

2.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

2.1 STATEMENT OF OBJECTIVES

The basic objectives of the Proposed Projects are as follows:

1. **Perform Steam Generator Replacement on Schedule to Minimize the Risk of Forced Outage or Plant Shutdown:** The first basic objective of the Proposed Projects is to replace DCPD's aging steam generators in order to minimize the risk of leakage or a permanent forced outage, or frequent mid-cycle inspections and the associated temporary plant shutdown, as well as to minimize the overall reduction in electrical generation at DCPD from continuing operation in the face of tube degradation.
2. **Reduce Costs Associated With Tube Degradation:** Tube degradation is expected to accelerate over the next few years, resulting in increased maintenance costs, increased tube plugging, use of expensive sleeving, a loss of electrical generation, and an increased regulatory burden associated with NRC mandates. The second basic objective of the Proposed Projects is to avoid these additional financial burdens and so operate DCPD in the most cost-efficient manner.
3. **Ensure Continued Supply of Low-Cost Power:** Each DCPD Unit provides 1,100 MWe of low-cost, zero-emission power to the California power supply. The third basic objective of the Proposed Projects is to ensure that this supply of power remains available to California users through the end of the terms of the two current NRC licenses for Unit 1 and Unit 2.
4. **Perform Steam Generator Replacement on a Least Cost Schedule:** Based on the current progression of tube degradation at DCPD, the likelihood of a forced outage to replace the steam generators is substantially increasing. The costs of operating with tube degradation will substantially increase as tube degradation progresses. The fourth basic objective of the Proposed Projects is to perform steam generator replacement on the schedule proposed by PG&E so that such replacement will involve the least cost.

2.2 PROJECT PURPOSE AND NEED

The purpose of the Proposed Projects is to replace the existing steam generators in Units 1 and 2, allowing DCPD to remain in service until the end of the current terms of the NRC licenses for

Unit 1 and Unit 2. Each unit contains four OSGs. All eight OSGs would be replaced, in two similar but separate projects – one for each Unit.

Under their current licenses, Unit 1 is authorized to operate until 2021, and Unit 2 until 2025. However, the existing steam generators are currently predicted to reach the end of their operating life within the next several years because of current and future predicted tube degradation and other associated maintenance difficulties. The most significant cause of tube degradation at DCPD is stress corrosion cracking; Units 1 and 2 currently suffer from several forms of such cracking. As tubes degrade, they must be taken out of service by use of a plug, or in some cases, they can be temporarily repaired by use of a sleeve. There are no practical means to reverse the progression of degradation, only mitigation and management strategies. Without steam generator replacement, studies conducted by PG&E indicate that there is no probability that Units 1 and 2 will operate until the end of their license terms.

Worldwide, most steam generators, including those at DCPD, were constructed with Alloy 600MA type tubing. Over the years, a large number of these steam generators have been replaced because of service-related degradation. In the U.S., there are 57 operating units (including DCPD) originally supplied with a total of 167 steam generators using Alloy 600MA tubing. To date, 34 of these units have replaced their steam generators and another 21 are working on replacement projects. By 2009 only two units (with a total of five steam generators) will remain in operation with original tubing material (assuming that DCPD has replaced its steam generators by this date). It is expected that these two units will also announce replacements within the next few years. Units with this original tubing and active tube degradation will face significant challenges if they continue operation after approximately 2009, because there will be very few other units with which to share the regulatory and technical burden.

Failing to replace the existing SGs as soon as possible poses an increasing risk that the OSGs will degrade to the point of exceeding the operating limits contained in the NRC licenses. These operating licenses require that the steam generators not operate with more than a prescribed percentage of tubes plugged. Currently this limit is 15 percent. The limit can be raised by a complex reanalysis and an NRC-approved license amendment to a maximum of approximately 25 percent plugged in the worst steam generator with the other three steam generators in that unit limited to about 20 percent. However, steam generator replacement is necessary to continue operation once the worst-case steam generator in each Unit reaches this ultimate 25 percent limit. If such limits are exceeded, DCPD could not continue to operate that Unit under its NRC license and would be forced to cease all operations in that Unit until steam generator replacement can be

accomplished. This would likely result in the long-term loss of approximately 1,100 MWe per Unit from the supply available for California electricity consumers.

According to studies prepared by PG&E, the existing DCPD steam generators are predicted to reach the end of their operating life within the next few years. PG&E conducted probabilistic analyses to predict the expected future life of the current steam generators using the recent rate of degradation. Results indicate that the worst steam generator in Unit 2 will reach the 25 percent plugging limit by Fuel Cycle 17 (2013) and Unit 1 in fuel cycle 18 (2014). Steam generator replacement will have to occur to continue operation beyond this point. Both units are currently operating in Fuel Cycle 12.¹

The statistical probability is zero that the Unit 1 and Unit 2 steam generators will continue to operate within all applicable limits until the end of each Unit's current operating license (2021 for Unit 1 and 2025 for Unit 2). Continued operation will increase the cost of steam generator inspection, repair and maintenance and will increase the risk of leakage, forced outages, extended refueling outages, and mid-cycle inspections because of current and predicted tube degradation and other maintenance problems with the existing steam generators. Therefore, the Proposed Projects are necessary to allow DCPD to continue to supply electric power for the remainder of its NRC licenses, and to prevent the loss of this major power source to California electricity users.

In order to avoid this increasing risk of forced shutdown and the escalating cost of continued operations in the face of tube degradation, PG&E has proposed a schedule that provides for steam generator replacement in 2008 for Unit 2 and 2009 for Unit 1. The probability of reaching 2008/2009 without exceeding regulatory limits and requiring early shutdown is estimated at 100 percent. This probability drops if the schedule is extended to later outages. For example, the probability drops to 80 percent if the replacement outages are delayed until 1R16/2R16 (October 2010/May 2011). Moreover, delaying the replacement outage schedule until 1R15/2R15 (January 2009/October 2009) creates a significant coordination issue with the planned replacement of steam generators at the San Onofre Nuclear Generating Station (SONGS) near San Clemente, California, operated by Southern California Edison. The number of skilled craft workers, engineers, radiation protection technicians, and other necessary personnel may be inadequate to perform four steam generator replacements in California in one year. This scenario will also result in an extensive loss of output from the state's four nuclear power plants in 2009. Likewise, the overall cost of the Proposed Projects is lowest for the 2008/2009 scenario and increases for later schedules.

¹ DCPD currently operates on an approximately 20-month cycle, scheduled so that outages occur in the Spring and Fall.

In order to meet the 2008/2009 replacement schedule, a contract for the manufacture of replacement steam generators must be in place by summer 2004. Steam generator replacement projects require long lead times to design, manufacture, and deliver new replacement steam generators; manufacturers require at least 40 months for this process. Analysis has shown that a replacement schedule of 2008 for Unit 2 and 2009 for Unit 1 is achievable and is the most cost effective with the least risk of forced shutdown. Given anticipated regulatory approval times and the length of the design, fabrication, and transportation to the site processes, PG&E is filing this application now and is seeking interim California Public Utilities Commission (CPUC) approval by June 2004 to allow for recovery of all abandoned project costs incurred by PG&E on long lead contracts if the projects are ultimately disapproved by the CPUC. This will allow PG&E to enter into these contracts and move forward with the projects. PG&E is seeking full project approval by October 2004.