDF
- 3.2 2009 NDCTP Workpapers Ch\_3 Part 3 of 3 HB\_09NDCTP\_Non-Qualified\_Application.PDF
- 4. Cover for Chapter 3 Synder.PDF
- 5. 2009 NDCTP Workpapers Ch\_3\_Part2of2\_Cost Study.PDF
- 6. Cover for Chapter 4.PDF
- 7.%202009%20NDCTP%20Workpapers%20Ch\_4\_Part1of2\_Cost%20Study.PDF

9.%202009%20NDCTP%20Workpapers%20Ch\_4\_Part2of2\_Technical%20Position  
%20Paper%20for%20Establishing%20an%20Appropriate%20Contingency%20F  
actor.PDF

PGE%20NDCTP%20Application%20-%20FINAL.PDF

2009%20NDCTP%20Workpapers.PDF

NuclearDecomCostTri2009\_Testimony.PDF

PGE%20NDCTP%20Application%20-%20FINAL.PDF

*H.4. Please provide a copy of submittals to the NRC over the period 2006-2009 related to decommissioning plans for the nuclear power plant.*

RESPONSE for HBPP and DCP: See files on the attached CD:

CEC h4 DCP.PDF

CEC H4 HBPP.PDF

*H.5. Please provide a copy of substantive filings submitted to a state regulatory commission or the NRC over the period 2006-2009 concerning the status of decommissioning of the plant, including the status and adequacy of decommissioning trust funds.*

RESPONSE for DCP and HBPP: See files on the attached CD:

2009%20NDCTP%20Workpapers.PDF

NuclearDecomCostTri2009\_Testimony.PDF

PGE%20NDCTP%20Application%20-%20FINAL.PDF

*H.6. What are the recent plans and status of efforts to store, transport offsite, and dispose of large plant components, including the old steam generators at Diablo Canyon, the SONGS 1 reactor vessel, the reactor vessel heads (after removal), and any other large radioactive plant components associated with the plant?*

RESPONSE for DCP: DCP is currently planning to continue storage on site of the large plant components until shutdown and decommissioning of the Units.

RESPONSE for HBPP: Presently a study is underway to evaluate all methods available for reactor vessel removal, transportation, and disposal. This study will evaluate the feasibility of whole vessel removal versus segmentation, considering the transport route conditions from Humboldt Bay. This study is expected to be complete by the end of 2009.

**I. Plant Performance (Diablo Canyon, SONGS 2 and 3, Palo Verde).**

*I.1. Please provide hourly generation data for each unit for 2001-2008.*

RESPONSE for DCPD: Attached on the CD are files of hourly generation, in Megawatts (MW). There is one file for each year, 2001 to 2008. These reports present DCPD Secondary (Turbine/Generator) power as reported by DCPD's PIMS system, Summary of Daily Operations. Then, starting in June 2005, "raw" CAISO generation values began to be reported and are included as well.

PIMS generation reporting comes from instrumentation located upstream of the Main Bank Transformers and CAISO generation comes from ISO meters installed on the downstream side of the Main Bank Transformers. The difference between the two figures is transformer losses. The Main Bank Transformers are a significant heat load, which means a loss in outgoing generation from the PIMS side to the CAISO side.

See files on the attached CD:

DCPD-ISO-Meter-PIMS-SDO-2001.pdf

DCPD-ISO-Meter-PIMS-SDO-2002.pdf

DCPD-ISO-Meter-PIMS-SDO-2003.pdf

DCPD-ISO-Meter-PIMS-SDO-2004.pdf

DCPD-ISO-Meter-PIMS-SDO-2005.pdf

DCPD-ISO-Meter-PIMS-SDO-2006.pdf

DCPD-ISO-Meter-PIMS-SDO-2007.pdf

DCPD-ISO-Meter-PIMS-SDO-2008.pdf

*I.2. Please include GADS (Generating Availability Data Systems) Data for 2001-2008 on availability and outages.*

RESPONSE for DCPD: See files on the attached CD:

GADS-Annual-Report\_DCPD-2001.pdf

GADS-Annual-Report\_DCPD-2002.pdf

GADS-Annual-Report\_DCPD-2003.pdf

GADS-Annual-Report\_DCPD-2004.pdf

GADS-Annual-Report\_DCPD-2005.pdf

GADS-Annual-Report\_DCPD-2006.pdf

GADS-Annual-Report\_DCPD-2007.pdf

GADS-Annual-Report\_DCPD-2008.pdf

*I.3. For each of the periods in which one or more of the units were operating at reduced output during 2001-2008, please provide an estimate of the cost of replacement power (\$/MWh).*

RESPONSE for DCPD: See file on the attached CD:

CEC\_Data\_Request\_#I3 2009.pdf

*I.4. What are the schedule, duration, and purpose of any planned outages that exceed 15 days that are planned to occur through 2016?*

RESPONSE for DCPD: PG&E maintains adequate reserves to replace power from a DCPD unit if an outage lasts longer than 90 days. PG&E would either dispatch its own resources or purchase spot 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. However, obtaining replacement power for DCPD on either the spot or forward markets, or from other PG&E generation sources, would be at significant additional financial cost to PG&E customers and, depending on the duration of the outage, with up to 8-10 million tons of GHG emissions annually, assuming 2300 MWs of fossil fueled replacement power. See file on the attached CD:

CEC\_Data\_Request\_#I4 2009.pdf

*I.5. Please provide any studies or reports that describe the characteristics of the resources that would be needed to replace the plant in the 2020s (when current operating licenses for the plants are scheduled to expire) in terms of baseload capacity and energy, ancillary services, transmission support, grid stability, and local reliability.*

RESPONSE for DCPD: PG&E prepared a study of possible alternatives to replace Diablo Canyon at the time it applied for approval to replace the steam generators at the plant in May 2004. A copy of the relevant chapters from that application is enclosed. See files on the attached CD:

DiabloGenReplacement\_Test\_PGE\_20040326-08-Ch06-Rev.pdf

DiabloGenReplacement\_Test\_PGE\_20040527-12-Ch09-Rev.pdf

*I.6. Please describe plans for replacing power from the plant if an outage lasts longer than 90 days.*

RESPONSE for DCPD: PG&E maintains adequate reserves to replace power from a DCPD unit if an outage lasts longer than 90 days. PG&E would either dispatch its own resources or purchase spot 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. However, obtaining replacement power for DCPD on either the spot or forward markets, or from other PG&E generation sources, would be at significant additional financial cost to PG&E customers and, depending on the duration of

the outage, with up to 8-10 million tons of GHG emissions annually, assuming 2300 MWs of fossil fueled replacement power.

*I.7. If there is a prolonged outage (one year or more) at the plant, what are the contingency plans for replacement power?*

RESPONSE for DCP: For prolonged outages at DCP, PG&E would seek longer-term replacement power 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. Again, as mentioned in I.4 above, this replacement power would likely be at higher cost and with significant GHG emissions compared to Diablo Canyon power.

*I.8. Please provide copies of plant evaluations conducted by the Institute of Nuclear Power Operation (INPO) and any INPO Performance Index for the facility from 2007-2009. As for other areas, confidentiality protection will be provided for proprietary information as needed upon identification by the respondent.*

RESPONSE for DCP: Please see our letter to Melissa Jones and Barbara Byron.

*I.9. How would portfolio needs and “best fit” criteria change in the absence of the nuclear facility for short-term (up to 90 days) and mid-term (91 days – five years) procurement?*

RESPONSE for DCP: PG&E will need to procure from the market a substantial amount of energy and capacity to replace Diablo for a short (up to 90 day outage). PG&E will also use existing resources, which it owns or has under contract, to cover the energy shortfall to the extent they are economic compared to market purchases. PG&E's needs will similarly increase under mid-term outages. PG&E's best-fit criteria will change to reflect the higher energy and capacity need, as well as the increase in CO2 emissions associated with replacement energy.

*I.10. What resources might be needed to provide grid stability to the system in the absence of the nuclear plants for an extended outage during the summer? Would replacement power purchased by the utility be likely to come from those resources?*

RESPONSE for DCP: DCP is not primarily intended to provide grid stability. However, the plant does play a significant role in resource adequacy. In the event of an extended outage any and all resources might be utilized to meet resource adequacy requirements.

## **J. Nuclear Fuel (Diablo Canyon).**

*J.1. How many months of nuclear fuel does the utility currently have under contract (including uranium, enrichment, and transportation services?) How many months into the*

*future does the utility typically contract for nuclear (uranium) fuel? What is the current mix of short-term and long-term fuel supply contracts, where long-term is five years or more?*

RESPONSE: Please see our letter to Melissa Jones and Barbara Byron.

*J.2. What are the major factors influencing the all-in-cost of uranium fuel to the utility?*

RESPONSE: Nuclear fuel is the end product of a series of services completed on the uranium concentrates purchased by the utility. Uranium is converted, enriched, and finally fabricated into fuel for use in the reactors. As a result, the major factors influencing the all-in-cost are:

<b>Area</b>	<b>Portion of Total Cost</b>
Uranium	29%
Conversion	4%
Enrichment	42%
Fabrication	18%
Taxes	7%
Total	100%

Uranium, conversion and enrichment prices are influenced by the demand on the worldwide market. As production levels meet or exceed demand, then prices remain stable and the market is balanced. With the oncoming of new plant construction in a number of countries in the world, supply is not in balance with demand and prices for uranium and enrichment are increased to account for the imbalance.

*J.3. Please provide a copy of the utility's most recent forecast for expected uranium fuel prices covering at least the next five years and for 10 years, if available.*

RESPONSE: Please see our letter to Melissa Jones and Barbara Byron.

*J.4. What is the utility's current outlook for uranium supply and the potential for a shortage?*

RESPONSE: Many new uranium production facilities are being delayed due to the current worldwide financial crisis. Uranium supply is only in balance due to the draw-down of secondary supplies in the market. The primary secondary supplies are Department of Energy stockpiles and Russian weapons grade materials. These secondary sources have finite amounts that once exhausted will create an imbalanced supply side for the market.

While the secondary sources are available to the worldwide market, a window is created to allow for the exploration, development and production of new uranium resources throughout the world. In the present restricted atmosphere for capital investments, new production is being delayed or canceled.

By 2015, there could be a serious shortage of uranium supply to cover the base worldwide requirements. Prices could escalate and utilities could be short of minimum fuel requirements.

## **K. Nuclear Insurance**

*K.1. Please provide current information on the insurance policies concerning nuclear liability claims for these facilities. (Diablo Canyon; SONGS 1, 2, and 3; Rancho Seco; Humboldt Bay; Palo Verde).*

RESPONSE for DCPD and HBPP: PG&E purchases four types of nuclear liability coverage from INPO:

1. Facility Form Policy
2. Secondary Financial Protection Policy
3. Master Worker Policy
4. Supplier and Transporters Policy

ANI's 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. With minor exceptions, 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 \$300 million. PG&E purchases the maximum limits for DCPD.

PG&E purchases \$53.3 million in nuclear liability coverage for HBPP. This amount is based on criteria in 10 CFR Part 140.12, "Amount of financial protection required for other reactors."

The Secondary Financial Protection Policy is used by the operators of nuclear power plants 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. (See response to Question K.2.)

The Master Worker Policy covers radiation tort claims of nuclear workers employed at facilities insured by ANI. This master policy provides a guaranteed cost, industry aggregate limit of \$300 million.

The Suppliers & Transporters Policy is purchased by companies that provide products or services to operators of nuclear facilities in the U.S. The policy is also purchased by the operators of nuclear facilities to provide stopgap coverage to the Facility Form. The policy is designed primarily to apply excess of the limit available under someone else's Facility Form Policy up to a maximum combined limit of \$300 million under all policies that may apply to the same occurrence.

*K.2. What is the current maximum liability for secondary financial protection for any licensed commercial reactor in the United States that experiences a nuclear liability loss? (Diablo Canyon; SONGS 1, 2, and 3; Rancho Seco; Humboldt Bay; Palo Verde).*

RESPONSE for DCPD: Under the Price-Anderson Act, public liability claims from a nuclear incident are limited to \$12.5 billion. As required by the Price-Anderson Act, PG&E purchases the maximum available public liability insurance of \$300 million for DCPD (Facility Form Policy). The balance of the \$12.5 billion of liability protection is covered by a loss-sharing program among utilities owning nuclear reactors (secondary financial protection). Under the Price-Anderson Act, owner participation in this loss-sharing program is required for all owners of nuclear reactors that are licensed to operate, designed for the production of electrical energy, and have a rated capacity of 100 MW or higher. If a nuclear incident results in costs in excess of \$300 million, then the Utility may be responsible for up to \$117.5 million per reactor, with payments in each year limited to a maximum of \$17.5 million per incident until the Utility has fully paid its share of the liability. Since DCPD has two nuclear reactors each with a rated capacity of over 100 MW, the Utility may be assessed up to \$235 million per incident, with payments in each year limited to a maximum of \$35 million per incident.

Response for HBPP: N/A.

*K.3. Does the plant have nuclear property, decontamination, and debris removal insurance, and if so what is the maximum coverage? (Diablo Canyon; SONGS 1, 2, and 3; Humboldt Bay; Rancho Seco; Palo Verde).*

RESPONSE for DCPD and HBPP: Yes. PG&E purchases nuclear property, decontamination and debris removal insurance from Nuclear Energy Insurance Limited (NEIL). PG&E purchases the maximum property coverage offered by NEIL for DCPD, in the amount of \$2,750 million, with a \$2.5 million deductible. PG&E purchases \$131 million of property damage insurance for HBPP Unit 3, with a \$1 million deductible.

*K.4. Does the utility have any form of coverage for outage expenses and replacement power costs, and, if so, what is the deductible and what is the maximum coverage? (Diablo Canyon, SONGS 2 and 3, Rancho Seco, Palo Verde).*

RESPONSE for DCPD: Yes, PG&E purchases accidental outage extra expense coverage for DCPD from NEIL. The maximum coverage is \$490 million for a single unit outage, with a maximum weekly indemnity of \$4.5 million per week for the first 52 weeks. The maximum weekly indemnity is \$3.6 million for the balance of the coverage, approximately 71 weeks.



The coverage has a waiting period or deductible of 12 weeks. In the event of an outage involving both units, the maximum coverage is \$784 million.

*K.5. Does the utility have nuclear liability and property tax insurance for non-certified acts (as defined by the Terrorism Risk Insurance Act) for terrorism-related losses, including replacement power costs, and, if so, what is the deductible and what is the maximum coverage? (Diablo Canyon; SONGS 1, 2, and 3; Rancho Seco; Humboldt Bay; Palo Verde).*

RESPONSE for DCP and HBPP: Yes, the property insurance purchased by PG&E for DCP and HBPP will respond in the event of non-certified acts (as defined by the Terrorism Risk Insurance Act) for terrorism related losses, including replacement power costs. If one or more acts of domestic terrorism cause property damage covered under any of the nuclear insurance policies issued by NEIL to any NEIL member within a 12-month period, the maximum recovery under all those nuclear insurance policies may not exceed \$3.24 billion plus the additional amounts recovered by NEIL for these losses from reinsurance. The ANI Facility Form includes terrorism coverage.

**L. Relicensing or Plant Retirement (Diablo Canyon, SONGS 2 and 3).**

*L.1. Please describe the current status and overall schedule for plant license renewal activities related to a license renewal application to the NRC. What is the current estimate for the amount of time needed to complete a license renewal application and submit it to the NRC? What studies for your plant are underway and are needed to support such an application to the NRC? What is the schedule and planned studies that will be completed for the license renewal feasibility studies for the CPUC and in response to the AB 1632 assessment recommendations? (Diablo Canyon, SONGS 2 and 3).*

*L.2. Please describe the license renewal studies to be completed for the plant (for example, the general topics and areas of investigation) and provide a status report, including any results, of license renewal feasibility studies that are planned, are in progress or have been completed.*

RESPONSE for L.1 and L.2: The activities necessary to support making a license renewal filing with the Nuclear Regulatory Commission are proceeding on a schedule that would allow PG&E to file with the NRC in early 2010, if the Company determines based on the results of those activities that it is prudent to proceed with a license renewal filing at the NRC in order to preserve the option to operate Diablo Canyon for an additional 20 years. At this time, PG&E has not identified any safety or environmental issues precluding renewal of the DCP operating licenses. NRC approval of a request to extend Diablo Canyon's operating licenses is only the first step toward continuing operations; specifically, NRC approval would be subject to PG&E receiving the additional federal, state and local permits required to operate Diablo Canyon an additional 20 years.

## **NRC Application Requirements**

The final rule containing the regulations for the license renewal safety review was published in 1995 in Part 54 of the Code of Federal Regulations (10 CFR 54). The NRC's Generic Aging Lessons Learned (GALL) Report (NUREG-1801) documents the basis for determining when existing aging management programs (AMPs) are adequate and when existing programs should be augmented for license renewal. The GALL Report references the Standard Review Plan for License Renewal (NUREG-1800) as the basis for identifying those programs that warrant particular attention during NRC's review of a license renewal application (LRA). A guideline for implementing the requirements of 10 CFR 54 (NEI 95-10) combined with NRC Regulatory Guide 1.88 provide format and content guidance for license renewal applications.

In 1996, the NRC published the final rule that revised 10 CFR 51, which contains the regulations for environmental analysis related to license renewal. The NRC's Generic Environmental Impact Statement (GEIS) for License Renewal (NUREG-1437) was issued in 1996 and examines the possible environmental impacts that could occur as a result of renewing a commercial nuclear power plant license and, to the extent possible, establishes the bounds and significance of these potential impacts that must be addressed in the licensee's ER.

## **Integrated Plant Assessment**

In accordance with 10 CFR 54.21 and the Project Plan, an Integrated Plant Assessment (IPA) was prepared as a part of the LRFS. The IPA identified structures, systems, and components (SSCs) that are within the license renewal scope and support the intended functions, as described in 10 CFR 54.4(a)(1) through (3) and which have intended functions as described in 10 CFR 54.4(b). A screening determination was made as to which SSCs that support the intended functions would require an aging management review (AMR). The SSCs subject to an AMR were listed in the IPA.

### **Scoping and Screening**

Scoping and screening reports have been created to identify each site structural, electrical, and mechanical system within the scope of 10 CFR 54; these systems were then screened to determine those that are subject to an AMR. Those reports subject to an AMR have been reviewed by the LRFS team and subject matter experts.

### **Aging Management Reviews**

AMRs identify and demonstrate the effectiveness of aging management programs (AMPs) required for the period of extended operation. AMRs must demonstrate that the effects of aging are adequately managed so that the intended function will be maintained in the extended period of operation. AMRs were performed in the LRFS for all long-lived, passive function components within the scope of license renewal.

## **Aging Management Programs**

NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," identifies aging management programs (AMPs) that were determined to be acceptable to manage aging effects in SSCs in the scope of license renewal, as required by 10 CFR 54. Ten element AMP reports consistent with those identified and evaluated in the GALL Report were prepared for DCCP SSCs determined to be in the scope of license renewal.

## **Time Limited Aging Analyses**

10 CFR 54 requires the identification and evaluation of the time limited aging analyses (TLAAs) within the scope of license renewal and of the plant-specific exemptions that are in effect and based on TLAAs. In accordance with the Project Plan, for TLAA issues and exemptions where it could not be shown that the analyses would remain valid for the period of extended operation, or that the analyses could not be projected to the end of the period of extended operation, an AMP was developed or an existing program was modified to manage the effects.

## **Draft Environmental Report**

A draft ER, prepared as a part of the LRFS, identifies environmental issues associated with an additional 20 years of DCCP operation that may require mitigation, evaluates the environmental impacts of alternatives, and addresses mitigation alternatives. The draft ER also contains an evaluation of Severe Accident Mitigation Alternatives (SAMAs). The purpose of the SAMA review is to evaluate plant design alternatives and procedural changes that could significantly reduce the radiological risk from a severe accident by preventing substantial core damage or by limiting releases from containment in the event substantial core damage occurs.

## **AB-1632 Recommendations**

See generally, the responses provided to Section F. As the CEC's knows, PG&E undertakes ongoing seismic studies in compliance with its long term seismic program. Additionally, PG&E is implementing certain surveys and studies consistent with the CEC recommendations in the AB 1632 report. To undertake the recommended 3-D seismic mapping surveys recommended in the report, PG&E will require additional funding from ratepayers. PG&E will request that funding in its CPUC filing addressing license renewal or as required by legislative mandate.

PG&E will undertake a seismic reliability study of the non-safety related SSCs as the CEC recommended. PG&E has completed a preliminary scoping document for that study and has begun the necessary activities to support completion. PG&E expects that study to be completed by the end of first quarter 2010. PG&E anticipates addressing the remainder of the CEC's AB 1632 report recommendations by the end of the first quarter 2010 as well.

## **CPUC Filing**

Consistent with the CPUC's jurisdiction and Decision 07-03-044, the CPUC filing will present the license renewal feasibility study and address whether it is cost-effective and in the ratepayers best interest to preserve the option to continue Diablo Canyon operations beyond the expiration of the current operating licenses by going forward with the federal and state approval processes necessary to continue plant operations. Accordingly, PG&E will present in that filing the license renewal feasibility study and an economic analysis comparing the capital and O&M costs of continued Diablo Canyon operations with alternatives, including several different scenarios.

An evaluation of proposed plant betterments potentially beneficial to operating DCPD for an additional 20 years and their additional cost is being completed for use in the financial analysis. Subject to the specific information set forth above, PG&E will submit with its license renewal filing the information requested by CPUC President Peevey by letter dated June 25, 2009, for its information.

### **M. Other Issues (Diablo Canyon, SONGS 2 and 3, Palo Verde).**

*M.1. Please describe any major fires or safety related events occurring at the plant (2005-2009) that were reported to the NRC, for example, transformer fires. Please describe the cause of the event and corrective action taken. (Diablo Canyon, SONGS).*

RESPONSE for DCPD: See files on the attached CD:

2005 FIRE RESPONSE.pdf  
2006 FIRE RESPONSE.pdf  
2007 FIRE RESPONSE.pdf  
2008 FIRE RESPONSE.pdf  
2009 FIRE RESPONSE.pdf  
CEC\_Data\_Request\_#M1 2009.pdf  
DCISC Transformer Presentation.pdf  
DCL05029.pdf  
DCL05138.pdf  
DCL06009.pdf  
DCL06062.pdf  
DCL06068.pdf  
DCL06108.pdf  
DCL07013.pdf

DCL07015.pdf  
DCL07067.pdf  
DCL07073.pdf  
DCL07076.pdf  
DCL08070.pdf  
DCL08089.pdf  
DCL08109.pdf  
DCL09001.pdf  
DCL09035.pdf  
EIR2006001final.pdf  
EN#44419.pdf

*M.2. Please provide updated information on the total revenue requirements for the power plant for each year, since an operating license for the facility was issued? Please indicate for each of these years whether the annual revenue requirements were determined through a cost-of-service or performance-based mechanism. Where possible, please break down these revenue requirements into fixed and variable operating costs, capital additions, return on equity, and return of equity (depreciation). (Diablo Canyon, SONGS).*

RESPONSE for DCPP: See file on the attached CD:

CEC\_Data\_Request\_#M2 2009.pdf

*M.3. What are the current estimates for the projected total plant lifetime costs including costs for plant design and construction, operation, maintenance, fuel, repair and retrofit, emergency response planning, security, insurance, decommissioning, waste storage, transport, and disposal, with and without license renewal? (Diablo Canyon, SONGS).*

RESPONSE for DCPP: PG&E does not have a forecast of costs for the period of license renewal, if the license is renewed. See file on the attached CD:

CEC\_Data\_Request\_#M3 2009.pdf

*M.4. Operators of nuclear power plants are expected to face a critical shortage of plant workers in the coming years as the current labor force retires. Nearly half of all employees in the nuclear industry are over 47 years old. What is the estimated percent of the employees at Diablo Canyon and SONGS that will be eligible for retirement over the next five? Please update information provided on what PG&E and SCE are doing to recruit and train plant workers, for example, engineers, technical workers, and managers, to replace these retiring workers. (Diablo Canyon, SONGS, Palo Verde).*

RESPONSE for DCPP: PG&E has partnered with SONGS in the program at Palomar College. The Palomar program provides a technical program that will allow candidates to

enter the Nuclear Industry with enough background to enter apprentice and initial training programs within the Maintenance specialty areas as well as the chemistry and radiation protection technical programs. All Diablo Canyon departments including Engineering, Maintenance, Chemistry, Radiation Protection and Operations have attrition forecasts that predict when hiring and training needs to occur. The Diablo Canyon Training Department is staffed to accommodate training for new hires in all these areas as forecast.

309 out of 1205 employees are currently retirement eligible. 666 out of 1205 will be retirement eligible in 5 years. This data is accurate as of June 30th. Using Trend Analysis based formulas, only 31 people are expected to retire in 2009, and a total of 187 from now until 2013 (5 years).

*M.5. Nuclear power plants also are expected to face shortages in key reactor materials and components for which the supply and production worldwide is limited. Please describe how these shortages might affect currently operating plants, if specialized reactor components need to be replaced through plant retirement. What is the lead time for delivery of key reactor components, for example, reactor vessel heads? (Diablo Canyon, SONGS, Palo Verde).*

RESPONSE for DCCP: See response to G.6.

*M.6. To protect plant workers, plant assets, and equipment in an emergency, please describe recent reassessments of the adequacy of access roads to the plants and surrounding roadways for allowing emergency personnel to reach the plant and to allow local communities and plant workers to evacuate. (Diablo Canyon, SONGS).*

RESPONSE for DCCP: In September 2002, PG&E prepared an update to its *Final Report: Evacuation Time Assessment for Transient and Permanent Population from Various Areas Within the Plume Exposure Pathway Emergency Planning Zone, Diablo Canyon Power Plant 2002 Update* (Wilbur Smith Associates). See file on the attached CD:

2002 Evacuation Time Assessment.PDF

The 2002 update includes an assessment of the adequacy of access roads to the plant and surrounding roadways for allowing emergency personnel to reach the plant and to allow local communities and plant workers to evacuate. This 2002 update reflects the most currently available census data.

The attached document did not update the 1981 analysis of the potential impact of earthquake damage on evacuation times prepared by TERA Corporation for PG&E in 1981, and supplemented in 1985. PG&E recently issued a contract to update the required evacuation time estimates for the Diablo Canyon Basic Emergency Planning Zone. The updated report will include a comparative assessment of the evacuation time estimates following an earthquake event. Specifically, the approach for the proposed study is (1) to update the damage scenarios, based on upgrades to the transportation network to reduce the likelihood of earthquake damage, and changes in estimated response times to remediate damage and return roads to service; and (2) to perform a comparative analysis of evacuation

times for selected roadways, with and without damage, to assess the incremental impacts of earthquake damage on evacuation time. Work will begin on July 28, 2009. PG&E expects to receive a complete analysis in the 1st quarter of 2010.

Another full update of the ETA study will be prepared in 2012 to reflect 2010 census data.

*M.7. Please describe the current status of worker recruitment and training programs (plant operation and maintenance manuals, etc.) to help ensure that knowledge and experience with the plant, particularly with respect to plant operation and maintenance and strong safety cultures are instilled in new workers. (Diablo Canyon, SONGS, Palo Verde).*

RESPONSE for DCP: Operations Training programs have been actively recruiting non-licensed operators to fill the operator pipeline. In each of the last 4 years, PG&E has hired 8 to 11 new operators who were trained through the Diablo Canyon accredited training program. Each of these candidates entered the workforce. This year (2009) there are 8 students who were recruited in the beginning of the year and are enrolled in initial training. They will be entering the work force at the end of this year. Additionally, there are ongoing licensed operator training classes that are feeding the Operator pipeline and accounting for attrition within the senior operator ranks. These classes have been traditionally filled with line of progression candidates from the non-licensed operator ranks as well as candidates from engineering and other qualifying technical departments. The training programs are 18 months in duration and have been ongoing. In the maintenance area, there are 3 active apprentice classes that will provide journeymen to replace the maintenance attrition in the areas of electrical, machinist and instrumentation technicians. Also, the engineering department has just begun an initial training/orientation class for newly hired engineers. This class is of 3 months in length. In summary, for PG&E, each critical department has long term attrition plans that identify hiring new people. The specially trained nuclear workers are put into initial training programs. Training resources are planned based on the department attrition plans.

*M.8. Please provide an update of efforts you have made to maintain and enhance effective safety culture and equipment maintenance programs at your plants, including worker training, transfer of institutional knowledge to newer employees, maintaining adequate staffing levels and other program areas. (Diablo Canyon, SONGS, Palo Verde).*

RESPONSE for DCP: There are several areas where we are enhancing the safety culture at Diablo Canyon. One area is through Leadership Development Quarterly Training. For example the 3rd quarter Diablo Canyon Leadership Training is specifically on safety conscious work environment. Every supervisor at Diablo is required to attend the Safety Training on lessons learned in the industry every two years. There is a safety focus area in the 5 year Operating Plan which focuses the plant on industrial and radiological safety performance and improvement. Within the Diablo Canyon training, all employees receive basic computer based training on safety that is required to be renewed on an annual basis. Beyond that, all other training programs reinforce safety and management expectations in all training settings by objective and by examples. In the area of knowledge management, Diablo Canyon is undergoing a knowledge capture pilot program and has many tools

developed to capture knowledge of experienced workers including procedures, design documents and training modules.

*M.9. Please describe safety culture issues that have arisen at SONGS, the NRC's response to the lapses in safety culture at SONGS and the NRC's concerns about plant performance. Please provide copies of NRC plant assessments and reports. Please describe SCE's overall plan and progress being made to address these safety culture issues at SONGS. (SONGS).*

RESPONSE: N/A