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SUBJECT: Part 21 rept re failure of circuit breakers,manufactured by BBC,Inc,during testing.

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Donald C. Cook Nuclear Plant Units 1 and 2
Docket Nos. 50-315 and 50-316
License Nos. DPR-58 and DPR-74
10 CFR 21 REPORT: FAILURE OF CIRCUIT BREAKERS MANUFACTURED BY BBC BROWN BOVERI, INC. DURING TESTING

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Attn: T. E. Murley

March 3, 1989

Dear Dr. Murley:

Introduction (10 CFR 21.21(b)(3)(i), (ii) and (iii))

This letter constitutes a follow-up report, as required by 10 CFR 21.21, of information provided to your staff via telephone on March 1, 1989. This report is being submitted by Indiana Michigan Power Company, P.O. Box 16631, Columbus, Ohio 43216. The 10 CFR 21 report concerns observed failures of closing mechanisms in two BBC Brown Boveri, Inc. type 5HK250 circuit breakers installed in safety systems in Cook Nuclear Plant Unit 1.

Background (10 CFR 21.21(b)(3)(iv) and (v))

On February 8, 1989, during the conduct of routine cleaning and inspection of circuit breakers installed in the 4KV distribution system for Cook Nuclear Plant Unit 1, a BBC Brown Boveri (BBC) 5HK250 breaker that had been removed from service for testing failed to close as required when the closing circuit was energized. The breaker supplies the Unit 1 east residual heat removal (RHR) pump and is required to close to perform its safety function. Subsequent investigation showed the cause of the failure to be aging and dirt contamination of the grease used for lubrication of the breaker closing mechanism. After cleaning and relubrication of the closing mechanism the breaker functioned properly. The failure of the breaker to close was considered to be an isolated event since the breaker in question, as well as other safety-related breakers of the same type, had previously passed all in-service surveillance tests. However, the breaker servicing described below in the discussion section was initiated at the time this failure was observed. On February 27, 1989, a second BBC 5HK250 breaker

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also failed to close during routine testing performed on the breaker while out of service. The cause of the second failure was determined to be the same as in the first case. After cleaning and relubricating of the breaker closing mechanism, the breaker functioned properly. The observation of two failures of the same type due to the same cause, in conjunction with the knowledge that breakers of the same type and similar age are used in safety-related applications elsewhere in the industry, prompted submittal of this 10 CFR 21 report.

Discussion (10 CFR 21.21(b)(3)(vi) and (vii))

As part of the investigation of the first breaker failure discussed above, BBC was contacted and assistance from a BBC service representative was requested. When the cause of the breaker's failure to close was determined, the BBC representative recommended a procedure for cleaning and lubricating the closing mechanism in order to provide for proper functioning of the breaker.

It should be noted that the observed failures during testing affected only the breaker's ability to close when required, and not the ability to open. As a result, all safety-related BBC 5HK250 breakers in both Units 1 and 2 at Cook Nuclear Plant that are required to close in order to perform their safety function have been serviced in accordance with the BBC representative's recommendations in order to ensure they will function properly. At the Cook Nuclear Plant this involved 18 BBC breakers in each unit. These breakers serve safety injection, auxiliary feedwater, containment spray, RHR, essential service water, component cooling water and centrifugal charging pumps, and the emergency diesel feed.

As an additional part of our investigation and corrective actions associated with the events described above, we have reviewed the maintenance procedures applicable to the BBC 5HK circuit breakers. This review was intended to assess to what extent procedural requirements may have contributed to the events and what, if any, procedural revisions could be made to prevent recurrence. It should be noted that the applicable maintenance procedure was prepared based on the instructions supplied with the breakers by the breaker manufacturer (I.T.E. instruction No. 1B-8.2.7-2). Discussions with the BBC representative revealed that periodic cleaning and lubrication of the closing mechanism was not addressed in the applicable BBC technical manual because the lubrication performed at the factory was considered to be permanent and was meant to last for the life of the unit. Therefore, review concluded that because the manufacturer's instructions contained no requirements for periodic lubrication of the breaker closing mechanism, our maintenance procedure similarly did not require this to be done during routine maintenance activities.

Conclusion (10 CFR 21.21(b)(3)(vii) and (viii))

In accordance with the BBC service representative's recommendations, actions have been completed to correct the breaker closing mechanism failures discussed above and all other BBC safety-related breakers installed in Cook Nuclear Plant Units 1 and 2 whose safety function is to close when called upon have similarly been serviced according to BBC's recommendations.

In order to prevent recurrence of the events discussed in this report, our maintenance procedure will be revised to include cleaning and lubrication of the breaker closing mechanism on a periodic basis as part of our maintenance program. This point may be of interest to other licensees who, as in the case of the Cook Nuclear Plant, have developed their maintenance procedures for the BBC breakers based on the manufacturer's instructions.

This document has been prepared following Corporate procedures that incorporate a reasonable set of controls to ensure its accuracy and completeness prior to signature by the undersigned.

Sincerely,

M. P. Alexich
Vice President

ldp

Attachment

cc: D. H. Williams, Jr.
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