

Brown Boveri

BBC
BROWN BOVERI

Switchgear Products Group

BBC Brown Boveri, Inc.
Spring House, PA 19477
Phone: (215) 628-7400

July 9, 1985

Mr. Larry Parker
Mail Stop E/W-E
Office of Inspection & Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: BBC Brown Boveri
HK Control Device

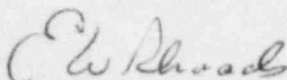
Dear Mr. Parker:

Per our telephone conversation of July 9, 1985, enclosed is a copy of an internal BBC Brown Boveri letter on the HK control device incident reported by TVA in the July 3, 1985 Morning Report.

This letter will be used by our District Office in Knoxville to write a report to TVA on the problem they have experienced with the HK control device.

It appears that this is the same problem that was identified in the BBC Brown Boveri Report to the NRC dated 3/22/83.

We will keep you advised of any changes in this situation.



E. W. RHOADS
Manager Quality Assurance

EWR/jm

Enclosure

cc: F. D'Antonio
A. Kaiser
L. Schmidt
G. Taylor
F. Wuzzardo

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Inter-Office Correspondence

To C. E. Wood - 5211 From E. W. Rhoads Dept./Div. Quality Assur.

Date 7/1/85 Location Spring House

Subject BELLEFONTE NUCLEAR STATION
A.O. 33-51014 & 33-54753

Copies To F. D'Antonio
L. Schmidt
G. Taylor
F. Wuzzardo

On February 23, 1983, the W. H. Zimmer Nuclear Power Station filed an interim 10CFR50.55(e) report with Region III of the U. S. Nuclear Regulatory Commission identifying a potentially reportable deficiency of a broken limit switch carrier on the HK control device used on some BBC Brown Boveri HK circuit breakers. This particular control device is used on circuit breaker types 7.5kV through 15kV, 500 through 750 MVA; 5HK350, 3000; and HKV circuit breakers.

On March 33, 1983, BBC Brown Boveri filed a 10CFR Part 21 report with the Office of Inspection and Enforcement of the U. S. Nuclear Regulatory Commission in Washington, D.C. to supplement the information in the report filed by CG&E and to clarify the extent of this potential problem at other nuclear power plants.

During the telephone conversation between BBC Brown Boveri and TVA on June 13, 1985, TVA was advised that the BBC Brown Boveri letter of March 22, 1983 to the NRC probably contained the information required to correct the condition they were experiencing with the control device on the 7.5 and 15HK circuit breakers at the Bellefonte Nuclear Station.

At the time of this conversation, TVA noted that some of the control devices utilized a spring with a ball and others utilized a spring with a cylinder to retain the contacts in the limit switch carrier of the control device.

A check of production records shows that the ball and spring were used to retain the contacts within the contact carrier until April 12, 1976, at which time an engineering change was made utilizing a cylinder within the spring to retain the contacts. Also, the cylinder was changed back to a ball on May 14, 1984 on the 7.5 and 15HK circuit breakers. The ball and spring retention has always been used on the HK1000 MVA and K-Line circuit breakers.

For the HK circuit breakers at the Bellefonte Station, either method of contact retention is acceptable, however, if TVA prefers to use all cylinders for the sake of uniformity, parts will be furnished by BBC Brown Boveri at no charge.

The inspection/adjusting procedure included in the BBC Brown Boveri 10CFR Part 21 report to the NRC dated March 22, 1983 should be followed by TVA during circuit breaker check-out or maintenance routines.

7/1/85

BBC Brown Boveri will supply parts if required, to make adjustments per IB 8303 (included with report to NRC dated March 22, 1985). Please note IB 8303 was revised (Rev. 1 was issued June 11, 1985). A copy is attached as an enclosure to this letter.

Although the problem with the control device (191921-T6) experienced at Bellefonte on three circuit breakers appears to be different than the condition described in the BBC Brown Boveri 10CFR Part 21 report of 3/22/83 because of balls or cylinders used with the contact retention springs, the BBC Brown Boveri evaluation of this condition indicates that the primary cause of contact becoming loose is due to the shock created by the lever overtravel as described in IB8303. The condition could be caused by lever stop not being short enough to limit the lever travel. Also, the shock to the control device is reduced when the circuit breaker is fully assembled and installed in the compartment. When the arc chutes are removed, as they sometimes are during checkout or maintenance, the shock to the control device during circuit breaker operation can be higher than normally experienced.

As stated above, both balls and cylinders have been used in control devices over many years with satisfactory results. Both types have been tested successfully during several seismic tests.

It should be noted that the changes from the ball to the cylinder and back to the ball on the 7.5 and 15HK circuit breakers was not related to the factory specification changes of the settings for the limit switch adjustments of the control device. The change back to the ball occurred in May 1984 at which time no changes were made to the limit switch adjustments. A change to the factory specification for limit switch adjustments was made in November 1984. These type changes are not normally the type that require customer notification.

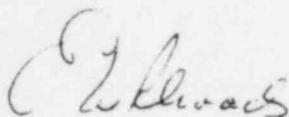
The information included in IB8303 was determined to be a design improvement to reduce or eliminate breakage of the limit switch carrier. The change included in Revision 1 of IB8303 is considered a refinement to further improve the operation of the control device.

It is recommended that IB8303 Rev. 1 dated June 11, 1985, be factored into the Bellefonte circuit breaker checkout procedures. Lever stops will be furnished by BBC Brown Boveri. Cylinders may be used in place of balls in the contact retention springs (note springs would change also). Both are acceptable for the 7.5 & 15HK control device design. Again, if desired, BBC Brown Boveri will provide these parts at no charge.

7/1/85

The circuit breakers at Sequoyah plant are of an earlier configuration and therefore, IB8303 is not applicable.

The results of using IB8303 at the Zimmer plant of CG&E have resolved their problem as originally reported. To the best of our knowledge, no other problems have been reported. Please keep us informed of your progress in completing the checkout of these circuit breakers.



E. W. RHOADS

EWB/ms

Enc.

INSTRUCTIONS FOR INSPECTING, ADJUSTING AND/OR REPLACEMENT
OF PARTS FOR OBTAINING LIMIT SWITCH ADJUSTMENTS
ON BROWN BOVERI 7.5KV THRU 15KV, 500 THRU 750 MVA;
5HK350, 3000; ALL HKV BREAKERS

IB-8303



INSTRUCTIONS FOR INSPECTING, ADJUSTING AND/OR REPLACEMENT
OF PARTS FOR OBTAINING LIMIT SWITCH ADJUSTMENTS
ON BROWN BOVERI 7.5KV THRU 15KV, 500 THRU 750 MVA;
5HK350, 3000; ALL HKV BREAKERS
(MANUFACTURED BETWEEN MARCH 1974 AND JULY 1978 INCLUSIVE)

1. GENERAL

- 1.1 For general breaker instruction, refer to the appropriate Brown Boveri Instruction Bulletin.
- 1.2 The breaker must be removed from the switchboard.
- 1.3 Unless otherwise stated, the breaker is to remain open with closing springs discharged.
- 1.4 The reason for a gap at Dim. "A" is to insure the "LSa" contact is made. The gap at Dim. "B" is to insure that the "LSb" contacts are made and to limit the overtravel of the lever so that the limit switch plastic carrier inside the control relay is not broken.
- 1.5 This Instruction Bulletin supersedes IB-7803.

2. INSPECTION AND ADJUSTMENT FOR DIM. "A" (See Fig. 1)

- 2.1 Charge the closing springs electrically or manually.
- 2.2 Check Dim. "A" with feeler or pin gages.
- 2.3 If required, readjust the screw (4) to Dim. "A" after first loosening the jam nut (5) and then retightening the jam nut after the adjustment.
- 2.4 Close and open the breaker to discharge the closing springs.

3. INSPECTION AND ADJUSTMENT FOR DIM. "B" (See Fig's 1 and 2)

- 3.1 For this procedure, the breaker is to be open and the closing springs discharged.
- 3.2 Check Dim. "B" with feeler or pin gages. (See Fig. 2)
- 3.3 If Dim. "B" is not within dimensions, it is necessary to shim the lever stop(7) up or down as required. This is done by adding or removing shims(2) at the lever stop. (See Fig. 1) Note that if all shims are removed and the Dim."B" still exceeds the max. allowed, the length of the lever stop should be checked. The lever stops made after July 1978 are $2 \frac{17}{32}$ long. Previous to this, the length was $2 \frac{25}{32}$. If required, install the shorter lever stop (7).

4. NEW PART NUMBERS

	<u>Qty. Per Breaker</u>	<u>Notes</u>
2. Shim 650451-A27	As req'd (3 est.)	
7. Lever stop 193392-A	1	2 17/32 overall length. Used in breakers built after July 1978.

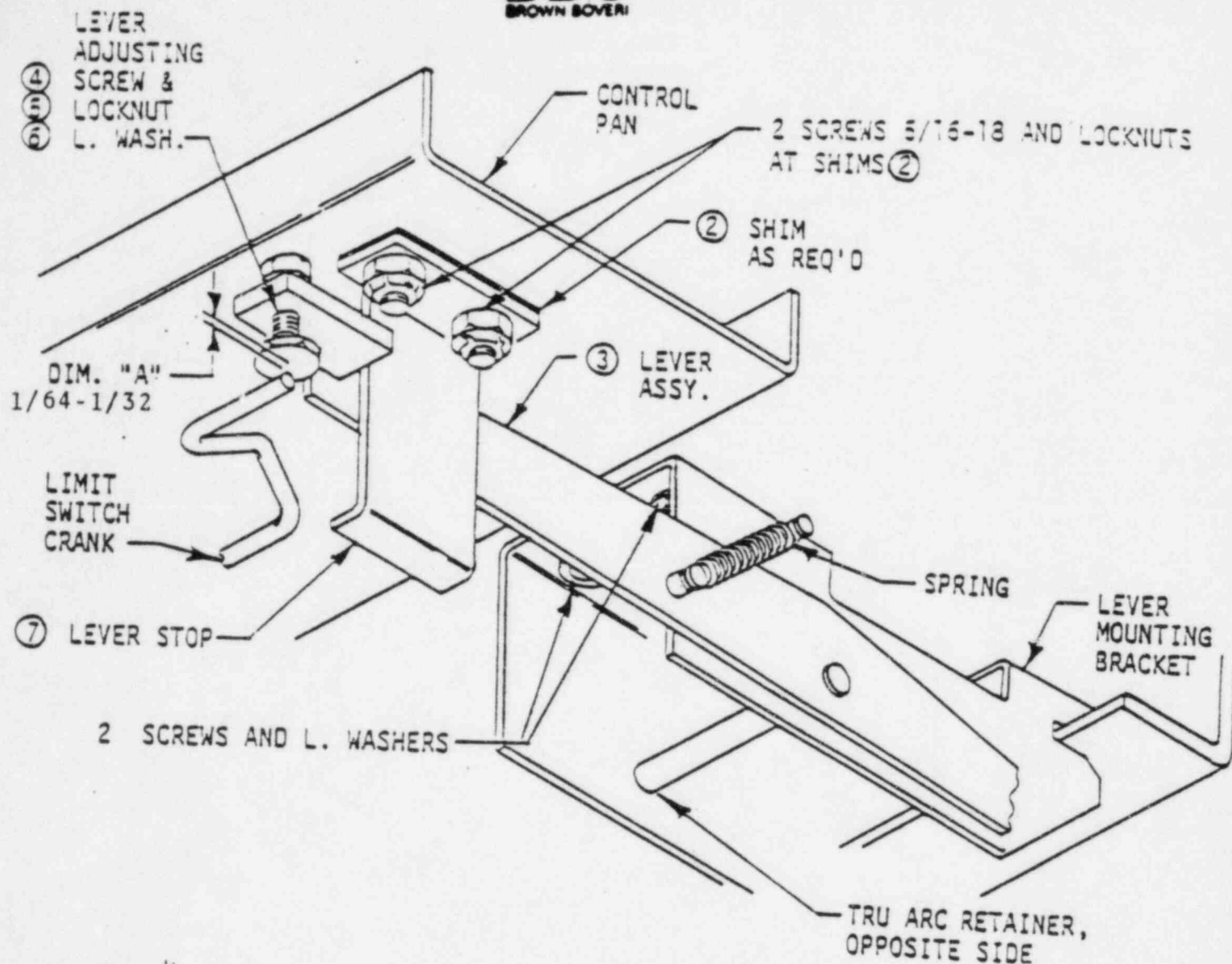


FIG. 1

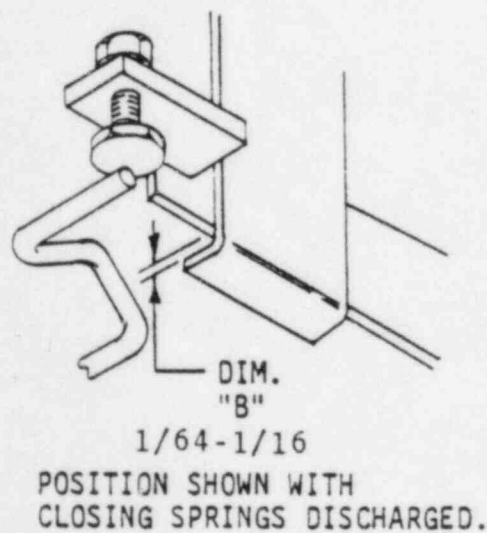


FIG. 2