ENVIRONMENTAL ASSESSMENT OF THE DIABLO CANYON STEAM GENERATOR REPLACEMENT PROJECTS

1.0 EXECUTIVE SUMMARY

The Pacific Gas and Electric Company (PG&E) Diablo Canyon Power Plant (DCPP) Proposed Projects are necessary to allow DCPP to continue to supply electric power for the remainder of its Nuclear Regulatory Commission (NRC) granted licenses, and to prevent the loss of this major power source to California electricity users. The DCPP project area is located 7 miles northwest of Avila Beach and 12 miles southwest of San Luis Obispo, California, within the San Luis Mountains. A vicinity map is shown in Figure 1-1. Two nuclear reactors are located on the site, each with a fuel handling system and spent fuel storage pool, including nuclear steam supply systems, a turbine-generator, auxiliaries facilities, high-voltage step-up transformers, and switching equipment. Unit 1 began commercial operation in May 1985, and Unit 2 began in March 1986. The operating licenses for Units 1 and 2 expire in September 2021 and April 2025, respectively.

DCPP Units 1 and 2 are each housed within separate containment structures located adjacent to each other on the main terrace at the 85-foot elevation along with the other primary structures of DCPP. Locations of the units are identified in Figure 1-2. Each unit consists of a reactor coolant system (RCS), which is a pressurized-water, closed-cycle, forced circulation system that is fueled with slightly enriched uranium dioxide enclosed in zirconium alloy tubes. RCS water circulated through the reactor acts as a coolant and moderator, and transports reactor heat to the steam generators (SGs) where it is converted into high-pressure steam. The entire RCS system is housed within the containment structure. The SGs also serve as a barrier between the radioactive RCS water and the non-radioactive steam system. Each DCPP unit has four SGs, which are large U-tube heat exchangers that convert heat from the reactor/RCS into steam to drive the turbine generators and produce electricity. Each DCPP unit produces 1,110 net megawatts electric (MWe). Figures 1-3 (Nuclear Steam Supply System) and 1-4 (Four Steam Generator Configuration) are diagrams that show the connectivity between the SGs and other components. The SGs are vital components that are subject to NRC license terms including operating limits that cannot be exceeded.

The Proposed Projects consist of two separate replacement projects, one for Unit 1 and a second for Unit 2. These will be implemented through two separate contracts for manufacturing of new

replacement steam generators and two separate installation contracts. Both manufacturing contracts will be awarded to the same fabricator and both installation contracts will be awarded to the same installation contractor to allow PG&E to negotiate the least-cost contracts.

The existing Unit 1 and Unit 2 old steam generators (also referred to as original steam generators, or OSGs) must be replaced with new steam generators (also referred to as replacement steam generators, or RSGs) of equivalent operational capacity because of current and predicted future tube degradation and associated maintenance problems. These Proposed Projects must be completed within a designated timeline, which includes a long design and construction lead-time necessary to complete the projects and the substantially increasing likelihood of a forced outage as a result of tube degradation in the existing steam generators. In addition, performing steam generator replacement on this schedule offers the most cost-effective approach because the costs of operating DCPP as the tubes continue to degrade are substantial.

The actual removal and replacement of each unit's steam generators will take place during one of each unit's scheduled maintenance and refueling outages in two major overlapping phases planned for winter/spring periods in 2008 and 2009. As a result, the construction, delivery, replacement, and storage activities will occur at different times for Unit 1 and Unit 2. PG&E plans to obtain the non-radioactive RSGs from a yet-to-be-determined international vendor that will manufacture them abroad and deliver the RSGs by ship and/or barge to a nearby California port (Long Beach or San Pedro). They will be transported north along the Pacific Coast by barge to DCPP at one of two locations, Port San Luis or the DCPP Intake Cove.

PG&E must complete bid evaluation and award contracts for design, construction, and delivery of each unit's RSGs to DCPP by no later than June 2004 to meet the proposed installation date at the least cost. The first replacement outage (Unit 2) is scheduled for February 2008. A June 2004 contract signing with a 40-month schedule will result in delivery by approximately November 1, 2007. Delivery should be completed before the winter storms that normally occur in December through February because transportation of the RSGs must occur by sea. The second outage for the replacement of the OSGs (Unit 1) is scheduled for January 2009. These RSGs will have to be delivered in September 2008 to allow for installation at that time.

The RSGs will be stored on site at a temporary storage facility until ready for installation. All necessary removal, replacement, and maintenance activities will take place during two 80-day replacement outages. The peak period of Proposed Project activity at DCPP will occur during these two outages when the actual removal and replacement of steam generators will take place. PG&E anticipates that up to an additional 900 workers will be on site during these outages.

After completion of replacement operations, the OSGs will be transported along existing roadways at DCPP and stored on site at an Old Steam Generator Storage Facility (also referred to as the Original Steam Generator Storage Facility, or OSGSF) to be constructed within or near the 500 kV switchyard in the canyon behind and above the primary plant facilities.

This Environmental Assessment evaluates the potential environmental impacts that could result from the described Proposed Projects. The results of these analyses indicate that the Proposed Projects would have no significant adverse environmental impacts. Accordingly, the Proposed Projects require no mitigation measures. An Impact Summary table with the findings of significance is included Section 6.

This Environmental Assessment also contains analysis of a No Project Alternative. The No Project Alternative assumes the construction of two new generation facilities in Alameda and Kern Counties to supply approximately 1,000 MW each, which would replace the electric power currently generated by DCPP. The No Project Alternative assumes that these new generation facilities would be combined cycle gas turbine (CCGT) plants designed to operate at 100 percent load. Natural gas combustion would result in additional criteria pollutant emissions, such as nitrogen oxides (NO_x) and sulfur oxides (SO_x), and would produce other state and federally listed hazardous air pollutants. Areas close to such plants may experience some degradation of air quality leading to impacts to sensitive receptors and contributing to existing air quality violations. This type of power generation would result in a substantial increase in emissions of air pollutants and could result in significant adverse environmental impacts.

If no action were taken to replace the electrical capacity of DCPP Unit 1 and 2, there would be a loss of 2,200 MWe of electric generation capacity, which could have significant adverse impacts on the electric supply system. This could result in significant adverse effects on public health and safety and the regional economy. A no action alternative, consisting of shutting down both generation units of Diablo Canyon without other efforts to replace power generation, is considered unlikely because of the magnitude of impacts and resulting loss of power supply, therefore, is not carried forward in the sections assessing the impacts of individual alternatives.

Figure 1-1. Site Vicinity Map
CLICK HERE TO VIEW

Figure 1-2. SGRP Temporary Facilities
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Figure 1-3. Nuclear Steam Supply System
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Figure 1-4. Four Steam Generator Configuration
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