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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

April 23, 1980

Docket No. 50-344

Mr. Charles Goodwin, Jr.
Assistant Vice President
Portland General Electric Co.
121 S.W. Salmon Street
Portland, Oregon 97204

Dear Mr. Goodwin:

Enclosed for your information is the staff's evaluation of the actions you have taken to satisfy the TMI Lessons Learned Category "A" items on Trojan. This evaluation is based on your submitted documentation and the discussions between our staffs on March 24, 1980. A list of participants in the March discussions is also attached.

We conclude that you have satisfied all Category "A" requirements. Certain items, such as the adequacy of procedures, will be verified by the Office of Inspection and Enforcement. These items are indicated in an attachment to the evaluation.

This evaluation does not address the Technical Specifications necessary to ensure the limiting conditions for operation and the long-term operability surveillance requirements for the systems modified during the Category "A" review. You should be considering the proposal of such Technical Specifications. We will be in communication with you on this item in the near future.

Sincerely,

A. Schwencer

A. Schwencer, Chief
Operating Reactors Branch No. 1
Division of Operating Reactors

Enclosures:
1. Evaluation of Compliance with Category "A" Lessons Learned Requirements
2. Attendance List, March 24, 1980 Meeting

cc: See Page 2

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ENCLOSURE 1

EVALUATION OF LICENSEE'S COMPLIANCE WITH CATEGORY "A" ITEMS OF NRC RECOMMENDATIONS RESULTING FROM TMI-2 LESSONS LEARNED

PORTLAND GENERAL ELECTRIC COMPANY
TROJAN

DOCKET NO. 50-344

Date: April, 1980

I. INTRODUCTION

By letters dated October 17[1], November 20[2], 26[3], December 7[4], 14[5], 20[6], 31[7], 1979, January 2[8], February 4[9], and April 15[10], 1980, Portland General Electric Company (licensee) submitted commitments and documentation of actions taken at Trojan Nuclear Plant to implement our requirements resulting from TMI-2 Lessons Learned. To expedite our review of the licensee's actions, members of the staff had discussions with the licensee on March 24, 1980. This report is an evaluation of the licensee's efforts to implement each Category "A" item which was to have been completed by January 1980.

II. EVALUATION

Each of the Category "A" requirements applicable to PWRs is identified below. The staff's requirements are set forth in Reference 11; the acceptance criteria is documented in Reference 12. The numbered designation of each item is consistent with the identifications used in NUREG-0578. Lessons Learned items 2.1.7.a and 2.1.9 are being reviewed separately and are not addressed in this report.

2.1.1 EMERGENCY POWER SUPPLY

Pressurizer Heater

The Westinghouse Owner's Group analysis has determined that the minimum requirements to maintain subcooling, in a four loop plant with a pressurizer volume of 1800 cubic feet is 150 kw of heater capacity. Furthermore, the analysis demonstrated that the RCS heat capacity is such that adequate subcooling would be maintained in the RCS for up to 4 hours without heat input from the pressurizer heaters.

The current Trojan design has 26 heaters with a capacity of 69 kw each, which are evenly divided into each bus. One train of power supply is adequate to supply 150 kw. The power and control circuits for the pressurizer heaters are supplied from the nonsafety-related 480V load centers B09 and B10. However, all pressurizer heaters (backup and control groups) can be manually connected to the emergency diesel generators through 4 kv switchgear. The manual connection can be completed within the necessary time period for providing heat input from the pressurizer heaters.

Emergency instructions for manual connection of pressurizer heaters to the emergency buses and associated operator training have been implemented. These instructions require the operator to manually connect at least 150 kw of heater capacity to an emergency bus if a loss of offsite power cannot be restored to the pressurizer within 60 minutes.

The existing electrical distribution system that enables the operator to manually connect the pressurizer heaters to the emergency buses is qualified to safety requirements.

The licensee has satisfied the short term Lessons Learned requirements for pressurizer heaters.

Pressurizer Relief and Block Valves and Pressurizer Level Indicators

Two power-operated relief valves (PORVs) for the pressurizer are pneumatically operated from the instrument air system upon actuation of solenoid control valves. An instrument air accumulator for each PORV is located in the containment and provides approximately 30 stored valve operations for each valve. The solenoid valves for the two PORVs are energized from separate 125 volt plant batteries.

The block valves (motor operated) for the PORVs are energized from redundant emergency buses which are fed from diesel generators A and B automatically upon loss of offsite power.

The PORVs and their associated block valves are connected to the emergency sources of power through safety grade circuit breakers. The design of the PORVs and block valves are such that they can be opened or closed in the event of loss of offsite power.

Three pressurizer level transmitter instrument channels indicate level in the control room. Each of these level instrument channels is independently powered from a different emergency instrument bus. These instrument buses can be supplied by the offsite power source or the emergency power source when offsite power is unavailable.

The licensee has satisfied the short term Lessons Learned requirements of emergency power supplies for the pressurizer power-operated relief valves/block valves and pressurizer level indicators.

2.1.2 PERFORMANCE TESTING FOR PWR RELIEF AND SAFETY VALVES

NUREG-0578 requires that PWR licensees shall functionally test the reactor coolant system relief and safety valves to demonstrate operability under expected operating conditions. The Category "A" requirement is for the licensee to commit to perform an appropriate test program.

Portland General Electric has referenced the Electric Power Research Institute's (EPRI), "Program Plan for the Performance Verification of PWR Safety/Relief Valves and Systems," as the program description and schedule to meet staff requirements, which is acceptable.

2.1.3.a DIRECT INDICATION OF POWER OPERATED RELIEF VALVES AND SAFETY VALVES FOR PWRs

NUREG-0578 requires PWR licensees to provide positive position indication for reactor coolant system relief and safety valves.

Portland General Electric is using the existing stem mounted position indication on the power operated relief valves (PORVs) and has installed an acoustical system (designed by Technology for Energy Corp. (TEC)) to monitor the position of the safety valves.

The PORV position indication devices have been qualified consistent with the component or system to which they are attached. The acoustical monitoring system has been seismically and environmentally qualified with the exception of the display unit which is currently being qualified by the manufacturer (TEC).

Alarms are associated with the direct indicating devices both on the PORV and on the safety valve acoustic monitors.

Trojan is in compliance with short term Lessons Learned requirements.

OIE will verify that the backup methods of determining valve position in the emergency procedures are adequate.

2.1.3.b INSTRUMENTATION FOR INADEQUATE CORE COOLING

Portland General Electric has installed two primary coolant saturation meters designed by Westinghouse. Each meter consists of a calculator and continuous display in the control room and has as inputs eight core exit thermocouples (T/Cs), two from each core quadrant, eight resistance temperature detectors (RTDs), one from each hot and cold leg, and two wide range safety grade pressure sensors.

Each meter is powered from a vital instrument bus and alarms low margin to saturation in the control room.

The subcooling monitor installed at the Trojan Nuclear Plant meets the short-term Lessons Learned Requirements.

OIE will verify that the procedures to manually calculate subcooling using steam tables are adequate.

2.1.4 CONTAINMENT ISOLATION

All containment isolation valves (CIVs) in non-essential systems that were originally designed to close upon receipt of an automatic isolation signal meet the Lessons Learned position on diversity. Diversity is provided on these valves (with the exception of main steam isolation valves (MSIV)) by use of a safety injection signal, which has diverse input. Diverse parameters are used to initiate MSIV closure.

Portland General Electric has identified all essential and non-essential systems. A basis for selection of each essential system was provided.

Portland General Electric has identified several non-essential systems that are not automatically isolated by the containment isolation signals. They have submitted justification for all non-essential valves not on automatic isolation. The staff has determined that sufficient isolation provisions have been provided for all non-essential penetrations. No further actions are required.

Modifications have been completed to prevent automatic reopening of any containment isolation valve upon reset of the isolation signal. The modifications involved use of seal-in contacts to prevent the solenoid valve coils from re-energizing.

Trojan has no valve control switches which control the reopening of more than one valve.

Trojan is in compliance with short term Lessons Learned requirements for containment isolation provisions.

2.1.5.a DEDICATED H_2 CONTROL PENETRATIONS

This requirement does not apply to the licensee since recombiners located wholly within the containment are used.

2.1.5.c RECOMBINER PROCEDURES

The internal recombiners at the Trojan Nuclear Plant can be operated from the control room. Shielding requirements and personnel exposure limitations are therefore not applicable.

The H_2 control system used at the Trojan Nuclear Plant meets the short term Lessons Learned requirements.

2.1.6.a INTEGRITY OF SYSTEMS OUTSIDE CONTAINMENT

A leakage reduction program has been developed for Trojan. Leak rate estimates have been made and reported based on previous maintenance records. For those systems where leakage measurements are appropriately made during shutdown, leakage measurements will be made prior to return to power. For those systems where leakage measurements are appropriately made during operation, leakage measurements will be made and reported within 30 days of return to power. The program includes those systems needed during or following a transient (SI, RHR, CS, sampling, WGS and CVCS letdown, makeup, seal injection, demineralizers and holdup tanks).

A list of systems excluded was provided and justified. Inability to use any of the excluded systems would not preclude any option for cooling the core nor prevent the use of any safety system. A preventive maintenance program has been established including regular surveillance for leaks, periodic tests and repairs as soon as practical. Helium leak testing will be performed by qualified contractors so no special training or equipment is required. No leakage criteria are established, but Trojan is committed to keeping leakage as low as practical. Trojan is in compliance with these Lessons Learned requirements.

OIE will review the leakage control and test procedures, verify that leak rate measurements are reported as scheduled, and periodically inspect to ensure that leakage is kept as low as practical.

2.1.6.b DESIGN REVIEW OF PLANT SHIELDING AND ENVIRONMENTAL QUALIFICATION

A design review was conducted by the PGE using their versions of the ISOSHLD and RIBD computer codes. The NRC-specified source terms were used. All systems included in the 2.1.6.a program were considered as sources of radiation in the initial study but the need to limit the high level sources was manifested. The analysis was redone, reflecting provisions made to prevent high level sources from reaching the CVCS demineralizers and the waste gas systems. Vital areas were identified and their post-accident accessibility was assessed using the General Design Criteria 19 Dose limits. The control room and the onsite technical support center are adequately shielded for continuous occupancy but the need for modifications is 13 other areas was identified and a commitment was made to completing these modifications by January 1, 1981. An evaluation of the environmental qualification of safety equipment was performed. Most of the equipment (such as pump motors, pump shaft seals and valve motor operators) was adequately qualified but further evaluation of other items ("O" rings, solenoids, valve diaphrams and level switches) is in progress.

Trojan is committed to making any necessary changes in safety equipment by January 1, 1981. Trojan is in compliance with these Lessons Learned Requirements.

2.1.7.b AUXILIARY FEEDWATER FLOW INDICATION TO STEAM GENERATORS

The auxiliary feedwater flow systems, one for each of the four steam generators, indicate flow in the control room. The four instrument channels are powered from vital instrument bus Y13 which is inverter fed from station battery A. Two of the instrument flow channels (steam generators B and D) will be transferred to vital instrument bus Y24 (inverter fed from Battery B) during present refueling outage. Three narrow range steam generator water level instruments (energized from separate vital instrument buses) are provided for each steam generators. These level instruments read out in the control room to provide diversity and satisfy the single failure criterion.

The design of the auxiliary feedwater flow indication channels is such that on-line testing is a feature. The feedwater flow indications to each steam generator are tested during startup and shutdown, and calibrated every refueling outage. Each auxiliary feedwater flow channel provides an indication of feed flow with an accuracy of ± 2.5%.

The licensee has satisfied the short term Lessons Learned requirements for auxiliary feedwater flow indication to steam generators for PWRs.

REACTOR COOLANT SYSTEM VENT DESIGN

The licensee has provided the design of the reactor coolant system vent and has committed to meet all of the clarification points in the October 30 letter. We find the licensee's response acceptable.

2.1.8.a IMPROVED POST-ACCIDENT SAMPLING CAPABILITY

A design review has been conducted. Interim methods for post-accident sampling have been developed and will be implemented prior to return to power. Samples can be taken from both the reactor coolant and the containment atmosphere. Provisions have been made for prevention of overexposures in both sample collection and analysis. The containment atmosphere sample can be analyzed for radioisotopic composition and for hydrogen content. The reactor coolant sample can be analyzed for radioisotopic composition, boron content, pH and dissolved hydrogen. The analysis facilities are expected to be functional after an accident and a backup counting facility is provided. Trojan is in compliance with these Lessons Learned requirements.

OIE will review the post accident sampling procedures and verify that the modifications are completed as scheduled.

2.1.8.b INCREASED RANGE OF RADIATION MONITORS

Interim methods for monitoring high level releases have been developed and will be implemented prior to return to power. At Trojan, most releases would be through the auxiliary building vent. The other potential release points are the containment vent, the condenser air ejector and the steam line discharges. Noble gas releases from these points except the steam line will be monitored by fixed area radiation monitors. These monitors are AC powered with battery backup. The readouts are in low background areas near telephones for transmitting information to the control room. The steam line releases are monitored by taking and analyzing steam grab samples; readings can be obtained every 15 minutes using grab samples. Provisions are made for monitoring radioiodine and particulate releases, except from the steam lines. The effluents are passed through a filter and a silver zeolite cartridges. The filter media are analyzed with a multi-channel analyzer or Eberline SAM-II units. These interim methods meet the requirements for range, reading frequency and power supply reliability. Trojan will be in compliance with these Lessons Learned requirements.

OIE will review the effluent monitoring procedures and will verify that the instruments are installed prior to return to power.

2.1.8.c IMPROVED IN-PLANT IODINE INSTRUMENTATION

At Trojan air monitoring is performed with portable air samplers with the filter media analyzed with a multi-channel analyzer or SAM-II portable two channel analyzer. All vital areas can be monitored. The two channel analyzer can monitor iodine in the presence of noble gases and for increased capability silver zeolite cartridges are available. Procedures are in effect and personnel are trained in their use. The SAM-II units are portable and can be moved to low background areas if necessary. Trojan is in compliance with these Lessons Learned requirements.

OIE will review the air monitoring procedures and verify that the silver zeolite cartridges and the SAM-II units are available.

2.2.1.a SHIFT SUPERVISOR'S RESPONSIBILITIES

A letter from the Assistant Vice President for Thermal Plant Operations and Maintenance has been issued to the Trojan plant Management and Shift Supervisors. This letter emphasizes the Shift Supervisor's management responsibilities for safe operation of the plant and command duties which are now defined in the Trojan plant Administrative Order, AO-1-4. The Management Directive will be reissued annually.

Administrative Order AO-1-4 has been revised to clearly specify duties, responsibilities and authority of the Shift Supervisors and control room operators for the line of command and the command-decision authority. Particular emphasis is placed on the responsibility of the Shift Supervisor to maintain a broad perspective of operational conditions affecting the safety of the plant as a matter of highest priority at all times.

Administrative Order AO-3-8 has been revised to require that the shift supervisor remain in the control room at all times during accident conditions.

Indoctrination of the shift supervisors on the revised AOs to emphasize their responsibilities and their management functions for safe operation has been held.

Administrative functions that detract from or are subordinate to the management responsibilities for assuring safe operation of the plant have been delegated to other personnel not on duty in the control room.

The licensee is in compliance with all Lessons Learned requirements for this item.

OIE will verify that administrative orders AO-1-4 and AO-3-8 are in effect and that operating personnel are familiar with the new provisions for shift supervisor responsibilities.

2.2.1.b SHIFT TECHNICAL ADVISOR (STA)

The licensee has established a pool of plant engineering staff and other qualified graduate engineers to fill the role of STAs for the short term Lessons Learned requirement. The STAs are assigned on 24-hour shifts onsite and will be available in the control room within 10 minutes of being notified. The STA will remain in the control room during emergency conditions and act as an advisor to the shift supervisor. He will have no other duties which would detract from his primary function.

The STAs are assigned the responsibility for operating experience assessment as part of their routine duties.

The licensee is in compliance with Lessons Learned requirements for this item.

2.2.1.c SHIFT AND RELIEF TURNOVER PROCEDURES

The Trojan plant Administrative Order, AO-3-6, "Conduct of Operations and Shift Records" has been modified to specify that shift turnover checklists include all requirements of the Lessons Learned positions. Checklists are signed by both oncoming and offgoing shift supervisors.

Checklists of critical equipment and components have been provided for Auxiliary Building operators, Turbine Building operators and water plant operators.

The Trojan Plant QA audit program has been revised to require a periodic audit which evaluates the effectiveness of the AO-3-6 turnover procedure. This audit includes spot checks of critical system and parameter status during plant operation.

The licensee is in compliance with Lessons Learned requirements for this item.

OIE will review AO-3-6 and the Trojan QA audit program to verify that the provisions for shift turnover checklists are clearly specified and in force and that the QA audit program has been initiated to evaluate the effectiveness of shift turnover.

2.2.2.a CONTROL ROOM ACCESS

The licensee has revised administrative order AO-3-8 to explicitly state that the shift supervisor has the authority and responsibility to control access to the control room. The line of succession for the person in charge of the control room is specified and is limited to persons possessing a current senior operators license.

The licensee is in compliance with Lessons Learned requirements for this item.

OIE will review AO-3-8 and verify that the provisions for control room access are clearly stated and are in effect at the Trojan plant.

2.2.2.b ONSITE TECHNICAL SUPPORT CENTER

The administration building has been designated as the interim onsite technical support center (TSC) and is located onsite and immediately adjacent to, but just outside, the security fence. Technical data, including records that pertain to the as-built conditions and layout of structures, systems, and components, are available at the interim TSC. Interim plant procedures have been implemented which provide plans for staffing, personnel assignments and evacuation of the TSC.

Communications equipment installed at the interim TSC include an in-plant Executone, a commercial telephone, and a low- and high-band radio. A dedicated telephone circuit to the NRC is available in the Resident NRC Inspector's trailer adjacent to the Administration Building. The above communications equipment will allow the interim TSC to communicate with the control room, the Operational Support Center (OSC), the ECCS, Westinghouse and the NRC.

The interim TSC is equipped with portable radiation monitoring equipment for measuring both direct radiation and airborne radioactive contaminants. Action plans for evacuating the interim TSC are specified in plant operating parameters are transmitted by a TV camera in the control room to a TV monitor (black and white) in the TSC. The TV camera has the capability to pan, tilt and zoom in on the various panels in the control room. The control of this camera is from the TSC.

The licensee has satisfied the short term Lessons Learned requirements for onsite technical support center.

2.2.2.c ONSITE OPERATIONAL SUPPORT CENTER

The licensee has designated the area behind the main control boards at elevation 93 feet in the control building as the interim on-site operational support center. Communications equipment between this area and the control room presently exist. A procedure which describes the activation, manning, and use of the operational support center has been implemented.

The licensee has satisfied the short term Lessons Learned requirements for the onsite operational support center.

REFERENCES

1. Letter, C. Goodwin, Jr., PGE, to H. R. Denton, Director, NRR, Dated 10/17/79, transmitting response to NUREG-0578.

2. Letter, C. Goodwin, Jr., PGE, to H. R. Denton, Director, NRR, Dated 11/20/79, supplemental response to NUREG-0578.

3. Letter, C. Goodwin, Jr., PGE, to H. R. Denton, Director, NRR, Dated 11/26/79, transmitting information on auxiliary feedwater system.

4. Letter, C. Goodwin, Jr., PGE, to H. R. Denton, Director, NRR, Dated 12/7/79, supplemental response to NUREG-0578.

5. Letter, C. Goodwin, Jr., PGE, to H. R. Denton, Director, NRR, Dated 12/14/79, transmitting information on auxiliary feedwater system.

6. Letter, C. Goodwin, Jr., PGE, to A. Schwencer, Chief, ORB#1, Dated 12/20/79, transmitting information on containment isolation system.

7. Letter, C. Goodwin, Jr., PGE, to D. B. Eisenhut, Acting Director, DOR, Dated 12/31/79, transmitting information on auxiliary feedwater system.

8. Letter, C. Goodwin, Jr., PGE, to H. R. Denton, Director, NRR, Dated 1/2/80, supplemental response to NUREG-0578.

9. Letter, G. A. Zimmerman, PGE, to C. M. Trammell, ORB#1, Dated 12/20/79, transmitting information on auxiliary feedwater system.

10. Letter, Donald J. Broehl to H. R. Denton, Director, NRR, Dated 4/15/80, transmitting additional information on short term Lessons Learned.

11. NUREG-0578, "TMI Lessons Learned Task Force Status Report and Short Term Recommendations."

12. Letter, Harold R. Denton to All Operating Nuclear Power Plants, Dated 10/30/79, Discussion of Lessons Learned Short Term Requirements.

ENCLOSURE 2

ATTENDANCE

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Roger Yott	Portland General Electric
E. J. Williams	Portland General Electric
Dave Mitchum	Portland General Electric
Joe Palluco	Portland General Electric
Roger Wuecham	Portland General Electric
Dan Herborn	Portland General Electric
Alex Rollet	Portland General Electric
Carl Keufer	Portland General Electric
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