

**MEMO**

**TO:** Michael Thomas  
Central Coast Region, California Regional Water Quality Control Board

**FROM:** Scott Keen and Ron Rimelman  
Tetra Tech, Inc.

**DATE:** December 4, 2002

**SUBJECT:** Diablo Canyon Power Plant, Construction of an Off Shore Discharge

In 1982, PG&E, in TERA Corporation's *Assessment of Alternatives to the Existing Cooling Water System*, considered an offshore discharge location as a means to reduce thermal effects of cooling water discharge from the Diablo Canyon Power Plant. The design concept examined by PG&E, that would meet criteria of the California Thermal Plan, included 2,250 feet of conduit in two compartments, each having a cross sectional area of 13 feet by 12 feet. Conduit would reach an ocean depth of approximately 83 feet; and the ultimate discharge point would be placed horizontally or 18 feet above and parallel to the ocean bottom. Hydroelectric energy recovery systems (two systems, total) would be placed near the condenser outlets. TERA Corporation estimated capital costs of \$174 MM for such a system.

Tetra Tech, Inc. and Hatch & Associates, Ltd have also estimated costs and considered the possibility of moving the Diablo Canyon Power Plant's point of cooling water discharge to an offshore location. The conceptual design has also assumed that 2,250 feet of conduit would be required. Interior dimensions of the conduit would be 12 feet high by 30 feet wide. It would be constructed of concrete and placed on the sea bottom by a cut and cover method; i.e., tunneling was not considered. The discharge end of the conduit would project 18 feet above the sea bottom. This offshore discharge system would be constructed in 15 to 20 months. Most of the discharge system could be constructed independently of the existing system, however, and Tetra Tech, Inc. has therefore assumed that the tie-in could occur in 1 to 2 months.

Tetra Tech, Inc. initially estimates an installed cost for an offshore discharge location of \$75 MM. In previous evaluations of cooling system alternatives, cost estimates have been adjusted to account for retrofitting activity, safety requirements of a nuclear facility, and the unique physical location of the Diablo Canyon Power Plant. By applying retrofit (1.3), construction (1.65), and regional (1.1) factors, as used previously, the resulting capital cost estimate for an offshore discharge is \$154 MM. Assuming that the final 'tie-in' to the existing cooling system could overlap with a regularly scheduled, one month maintenance shut down, PG&E could lose generating revenue for up to one month per unit or \$54 MM, based on revenue estimates provided by PG&E of \$900,000 per unit per day.

One circumstance that cost factors and resulting cost estimates do not take into account is the possibility of a highly irregular and rocky sea bottom. Such an ocean floor (rocks, pinnacles, etc) would present very difficult obstacles to construction and could significantly change construction estimates, if not preclude construction altogether.

The net present value of this conceptual offshore discharge system, assuming a twenty-year project life, would be \$144 to \$194 MM. Annual costs, assuming amortization of capital costs over twenty years, would be:

- \$14.5 MM per year, if there is no lost revenue attributed to the final tie-in, or
- \$68.5 MM in the first year and \$14.5 MM thereafter, with one month of lost revenue incurred during the final tie-in

A twenty-year project life is used based on a twenty-year duration for the facility's operating license, as reported by PG&E.