U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No. 50-344/85-20

Docket No. 50-344

License No. NPF-1

Licensee: Portland General Electric Company
121 S. W. Salmon Street
Portland, Oregon 97204

Facility Name: Trojan

Inspection at: Rainier, Oregon

Inspection conducted: June 12-15 and 17-21, 1985

Inspectors: Clifford A. Clark — 8/26/85
C. A. Clark, Reactor Inspector — Date Signed

Talbert Young Jr. for — 8-27-85
R. Compton, Consultant — Date Signed

Approved by: Talbert Young Jr. — 8-27-85
T. Young, Jr., Chief, Engineering Section — Date Signed

Summary:

Inspection during June 12-15 and 17-21, 1985 (Report No. 50-344/85-20)

Areas Inspected: This announced inspection consisted of a technical review of the program plan, procedures and records pertaining to the Trojan Inservice Testing program for pumps and valves. Inspection procedure 61700 was covered. The inspection involved a total of 100 hours onsite by one NRC inspector and one consultant.

Results: In the areas inspected, one violation of NRC requirements was identified (failure to follow procedures for testing relief/safety valves-paragraph 4) and one unresolved item was identified (adequacy of procedures to implement SER and Code requirements - paragraph 2 and 3).

DETAILS

1. Persons Contacted

*W. S. Orser, General Manager - Trojan
*R. P. Schmitt, Manager - Operations and Maintenance
*J. D. Reid, Manager - Plant Services
*D. R. Keuter, Manager - Technical Services
*F. C. Gaidos, Manager - Quality Assurance
*G. Kent, Plant Test Engineer
*G. Stein, Mechanical Supervisor - Maintenance
R. Reinart, I&C Supervisor
*S. Richards, NRC Senior Resident Inspector

*Denotes those attending the exit interview on June 21, 1985.

The inspectors also interviewed other licensee employees, including members of the technical, operations, maintenance, I&C, and training staff.

2. Inservice Testing (IST) Program Plan

Inservice testing is required to be performed in nuclear power plants in accordance with the ASME Boiler and Pressure Vessel Code by 10 CFR 50.55.a(g). The ASME Code, Section XI, Subsections IWP and IWV, outlines rules for inservice testing of pumps and valves. Amendment 2 to the "Trojan Nuclear Plant Pump and Valve Inservice Testing Program", issued September 1982, is the document currently detailing the scope, implementation and administration of the IST program. This plan and relief requests from July, August and December 1982 were approved, with additional conditions and requirements, in a Safety Evaluation Report (SER) by the NRC Office of Nuclear Reactor Regulation (NRR) on March 14, 1984.

Implementation of the IST program at Trojan began in January 1981 to the 1977 Edition of the Code through the Summer 1978 Addenda. In September 1982, the applicable code edition was updated to 1980 through Winter 1980 Addenda. The initial 120 month IST period began on May 20, 1976 and extends through May 20, 1986. The program applies to 24 pumps in 10 systems and approximately 390 valves in 20 systems.

The IST Program Plan (Amendment 2) and subsequent relief requests were reviewed for compliance with the applicable edition of the Code, the requests for relief detailed in the plan and the additional conditions imposed by the SER.

The inspectors consider that the program plan should be updated in a more timely manner to reflect in a consolidated way the approved relief requests, special conditions and additional requests imposed by NRR in the 2½ years since the issue of Amendment 2.

The inspectors noted several instances where tests are not being performed as required and relief has not been requested. These instances are discussed in paragraph 3 of this report.

There were no violations of NRC requirements identified.

3. IST Program Procedures

The Trojan IST Program Plan is implemented through various site procedures. The following procedures were reviewed for compliance with the ASME Code, the IST Program Plan and 10 CFR 50 Appendix B requirements:

Administrative Order-AO-6-1, Rev. 14, "Periodic Surveillance"

Administrative Order-AO-3-9, Rev. 20, "Maintenance Requests"

Periodic Engineering Test-PET 9-4, Rev. 4, "Documentation of Inservice Testing Data for Pumps and Valves"

Various other maintenance and surveillance procedures related to pump and valve testing.

Site procedures correctly referenced the requirements of Section XI and the surveillance procedures included gauge identification number and calibration dates and provided acceptance criteria. The Plant Test Engineer (PTE) reviews test results, compares them to a current Data Log which reflects acceptance criteria for alert and action ranges, and determines component operability. This Data Log serves as the year's summary of test records for each component. If the results are out of tolerance, a Form PET 9-4-DB is written to document the condition and the recommended corrective actions. The following findings were identified in regard to site procedures:

a. Section XI and PET 9-4 require the full range of instruments used for IST, to be no more than three times the reference value or less. However, the following gauges used for IST exceed these limits:

(1) PI 601 and 602, Residual Heat Removal (RHR) pump suction pressure gauges, with reference values of approximately 25 psi; range 0-600 psi

(2) PI 1953 and 1954, RHR pump discharge pressure gauges, with reference values of approximately 200 psi; range 0-1000 psi

(3) PI 3733A-D, SW Pump suction pressure gauge, with reference values of approximately 13 psi; range 0-60 psi

(4) PI 3044A and B, AFW pump suction pressure gauge with reference values of approximately 12 psi; range 0-100 psi.

b. Section XI and PET 9-4 require pump tests to be performed by setting either flow or differential pressure at the reference value and then determining the other parameters. The IST procedures for the

Containment Spray, Component Cooling Water and Residual Heat Removal pumps do not pre-establish either flow or differential pressure to a reference value. Tests are run at various conditions and results evaluated based on allowable range for each parameter. No relief request has been generated for this test approach. This test method may also be contributing to problems discussed in paragraph 4 of this report.

c. Valve SF 51 is listed in the Program Plan as a Category "A" valve requiring leak testing. However, this valve did not appear in the 1984 outage report for the containment Local Leak Rate Test results. No other leak test procedure applies to this valve.

d. In a letter to NRR on December 9, 1983, the licensee committed to recategorize accumulator discharge check valves 8956A through D as "AC" and perform leak testing in accordance with the Code. However, per Periodic Operating Test (POT) 2-4, these valves are only leak tested if the first check valves from the RCS leaks. As these first valves have not yet leaked, 8956A-D have not been leak tested.

e. Pressurizer power operated relief valves PSV-455A and 456 and Main Steam system air operated relief valves CV-2210, 2230, 2250 and 2270 are not set pressure tested as required for relief valves by IWV-3510.

f. Several problems were noted regarding safety and relief valve test procedures. Procedure MP-5-1 for Pressurizer Safety Valves was not clear as to what constitutes an unacceptable test, who determines ultimate corrective action and what action is required (testing of additional valves). As found lift tests are not required to be performed for valves being repaired (September 1984 test of SV8010C). This defeats part of the purpose of Section XI testing; i.e., verification of operational readiness, and precludes taking corrective action to test additional valves if set pressure problems do exist.

In addition, this procedure and MP-12-15, which tests all other relief values except Main Steam reliefs, allow averaging of lift test values to determine acceptability. This approach would allow two tests, both outside of the specified set pressure tolerance, to be averaged to make a satisfactory test. The ASME Performance Test Code PTC 25.3-1976 which details the requirements for relief/safety valve testing does not address test averaging. ANSI/ASME OM-1-1981, "Requirements for Inservice Performance Testing of Nuclear Power Plant Pressure Relief Devices", requires "a minimum of two consecutive openings within Code tolerance" to demonstrate satisfactory repeatability.

Individually the above findings are not of great significance, but collectively they indicte that IST program procedures need to be reviewed to assure that all requirements of the IST program are being properly addressed.

The licensee agreed to investigate the above findings to determine what actions need to be taken. Pending completion of the licensee's review, these apparent discrepancies between site procedures and the ASME Code and Licensee commitments will be identified as Unresolved Item (50-344/85-20-01) and will be examined on future inspections.

4. IST Records

Various types of IST records for pumps and valves were examined for conformance to Code and site procedural requirements. The inspectors noted significant and continuing improvements in the overall program conformance to requirements and commitments and in the overall test documentation in the last 18 months. For example, during 1982 and 1983, there were no pump test status and corrective action summaries as required by Code. Also, prior to 1984 the specified acceptance criteria for pump tests did not conform with Code guidelines and no justification was provided. This condition was identified, evaluated and corrective action taken by the new PTE in January 1984.

In general, the inspectors considered that the documentation of corrective action, results of the action and the closeout of unsatisfactory pump and valve IST results need to be improved to provide clear traceable records. In addition, licensee evaluation and improvement of the pump and relief valve test programs appears necessary.

Following are discussions of the specific inspection areas and observations for the review of pump and valve IST records:

a. Pumps

The inspectors consider that the overall program for inservice testing of pumps needs to be analyzed and upgraded to assure that accurate and complete information required by Section XI is provided. The following observations contribute to this general concern:

(1) In 1983, the results of over 70 pump tests were in the alert or action range. Although fewer unsatisfactory test results have been recorded since 1983, the number is still high. Constantly placing pumps in an alert or action status can lead to a desensitizing of personnel to test results being outside a "normal" range and possibly affect performance of necessary in depth evaluations and corrective actions.

(2) It appears that, in general, reference values are reestablished more frequently than normally observed and at times the new values are not representative of normal pump performance. For example, the new reference value for flow on RHR pump "A" established April 25, 1985 was the second highest flow rate recorded for this pump in the last 20 tests. Conversely, repeated tests of Service Water Booster, Boric Acid and Diesel Oil Transfer, Service Water and Auxiliary Feedwater pumps were high for differential pressure and were accepted by the PTE based on pump curve analysis. PTE written comments included

"low baseline" values. However, new reference values were not established in these cases. Uncharacteristically low reference values would tend to mask pump degradation. The reasons and justifications for reestablishing new reference values and applicable ranges are often not listed or specific.

(3) The RHR pumps have not been operating at proper levels since 1982. Twenty-one of 40 tests on pump "A" have been unsatisfactory, with eight tests in the "action" range. Actions taken to evaluate and resolve this problem are still continuing and no effective plan to promptly and decisively settle this issue is apparent.

(4) Problems with repeatability of tests and/or with meeting operability limits for the Boric Acid Transfer and Diesel Oil Transfer Pumps indicate possible procedural or instrumentation problems. The Diesel Oil Transfer pumps are operating at less than 50 percent of the manufacturers pump curve. Test report summaries by the PTE and PET 9-4-DB reports often contain references to "history of non-repeatability" and "historical instrument drift" and acceptance is repeatedly made based on pump curve analysis.

The pump test program needs a thorough engineering review to assure that the test procedures and existing instrumentation are providing the level of information needed. The findings identified in paragraphs 3a and b of this report are also related to this problem. The review should also include the appropriateness of existing reference values and acceptance ranges.

The inspectors selected approximately 20 instruments used during IST to verify range, accuracy and calibration records. In addition to the problem with instrument range noted in paragraph 3.a. of this report, the inspectors found that gauge FI 2066 which has a two year calibration interval had last been calibrated on November 10, 1982. Numerous "Out of Calibration" (OOC) Investigation forms had been generated by Maintenance. These forms require disposition by Engineering. Sixteen were over one year old and had not yet been dispositioned. Many of these OOC's dated back to 1984, e.g., Auxiliary Feedwater Pump Suction pressure gauge out of calibration August 17, 1984. Prompt evaluation of OOC's is necessary to determine if instrumentation errors could have affected surveillance tests and operability determinations.

b. Valves

Test records for approximately 20 power operated valves were selected at random to verify that stroke times, test frequencies and necessary corrective action conformed to Code and procedural requirements. Two discrepancies were noted.

(1) The stroke time of valve CV-3004D2 was unsatisfactory on the November 1983 test. When the valve was cycled again, the stroke time was just at the upper limit of 15 seconds. This

second test was accepted by the PTE. Subsequently, this valve would not open at all on the first attempt during the next quarterly test. Valve stroke tests must be evaluated and on the first attempt only to assure that results are effective for emergency condition operation.

(2) The April 1985 stroke times for HCV-606 and 607 appear to have exceeded the limit 125% of previous time, detailed in Section XI, Subsection IWV-3417. Test records do not show any documentation of this deviation, or the Code required corrective action, to increase test frequencies.

Test results were examined for valves addressed in the March 14, 1984 SER paragraphs II.C.4, 5, 8, 9, 10 and 15 for which NRR invoked additional requirements. One problem was noted. The partial stroke test of SI-8956A through D is to be performed at each cold shutdown (not more frequently than 3 months) per the Program Plan. No test results exist for valves A, B and D from 1/25/83 through 4/29/84 although the plant was in cold shutdown mode until July 11, 1983 and the "C" valve was tested in July 1983. Other tests and results examined were in conformance with requirements.

The records related to the testing of all 54 IST program relief and safety valves were examined. In addition to the concerns discussed in paragraph 3.f of this report, several problems were noted. Subsection IWV-3513 requires additional valves in a system to be tested if any valve fails. When Pressurizer safety valve PSV-8010C failed high on August 19, 1982 no additional tests were performed until a new PSV-8010B valve was tested acceptable on November 7, 1982. Pressurizer Safety Valve PSV-8010A was tested acceptable later on January 26, 1983. Component Cooling Water (CCW) System valve PSV-3323A failed a test in 1985 but companion valve PSV-3323B was not tested. It is noted that both of these valves had failed their only earlier lift tests in 1983. In addition, the Residual Heat Removal (RHR) system has four relief valves. During testing two valves (PSV-8709 & PSV-8856B) failed in 1982, one valve (PSV-8856A) failed in 1983 and two valves (PSV-8708 & PSV-8856B) failed in 1984, without additional valves being tested.

Unsatisfactory relief/safety valve tests and required corrective actions are not documented in any clear, formal manner. The standard IST failure documentation, form PET 9-4DB, is not used. In general, relief valve test documentation was found to be fragmented and hard to retrieve from the files.

The failure to perform relief/safety valve testing as required by the ASME Code is an apparent violation of paragraph 4.0.5 of the Trojan Nuclear Plant Technical Specifications (50-344/85-20-02). The overall adequacy of the pump testing program is considered part

of Unresolved Item (50-344/85-20-01) and will be evaluated during a future inspection.

5. QA Activities

Quality assurance personnel were interviewed and audit or surveillance schedules were examined to determine QA activity related to IST. Specific IST audits or surveillances have not been performed since 1981. Surveillances of Relief Valve testing activities were scheduled for July 1985.

6. Exit Meeting

On June 21, 1985, an exit meeting was conducted with the licensee representatives identified in paragraph 1. The inspector summarized the scope of the inspection and findings as described in this report. The licensee committed to review the concerns identified with the IST program and take remedial action as required.