Portland General Electric Company

James E. Cross Vice President, Nuclear

October 1, 1990

Trojan Nuclear Plant
Docket 50-344
License NPF-1

Mr. John B. Martin
Regional Administrator, Region V
U.S. Nuclear Regulatory Commission
Creekside Oaks Office Park
1450 Maria Lane, Suite 210
Walnut Creek CA 94596

Dear Mr. Martin:

Nuclear Regulatory Commission (NRC) Generic Letter (GL) 89-13, "Service Water System Problems Affecting Safety-Related Equipment"

The purpose of this letter is to provide a status of the action plan developed to respond to GL 89-13 as committed to in Portland General Electric Company's (PGE's) initial response letter of January 25, 1990.

PGE maintains on file a detailed action plan addressing NRC Recommended Actions I through V in GL 89-13. In some cases, an alternative course of action has been chosen from the generic letter recommendations, as described below. Appropriate Plant records will document the justification that the alternative actions will ensure that the safety functions of the Service Water System (SWS) are being met.

The current status of PGE's actions on each of the recommended actions of GL 89-13 is as follows:

NRC Recommended Action I

A macro-biofouling program of surveillance and control techniques to preclude flow blockage due to biofouling has been developed and is being refined. Infestation of Asiatic clams, as well as normal silt/debris loading from the Columbia River, is being addressed by this program. The SWS intake structure is inspected, mapped, and dredged with routine frequency. Flushes, inspections, and flow measurements of the SWS are routinely conducted. In addition, biocide treatment for micro-biofouling is being accomplished by a newly installed bromine system.

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The macro-biofouling program currently underway does not follow all the guidelines of Enclosure 1 to GL 89-13. The SWS will not be continuously chlorinated or treated with another biocide. Also, service water cooling loops and other systems that use raw service water as a source are not filled with chlorinated or equivalently treated water before layup. Although various biocides are being evaluated, the decision to implement a treatment program for macro-biofouling has not yet been made, pending completion of this evaluation. As an alternative, periodic flushes, inspections, and flow data acquisition will be utilized in lieu of biocide treatment for clams if this proves to be of equal or greater effectiveness. The generic letter states that an equally effective program to preclude biofouling would also be acceptable.

Additionally, the guidelines of Enclosure 1 to GL 89-13 are not followed in that system and component flushes on redundant and infrequently used cooling loops are not currently verified at maximum design flows. Alternatively, system dead legs are periodically flushed, and design basis flows verified to components in safety-related cooling loops.

NRC Recommended Action II

In general, testing will not be conducted to verify the heat transfer capability of safety-related heat exchangers cooled by service water and the guidelines of Enclosure 2 to GL 89-13 will not be followed.

As an alternative approach to Enclosure 2, the heat transfer capability of open-cycle heat exchangers will be verified by reviewing existing design basis calculations, supplemented by additional calculations as necessary, in conjunction with periodic maintenance, inspection, and water side flow monitoring and trending. Heat transfer testing will be conducted on selected air-to-water heat exchangers to validate the design basis calculation models. Also, the Component Cooling Water System (CCWS) heat exchangers will be tested at least every other fuel cycle to verify their overall heat transfer properties, in addition to their regular annual maintenance and inspection. Heat exchanger testing will not be conducted at design heat removal rates because heat loads under normal Plant conditions are not amenable to the collection of meaningful heat transfer data, and the results of the many inspections already performed have indicated regular periodic maintenance will be required. The need to monitor and trend heat exchanger temperatures, air side flows, and lube oil cooler parameters is still under evaluation.

Intermediate closed-cycle systems were evaluated to determine if the requirements of GL 89-13 were applicable to these systems. Chemistry records were reviewed and partial inspections performed to confirm the adequacy of the chemistry control programs for these systems. Although complete chemistry records do not exist for all systems between Plant startup in December 1975 and before late 1977, the existing records cover enough of the operating history of the Plant to warrant a valid conclusion. Consequently, based on the results of this review, intermediate closed-cycle systems for Trojan will be excluded from GL 89-13 Recommended Action II (and III).

NRC Recommended Action III

Inspection and maintenance programs have been expanded to monitor the SWS. The 1990 refueling outage inspections focused on internal pipe coating condition, pipe/valve/component erosion-corrosion, heat exchanger fouling, and heat exchanger tube wall thinning. Remote video camera inspections were performed on approximately 990 linear feet of epoxy-lined service water piping. Pipe coating inspections to date have shown the coating to be in relatively good condition and nearly 100 percent intact. Six strainers, 53 coolers, and 60 valves in the SWS were also inspected. Corrosion damage was revealed on uncoated carbon steel wetted surfaces, and fine particle abrasion/cavitation damage was found on softer materials within the SWS. Mud, silt, clam fragments, and clams were found in room and area coolers.

Baseline as-found data was acquired on all inspected coolers to aid in establishment of the appropriate inspection/cleaning interval, and the coolers were left clean. The same heat exchangers will be opened during the 1991 refueling outage to determine the extent of fouling over the course of an operating cycle. The 1991 findings will become the second data point in what is to be a three-point data base for determining the appropriate inspection/cleaning frequency. A mid-cycle inspection will be performed on the two worst-case room/area coolers to ensure that the annual operating cycle interval is not too long. Also, nine SWS heat exchangers were eddy current tested during the 1990 refueling outage. All eddy current results were satisfactory. Upon re-examination by eddy current during the 1991 refueling outage, baseline data and wear rates will be finalized and a routine examination interval established.

NRC Recommended Action IV

Design Basis Documents have been prepared for the SWS and Component Cooling Water System and will be validated via an as-built system walkdown. This effort will be used to address Recommended Action IV to

confirm the as-built system is in accordance with the licensing basis documentation. A single active failure analysis will also be performed as part of the licensing basis confirmation.

NRC Recommended Action V

As stated in PGE's initial response letter of January 25, 1990, a review will be performed to confirm that maintenance practices, operating and emergency procedures, and training are adequate to ensure that safety-related equipment cooled by the SWS will function as intended, and that operators of this equipment will perform effectively.

In summary, PGE is proceeding with a program to implement the recommended actions of GL 89-13, except where acceptable alternatives have been identified as delineated above. It remains PGE's intention to complete implementation of program actions by the end of the 1991 refueling outage.

Sincerely,

T. D. Walt
for J. E. Cross

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Mr. David Stewart-Smith
State of Oregon
Department of Energy

Mr. R. C. Barr
NRC Resident Inspector
Trojan Nuclear Plant