



Albert F. Kaiser  
President

November 6, 1990

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U.S. Nuclear Regulatory Commission  
Attn: E. William Branch, Chief  
Vendor Inspection Branch  
Division of Reactor Inspection & Safeguards  
Office of Nuclear Reactor Regulation  
Washington, DC 20555

Subject: Part 21 Report  
ABB K-Line Circuit Breakers

Gentlemen:

This letter is in response to the NRC concerns about workmanship and manufacturing deficiencies detected in ABB K-Line circuit breakers at the Haddam Neck Nuclear Power Plant. The circuit breakers were manufactured in April 1988, and the problems were detected in early 1989 and reported in April 1989.

Prior to the date of that report some workmanship and manufacturing deficiencies were identified by Iowa Electric Light and Power Company (Duane Arnold Plant). These circuit breakers were manufactured in August 1988. The problems were identified about October 1988. These twelve K-Line circuit breakers were returned to the factory for rework and retest and returned to the customer about November 1988.

Assembly of circuit breakers was moved from Columbia, SC. to Florence, SC, at the end of 1987. A large number of new employees had to be trained in 1988, although inspection was intensified, some errors did occur. Management believed these problems were all resolved.

However, there have been reports of workmanship and manufacturing deficiencies from FP&L (St. Lucie and Turkey Point) and from Wisconsin Electric Power (Point Beach) concerning circuit breakers manufactured recently. Problems reported concerned cracked arc chutes and careless workmanship evidenced by loose or missing hardware.

One problem noted is that on some K3000/K4000 circuit breakers, maladjustment of the contact gap has caused the pushrod to hit the arc chute and cause breakage of the arc chute. This arc chute material is brittle and if it does fall into the breaker it is unlikely to cause a problem. This condition can be corrected by proper setting of the contact gap and replacing the arc chute.

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K-Line arc chutes were originally manufactured with a cement mixture strengthened with asbestos (this is a safe form of asbestos). When this product was banned another fiber (wolastinite) was used, however this has proved to be too brittle and is being replaced by a new asbestos free material (hemit) which can withstand the rigors of shipping and handling and meets all technical requirements.

An inspection should be conducted to determine that a retaining ring is attached on both sides of the pivot pin connecting the jackshaft and the pushrod to the moving contact assembly. Retaining rings were reported missing at both Haddam Neck and St. Lucie.

ABB personnel are promptly correcting all of the problems reported by FP&L and Wisconsin Electric.

The ABB Circuit Breaker Division has instituted the following actions to immediately correct this situation and prevent further occurrences:

1. Assembly and test procedures and specifications are being reviewed.
2. All final testers are now required to receive additional training in electrical and circuit breaker theory.
3. To preclude a recurrence of the possible conditions, all K-Line circuit breakers manufactured by ABB are subject to an audit after the completion of final production tests.

ABB recognizes that there may be some concern over other K-Line circuit breakers manufactured since the move to Florence, SC. The detailed inspection and tests that circuit breakers normally receive prior to being placed into service would identify the types of problems reported.

In order to allay any concerns, in the case of K-Line breakers that have not been checked out and placed in service, ABB will undertake a complete inspection either at the customer's location or by having such breakers returned to Florence. In the event of any deficiencies, the company will correct such deficiencies and extend the warranty period for one year from that date. ABB undertakes to complete this inspection by April 1, 1991.

# ROUTING - REQUEST

Please

- READ
- HANDLE
- APPROVE
- and
- FORWARD
- RETURN
- KEEP OR DISCARD
- REVIEW WITH ME

To JIM MCKNIGHT  
PLEASE PLACE IN POR  
UNDER DOCKET NO.  
99901220  
(NEW FILE)

Date 11/21

From STU MAGRUDER  
\* 23220



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Operation of the circuit breaker and its devices should be checked in accordance with I.B. 6.1.2.7-1G or IB 6.1.2.7-2B, revised copies of which were mailed to all K-Line users earlier this year.

Copies of this report are being sent to all nuclear utilities using K-Line circuit breakers. Attachment "A" includes a list of those utilities that have procured K-Line circuit breakers from 1988 through October 1990.

It should be noted that the K-Line circuit breaker has been on the market for over thirty (30) years. It was adapted for nuclear applications over twenty years ago and it has demonstrated very good reliability and has had no major problems.

A. F. Kaiser, President  
ABB Power Distribution Inc.

APK/jm

Attachment

## ATTACHMENT "A"

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<u>S.O.</u>	<u>CUSTOMER</u>	<u>DELIVERY</u>	<u>TYPE</u>	<u>QUANTITY</u>	<u>REMARKS</u>
48-12512	CEI - Perry	3/4/88	K-3000S	1	
48-12629	Georgia Power - Vogtle	5/20/88	K-600 OD4	3	
48-12791	PECO - Peach Bottom	7/1/88	K-600S	2	
48-12920	Iowa Elec. - Duane Arnold	8/26/88	K-800S - SS4	8	
48-12920	Iowa Elec. - Duane Arnold	8/26/88	K-800S - SS3	2	
48-14036	Iowa Elec. - Duane Arnold	10/21/88	K-800S	2	
48-14128	SCE - San Onofre	11/1/88	K-2000S	1	
48-14286	Arkansas Pwr - Ark Nuc One	12/14/88	K-1600 OD5	1	
48-14745	Houston Service Gulf States - River Bend	3/3/89	K-800 OD4	1	
48-14745	Houston Service Gulf States - River Bend	3/3/89	K-800 OD3	1	OD3 incorrectly ordered, changed to OD4
48-14745	Houston Service Gulf States - River Bend	3/3/89	K-800 OD3	1	OD3 incorrectly ordered, changed to OD4
48-14748	SCE - San Onofre	3/3/89	K-600S	6	
48-14752	Bechtel PECO Limerick	3/6/89	K-600S	1	
48-15041	Bechtel PECO Limerick	7/25/89	K-600S	1	Not Class 1E
48-15218	LILCO - Shoreham	5/22/89	K-600S	1	
48-15218	LILCO - Shoreham	6/19/89	K-600S	1	
48-15224	Duquesne Beaver Valley	6/6/89	K-600 OD4	1	
48-15265	Bechtel PECO Limerick	6/9/89	K-600S	1	
48-15265	Bechtel PECO Limerick	7/17/89	K-600S	1	

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<u>S.O.</u>	<u>CUSTOMER</u>	<u>DELIVERY</u>	<u>TYPE</u>	<u>QUANTITY</u>	<u>REMARKS</u>
48-15542	Bechtel PECO Limerick	8/89	K-600S	2	
48-15542	Bechtel PECO Limerick	7/7/89	K-600S	2	
48-15565	Detroit Edison	1/10/90	K-600S	1	
48-15566	Detroit Edison - Fermi	7/29/89	K-600S	1	
48-15568	Detroit Edison - Fermi	10/4/89	K-600S	1	
48-15569	Detroit Edison - Fermi	8&10/89	K-600S	2	
48-15594	Detroit Edison - Fermi	7/14/89	K-600S	1	
48-15759	Detroit Edison - Fermi	10/4/89	K-3000S	1	
48-15938	Niagara Mohawk Nine Mile 2	10/6/89	K-600 OD4	1	
48-16201	FP&L - St. Lucie	12/89	K-600S	10	
48-16201	FP&L - St. Lucie	12/89	K-1600S	2	
48-16201	FP&L - St. Lucie	1/90	K-3000S	1	
48-16362	Arkansas Nuclear One	12/14/89	K-600 OD4	2	
48-16644	PECO - Peachbottom	1/90	K-600S	6	
48-16746	SCE - San Onofre	2/90	K-600S	2	
48-16820	FP&L - Turkey Point	4/90	K-1600S	5	
48-16820	FP&L - Turkey Point	4/90	K-600S	4	
48-16845	FP&L - St. Lucie	2/90 - 3/90	K-3000S	5	
48-17027	PECO - Peachbottom	5/25/90	K-600S	3	
48-17257	Iowa Elec. - Duane Arnold	5/90	K-600S	7	
48-17259	FP&L - Turkey Point	6/90	K-1600	2	
48-17259	FP&L - Turkey Point	6/90	K-600	2	

## ATTACHMENT "A"

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<u>S.O.</u>	<u>CUSTOMER</u>	<u>DELIVERY</u>	<u>TYPE</u>	<u>QUANTITY</u>	<u>REMARKS</u>
48-17438	PSEG - Salem	6/25/90	K-1600	1	
48-17618	Arkansas Power - Nuclear One	8/90	K-600	1	
48-17868	FPC - Crystal River	5/90	K-600	2	
48-17872	APS - Palo Verde	8/24/90	K-600S	1	Not Class 1E
48-18114	Niagara Mohawk - Nine Mile Point	10/90	K-600	2	
48-65101	Wisc. Elec. Pwr - Point Beach	4/27/90	K-DON-1600S	1	
48-65101	Wisc. Elec. Pwr - Point Beach	4/90	K-DON-800S	14	
48-65101	Wisc. Elec. Pwr - Point Beach	4/26/90	K-4000S	2	
48-66444	FP&L - Turkey Point	9/89-10/89	K-1600S	10	
48-66444	FP&L - Turkey Point	8/89-9/89	K-600S	4	
48-66653	FP&L - Turkey Point	1/10/90 12/30/89	K-600S K-1600S	1 1	Not Class 1E
48-66718	FP&L - Turkey Point	5/90	K-800S	2	
48-66718	FP&L - Turkey Point	5/90	K-1600S	1	
48-68012	NSP - Praire Island	9/90	K-600S	12	
48-66281	Connecticut Yankee - Haddam Neck	4/88	K-3000S	1	
48-66281	Connecticut Yankee - Haddam Neck	4/88	K-1600S	12	