

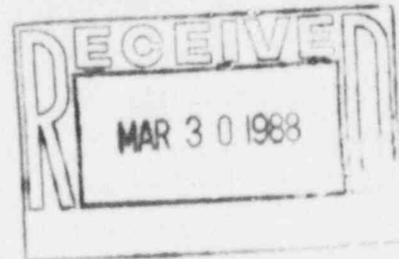
**LOUISIANA**  
POWER & LIGHT

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March 29, 1988

W3P88-0051  
A4.05  
QA

Mr. Robert D. Martin  
Regional Administrator, Region IV  
U.S. Nuclear Regulatory Commission  
611 Ryan Plaza Drive, Suite 1000  
Arlington, TX 76011



Subject: Waterford 3 SES  
Docket No. 50-382  
License No. NPF-38  
NRC Bulletin No. 88-01

Dear Mr. Martin:

This reply to the subject Bulletin provides the information requested concerning defects in Westinghouse circuit breakers. The LP&L review conducted in response to this Bulletin determined that Waterford 3 does not utilize Westinghouse series DS circuit breakers and is therefore not subject to the inspections requested or the safety concerns of Bulletin 88-01.

Should you require additional information, please feel free to contact me or G.E. Wuller, Operational Licensing Supervisor, at (504) 464-3499.

This response is submitted as requested under affidavit under provisions Section 182a of the Atomic Energy Act of 1954, as amended.

Very truly yours,

R.F. Burski  
Nuclear Safety & Regulatory Affairs  
Acting Manager

RFB:GEW:ssf

Attachment: Affidavit

cc: NRC Document Control Desk, Washington, D.C. (original)  
J.A. Calvo, NRC-NRR  
D.L. Wigginton, NRC-NRR  
NRC Resident Inspectors Office  
E.L. Blake  
W.M. Stevenson

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"OPPORTUNITY EMPLOYER"

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

In the matter of )  
 )  
Louisiana Power & Light Company ) Docket No. 50-382  
Waterford 3 Steam Electric Station )

AFFIDAVIT

R.F. Burski, being duly sworn, hereby deposes and says that he is Nuclear Safety and Regulatory Affairs Acting Manager, Nuclear Operations of Louisiana Power & Light Company; that he is duly authorized to sign and file with the Nuclear Regulatory Commission the attached response to NRC Bulletin No. 88-01; that he is familiar with the content thereof; and that the matters set forth therein are true and correct to the best of his knowledge, information and belief.

R.F. Burski  
R.F. Burski  
Nuclear Safety & Regulatory Affairs  
Acting Manager  
Nuclear Operations

STATE OF LOUISIANA)  
 ) ss  
PARISH OF ORLEANS )

Subscribed and sworn to before me, a Notary Public in and for the Parish and State above named this 29<sup>th</sup> day of March, 1988.

[Signature]  
Notary Public

My Commission expires for life.

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR REACTOR REGULATION  
WASHINGTON, D.C. 20555

RECEIVED  
ADMINISTRATIVE DIVISION

FEB 10 1988

February 5, 1988

88-0121

NRC BULLETIN NO. 88-01: DEFECTS IN WESTINGHOUSE CIRCUIT BREAKERS

Addressees:

For Action - All holders of operating licenses or construction permits for nuclear power reactors.

Purpose:

The purpose of this bulletin is to provide information on Westinghouse series DS circuit breakers and safety concerns associated with their use and to request that addressees using these breakers in Class 1E service perform and document inspection of the welds on the pole shafts and inspection of the alignment in the breaker closing mechanism.

Description of Circumstances:

The following occurrences have raised concerns about the use of these circuit breakers:

McGuire 2: On July 2, 1987, a DS-416 reactor trip breaker (RTB) failed to open in response to manual trip demands from the control room. The RTB had bound mechanically in the closed position because the main roller had become wedged between a raised segment of the close cam and the nearby side frame plate. Excessive lateral movement of the main drive link and a broken center pole lever to pole shaft weld permitted the binding to occur. The failure was reproduced once by the licensee during bench tests of the RTB at McGuire and several times during detailed laboratory investigations performed by Westinghouse. Substandard welding during fabrication (i.e., porosity, lack of fusion, inadequate extent of welding) caused the weld to break. Details of this failure mode are given in Information Notice No. 87-35, Supplement 1, dated December 16, 1987.

The licensee visually inspected the remaining pole shaft welds of the defective McGuire breaker and the other McGuire RTBs and found indications of lack of fusion (i.e., lack of characteristic weld bead ripple, notches at the edges of the weld beads, and small evidence of base metal melting).

Catawba 1 and 2: The licensee inspected all DS-416 RTBs and found a pole shaft with a crack about 1/4 inch long at the finish end of the antibounce lever weld. The licensee also observed lack of fusion at the start ends of the center pole

lever and antibounce lever welds. Subsequent examination under magnification of the Catawba pole shaft in the laboratory of an NRC contractor revealed two additional cracks, one at each end of the center pole lever weld. After the cracks from the center pole lever weld were removed, about half (i.e., 67 degrees of weld arc) of the original 120 degrees of weld arc remained.

Similarly, 86 degrees of weld arc remained after the antibounce lever weld defects were removed. The licensee's inspection of the RTBs included checking the alignment of the main roller on the close cam surface. Two RTBs were found with excessive lateral tolerance, allowing the roller to strike the side frame plates located adjacent to the close cam, even though the pole shaft welds were observed to be intact. The licensee also noted that some pole shaft welds of this type of circuit breaker used in its hydroelectric plants had failed several years ago but that they have performed satisfactorily since they were repaired by additional welding on the opposite sides of the levers.

Sequoyah 2: In April 1987, two fillet welds broke on the pole shaft assembly of a DS-416 circuit breaker that energizes the emergency fire protection pumps. The weld failures apparently freed the center moving contact assembly (i.e., the Y-phase contact assembly), allowing it to move independently of the pole shaft that drives the other two moving contact assemblies, as evidenced by an electrical phasing problem and erratic operation of the fire pump. The two failed welds joined adjacent levers (the center pole lever and the antibounce lever) to the pole shaft. The two levers are connected by a pin. On the basis of engineering analysis, the licensee concluded that the center pole lever weld failed first because of excessive porosity; the antibounce lever weld then failed because it was inadequately sized and could not accommodate the load normally supported by the center pole lever weld that was thrust upon it through the connecting pin.

Calvert Cliffs 1: In September 1986, a broken weld connecting the center pole lever to the pole shaft in a DS-206 circuit breaker used in Class 1E service for the control room habitability system was detected during routine maintenance surveillance. No adverse effect on breaker performance had been noted; the weld for the adjacent antibounce lever was observed to be intact and carrying the load of the broken weld. The licensee's measurements showed that the leg size on the pole shaft side was 0.3 inch and the leg size on the lever arm side was 0.1 inch. On the basis of analysis, the licensee concluded that the failure was due to extensive lack of fusion of the weld to the lever as a result of improper weld technique. The licensee examined an additional 10 welds on this pole shaft and another pole shaft and found that the start ends of the welds in general were not fused properly to the levers and that the weld legs generally exhibited mismatches. Cracks were detected in the start ends of 2 of the 10 welds.

Westinghouse: Both commercial grade and Class 1E circuit breakers of the DS series use similar pole shafts or possess features associated with the observed binding and electrical phasing problems. Specifically, Model Nos. DS-206, DSL-206, DS-416, DSL-416, and DS-420 are susceptible to these types of failures. The welds of these pole shafts were randomly inspected during manufacture. However, no documentation confirms either that in-process inspections were performed

when the pole levers were welded to the pole shafts or that inspections were performed during the dedication of the commercial grade breakers to Class 1E service.

Discussion:

As a result of the operating experiences and observations discussed above, there is a question concerning the operability of RTBs and other Class 1E circuit breakers of the Westinghouse DS series. Some DS series circuit breakers may not have been fabricated in compliance with General Design Criterion (GDC) 1 and Appendix B, 10 CFR 50, and have inadequate welds joining levers to pole shafts. Excessive misalignment of the main rollers on the close cam also can occur. GDC 1 and Appendix B require, in part, that components important to safety be fabricated to quality standards commensurate with the importance of the safety functions to be performed. Consequently, licensees should take action to confirm compliance with GDC 1 and 10 CFR 50 Appendix B and to inspect all relevant welds and roller clearances according to the manufacturer's specifications and to take appropriate remedial actions to correct deficiencies.

On December 1, 1987, Westinghouse issued Technical Bulletin NSID-TB-87-11 (Attachment 1) as a result of its investigation of the McGuire 2 RTB failure. It recommended inspection of the pole shaft welds and of the alignment in the breaker closing mechanism according to specific criteria and provided guidance for corrective actions if required, including a procedure for the removal and installation of pole shafts. The NRC has reviewed the Westinghouse technical bulletin and finds that it adequately addresses the NRC concerns subject to certain changes discussed below. Specifically, the NRC has concluded that RTBs should be inspected expeditiously, that in view of the Sequoyah 2 weld failures welds should be inspected for porosity, and that a bypass breaker not meeting the weld criteria in the Westinghouse technical bulletin should be removed from service.

Actions Requested:

The phrases "short-term inspection" and "long-term inspection" used in this NRC Bulletin are consistent with the phrases as used in the Westinghouse technical bulletin. Specifically, short-term inspections refer to inspections of the three main pole levers (the left pole lever, the center pole lever, and the right pole lever). These short-term inspections should be performed on breakers at the next available opportunity (e.g., a maintenance outage) or during the next surveillance test for the breaker, whichever is earlier. Long-term inspections refer to inspections of the four remaining welds on the pole shaft and to the direct check of the alignment of the breaker closing mechanism. These long-term inspections should be performed on the breaker prior to restart following the next refueling outage. However, for plants that have not yet received an operating license, the implementation periods for the short-term and long-term inspections are modified by this NRC bulletin to mean before fuel loading.

As used in this NRC bulletin, the phrase "replacement pole shaft" may include a repaired pole shaft. However, since welding of a pole shaft lever may cause

distortion and misalignment of the lever, such repairs should be attempted only after consultation with Westinghouse. Any repaired pole shaft weld should meet the criteria in Section 6.1.1 of the Westinghouse technical bulletin, as supplemented below.

Addressees using Westinghouse DS-206, DSL-206, DS-416, DSL-416, and DS-420 circuit breakers in Class 1E applications, including RTBs, are requested to perform short-term and long-term inspections in accordance with the Westinghouse technical bulletin, except that the following changes should be made to the following sections:

6.0 Add the following:

However, inspection of the 3 main pole shaft welds for all RTBs (both main and bypass) should be completed within 30 days of receipt of this NRC bulletin.

6.1.1, 6.1.2, and 7.1 Add the following:

- e) porosity - surface pin holes with cumulative diameters less than 1/16 inch in each inch of weld

6.2.4 Delete this section and the reference to it in Section 6.2.3.

With regard to Section 6.2.4, any RTB with a pole shaft that does not meet the criteria in Section 6.1.2 should be deemed inoperable and should not be used in the operating or bypass breaker position in the reactor trip switchgear. Such pole shafts should be removed from service and a replacement pole shaft installed in the breaker before returning it to service. The replacement pole shaft should meet the criteria in Section 6.1.1.

Reporting Requirements:

If addressees cannot meet this suggested schedule for short-term and long-term inspections, they should justify to the NRC their proposed alternative schedules.

Records of inspections and corrective actions in response to this NRC bulletin shall be documented and maintained in accordance with plant procedures for Class 1E equipment. Any addressee who does not have circuit breakers subject to this bulletin shall provide a letter to the NRC stating this fact within 60 days of receipt of this bulletin. Addressees who do have circuit breakers subject to this bulletin shall provide letters of confirmation to the NRC of the completion of the inspections. These letters shall include the number of breakers of each type inspected, the number of breakers of each type requiring corrective actions due to pole shaft welds not meeting the acceptance criteria and the number of breakers of each type requiring corrective actions due to mechanism alignments not meeting the acceptance criteria. These letters of confirmation shall be submitted to the NRC within (1) 30 days of completion of the short-term inspections and (2) 30 days of completion of the long-term inspections.

Since inspection of the three main pole shaft welds for all RTBs should be completed within 30 days of receipt of this bulletin, a letter of confirmation of completion of these inspections including the above information is requested within 60 days of receipt of this bulletin.

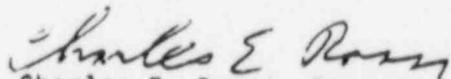
The letter of confirmation shall be submitted to the appropriate Regional Administrator under oath or affirmation under the provisions of Section 182a, Atomic Energy Act of 1954, as amended. In addition, the original copy of the cover letter and a copy of any attachment shall be transmitted to the U. S. Nuclear Regulatory Commission, Document Control Desk, Washington D.C. 20555, for reproduction and distribution. For purposes of NRC accounting, all correspondence associated with this bulletin, including the letter of confirmation, should bear the identifying number TACS 65955/65956.

This request for information was approved by the Office of Management and Budget under blanket clearance number 31500011. Comments on burden and duplication should be directed to the Office of Management and Budget, Reports Management, Room 3208, New Executive Office Building, Washington D.C. 20503.

Although no specific request or requirement is intended, the following information would be helpful to the NRC in evaluating the cost of complying with this bulletin:

- (1) staff time to perform requested inspections, corrective actions, and associated operability testing
- (2) staff time to prepare requested documentation
- (3) additional cost incurred as a result of the inspection findings (e.g., costs of corrective actions, costs of down time)

If you have any questions about this matter, please contact one of the technical contacts listed below or the Regional Administrator of the appropriate regional office.

  
Charles E. Rossi, Director  
Division of Operational Events Assessment  
Office of Nuclear Reactor Regulation

Technical Contacts: Darl S. Hood, NRR (301) 492-1442      K. R. Naidu, NRR (301) 492-0980  
C. Vernon Hodge, NRR (301) 492-1169      C. D. Sellers, NRR (301) 492-0930

Attachments:

1. Westinghouse Technical Bulletin NSID-TB-87-11, December 1, 1987
2. List of Recently Issued NRC Bulletins