U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Report Nos. 50-387/90-02
50-388/90-02

Docket Nos. 50-387
50-388

License Nos. NPF-14
NPF-22

Licensee: Pennsylvania Power & Light Company
2 North Ninth Street
Allentown, Pennsylvania 18101

Facility Name: Susquehanna Units 1 and 2

Inspection At: Berwick, Pennsylvania

Inspection Conducted: January 22-26, 1990

Inspector: Ray K Mathew — 3/6/90
R. K. Mathew, Reactor Engineer — date

Approved by: C J Anderson — 3/6/90
C. J. Anderson, Chief Plant Systems Section, DRS — date

Inspection Summary: Inspection on January 22-26, 1990 (Combined Report Nos. 50-387/90-02 and 50-388/90-02)

Areas Inspected: Special announced inspection to review the licensee's maintenance program for molded case circuit breakers. This review was to assess an allegation regarding the licensee permitting the disassembly and adjustment of molded case circuit breaker trip units.

Results: The inspection confirmed that the licensee does perform disassembly and adjustment of molded case circuit breaker trip units. However, the licensee is performing this task under their Quality Assurance program and in a controlled condition as required by Appendix B to 10 CFR 50. No safety significant deficiencies nor violations were identified. One item remained as unresolved at the end of the inspection.

DETAILS

1.0 Persons Contacted

1.1 Pennsylvania Power and Light Company

*J. Blakeslee, Assistant Superintendent of Plant
*R. Bogar, Supervisor, Electrical Maintenance
*P. Capotosto, Senior Project Engineer, NQA
R. Collier, Maintenance Engineer
D. Heffelfinger, Coordinating Engineer, NQA
R. Kuhl, Senior Quality Control Specialist
*D. Roth, Senior Compliance Engineer

1.2 U.S. Nuclear Regulatory Commission

*S. Barber, Senior Resident Inspector

* Denotes those present at the exit meeting.

2.0 Purpose

The purpose of this inspection was to review the licensee's maintenance program for molded case circuit breakers. This review was to assess an allegation regarding the licensee permitting the disassembly and adjustment of molded case circuit breaker trip units. As part of the NRC's function to assure that the issues raised by allegations are adequately investigated and resolved, the inspector reviewed the allegation described below.

3.0 Background

On May 15, 1989, the NRC received an allegation regarding a maintenance procedure used by Pennsylvania Power and Light Company (PP&L) at Susquehanna Steam Electric Station that permits adjustment of molded case circuit breaker trip units.

Allegation Review and Resolution

Concern

The alleger stated concerns regarding the licensee's practice of permitting maintenance personnel to disassemble and make internal adjustments to Molded Case Circuit Breaker (MCCB) trip units. The alleger referenced maintenance procedure MT-GE-008, Revision 7, dated January 4, 1988 which contained specific instructions for performing adjustments.

Discussion

The inspector reviewed the licensee maintenance procedure MT-GE-008, Revisions 7 and 8 titled "480 volt and under circuit breaker high circuit

testing". Section 5.2.2b in Revisions 7 and 8 depicts details for internal adjustments of MCCBs magnetic trip units. During the inspection, the licensee stated that most of the breakers with magnetic trip units have external adjustments and therefore do not require disassembly or internal adjustments to establish trip points within the tolerance values specified in data setpoint lists and surveillance procedures.

The licensee stated that the only MCCBs which may have had internal trip units adjusted are Westinghouse HFB-TM type breakers. These breakers have thermal and magnetic trip units. The magnetic trip units are not replaceable and have no external adjustments. These breakers provide accurate overload and short circuit protection for conductors and connected apparatus. On low overloads, the thermal bimetal initiates tripping action. On short circuits, the magnetic element instantly opens the circuit. The thermal trips are tested at 300% of breaker rating and they are preset and cannot be adjusted.

The inspector noted that circuit breakers are adjusted only if the magnetic trip points are already within the manufacturers tolerance band. The licensee's acceptance criteria for preferred setting of actual magnetic trip current is +0% to +25% of specified value and actual trip time is less than or equal to 0.05 seconds. These setpoints assure that the breaker trips instantaneously with no intentional time delay. The licensee's set points are more conservative than the typical industry practice. These setpoints are selected by the licensee to achieve proper electrical coordination of their electrical power system.

The inspector reviewed procedures and documents listed in Attachment A. Documentation reviewed indicated that the licensee has not done any trip adjustments in the last 6-7 years and any adjustments were performed on a very limited number of breakers. The inspector noted that the licensee in many cases rejected the MCCBs if they were found out of tolerance during the initial breaker testing.

During the inspection, the licensee presented a demonstration of their breakers testing and adjustments. The licensee disassembled an HFB-TM type breaker for the NRC inspector to assess the extent of adjustments needed to attain the required magnetic trip setpoints. The inspector noted that the adjustments to the three internal adjustment screws are very minor and it did not significantly affect the original air gap adjustments done by the manufacturer. The adjustment to the screws determines when the trip bar will be actuated by the magnetic action.

The inspector did not find any unacceptable conditions due to the following reasons:

- The MCCBs are tested and adjusted in a controlled environment. The acceptance criteria of tests meet the manufacturer's breaker trip curve for magnetic trip, breaker setpoint documents and surveillance procedures criteria.

- The maintenance of MCCBs are covered by the licensee's QA program which requires QA/QC review of the work performed by modifications through Work Authorization (WA) procedures and QA audits.

- Vendor procedures exist to disassemble the breaker and replace shunt trips coils, arc extinguishers, auxiliary switch, and replaceable type trip units in addition to cleaning the MCCB contacts. Therefore, the disassembly of MCCB is an approved vendor suggested method.

- The adjustments done to the magnetic trip unit is minor and performed by qualified and trained personnel.

- No breaker failures were noted for these types of breakers at Susquehanna within the last five years.

- Sampling of the licensee's completed surveillance packages showed that there was no appreciable drift from the previous setpoints.

- Breakers are calibrated and tested several times with the use of approved and calibrated measurement and test equipment prior to installation.

The allegation regarding the disassembly and adjustment of the MCCBs is substantiated. However, no safety significance deficiencies were identified nor were any NRC requirements violated.

4.0 Maintenance

The inspector reviewed the licensee documents and procedures listed in Attachment A to determine whether maintenance of breakers is being conducted in accordance with Technical Specification (TS) requirements and licensee commitments.

The licensee is performing 18-month rotational testing of all primary containment overcurrent protective devices in accordance with Technical Specification Section 3/4.8.4. This includes functional testing of overcurrent protection of breakers, visual inspection and preventive maintenance.

The inspector noted that the licensee did not have an Electrical Maintenance Program to test all the nontechnical specification related breakers and nonsafety related molded case circuit breakers. The lack of maintenance testing of Appendix R related breakers was identified during a previous NRC inspection, 88-21 and 88-24. The licensee stated that although they have not instituted a formal breaker testing program, they do perform a number of activities to inspect and overhaul circuit breakers under their preventive and surveillance maintenance program.

The inspector noted that all the breakers above 480 volts are fully tested in accordance with their maintenance and surveillance procedures. Circuit breakers 480 volts and below, except for the Technical Specification related breakers, undergo a clean and inspect preventive maintenance along with breaker exercising. This is performed to verify that the breakers function properly and that the connected loads can operate without any breaker related problems. These maintenance activities, however, do not verify the trip settings or calibrations. In response to the inspector's concern regarding inadequate testing of all molded case circuit breakers, the licensee stated that they will have a long term breaker testing program established by the third quarter of 1991. This is an unresolved item pending the licensee developing an appropriate testing program for all molded case circuit breakers and reviewed by the NRC. (50-387/90-02-01 and 50-388/90-02-01)

During the inspection, the inspector noted that Revision 8 of maintenance procedure MT-GE-008, was not approved by the Plant Operations Review Committee (PORC). However, the previous Revisions (1-6) were PORC approved and only minor changes were made between Revisions 6 and 8. The licensee's QA audit report (88-108) identified three procedures that required clarification for PORC review. The root cause of the problem was inadequate criterion for determining which maintenance procedures require PORC review. Based on the QA recommendations, the licensee issued a procedure AD-QA-501 on January 9, 1990 to address the requirements of maintenance procedures that need PORC review. The licensee stated that all of the procedures will be reviewed and appropriate actions will be completed by the next periodic review. The inspector did not identify any other procedures with similar problems and determined that the licensee had taken appropriate corrective actions to resolve this issue.

The licensee has established a Work Authorization (WA) system for performing both corrective and preventive maintenance work. The Quality Control staff reviews WAs to determine the scope of work being performed and establish any hold points prior to the start of work. The inspector reviewed randomly selected WAs to verify whether the work performed by the maintenance group met all the requirements as specified in procedure AD-QA-502, Revision 15. The inspector noted that applicable work activities were identified and performed properly. No unacceptable conditions were noted.

The inspector reviewed the licensee's equipment performance and trending analysis program. This program provides a quarterly review of component failures, compares equipment reliability with industry experience and suggestions to improve overall equipment availability. The review primarily includes maintenance activities associated with plant components and recommends changes to address the dominant failure modes for the components. The licensee's NPRDS component failure analysis report did not identify any molded case circuit breaker failures within the last five years.

The licensee also has established an Industry Events Review Program (IERP) that reviews and evaluates data input such as vendor data, NRC Bulletins and Information Notices, INPO and other industry reports and in-house WAs. If an event or problem is determined to be applicable to the site, the selected item is tracked in the IERP system, until a review and evaluation is completed. If the review determines that a potential problem could exist, a WA is prepared and the tracking of the WA system then follows the subject item.

5.0 Quality Assurance (QA) Maintenance Interface

The licensee's QA program was reviewed to verify the quality assurance/quality control involvement in the performance of maintenance work activities. During the review of WAs, the inspector noted that the inspection hold points were determined during pre-maintenance review and final review was performed and unsatisfactory conditions were documented.

QA performs an annual audit of the maintenance program each year. The inspector reviewed QA Audit Report No. 88-108 and found that the audit report identified findings, which the licensee was responsive in resolving. QA also performed a surveillance audit of molded case circuit breaker testing, addressing proper performance of work, utilization of current set points, and proper completion of work documents to reflect the work performed. The results of the audit indicated several observations and the licensee was asked to provide feedback to improve the existing maintenance program.

Based on the areas inspected, the inspector determined that the licensee has a good QA program to address the electrical maintenance area.

No unacceptable conditions were noted.

6.0 Exit Meeting

The inspector met with the licensee representatives at the conclusion of the inspection on January 26, 1990, as denoted in Section 1.0. The inspector summarized the scope and findings of the inspection at that time. No written material was given to the licensee during this inspection.

Attachment A

Procedures/Documents Reviewed

MT-GE-008, Revision 8 - 480 volt and under circuit breaker high current testing

MT-GE-014, Revision 6 - D.C. Switchgear inspection and breaker maintenance.

SM-106-000, Revision 4 - Functional testing, inspection and P.M. of primary containment penetration conductor overcurrent protective devices.

MT-GE-012, Revision 7 - 480V MCC starter cubicle inspection and maintenance

AD-QA-501, Revision 0 - Maintenance procedure program

AD-QA-502, Revision 15 - Work Authorization System

AD-QA-422, Revision 8 - Surveillance Testing Program

AD-QA-402, Revision 11 - Setpoint change control

SM-106-001, Revision 3 - Functional testing, inspection and P.M. of breaker cubicle 1B219022 (HFB-TM) the reactor recirc. pump A discharge valve HV-B31-1F031A

AD-QA-541, Revision 4 - Maintenance - equipment performance and trending analysis.

WA-S81333 - 1B226-103 breaker replacement

WA-S81077 - Battery charger repair

SM-106-004- GRPS - Surveillance for breaker 1B246011

SM-106-024-GRPB - Surveillance for breaker 1B246051

SM-106-001-GRPA - Functional testing of breaker 1B219022

WA number S23033 - Perform breaker retest on 1B236112

WA number S22961 - Perform breaker retest on 1B236093

SM-106-019-GRPA - Functional testing of breaker 1B236021 dated 2/25/85 and 10/11/87

WA number P81847 - 3 year inspection

MT-GE-08, Revision 1-7 - 480 volt and under circuit breaker low current testing

WA number S50375 - Breaker test dated 2/6/85

Drawing No. B199463 - Safety related 480 v. motor control center breaker and overload setpoint list

IOM-397 - Instruction manual for safeguard motor control center

IOM-411 - Instruction manual for non-essential motor control center

QA Audit 88-108 - Susquehanna steam electric station audit of electrical maintenance and relay testing

QA Surveillance Report No. - circuit breaker testing

Dwg. No. 8856-E118-60-1 - Maximum and minimum characteristic curves.