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Perry Nuclear Power Plant  
Docket Number 50-440  
License Number NPF-48

Subject: Reply to a Notice of Violation; EA-03-007

Ladies and Gentlemen:

Enclosed is the Perry Nuclear Power Plant (PNPP) response to a Notice of Violation (EA-03-007) issued by a Nuclear Regulatory Commission (NRC) letter dated March 4, 2003. The details of the violation were documented in NRC Inspection Report No. 50-440/02-08.

The response to this Notice of Violation is found in the enclosure to this letter. This violation documents a failure to implement a procedure for electrical breaker installation, which resulted in the failure of the High Pressure Core Spray pump to start during routine surveillance testing on October 23, 2002. This violation is associated with a White significance determination process finding. The PNPP acknowledges the significance of this finding and this occurrence has been entered into the PNPP corrective action program. At the time of this violation response, near term corrective actions have been completed. Other longer term corrective actions are planned and the PNPP staff is working toward implementation of the remaining corrective actions.

There are no regulatory commitments contained in this letter. Any actions discussed in this document that represent intended or planned actions, are described for the NRC's information, and are not regulatory commitments.

If you have questions or require additional information, please contact Mr. Vernon Higaki, Manager-Regulatory Affairs, at (440) 280-5294.

Very truly yours,



Enclosure

cc: J. E. Dyer, NRC Region III Administrator  
R. J. Powell, NRC Sr. Resident Inspector - PNPP  
S. P. Sands, NRR Project Manager - PNPP

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REPLY TO A NOTICE OF VIOLATION; EA-03-007

RESTATEMENT OF THE VIOLATION

Technical Specification 5.4 requires, in part, that procedures be established, implemented, and maintained as recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Regulatory Guide 1.33, Appendix A, Section 9, "Procedures for Performing Maintenance," recommends that maintenance activities that affect the performance of safety-related equipment should be performed in accordance with written procedures appropriate to the circumstances. Procedure GEI-0135, Revision 1, March 30, 1999, "ABB Power Circuit Breakers 5 KV Types 5HK250 and 5HK350 Maintenance," Step 15[sic].14.3.3 requires a visual check of the cell switch normally open contacts to verify they are in the flat horizontal position prior to breaker installation. The procedure allows in a note to the step, that it may be acceptable for contact bars to not be in a flat horizontal alignment provided a clear make/break of the contacts is observed.

Contrary to the above, the licensee failed to implement procedure GEI-0135 during the installation and inspection of the high pressure core spray pump breaker from 1994 through October 23, 2002. Specifically, the licensee did not verify that the contacts were in the flat horizontal position prior to breaker installation or that there was a clear make/break of the contacts. This failure to verify the alignment of the contacts resulted in degradation of the connection over time and failure of the pump to start during surveillance testing on October 23, 2002.

REASON FOR THE VIOLATION

Licensee Event Report (LER) 2002-002 was submitted on December 23, 2002, for the failure of the High Pressure Core Spray Pump (HPCS) to start. The investigation for this event, discussed in LER 2002-002, revealed that the breaker cell switch linkage may not have been properly adjusted when the breaker was replaced in 1994 with a refurbished breaker. The cell switch and breaker are not a matched set and therefore may require adjustment any time the breaker/cell switch combination is changed. In this case, variations in the tolerances for the location of the operating pin on the breaker resulted in a change of the cell switch alignment when the breaker was replaced.

The electrical maintenance procedure GEI-0135 did not have specific criteria for the visual inspection of the cell switch contact alignment. In this case, the visual inspection of the cell/switch contact alignment, if performed, did not verify the contacts were in a full, flat horizontal position for correct engagement, although a satisfactory functional check was achieved when the replacement breaker was installed. The inspections performed in April 1998 and January 2002 did not identify an issue with cell switch contact alignment and indicates that a weakness existed in the procedure. The only way to be certain that the contacts are in a horizontal position is to observe them during installation of the breaker to ensure they rotate 90° so the normally closed contacts are in a horizontal position and centered in the viewing window.

The instruction used during the earlier visual inspection did not provide the objective criterion, "centered in the viewing window."

The procedure GEI-0135 contained a note prior to the step that provided the criterion for verifying the breaker cell switch contacts are in the proper position. The note stated, "It may be acceptable for contact bars to not be perfectly straight vertical or flat horizontal aligned provided a clear make/break is observed." This note confused the criterion and the objective of the procedure step to verify proper contact position.

### CORRECTIVE STEPS THAT HAVE BEEN TAKEN AND THE RESULTS ACHIEVED

Failure of the HPCS pump to start was entered into the PNPP corrective action program as Condition Report 02-03972 on October 23, 2002. Condition Report 03-01546 was initiated on March 27, 2003, to address questions that require clarification or additional information that were not provided in the responses to CR 02-03972.

The cell switch linkage for the HPCS pump breaker was adjusted to obtain proper alignment of the switch contacts. Adjustment of the cell switch to obtain proper alignment included shortening the cell switch linkage actuator arm. Proper cell switch operation was verified; both visually and electrically, during breaker racking evolutions. Proper operation of the HPCS system was verified on October 23, 2002 at 1848 hours when the HPCS pump was started in accordance with the system operating instruction.

Investigation and diagnosis of cell switches found in 5KV breakers was conducted using a spare cell switch and a breaker cubicle used for training. A cell switch typically has four normally open and four normally closed contacts positioned perpendicular from each other on the switch shaft. Optimal alignment of the open and closed switch contacts on the shaft is 90 degrees plus or minus 5 degrees. Measurements taken on the spare switch showed that aligning the top or bottom edge of the open switch contact tab with the viewing window opening equates to approximately 10 degrees of rotation of the switch. Full contact between the stationary contacts and the moveable contacts is achieved when the contact tabs are visible in the viewing window. The optimal switch contact position is when the contact tabs are centered in the viewing window. Utilizing the contact tab position centered in the viewing window as criteria for acceptability, walkdowns of the 5 KV breaker cubicles were performed.

A walkdown of 5KV safety related and non-safety related switchgear involving 40 breaker cubicles was initiated to identify any breaker cell switch contacts not centered in the viewing window. Cell switches that did not satisfy this criterion were documented to require additional adjustment to optimize the cell switch contact alignment. The walkdown of safety-related switchgear was completed on November 18, 2002. Work requests were submitted for 10 safety related breakers that require cell switch adjustment. The walkdown of non-safety related switchgear involving 33 breaker cubicles was completed on December 4, 2002. A few non-

safety related breakers were identified and work requests were submitted for cell or auxiliary switches that need additional adjustment.

Voltage checks for the 10 safety related breakers that were identified to require cell switch adjustments were completed on December 17, 2002, to verify they were providing circuit continuity. Voltage readings on each side of the switch contact were taken to confirm the breakers were ready to operate. The voltage checks verified cell switch contacts that permit breaker closure were making electrical contact even though their contacts were not optimally centered in the viewing window.

Perry procedure GEI-0135 was revised and made effective on February 25, 2003. The procedure revision clarified instructions, by revising step 5.14, to observe that the breaker auxiliary and/or cell switch contacts are centered in the viewing window prior to installation of the breaker into the cubicle. Guidance in Attachment 9, "Auxiliary Switch and Cell Switch Linkage Adjustment Guide," was also enhanced to include the criteria to ensure the contacts are properly aligned. Guidance for shortening the actuator arm was also included in Attachment 9. The note referenced in the violation and reason for the violation was removed from the procedure.

After implementation of the revised procedure GEI-0135, a staff maintenance engineer performed another walkdown of the 5KV electrical breakers on March 27, 2003. This walkdown again confirmed that the same 10 safety related breaker cell switches require adjustment to satisfy the revised procedure criterion. Four of the cell switches were observed to have contacts that are at the limit of the edge of the viewing window. Six cell switches were observed to have contact tabs that were not fully visible in the viewing window.

A revision to the system operating instruction SOI-R22, "Metal clad Switchgear 5 – 15 KV," was completed and made effective March 27, 2003, that includes guidance to plant operators for visual checks of cell switch contact position when racking in breakers. The revised procedure also states when racking in class 1E 5 KV breakers, the breaker "may not be declared operable until the breaker is cycled per an approved instruction." Training was conducted for non-licensed operators on CR 02-03972. Specific discussion included the draft revision of the procedure SOI-R22 and an actual cell switch for hands on application. The non-licensed operator training was completed on March 25, 2003.

#### CORRECTIVE STEPS THAT WILL BE TAKEN TO AVOID FURTHER VIOLATIONS

Cubicle cell switches for five Division 2 breakers and one Division 3 breaker will be adjusted to achieve optimal cell switch contact alignment in the upcoming ninth refueling outage scheduled to commence on April 5, 2003. Two of these breakers provide an automatic closure to support safety system functions. The remaining four cubicle cell switches have been scheduled for adjustment during the normal maintenance schedule and will be completed by the end of the tenth operating cycle. The remaining four cubicle cell switches are associated with electrical bus tie or feeder breakers, and are not required to fulfill an automatic closure feature.

Electrical maintenance personnel will be provided training on the changes to procedure GEI-0135. Training is to be completed in continuing training cycle 3, which is scheduled for September through December 2003.

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

The HPCS pump was returned to an operable status on October 23, 2002. Full compliance was achieved on February 25, 2003, when the revised procedure GEI-0135, "ABB Power Circuit Breakers 5 KV Types 5HK250 and 5HK350 Maintenance," became effective.