



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION V

1450 MARIA LANE, SUITE 210  
WALNUT CREEK, CALIFORNIA 94596

PDR

NOV 29 1989

Docket No. 50-344

Portland General Electric Company  
121 SW Salmon Street, TB-17  
Portland, Oregon 97204

Attention: Mr. David W. Cockfield  
Vice President, Nuclear

Gentlemen:

Thank you for your letter dated October 12, 1989, in response to our Notice of Violation and Inspection Report No. 50-344/89-09, dated August 29, 1989, informing us of your assessments and the steps you have taken to correct the items which we brought to your attention. Your assessments and corrective actions will be verified during a future inspection.

Your cooperation with us is appreciated.

Sincerely,

for

A. E. Chaffee, Deputy Director  
Division of Reactor Safety  
and Projects

11  
IEO1

NOV 29 1989

bcc w/copy of ltr. dated 10/12/89:  
Docket File  
Project Inspector  
Resident Inspector  
G. Cook  
A. Johnson  
B. Faulkenberry  
J. Martin  
J. Zollicoffer  
State of Oregon

bcc w/o copy of letter dated 10/12/89:  
M. Smith

REGION V *W*  
MMendonca/jg      AChaffee *W*  
10 /19 /89            11 /29 /89

REQUEST COPY	REQUEST COPY
YES / NO	YES / NO

SEND TO PDR
YES / NO



Portland General Electric Company

David W. Cockfield Vice President, Nuclear

October 12, 1989

Trojan Nuclear Plant  
Docket 50-344  
License NPF-1

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington DC 20555

Dear Sir:

Reply to a Notice of Violation

Your letter of August 29, 1989 transmitted several Notices of Violation associated with Nuclear Regulatory Inspection Report 50-344/89-09. Attachment 1 is our response to the Notices of Violation.

Your letter also requested additional information on several issues identified in the body of the inspection report. The responses to these issues are still under development and will be submitted by October 27, 1989.

Sincerely,

Attachments

c: Mr. John B. Martin  
Regional Administrator, Region V  
U.S. Nuclear Regulatory Commission

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

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

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RESPONSE TO NOTICES OF VIOLATION

VIOLATION A

Trojan Technical Specification 4.7.6.1 requires that the control room emergency ventilation system be demonstrated OPERABLE at least every 31 days by initiating flow and verifying that the train operates for at least 10 hours with the preheaters on and maintains the control room air temperature less than or equal to 110°F.

Contrary to the above, since May 1988, licensee surveillance testing of the control room emergency cooling system did not demonstrate the system operable in that a recently installed non-safety, supplemental control room cooling system (CB-16) had been in service during the required tests of the control room emergency ventilation system.

This is a Severity Level IV violation (Supplement I).

Response

Portland General Electric (PGE) acknowledges the violation.

1. Reason for the Violation.

CB-16 was designed as a backup to a safety-related system. With the exception of tornado missile protection, it was designed as safety-related. Although some documents indicate that CB-16 is a safety-related system, the limitations of the system were not fully conveyed to the Plant Operations Staff. Based on this information, the testing procedure was revised to include CB-16 operation during surveillance testing of CB-1. As a result, CB-16 was operated in support of the safety-related control room ventilation system (CB-1).

The reason for the violation is that CB-16 was not designed as fully safety-related, and there was a failure to communicate and correlate its design with its operational objectives.

2. Corrective Steps That Have Been Taken and the Results Achieved.

PGE reviewed the design of CB-16 to identify all changes needed to make the system safety-related. Changes have been initiated to upgrade the system to safety-related through preparation of a Probabilistic Risk Assessment (PRA) to address tornado missile protection.

VIOLATION A (continued)

Operability criteria for CB-16 have been added to the testing procedure [Control Room Emergency Ventilation System Performance, Periodic Operating Test (POT)-20-1, Revision 29]. Should CB-16 be inoperable, the surveillance test of Technical Specification 4.7.6.1 would be performed with only CB-1 in operation.

3. Corrective Steps That Will Be Taken to Avoid Further Violations.

- a. A License Change Application (LCA) will be submitted by November 30, 1989, to include the testing of CB-1 with CB-16 in operation pending the upgrade of CB-16 to safety-related.
- b. The Probabilistic Risk Assessment (PRA) that has been performed shows the danger to CB-16 from tornado-generated missiles as negligible. This PRA will be submitted to the NRC for review and approval thirty days after receipt of the Final Report. Upon receipt of NRC approval of the CB-16 PRA, CB-16 will be declared fully safety-related. If necessary, a subsequent LCA will then be processed.

The Nuclear Safety and Regulation (NSRD) and Nuclear Plant Engineering Departments will review this event as a lessons learned item. The design modification and safety evaluation process will be reviewed by both departments to ensure the design review process requirements are addressed.

4. Date When Full Compliance Will Be Achieved.

Full compliance has been achieved.

VIOLATION B.1, 2

Title 10, Code of Federal Regulations, Part 50 (10 CFR 50), Appendix B, Criterion V, states in part:

"Activities affecting quality shall be prescribed by documented instructions, procedures or drawings . . . and shall be accomplished in accordance with these instructions, procedures, or drawings".

1. PGE Nuclear Division Procedure (NDP) 200-4, Revision 2, "Quality-Related Calculations", Section 5.2.A.7, states, in part, . . . calculations shall be sufficiently detailed as to purpose, methods, assumptions, design input . . . ."

Contrary to the above, as of May 24, 1989, Calculation No. TC-508, "Roof-Mounted Chiller Support for CB-1", Revision 0, was not sufficiently detailed in that all the appropriate design inputs were not included. Specifically, Calculation No. TC-508 did not assess the supports for their ability to withstand design basis wind loads.

2. Section 5.2.C.2 of NDP 200-4 states, in part, ". . . check hand calculations for assumptions, analytical methods, mathematical accuracy, completeness, and, as appropriate, compliance with design criteria . . . ."

Contrary to the above, as of May 24, 1989, Calculation No. TC-351, "CB-1 Intake Pipe and Supports RDC 86-021", dated June 17, 1986, calculated a concrete anchor bolt load of 4215 pounds, while the specified design allowable concrete anchor bolt load was 2880 pounds.

This is a Severity Level IV violation.

Response

PGE acknowledges the Violation associated with B.1. PGE has determined that compliance was achieved with respect to B.2.

B.1 Calculation No. TC-508, "Roof Mounted Chiller Support for CB-1"

1. Reasons for the Violation:

Calculation TC-508 took credit for the design seismic loads as the governing load case excluding the design basis wind loads in the design of the CB-16 chiller supports. The seismic loading was chosen over wind loading because of the Control Building roof location of the chiller units. This location would receive seismic ground motion where amplification would be the greatest. However, the engineering judgment behind choosing seismic loading as the

VIOLATION B.1, 2 (continued)

governing load case over wind loading was not documented in the calculation. This is a personnel error in not complying fully with procedural requirements.

Where systems are required to be designed to withstand external missiles, the design basis missiles are considered to be those missiles specified in the Final Safety Analysis Report (FSAR). Therefore the chiller units becoming a damaging missile to the CB-1 system was not evaluated.

2. Corrective Steps That Have Been Taken and the Results Achieved:

A new calculation, TC-593, "Chiller supports for CB-16, "Wind Loading", was performed on June 8, 1989 to include the wind load case for CB-16. This calculation determined the wind load case, as originally judged, was not the governing load case. Therefore, the original conclusions of Calculation TC-508 did not change.

3. Corrective Steps That Will Be Taken to Avoid Further Violations:

Nuclear Division Procedure (NDP) 200-4, "Quality Related Calculations", has been revised to require detailed documentation for design inputs and acceptance criteria. Training sessions are planned to reinforce the requirement for clear documentation of design inputs and assumptions in calculations which demonstrate compliance with the Trojan design bases. These training sessions will be completed by December 31, 1989.

4. Date When Full Compliance Will Be Achieved:

Full compliance has been achieved with the completion of Calculation TC-593, June 8, 1989.

B.2 Calculation No. TC-351, "CB-1 Intake Pipe and Supports, RDC 86-021"

PGE does not acknowledge this Violation.

1. Reasons for Denial of the Alleged Violation:

The qualification of the control room emergency ventilation intake ducts and supports as performed in Calculation TC-351 should not be considered as a violation of design criteria. First, there is no technical concern that the support of the intake ducts is not adequate, and second, a violation of design criteria does not exist.

VIOLATION B.1. 2 (continued)

The original design criteria for Trojan did not require consideration of tornado load effects, and therefore, the initial design of safety-related structures was completed without consideration of tornado wind pressure and depressurization loadings. Shortly before issuance of the construction permit, tornado effects were identified by the Atomic Energy Commission (AEC) as a design consideration for Trojan, and it was directed by the AEC that Trojan structures be evaluated. The evaluation was, therefore, undertaken after the initial design of Trojan structures had been completed. The criteria were described by the AEC in Section 3.3.2 of the Trojan Safety Evaluation Report, dated October 7, 1974. Section 3.3.2 of the Final Safety Analysis Report (FSAR) states analyses have shown that safety-related structures are capable of withstanding 200-mph tornado loads, and that some have further been shown to be capable of withstanding 300-mph tornado loads. Table 3.3-2 of the FSAR lists these capabilities for portions of the Plant structures. For the Control Building, the table lists different capabilities for different portions of the structure. The control room and cable spreading room are listed as being capable of withstanding the 300-mph tornado loads, while portions of the building below the cable spreading room are listed as capable of withstanding the 200-mph tornado loads. The FSAR does not clearly specify that either the 200-mph or 300-mph tornado loads are applicable to equipment located on the roof of the Control Building.

Section 3.3.2 of the original Trojan FSAR, including changes through Amendment 25, dated November 1975, describes the tornado design criteria for Trojan at the time the initial operating license was issued. This section states that tornados of greater magnitude than any experienced in the area are considered in order to ensure that any damage which may be sustained by the structures will not impair the ability to safely shut down the reactor and maintain it in that mode, as well as to maintain the integrity of the Containment. The acceptance criteria for evaluation of tornado load effects on safety-related structures, systems, and components is interpreted as the requirement to demonstrate no loss of safety-related function during or following a tornado of greater magnitude than any experienced in the area. In order to demonstrate no loss of safety function, compliance with code-allowable stress limits specified in the Trojan FSAR for load combinations which include tornado effects have been, and will be maintained.



VIOLATION B.1, 2 (continued)

The purpose of IE Bulletin No. 79-02, as stated in the Bulletin, was to assure the operability of Seismic Category I piping systems in the event of a seismic event. All of the documentation pertaining to PGE's response to the Bulletin addressed only concrete anchor bolts used for support of Seismic Category I piping systems. PGE is not committed to IE Bulletin No. 79-02 for other than Seismic Category I piping systems; however, a factor of safety of 4.0 is generally used for design of other Seismic Category I installations.

The objective of Calculation IC-351 was to demonstrate the design capacity of intake ducts and supports. The original calculation used a very conservative drag coefficient to determine tornado wind loads on the intake ducts. Loads for the 300-mph tornado were used in the calculation, and the factor of safety for the concrete anchors was determined to be 2.7 for this load case. Based on loads for a 300-mph wind being more than a factor of 2 greater than loads for a 200-mph wind, the conclusion of the original calculation stated that the intake ducts and supports were capable of withstanding the 200-mph tornado wind loads. The existence of the calculated factor of safety of 2.7 for the 300-mph load case was taken. The engineer determined that the calculation had demonstrated adequate capacity to withstand tornado wind loads.

After the concern for the documented factor of safety was raised during the NRC audit Nuclear Plant Engineering (NPE) revised the calculation to determine loads from the 300-mph tornado wind based on a more realistic drag coefficient for wind flow around the two intake ducts. The revised anchor bolt pullout was calculated to be 1,420 pounds. The factor of safety for this load is about 6, which is greater than the factor of safety of 4.0 required by NRC IE Bulletin 79-02.

VIOLATION B.3, 4

3. NDP 200-4, Revision 2, dated October 6, 1987, entitled "Quality Related Calculations", states in Section 5.1E, "Calculations prepared for one job may be used or referenced for another job.

Previously used calculations shall be checked for applicability, assumptions, and mathematical accuracy . . .".

Contrary to the above, as of May 24, 1989, a design change to replace vital inverters, design change package RDC 86-031, included an analysis on the impact of the DC system based on unverified, incorrect assumptions of the inverter performance characteristics made in a previously used calculation.

VIOLATION B.3, 4 (continued)

NPEP 200-14, Revision 6, dated October 19, 1988, entitled "Detailed Construction Package Preparation and Control", states in Section 4.1.2, "If the RDC modification for which a DCP is prepared involves quality-related systems, structures or components, a design verification must be completed for the DCP . . ."

Contrary to the above, Design Change RDC 86-045, which added a supplemental control room cooling system, CB-16, did not include a design verification that 480-volt motor loads, added in May 1988, would not adversely impact the vital 480-volt system or overload the emergency diesel generators (EDGs).

This is a Severity Level IV Violation.

Response

PGE acknowledges the violation associated with B.3 and B.4.

B.3 Replacement of Vital Inverters, "RDC 86-031"

1. Reason for the Violation:

The engineer responsible for review of the battery capacity calculation did not verify and document an assumption pertaining to new inverter input amperage. The calculation used was based on the previously installed inverter performance characteristics.

This is a personnel error in not following procedural requirements.

2. Corrective Steps That Have Been Taken and the Results Achieved:

Following the internal Safety System Functional Inspection, the Design Input Record was revised stating a battery/battery charger load review was conducted to determine if replacement of the inverters would change the original design basis of the 125-vdc system. The conclusion of the review was that the new inverter load is less than the load profile calculated in the Design Basis Calculation VIII.B, and as such, the inverter replacements do not change the original design basis.

3. Corrective Steps That Will Be Taken to Avoid Further Violation:

The Electrical Branch of the Nuclear Plant Engineering Department will review the requirements of Nuclear Plant Engineering Procedure (NPEP) 200-11, "Verification of Design" and Nuclear Division Procedure (NDP) 200-1, "Design Change Control". This review will be completed by December 31, 1989.

VIOLATION B.3, 4 (continued)

4. Date When Full Compliance Will Be Achieved.

Full compliance has been achieved following review of the load profile in the Design Basis Calculation VIII.B.

B.4 RDC 86-045, "480 Volt Motor Loads"

1. Reason for the Violation:

The design engineer conducted a review of the 480 volt load addition and reviewed Emergency Diesel Generator (EDG) loading calculation, TE-124. As a result of the review, the engineer concluded the load additions were insignificant. However, this conclusion was not formally documented. Nuclear Plant Engineering Procedure (NPED) 200-11, Section 4.3.1 requires each reviewer to document his portion of the design review and the results on the Design Review Report. The reason for the violation is personnel error in not following procedural requirements.

2. Corrective Steps That Have Been Taken and the Results Achieved:

An evaluation of the additional loads was performed and documented by memo in the RDC 86-045 file on June 2, 1989. The memo addresses the assumptions used and the additional loading to B-21 and B-26 buses for CB-16. The evaluation results confirm the original assumptions of the design engineer and show an overall margin reduction of 7 percent of the EDG continuous rating to new margin values of 626 kVA and 855 kVA for Train A and Train B respectively. As previously concluded, this margin is acceptable.

3. Corrective Steps That Will be Taken to Avoid Further Violations:

The next revision to calculation TE-124 and the computer program for load flow and fault current studies will include the new 480-volt loads.

The need to document all engineering decisions and reviews was specifically discussed with the Electrical Engineering Branch. This has resulted in a change in the level of documentation and review normally performed for the preliminary and detailed design.

4. Date When Full Compliance Will be Achieved:

Full compliance has been achieved with the completion of the evaluation of load increases to the B-21 and B-26 buses. This evaluation has been documented in the RDC 89-045 file.

VIOLATION C

10 CFR 50, Appendix B, Criterion XV states, in part, that "Measures shall be established to control materials, parts or components which do not conform to requirements in order to prevent their inadvertent use or installation. These measures shall include, as appropriate, procedures for identification, documentation, segregation, disposition and notification to the affected organizations".

NDP 600-1, Revision 6, dated March 2, 1989, entitled "Control of Nonconforming Materials, Parts and Components", Section 3.1., defines nonconforming components as ". . . components that exhibit a deficiency in one or more characteristics or documentation which makes the use of the item unacceptable or indeterminate".

Contrary to the above, as of May 24, 1989, the licensee has failed to issue Nonconformance Reports for nonconforming conditions on the inverters installed in 1987 and 1988 outages for the Class 1E Preferred Instrument AC System. Specifically, the inverters exhibited frequency swings and voltage characteristics outside the existing design basis, making the acceptability indeterminate.

This is a Severity Level IV violation (Supplement I).

Response

PGE acknowledges the violation.

1. Reason for the Violation:

At the time the problems with post-installation frequency swings on the inverter and output voltage tolerances were identified, the responsible individuals did not document the nonconformance on the Nonconformance Report (NCR) as required by procedure. Therefore, the problems were not formally evaluated and dispositioned. This is a personnel error in not complying with procedural requirements.

2. Corrective Steps That Have Been Taken and the Results Achieved:

NCR 89-305 was issued June 16, 1989 to address the frequency swings. NCR 89-342 was issued July 6, 1989 to address the use of voltmeters to verify the inverters are operating within their design basis. The initial reviews of these NCRs determined there were no operability concerns. The evaluation of these NCRs will be completed when calculation TE-176, "Input Power Specifications for loads connected to the preferred Instrument A.C. Buses", is finalized.

VIOLATION C (continued)

3. Corrective Steps That Will Be Taken to Avoid Further Violations:

The Nuclear Plant Engineering Department will review the requirements of procedures NDP 200-1, "Design Change Control", and NDP 600-1, "Control of Nonconforming Materials, Parts, and Components", to ensure instruments necessary to determine operability are addressed in design packages. This review will be completed by December 31, 1989.

Date When Full Compliance Will Be Achieved:

Full compliance will be achieved when calculation TE-176 is completed and the evaluation of the use of voltmeters to determine operability is performed. TE-176 is planned to be complete by December 29, 1989.

VIOLATION D

10 CFR 50, Appendix B, Criterion XII, states, in part, that "Measures shall be established to assure that . . . instruments . . . used in activities affecting quality are properly . . . calibrated . . ."

Topical Report (PGE-8010), entitled PGE "Nuclear Quality Assurance Program", Revision 11, Chapter 12.0, Control of Measuring and Test Equipment and Installed Instrumentation, states, in part, that "A calibration control program is utilized to assure that . . . instruments . . . are calibrated . . ."

Contrary to the above, as of June 7, 1989, an ammeter, a frequency meter, and a voltmeter, all part of Elgar Inverter Y-26, installed during the 1988 refueling outage, were not calibrated prior to being placed into operation.

This is a Severity Level IV violation (Supplement I).

Response

PGE acknowledges the violation.

1. Reason for the Violation:

Personnel who prepared, reviewed, and implemented Detailed Construction Package (DCP) 2 to Request for Design Change (RDC) 86-031 did not include calibration of the meters on Elgar inverter Y-26 as a requirement. Post-installation walkdown and testing also did not identify the meters needed to be calibrated. The procedures governing the DCP process were adequate and included meter calibrations as an item to be considered. The reason for the violation was personnel error.

2. Corrective Steps Taken and Results Achieved:

The voltage, frequency and amperage meters on Inverter Y-26 were calibrated and subsequently entered in the Planned Maintenance Program for periodic calibration on July 7, 1989. After operating for approximately one year, the "as-found" condition of the voltage and amperage meters was approximately 3 percent high. The frequency meter was approximately 1 percent low. The meters are required to verify operability and are not for precise measurements. These small meter inaccuracies did not affect the operability of the inverters.

3. Corrective Steps That Will Be Taken To Avoid Further Violations:

- a. The criteria for assigning calibration requirements for installed instruments used in supporting Trojan Technical

VIOLATION D (continued)

Specification surveillances will be reviewed and referenced in those procedures used in the design process by December 31, 1989.

- b. Nuclear Division Procedure (NDP) 200-1 (Design Change Control) is being reviewed and will be revised to ensure that the responsibilities and authority of individuals in the configuration management process are understood by December 31, 1989.
- c. Administrative Order (AO) 5-1, Plant Changes and Alterations, will be evaluated for consistency with the changes to NDP 200-1 by March 31, 1990.

4. Date When Full Compliance Will Be Achieved:

Full compliance was achieved when PGE calibrated the meters for inverter Y-26 on July 7, 1989.

VIOLATION E

Technical Specification 6.8.1 requires, in part, that written procedures shall be established, implemented and maintained covering the activities recommended in Appendix A of Regulatory Guide 1.33, November, 1972.

Regulatory Guide 1.33, Appendix A, requires procedures for combating emergencies and other significant events, including loss of electric power.

Contrary to the above, as of June 6, 1989, PGE procedure, Off-Normal Instruction (ONI)-46, "Loss of 120-V AC Instrument Bus", Revision 1, dated April 16, 1984, was not maintained in that it had not been revised to reflect the control room configuration as effected by a design modification. Procedure ONI-46 identified that one of the symptoms of loss of AC instrument bus was a "Preferred AC Bus Undervolt" annunciation. As a result of a design change during 1987-1988, the control room annunciator Panel K-06 was modified to annunciate "Inverter Trouble" instead of "Preferred AC bus Undervolt".

This is a Severity Level V violation (Supplement I).

Response

PGE acknowledges the violation.

1. Reason for the Violation:

The Operations support staff did not process the necessary revision to PGE procedure ONI-46, "Loss of 120-V AC Instrument Bus", reflecting the actual control room configuration resulting from the 1987-1988 design change in a timely manner.

The reason for the violation is personnel error in not identifying the procedural change required by the modification addressed in the design change package, and secondly, failing to complete the required procedural change after the procedural discrepancy was discovered by the internal SSFI team.

2. Corrective Steps That Have Been Taken and the Results Achieved:

ONI-46 was amended by procedure deviation D89-353 on June 6, 1989. Individual responsibility to provide a complete and thorough closeout of all actions initiated for procedure revisions was re-emphasized in a review of this event by the Operations Support Staff.



Trojan Nuclear Plant  
Docket 50-344  
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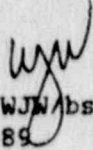
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3. Corrective Steps That Will Be Taken to Avoid Further Violations:

Long-term corrective action will be provided by Trojan's Procedure Upgrade Program. This program will have a computerized data base with a key word search capability. This feature of the program will allow searching of procedures for required changes and will ensure the changes enter the revision process in a timely manner. Projected completion date for the Procedure Upgrade Program is 1991. Plant System Engineering and the Operations Support Staff will be trained on the computer database associated with the upgrade program.

4. Date When Full Compliance Will Be Achieved:

Full compliance was achieved on June 6, 1989 when ONI-46 was deviated.

  
RMN/SAB/WJM/bsh  
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