

U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No. 50-344/85-16

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: May 14 - July 1, 1985

Inspectors:

S. A. Richards  
S. A. Richards  
Senior Resident Inspector

7-18-85  
Date Signed

G. C. Kellund  
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Resident Inspector

7-18-85  
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Approved By:

R. T. Dodds  
R. T. Dodds, Chief  
Reactor Projects Section 1

7/19/85  
Date Signed

Summary:

Inspection on May 14 - July 1, 1985 (Report 50-344/85-16)

Areas Inspected: Routine inspection of operational safety verification, corrective action, maintenance, surveillance, followup on previous inspection items, observation and review of refueling activities, evaluation of preparations for plant startup following the refueling outage, review of selected system modifications, and inspection of various aspects of plant operation. The inspection involved 305 inspector-hours by the two NRC Resident Inspectors.

Results: Two violations of NRC requirements were identified.

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## DETAILS

### 1. Persons Contacted

\*W.S. Orser, Plant General Manager  
R.P. Schmitt, Manager, Operations and Maintenance  
D.R. Keuter, Manager, Technical Services  
J.D. Reid, Manager, Plant Services  
R.E. Susee, Operations Supervisor  
D.W. Swan, Maintenance Supervisor  
A.S. Cohlmeier, Engineering Supervisor  
G.L. Rich, Chemistry Supervisor  
T.O. Meek, Radiation Protection Supervisor  
S.B. Nichols, Training Supervisor  
D.L. Bennett, Control and Electrical Supervisor  
P.A. Morton, Quality Assurance Supervisor  
R.W. Ritschard, Security Supervisor  
H.E. Rosenbach, Material Control Supervisor  
J.K. Aldersebaes, Manager, Nuclear Maint. and Construction

The inspectors also interviewed and talked with other licensee employees during the course of the inspection. These included shift supervisors, reactor and auxiliary operators, maintenance personnel, plant technicians and engineers, and quality assurance personnel.

\*Denotes those attending the exit interview.

### 2. Operational Safety Verification

During this inspection period, the inspectors observed and examined activities to verify the operational safety of the licensee's facility. The observations and examinations of those activities were conducted on a daily, weekly, or biweekly basis.

On a daily basis, the inspectors observed control room activities to verify the licensee's adherence to limiting conditions for operations as prescribed in the facility technical specifications. Logs, instrumentation, recorder traces, and other operational records were examined to obtain information on plant conditions, trends, and compliance with regulations. On occasions when a shift turnover was in progress, the turnover of information on plant status was observed to determine that all pertinent information was relayed to the oncoming shift.

During each week, the inspectors toured the accessible areas of the facility to observe the following items:

- a. General plant and equipment conditions.
- b. Maintenance requests and repairs.
- c. Fire hazards and fire fighting equipment.
- d. Ignition sources and flammable material control.
- e. Conduct of activities in accordance with the licensee's administrative controls and approved procedures.

- f. Interiors of electrical and control panels.
- g. Implementation of the licensee's physical security plan.
- h. Radiation protection controls.
- i. Plant housekeeping and cleanliness.
- j. Radioactive waste systems.

The licensee's equipment clearance control was examined weekly by the inspectors to determine that the licensee complied with technical specification limiting conditions for operation with respect to removal of equipment from service. Active clearances were spot-checked to ensure that their issuance was consistent with plant status and maintenance evolutions.

During each week, the inspectors conversed with operators in the control room, and with other plant personnel. The discussions centered on pertinent topics relating to general plant conditions, procedures, security, training, and other topics aligned with the work activities involved.

The inspectors examined the licensee's nonconformance reports (NCR) to confirm that deficiencies were identified and tracked by the system. Identified nonconformances were being tracked and followed to the completion of corrective action. NCRs reviewed during this inspection period included 85-020, 85-028, and 85-057.

Logs of jumpers, bypasses, caution, and test tags were examined by the inspectors. Implementation of radiation protection controls was verified by observing portions of area surveys being performed, when possible, and by examining radiation work permits currently in effect to see that prescribed clothing and instrumentation were available and used. Radiation protection instruments were also examined to verify operability and calibration status.

During this inspection period, the plant remained in a refueling status, therefore, the requirements for operable safety systems was minimal. The inspectors routinely verified that the technical specification requirements for refueling operations were being met with regard to reactivity control, containment integrity, power availability, and decay heat removal capability.

No violations or deviations were identified.

### 3. Corrective Action

The inspectors examined facility records to verify that quality related deficiencies were identified and reported to cognizant management for resolution. Records examined by the inspectors included Requests for Evaluation, Possible Reportable Occurrences, Plant Review Board meeting minutes, and Quality Assurance Program Nonconformance Reports. Plant Review Board meetings were attended by the inspectors on May 30 and June 13.

No violations or deviations were identified.

#### 4. Maintenance

Maintenance activities involving preventive and corrective maintenance were observed by the inspectors during the inspection period. On a selective basis, observations by the inspectors verified that proper approvals, system clearances, and required prerequisites were performed, as appropriate, prior to maintenance on safety-related systems or components. The inspectors verified that qualified personnel performed the maintenance using appropriate maintenance procedures. When possible, replacement parts were examined to determine the proper certification of materials, workmanship and tests. During the actual performance of the maintenance activity, the inspectors checked for proper radiological controls and housekeeping, as appropriate. Upon completion of the maintenance activity, the inspectors verified when possible, that the component or system was properly tested prior to returning the system or component to service. During the inspection period, maintenance activities observed were associated with various aspects of refueling activities including preparations for fuel movement and securing the containment following fuel reload, and with calibration of the auxiliary feedwater flow instruments.

No violations or deviations were identified.

#### 5. Surveillance

The surveillance testing of safety-related systems was witnessed by the inspectors. Observations by the inspectors included verification that proper procedures were used, test instrumentation was calibrated and that the system or component being tested was properly removed from service if required by the test procedure. Following completion of the surveillance tests, the inspectors verified that the test results met the acceptance criteria of the technical specifications and were reviewed by cognizant licensee personnel. The inspectors also verified that corrective action was initiated, if required, to determine the cause for any unacceptable test results and to restore the system or component to an operable status consistent with the technical specification requirements. Surveillance tests witnessed during the inspection period were associated with hydraulic snubber testing, calibration of a source range instrument, testing of an emergency diesel generator, and verification of rated flow through a containment spray pump suction check valve.

No violations or deviations were identified.

#### 6. Followup On Previous Inspection Items

Violation 84-29-02 (Closed): Failure to periodically check the proper operation of time delay relays. The licensee has implemented Maintenance Procedure 1-17, "Time Delay Devices." This procedure requires that all safety-related time delay relays be checked for proper operation at a scheduled frequency. Further details of the inspector's review of this program is contained in paragraph 9 of this report.

Violation 84-29-03 (Closed): Inattentiveness to reactor controls resulting in the lifting of four main steam line safety valves. The



licensee has instituted several measures to improve operating crew performance. Operations manning levels have been increased to allow a six crew shift rotation with increased operator training. Control of personnel access to the control room has been enhanced to reduce operator distractions. Administration of equipment tagging has been removed from the control room during the day shift. In addition, management guidance has been provided to operations personnel and to the shift technical advisors with regard to their responsibilities during both routine operations and events. Following plant recovery from the operational events of September, 1984, the plant operated in a relatively uneventful manner for the remainder of cycle seven.

Unresolved Item 84-21-01 (Closed): Installation of the auxiliary feedwater system battery. The inspectors reviewed pipe support drawing HBD-72-56-H6 and verified that the attachment of the battery rack leg to the diesel fuel line pipe support was properly documented.

Licensee Event Report (LER) 85-03 (Closed): Inadvertent safety injection due to circuit failure. The inspector discussed this event with the Instrumentation and Control Supervisor and verified that the root cause of the event was the electronic failure of a pressurizer low pressure bistable. The faulted bistable has been replaced.

## 7. Refueling Outage Activities

The plant remained in a refueling outage for the entire duration of this inspection period. Major evolutions being conducted by the licensee during the outage included:

- core refueling with replacement of 40 fuel assemblies
- 10 year inservice inspection of the reactor vessel
- steam generator eddy current testing
- steam generator sludge lancing
- turbine generator inspection
- containment local leak rate testing
- replacement of selected sections of secondary system piping due to pipe wall thinning
- replacement of selected feedwater heaters
- safety-related snubber surveillance testing
- modification of the reactor trip breakers
- various modifications to meet environmental qualification requirements
- various modifications for fire protection (Appendix R to 10 CFR 50)
- technical specification surveillances with refueling outage frequencies

The inspectors followed the progress of the outage activities by attending the licensee's daily morning meeting. At this meeting, the status of all major work items was summarized by the supervisors and managers responsible for the work. The inspectors made frequent tours of the plant, including the containment building, and witnessed portions of refueling activities in progress.

Due to a recent technical specification change, the licensee was required, for the first time, to inspect and functionally check a percentage of the safety related snubbers during the outage. The

snubbers are divided into two basic categories, hydraulic and mechanical. The licensee has only 20 hydraulic snubbers, all of which are of large capacity and are installed on the steam generators and the main steam lines. Initial functional testing of two hydraulic snubbers resulted in both failing. Based on these failures, the licensee elected to rebuild all 20 hydraulic snubbers. Each hydraulic snubber was also successfully functionally tested prior to reinstalling it in the plant. Functional testing of the mechanical snubbers also resulted in a number of failures. Based on these failures, the licensee increased the scope of the inspections as required by technical specifications. The inspectors witnessed portions of testing both hydraulic and mechanical snubbers.

In response to concerns raised with regard to the proper assembly of compression fitting used in the fabrication of instrumentation sensing lines, the licensee implemented an inspection program to check selected safety related fittings. The initial results of this program indicated that a relatively high percentage of the fittings inspected were not assembled in accordance with the vendor's recommended practice. The majority of the discrepancies were associated with the fitting not being engaged the correct number of turns. A review of the results also indicated that fittings which were found not properly assembled were from initial plant construction and not due to recent plant modifications. Based on these inspection results, the licensee has increased the scope of the program which will continue after the completion of the outage. The inspectors concluded that the licensee's actions in this area have been appropriate. The inspectors will further review the scope and results of this program in a later inspection report.

While performing a local leak rate test (LLRT) of containment penetration P-50, the 'B' train containment recirculation suction line, the licensee discovered that a test connection located on top of the line outside of containment had a thru wall crack. This line is not normally in service or pressurized. An analysis of the failure by the licensee indicated that the test connection had failed as a result of cyclic fatigue. An inspection of other test connections on containment penetrations revealed no other indications of potential failures. The cracked test connection was repaired and successfully passed an LLRT. The licensee has submitted a 30 day report to the NRC documenting this occurrence. The resident inspectors will complete their followup of this item as part of the routine licensee event report inspection process.

As discussed in paragraph 10 of inspection report 85-13, the inspectors had questioned the validity of licensee's determination of the minimum acceptable performance of the residual heat removal (RHR) pumps. During the outage, the licensee ascertained that their original analysis was in error. To resolve the immediate question of pump acceptability prior to restart of the plant, the licensee contracted the Westinghouse Corporation to perform an ECCS analysis assuming a reduction in pump performance beyond that previously considered. The Westinghouse analysis verified that the net effect on core cooling was minimal and that the RHR pump performance was acceptable. Based on this information, the inspectors concluded that a safety concern regarding the RHR pump performance did not exist. The inspectors will followup on the

circumstances surrounding the licensee's determination of an invalid acceptability limit.

During routine work in a control room panel, a licensee craftsman noted that a termination to a contact on a manual safety injection switch was broken with the broken wire covered by tape. The functional result of this broken wire was that should a manual safety injection have been initiated with the switch, one of two reactor trip breakers would not have opened as a direct result of the switch. No automatic safety functions were affected and the manual reactor trip switch, located next to the safety injection switch, remained capable of opening both reactor trip breakers. Additionally, both trip breakers would open on a manual safety injection if the plant was above 10 percent power due to the main turbine being tripped. The licensee attempted to determine by review of work records and discussions with employees who may have been responsible for the problem. The switch had been last functionally tested in February, 1984. The licensee has been unable to identify any activities since that time which could have been related to the problem. The switch was repaired and the other safety injection switch and the reactor trip switches were inspected for similar problems with negative results.

The inspectors discussed the significance of this event with the plant general manager. The inspectors commented that although the safety significance in this instance was small, the fact that an individual was aware of the problem, as evidenced by the tape on the wire, and apparently had not reported the problem to plant supervision was of concern. The plant manager acknowledged this observation.

No violations or deviations were identified.

#### 8. Ready For Startup Program

For the plant recovery from the refueling outage, the licensee has implemented a "Ready for Startup" program. This program is outlined by Administrative Procedure A0-3-25. The program requires individual managers and supervisors to review their assigned areas and determine whether the plant is properly prepared to return to power operation. The individual reviewing any given area is required to fill out a form and list any outstanding exceptions which need consideration for plant recovery. Approximately 22 separate categories are considered. The evaluations for each category are filed in a ready for startup notebook which is then used by plant management to maintain an overall understanding of the plant status. The notebook is updated as open items are cleared or resolved, and is factored in to the plant general manager's decision to allow the facility to commence heatup and critical operation.

The licensee held several meetings with all supervisory personnel in attendance to discuss management expectations of the program and the status of each area under review. An inspector attended the meetings held on June 21, 28, and 29. The inspectors also reviewed the ready for startup notebook and discussed the program with various personnel involved. The program appeared to be very effective in tracking the



status of a large number of diverse areas which relate to readiness of the plant to operate.

In addition to this program, the licensee has implemented several other actions to aid in a trouble-free recovery from the outage. Management personnel are assigned to provide coverage during critical steps in the recovery. The operating crews will be reporting onsite early to allow for pre-shift briefings prior to important evolutions and all operators will complete a formal training class on major outage modifications prior to the startup.

The implementation of this program was audited by the corporate quality assurance organization while the program was in progress. Their comments and those of supervisory personnel will be factored into a revision of the program for next year's outage. At the conclusion of this inspection period, the plant had basically resolved all major outstanding items and was preparing to heatup.

No violations or deviations were identified.

9. Followup On Equipment Modifications For September 20, 1984 Event

While attempting to return the unit to operation following the 1984 refueling outage, the plant experienced a reactor trip and safety injection, during which both safety related auxiliary feedwater (AFW) pumps and one emergency diesel generator (EDG) failed to function as expected. The licensee committed to review the circumstances surrounding each failure and take corrective action as necessary. The licensee has completed their review.

At the time of the event, the licensee determined that the diesel AFW pump had not operated properly because a time delay relay in the control circuitry was not correctly set. As long term corrective action, the licensee implemented a program to periodically check the settings of time delay devices. The inspectors reviewed this program and the results of the first set of checks and found the program to be effective. The licensee has identified a number of discrepancies in the initial program and is working to correct these. Additionally, the licensee has commenced tacking the setting dial of the relays in place with a locking paste. This prevents inadvertent movement of the dial.

The licensee found two problems associated with the EDGs. First, the unit technical specifications require that the crankcase high pressure trip be disabled on an automatic start. The control circuitry was found not to function in this manner. The licensee modified the trip with request for design change (RDC) 83-053. Their review also found that the EDG "fail to start" function was not overridden. The licensee has determined that this function should remain operable during an automatic start and has requested the NRC Division of Nuclear Reactor Regulation to revise the technical specifications in this area. The second problem noted was that new vibration dampers placed on the EDGs were causing oil splash to erroneously trip the crankcase pressure switches on manual starts. The licensee has installed splash guards on the pressure switches to correct this problem.



With regard to the steam driven AFW pump, the licensee addressed the problems of the pump control oscillations and the pump suction transmitter failure. Immediately after the event, the licensee modified the snubbing orifice on the discharge pressure sensing line. This action corrected the pump oscillations. No obvious problem was observed with the suction pressure transmitter, therefore, the licensee agreed to perform a design review of the instrument installation. As an interim corrective measure, the licensee has increased the frequency of calibration of the instrument and checks the control room indication daily for correct operation.

The licensee's design review was completed during this inspection period. The review considered the instrument location, the sensing line arrangement, the transmitter mounting, the environmental conditions, the transmitter design, and the possibility of mechanical vibrations or hydraulic transients. The review was unable to identify the cause of the transmitter failures, however, in light of the past problems with the transmitter, the review recommends that the unit be replaced with a more recent state of the art design.

No deviations or violations were identified.

#### 10. Request For Design Change (RDC) Review

During the outage, the inspectors selected several design changes to review for proper implementation. The design changes were associated with the following activities:

- Modification of the incore instrumentation seal table
- Installation of a shunt trip feature on the reactor trip breakers
- Installation of a control circuit decouple switch on the 'B' train EDG
- Modification of systems associated with the boron injection tank to reflect the reduction of boron to 0 ppm in the tank.

The inspectors reviewed the documentation packages associated with each job and observed completed work when possible. The inspectors will continue their efforts in this area with reviews of completed work packages and testing documentation.

No significant problems were noted, however, discussions with licensee personnel and review of design documentation indicated that a significant amount of difficulty with the installation of the EDG decoupler switch resulted due to problems with the accuracy of the vendor drawings which describe the point-to-point wiring of the EDG control panels. Problems with the accuracy of vendor drawings has previously been discussed with the licensee and documented in inspection report 85-04. In discussions with the plant general manager, he acknowledged that the plant's experience with this modification tended to verify that problems exist with vendor drawings. He further noted that correction of this type of drawings has been given a high priority by the corporate office.

No violations or deviations were identified.

#### 11. Spent Fuel Pool Rerack Documentation

As part of a continuing effort to monitor the work associated with increasing the capacity of the spent fuel pool (SFP), the inspectors reviewed selected sections of the documentation of the work, which has now been completed. The inspectors' review indicated the following:

- One rack did not meet the acceptance criteria for spacing between the top of the rack and the pool wall. The rack is too close by 3/16 inch.
- Four racks were not annotated as acceptable by the action engineer although they did not meet the acceptance criteria for levelness. The procedure allowed the action engineer to accept each rack on a case-by-case basis.
- The testing procedure was revised to drag test only 60 cells with the racks in the pool although the PGE topical report stated that a minimum of 76 cells would be tested.
- The PGE topical report and the installation procedure were in conflict with regard to acceptable spacing between racks and between racks and the wall.
- Four racks were not signed off as having had the second set of four rack feet screwed down into proper contact by the divers who worked on the job.

The inspectors discussed these discrepancies with the responsible licensee personnel. The licensee has initiated action in each case to correct the problem. The inspectors were particularly concerned with regard to the verification of the proper positioning of the rack feet. The licensee reviewed their work records and contacted the contractor who had provided diving services for the job. Based on this effort, the licensee concluded that the rack feet were properly installed. The inspectors concurred with the licensee's determination, however, the inspectors concluded that the licensee's failure to properly document the work activity, as required by procedure, was an apparent violation (344/85-16-01).

At the conclusion of the inspection period, the inspectors discussed with the plant general manager the importance of licensee personnel properly documenting their work. The inspectors noted that further reviews by licensee personnel may have identified the deficiencies observed by the inspectors, however in view of the fact that the SFP racks were basically in service, the inspectors felt that these deficiencies should have been addressed at the time the job was complete.

## 12. Miscellaneous Observations

While making a tour of the reactor containment on June 28, with the plant in mode 5 and making preparations to heatup, the inspectors noted a danger tag hanging on a drain line valve off the 'B' train containment spray header. The tag indicated that the valve was open and the inspectors observed that the drain cap was removed. Because of the plant's intentions to commence heatup, this condition did not appear appropriate. The inspectors reviewed the clearance log and observed that the log indicated that the tag, tag number 4 of clearance 85-1066, had been removed and the valve properly positioned. The inspectors immediately informed the shift supervisor and plant supervision of the problem. The inspectors observed several factors that could have caused

the problem. The clearance sheet did not state clearly the train that the tag was associated with in describing the tag location. Further, check valves, test connections, drains, and vents at Trojan are not normally designated by number. Therefore, when describing the location of the tag for such a valve, the location is referenced to a nearby reference valve. This obviously lends itself to the potential for error on the part of the individual hanging or removing a tag. Additionally, if a tag is located inside containment, such as in this case, the individual looking for the valve may not have the clearance sheet with him as an aid in finding the valve. The inspectors concluded that failure to control the clearance as required by plant safety procedure PS-3-30, "Trojan Holdout and Tagging Procedure", is an apparent violation (344/85-16-02). The inspectors discussed this occurrence with the plant general manager in relation to the licensee's ongoing consideration of independent verification of activities at the plant.

The inspectors noted that the pressurizer pressure instruments are located inside containment in such a manner that approximately 20 psi static head of water is contained in the sensing line between the pressurizer vapor space tap and the instrument. The inspectors questioned whether the instruments were properly biased to account for this head of water. The licensee's review determined that the instruments are required to be adjusted to account for the static head and that this had not been considered since initial plant operation. The licensee also determined that interim operation with the instruments "as is" is acceptable from a safety consideration and has documented this conclusion via a safety evaluation. The licensee intends to adjust the instruments at the first available opportunity. This item will be further followed and is considered unresolved (344/85-16-03).

The inspectors noted that the licensee's local leak rate test (LLRT) of the fuel transfer tube does not pressurize the outer tube although the tube contains expansion bellows both inside and outside containment. The licensee's Nuclear Safety and Regulation Division felt that a test of this type was not required, however, they agreed to address this concern in a license change application to the NRC. This item will be followed by the inspectors (344/85-16-04).

During the course of the inspection period, the inspectors noted five pipe hangers or supports which were not properly made up. The discrepancies were all associated with 2 inch pipe or smaller and in only one case did a support appear to be nonfunctional. The systems involved were the safety injection system and a containment penetration isolation valve associated with the containment atmospheric sampling system. Other examples of pipe support discrepancies have been documented in previous reports. The inspectors discussed these observations with the plant general manager. The inspectors judged that the discrepancies noted would not affect overall system operability, however, it appeared to indicate a need for the licensee to sensitize their personnel to the importance of maintaining the plant in conformance with design, including small bore pipe hangers. The plant manager stated that he would address this issue with site maintenance and modifications personnel.

### 13. Unresolved Item

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, violations, or deviations. An unresolved item disclosed during the inspection is discussed in paragraph 12.

14. Exit Interview

The inspectors met with the plant general manager at the conclusion of the inspection period. During this meeting, the inspectors summarized the scope and findings of the inspection.