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Docket No. 50-461

Mr. James L. Caldwell  
Director, Division of Reactor Projects, Region III  
U.S. Nuclear Regulatory Commission  
801 Warrenville Road  
Lisle, Illinois 60532-4351

Subject: Clinton Power Station Circuit Breaker Plan

Dear Mr. Caldwell:

This letter is to transmit Clinton Power Station's (CPS) plan to address concerns with both low and medium voltage circuit breakers at CPS. We believe that this comprehensive plan will provide assurance that these circuit breakers will meet operational requirements.

If you have any questions about this plan, please contact me at (217) 935-8881, extension 3900.

Sincerely yours,

Wilfred Connell  
Vice President

MRS/krk

Attachment

cc: Geoffrey C. Wright, Region III, USNRC  
Mark Ring, Region III, USNRC  
Dave Zemel, T-31Z  
NRC Resident Office, V-690  
Document Control Desk

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## ***CPS Circuit Breaker Plan***

### **Background**

In 1995, CPS breaker maintenance efforts were increased after issuance of a Notice of Violation for not implementing a recently issued 10 year refurbishment recommendation for 480V Asea Brown Boveri (ABB) K-Line Breakers. Actions to support short term docketed commitments were completed by the end of 1995. Also in 1995, Illinois Power identified a manufacturing defect with cold soldered joints on the Power Shield trip units for these same ABB K-Line Breakers. Clinton Power Station's diligence in taking the vendor to task, issuance of the Part 21, and aggressive approach to completing repairs associated with this deficiency were cited as a strength by the NRC.

In 1996, refurbishment efforts continued with the ABB Breakers. However, as CPS recently came to realize, control of vendor activities was poor and resulted in loss of important as-found data. Efforts are in progress to fix any related problems with ABB and CPS processes. Also in 1996, the CPS breaker team expanded their efforts to address the material condition of 4160 and 6900V Breakers and present their recommendations to the Material Condition Management Team (MCMT). A plan was approved for the General Electric (GE) Magne Blast breakers which have operated well at CPS, but have a history of industry problems. The plan included buying a spare breaker and swapping/refurbishing the 5 Div. III breakers during our 7th operating cycle.

Westinghouse breakers have performed well in the industry and at CPS, however our preventive maintenance program did find two large frame model DHP breakers to be sluggish during slow-close testing. This slow closure was caused by degraded lubricant. As a result, the MCMT approved a plan to refurbish the eight non-safety, large frame, Main Feed model DHP breakers during cycle 7.

In late 1996, two new problems were identified with Westinghouse breakers. CPS experienced a failure to close and determined the cause to be binding of a non-lubricated linkage for the motor cutoff switch. The subsequent investigation found there were no industry documents (i.e., Notices, Bulletins, Part 21, etc.) issued against motor cutoff switch problems. After conferring with NRR, Illinois Power issued a Part 21 against the vendor's manual due to lack of instruction for motor cutoff switch maintenance. Although documenting of the as-found condition was not specified, 8 safety related Westinghouse breakers were inspected in RF6 with the new motor cutoff switch instructions and no deficiencies were noted in the work packages. Additional inspections to be performed in RF6 will include detailed account of the as-found conditions. The second problem identified with these breakers was cracking and wear associated with levering in devices (IEIN 96-50). This issue is being addressed through improved inspection criteria, changes to post-maintenance testing requirements and training.

In 1997, other problems were identified with Westinghouse breakers. During preventive maintenance work, the last of four model DVP (vacuum) breakers to be inspected passed the timing criteria but failed the ductor test. Intrusive inspection found wear and degraded, excessive lubricant on the vacuum bottle shafts and associated roller contact assemblies. CPS is in the process of obtaining new contact assemblies. Also, recently identified by the NRC Engineering and Technical Support inspection team, was that improper lubricant had been used on a model DHP breaker's trip latch mechanism. The use of this lubricant is believed to have caused its failure to close in 1995.

#### Plan Specifics

As a result of the above conditions and findings, Clinton Power Station will complete the actions detailed on Attachments B, C, and D for ABB, GE, and Westinghouse breakers, respectively. In addition, Operator requalification training will be enhanced to include discussions on the importance of breaker material condition and the need to document any problems observed with breaker performance.

## **ABB 480 Volt Circuit Breakers**

### Problem

The refurbishment of ABB breakers that began in 1995, has shown various degrees of degraded lubrication in all ABB breakers. As found testing performed on the ten safety related breakers refurbished in 1995 found one breaker that failed to trip. This single failure, on a breaker that had not been in service for 4 years, was deemed an isolated case by the CPS personnel who attended the vendor testing. In 1996, lack of detailed requirements specified in related purchase orders resulted in not all breakers being tested upon arrival at the refurbishment vendor. This loss of as found test data has limited the ability to assess the impact that degraded lubricant has on breaker performance at CPS. No in-service failures of ABB breakers at CPS have been attributed to lubrication problems.

### Population

Safety Related	33 (15 are currently refurbished and in-service)
Critical, Non-Safety Related	88 (3 are currently refurbished and in-service)
Non-Critical, Non-Safety Related	133

### Plan Details

1. Complete the actions necessary to have a total of 21 of the 33 safety related breakers refurbished and back in service by the end of RF-6, the current refueling outage. This refurbishment, which was started in 1995, will complete the refurbishment of all Division II breakers.
2. Accelerate schedule to refurbish all remaining safety related breakers that have not been refurbished since 1995 so they are refurbished by the end of RF-7. Original schedule showed completion at the end of RF-8.
3. Provide detailed specifications and expectations to refurbishment vendor prior to additional vendor refurbishments of the circuit breakers.

### Assurance

The ABB Breaker Plan addresses the need to complete refurbishment of all safety related 480V breakers. Although no in service failures have been experienced due to degraded lubrication, the accelerated refurbishment schedule is consistent with conditions identified during refurbishments and CPS history.

## ***General Electric 4160 Volt Circuit Breakers***

### Problem

GE breakers have a history in the industry of several different failure modes. A multitude of documents (SAL, SIL, OE, IEIN, etc.) have been issued. CPS breakers are newer than most in the industry, and have had few problems since start-up. However, they are 17 years old and have had only one Clean & Inspect PM performed, approximately 5 years ago. GE does not recommend a refurbishment schedule for their Magne Blast breakers except for extreme applications, such as capacitor switching or arc furnace loads which are highly repetitive, or if the breaker is refurbished per Service Advisory Letter (SAL) 354.1. No breakers at CPS have yet been refurbished.

### Population

Safety Related	5 ( all on Div III, HPCS )
Critical, Non-safety Related	None

### Plan Details

1. Develop detailed inspection checklist and acceptance criteria to assess the material condition of circuit breakers. This will be completed to support inspections in RF-6.
2. Perform an inspection of two circuit breakers using the developed inspection and acceptance criteria. Failure of critical parameters will result in an expansion of the scope to inspect additional breakers and take corrective action commensurate with the criteria's significance. This will be completed in RF-6.
3. Refurbish four circuit breakers during cycle 7 and one in RF-7 to complete the refurbishment of all General Electric 4160 volt circuit breakers.
4. Obtain delivery of spare safety related circuit breaker by the end of RF-6.

### Assurance

The GE Breaker Plan will address the material condition of GE breakers with respect to lubrication and other Industry identified issues. The two breakers to be inspected represent 40 % of the population. The inspection results will either provide the basis for a reasonable assurance that the breakers will perform satisfactory until they are refurbished in cycle 7 or will identify deficiencies and provide resolution for them.

## ***Westinghouse 4160 and 6900 Volt Circuit Breakers***

### Problem

Westinghouse breakers have a good industry and CPS record except for the following issues. The first issue is the motor cutoff switch that caused a failure to close of a Class-1E breaker at CPS. The second issue is with lubrication. It appears that in some cases components may not have received proper lubrication during the Clean & Inspect PM, thus having caused a failure to close in 1995. Also, CPS has seen degraded lubricant in large frame model DHP, Non-1E breakers in RF-5 (4/95) and on model DVP breakers in RF-6. Additionally, a problem has been identified (IEIN 96-50) with levering in devices that may prevent the breaker from closing in after it is believed to be fully racked-in. Westinghouse does not specify a refurbishment schedule for their model DHP and DVP breakers.

### Population

Safety Related	26 ( 22 - Model DHP, 4 - Model DVP )
Critical, Non-safety Related	57 ( all Model DHP )

### Plan Details

1. Inspections of eight safety related circuit breakers were completed in RF-6. These inspections included steps to ensure there was no binding in the motor cutoff switch linkage. No problems were identified during these inspections.
2. Develop detailed inspection and acceptance criteria to assess the material condition of circuit breakers including degraded lubricant, motor cutoff switch and levering-in device issues. This will be completed to support remaining inspections in RF-6.
3. Perform additional inspections using the newly developed inspection and acceptance criteria to assess the condition of five safety related and three critical non-safety related Westinghouse model DHP circuit breakers. This inspection will assess the overall material condition of the breaker including the motor cutoff switches and levering-in devices. Failure of critical parameters will result in an expansion of the scope to inspect additional breakers and take corrective action commensurate with the criteria's significance. This will be completed prior to the end of RF-6.
4. Perform detailed inspections of all four Westinghouse model DVP circuit breakers and rework and replace deficiencies as required. This will be complete prior to the end of RF-6.
5. Refurbish eight critical non-safety related main feed circuit breakers in cycle 7.
6. Based on inspection results and industry feedback, develop a plan to assess the refurbishment needs of the remaining safety related and critical non-safety related circuit breakers. This will be completed within 90 days after the end of RF-6.



7. Train appropriate Operations and Maintenance personnel on NRC Information Notice 96-50 recommendations on ensuring the breaker is completely racked-in. This will be complete before the end of RF-6.
8. Revise maintenance procedures to include NRC Information Notice 96-50 recommendations for inspections that should be performed to ensure that the levering-in device is not worn or cracked. Procedures previously provided instructions for inspections of the levering-in device but procedure revision will provide greater detail. This will be complete before the end of RF-6.

#### Assurance

The Westinghouse Breaker Plan will address the fail to close problem associated with levering in devices and will determine the material condition of Westinghouse breakers with respect to lubrication and motor cutoff switch issues. The eight breakers to be inspected represent 22% of the 36 safety and non-safety related breakers determined by Engineering and Operations as important to close. The inspection results will either provide reasonable assurance that the breakers will perform satisfactorily or will identify deficiencies and provide resolutions for them.