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November 19, 1979

Trojan Nuclear Plant
Docket 50-344
License NPF-1

Mr. Darrell G. Eisenhut, Acting Director
Division of Operating Reactors
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Sir:

This letter is in response to your Request for Review dated September 21, 1979 in connection with the June 26, 1979 letter regarding the multiple failure occurrence at the Zion Station in May of 1979. We have reviewed the events associated with the Zion incident discussed in your letter in conjunction with the Trojan design and relevant experience. We have also reviewed the Trojan plant history with regard to multiple equipment failures in safety-related systems. Finally, we have reviewed our engineered safety system surveillance procedures and the Trojan plant history with respect to challenges to protective features. This letter discusses the major conclusions arising out of this review.

With regard to the Zion incident, Trojan procedures for testing safeguards signals involves use of a semi-automatic logic testor and does not require simultaneous depression of test buttons to develop test inputs, as seems to have been the case at Zion. Our procedure has undergone seven improvement revisions, and, if followed, will not result in a trip or challenge the protective system. In addition, the procedure contains appropriate CAUTION statements. A review of the Trojan plant history of License Event Reports (LERs) with regard to the specific Zion equipment failures shows the following:

1. The main steam isolation valves (MSIVs) failed to close three times (LER 79-03, 78-09, 78-05). Twice this was due to valve stem binding, and once it was due to faulty solenoid valve air operators. The incidence of MSIV solenoid valve air operator failure has been low since the MSIV solenoid valves were included on a periodic maintenance program that examines them at least quarterly. The frequency of MSIV valve stem binding is expected to decrease

since incorporation of a technical bulletin from the valve vendor that increases the packing gland clearance and modifies the gland configuration. In addition, there has been one incident of a single MSIV slamming shut when the air line to that particular MSIV solenoid valve was disturbed by workmen in the field.

2. The feedwater control valve used for feedwater isolation has never failed to close when called upon. A backup feedwater isolation valve has failed to close on five occasions (LER 76-03, 76-66, 77-23, 79-05, 79-07). A backup feedwater isolation valve bypass valve has failed to close on three occasions (LER 76-29, 76-64, 77-36).

   The valve closure failures on the backup feedwater isolation system were due to a variety of reasons (hydraulic control fluid type, control fluid leaks, steam corrosion of components, fitting application, pressure regulatory valve, solenoids). Many components were rebuilt or replaced. An assessment of adequacy of the current system design for the backup isolation valves is currently being conducted. At no time did the feedwater isolation not take place, since the main feedwater flow control valves have always closed on command.

   There were four instances (two in July 1977, two in April 1979) when a main feedwater flow control valve failed open. The problem was traced to inadequate capacitors in the control circuitry. All the affected capacitors were replaced with capacitors of the proper voltage rating.

3. The steam generator atmospheric relief valves have never failed to reseat following actuation. On a few occasions, a small amount of steam weeping has taken place.

4. The turbine-driven auxiliary feedwater pump did overspeed early in Plant operation (LER 76-60) because of control circuit deficiencies. These have been corrected and we do not expect further problems.

5. The majority of valves used in safety-related flow paths are motor-operated valves that are included in a three-refueling-cycle inspection program. The

valves with air-operators used in safety-related systems are included in a 2-yr inspection program when the valves that are accessible are tested. Solenoid valves used at Trojan are mostly Automatic Switch Company products. Some of these valves are hermetically sealed and do not readily permit a meaningful inspection. Of the 150 air-operated valves included in the Q-list, about two solenoid valves per year are replaced, usually as a trouble-shooting technique.

With regard to multiple equipment failures in safety-related equipment, of the total 160 LERs that have been generated since November 1975, only six instances have occurred at Trojan that might be considered multiple failures (LER 76-06, 76-67, 78-04, 78-12, 78-29 and 79-03). Of these, three are considered as having little safety impact. LER 76-67 involved two Containment atmosphere sample line isolation valves failing by 0.5 sec to close within the required time of 10 sec during Containment isolation surveillance. LER 78-12 involved four of the 12 steam generator level transmitters out of calibration due to normal instrument draft. The reactor trip setpoints for these instruments were less conservative than those established by the Technical Specifications. LER 78-29 involved the freezing of two sensing lines for two steam pressure transmitters to the same main steam line. When the lines froze, the detectors failed high and tripped their respective bistables placing the Plant closer to safety system actuation. LERs 76-06, 78-04 and 79-03 can be considered as having had safety significance. LER 76-06 involved the failure of both auxiliary feedwater pumps to auto start when the main feedwater pumps were tripped. The operator then manually started one of the pumps. The cause of this failure was the mislogging of a lifted lead in the auto start circuitry. This situation was corrected by reconnecting the lifted auto start lead, and by changing the adminstrative control of the lifted lead log. LER 78-04 involved the "A" train Design Basis Accident emergency diesel loading sequences not actuating several ESF loads during a periodic test. This was caused by the loosening of a locking device that ensures proper drive gear engagement. Corrective action was the tightening of the locking device. LER 79-03 involved the failure of two MSIVs to close on a manual signal during routine surveillance testing. The failure to close was due to bending between the valve stem and packing. Corrective action was immediate adjustment of the packing, and subsequent gland clearance and gland modification.

With regard to engineered safety system surveillance, the Trojan procedures were briefly discussed with respect to our review of the Zion incident. The instrument and control technicians who perform the testing are given periodic informal "shop talks" by their supervisors. The caution areas in the procedures and the need to be careful when conducting the testing

program are highlighted. In addition, the Maintenance Department holds critiques and shop discussions regarding mistakes, problem areas, and the need for care when working on equipment.

Trojan plant history shows that since November 1975 personnel error has been responsible for tripping the Plant 13 times out of the 90 shutdowns. Since December 1975, the Plant has undergone six inadvertent safety injection actuations (January 1976, April 1976, October 1976, March 1977, September 1978 and September 1979). Two of these are attributable to electronic signal noise, and four involved, either directly or indirectly, personnel error. When personnel error was involved, corrective action included discussions by supervisors with the person involved, the issuance of training bulletins, or request for Plant design changes.

In summary, an event similar to the Zion incident has not occurred at the Trojan plant. The few instances that can be considered as multiple failures have been documented, investigated and corrected. Management policies and procedures are cognizant of the importance of avoiding challenges to the protective features of the Plant.

Sincerely,

C. Goodwin, Jr.
Assistant Vice President
Thermal Plant Operation and
Maintenance

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c: Mr. Lynn Frank, Director
State of Oregon
Department of Energy