REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 8708050209 DOC. DATE: 87/07/31 NOTARIZED: NO DOCKET #
FACIL: 50-315 Donald C. Cook Nuclear Power Plant, Unit 1, Indiana & 05000315
50-316 Donald C. Cook Nuclear Power Plant, Unit 2, Indiana & 05000316

AUTH. NAME	AUTHOR AFFILIATION
ALEXICH, M. P.	Indiana & Michigan Electric Co.
RECIP. NAME	RECIPIENT AFFILIATION
MURLEY, T. E.	Document Control Branch (Document Control Desk)

SUBJECT: Part 21 rept re notification made concerning transformer lead corrosion, per 870727 telcon. Corrosion discovered on leads to transformers sufficient to create potential safety hazard, had transformers been installed w/o repair.

DISTRIBUTION CODE: IE19D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 5
TITLE: Part 21 Rept (50 DKT)

NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	PD3-3 LA	1	0	PD3-3 PD	1	1
	WIGGINGTON, D	1	1			
INTERNAL:	AEOD/DOA	1	1	AEOD/DSP/TPAB	1	1
	ARM TECH ADV	1	1	NRR CRUTCHFIELD	1	1
	NRR VARGA, S	1	1	NRR/DEST/ADE	1	1
	NRR/DEST/ADS	1	1	NRR/DLPQ/QAB	1	1
	NRR/DOEA/EAB	1	1	NRR/DOEA/GCB	1	1
	NRR/DRIS/VIB	1	1	NRR/PMAS/ILRB	1	1
	REG FILE 01	1	1	RES DEPY GI	1	1
	RES/DE/EIB	1	1	RGN1	1	1
	RGN2	1	1	RGN3	1	1
	RGN4	1	1	RGN5	1	1
EXTERNAL:	INPO RECORD CTR	1	1	LPDR	1	1
	NRC PDR	1	1	NSIC SILVER, E	1	1

TOTAL NUMBER OF COPIES REQUIRED: LTTR 27 ENCL 26

INDIANA & MICHIGAN ELECTRIC COMPANY

P.O. BOX 16631
COLUMBUS, OHIO 43216

July 31, 1987
AEP:NRC:0971B

Donald C. Cook Nuclear Plant Units 1 and 2
Docket Nos. 50-315 and 50-316
License Nos. DPR-58 and DPR-74
PART 21 - TRANSFORMER LEAD CORROSION

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

Attn: T. E. Murley

Dear Dr. Murley:

This letter is to confirm the telephone conversation of July 27, 1987 between Mr. P. A. Barrett of American Electric Power Service Corporation and Mr. D. L. Wigginton of the NRC Office of Nuclear Reactor Regulation regarding notification made pursuant to 10 CFR 21. Specifically, on July 27, 1987 we concluded that corrosion discovered on the leads to transformers (ITE dry-type transformers; 4KV/600V-2000KVA and 4KV/480V-1000KVA), supplied to the D. C. Cook Nuclear Plant by Brown Boveri Corporation, was sufficient to create a potential safety hazard, had the transformers been installed without repair.

In May 1987, we were preparing to install transformers which had been in storage for approximately one year. During the preparation, corrosion and pitting were observed on the leads to bus contact surfaces. The cause of the corrosion was flux residue (ammonium chloride) on the leads, which forms hydrochloric acid in the presence of moisture. The moisture present in a normal storage environment (for electrical equipment) is sufficient to support the chemical reaction needed to form hydrochloric acid. The acid reacts with the tin-plating, copper, and aluminum at the lead to bus lug contact surface, producing corrosive effects.

The degraded transformers leads have not presented any actual threat to the safety of the D. C. Cook Plant. The degraded transformer leads were identified, cleaned and reterminated prior to installation in Unit 1. The Unit 2 transformers were not placed in extended storage and have been energized; thus, enough heat has been available to sublime the flux residue. We have made resistance checks and visual inspections, which have revealed no indication of degradation on the Unit 2 transformers.

We believe that although failure of the Unit 1 transformers could have occurred if the corrosion had gone undetected, this issue did not

IE19
1/1

constitute a substantial safety hazard to the Donald C. Cook Nuclear Power Plant. In addition, we are not aware of other facilities or activities subject to 10 CFR 21 for which any of these transformers have been supplied.

Attached is a letter dated May 26, 1987 from Mr. Tom Harner of Brown Boveri Corporation (BBC) to Mr. Jim Markham of D. C. Cook Nuclear Plant and a Statement of Conformance dated June 19, 1987 from BBC. The letter and the Statement of Conformance address BBC's confirmation of the cause of the corrosion and action that can be taken to resolve the effects of the corrosion.

If you need further information please contact Mr. P. A. Barrett, Nuclear Safety and Licensing (614-223-2034).

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

Very truly yours,

M. P. Alexich
Vice President

cm

cc: John E. Dolan
W. G. Smith, Jr. - Bridgman
R. C. Callen
G. Bruchmann
G. Charnoff
NRC Resident Inspector - Bridgman
A. B. Davis - Region III

Attachment to AEP:NRC:0971B

Letter, T. Harner (BBC) to J. Markham (D. C. Cook Plant),

Dated May 26, 1987

Statement of Conformance from BBC,

Dated June 19, 1987

Transformer & Switch Division
Brown Boveri Power Equipment, Inc.

BBC
BROWN BOVERI

Transformer & Switch Division
Brown Boveri Power Equipment, Inc.
State Route 42
P. O. Box 38
Bland, VA 24315

May 26, 1987

SHEET ATTACHMENT 2 OF
SUB PR 87-0437
BY W. S. CK.
DATE 7/24/87

Mr. Jim Markham
D. C. COOK NUCLEAR PLANT
Red Arrow Highway
Bridgman, MI 49016

Dear Mr. Markham

SUBJ: Corrosion

This letter is to confirm our conversation on 5-22-87, concerning the corrosion on the aluminum bus on the transformers supplied on our S.O. #24-30985S thru 24-30999S.

After veiwing the photographs that you sent, we can confirm that this corrosion was caused by the acid flux used on the braided flexes during the tinning process. The flexes were not cleaned as thoroughly as they should have been after they were tinned. The acid flux residue on the flexes attacked the aluminum bus and caused the corrosion. The flux that was used is STAY-CLEAN soldering and tinning flux made by the J. W. Harris Co. of Cincinnati, Ohio. This flux can be removed using hot water. We suggest that you clean the flexes that you have using a stainless steel wire brush and hot water only. The aluminum bus should also be cleaned with a stainless steel wire brush to remove the corrosion and provide a smooth contact surface. A corrosion inhibitor should be applied to both surfaces before re-connecting. We recommend PENETROX "A", made by the Burndy Co. of Norwalk, Conn. However, any inhibitor suitable for this type of connection may be used.

We apologize for the inconvenience this has caused. However, the electrical nor the mechanical reliability has in any way been harmed by this incident.

Regards

Tom Harner

Tom Harner
Field Service Coordinator

Wesley F. Patterson

Wes Patterson
Engineering Manager

BBC BROWN BOVERI POWER EQUIPMENT, INC.
P.O. Box 38
BLAND, VA. 24315

BBC
BROWN BOVERI

STATEMENT OF CONFORMANCE

We certify that the listed equipment and required documentation for same meet the requirements of the purchase and applicable specifications:

P.O. No: 02875-821-5X Rev. -

SPECIFICATION: DCCEE-199-QCN & 200 QCN Rev. -

PRIME VENDOR: BBC Brown Boveri, Inc.

SUPPLIER: BBC Brown Boveri, Inc.

ADDRESS: P.O. Box 38, Bland, VA. 24315

IDENTIFICATION: This Statement of Conformance covers the material and workmanship to repair the transformer bus corrosion problem on Bland S.O. No.'s 24-30985 S to 30989 S, 30993 S, 30995 S to 30997 S.

NOTE: The repair process of these transformers have been reviewed and approved by BBC. The modification will not affect the equipments integrity. The following repair process procedure is required.

Sand the terminations smooth with a hand held power sander or sanding block at least as large as the termination area to insure a smooth and uniform surface. After sanding, the following procedure should be followed to reconnect the braided flexes.

1. Clean aluminum contact area with a stainless steel wire brush.
2. Immediately coat the contact area with Alco #2 Electrical Joint Compound. Abrade contact area through compound with a stainless steel wire brush. Do not remove compound from contact area.
3. Clean the tinned copper braided flexes with a stainless steel wire brush and hot water. After cleaning, coat the contact area with Alcoa #2 Electrical Joint Compound.
4. Make connection. Torque bolts to 50 ft./lbs.

We certify that field repairs were performed in accordance with the above procedure under Brown Boveri direction.

Alfred M. French
Signature

Q. A. Supervisor
Title

June 18, 1987
Date

Rev. 1 - Dated 6/19/87

THIS 1 -PAGE DOCUMENT MEETS THE DA CERTIFICATION REQUIREMENTS OF PO# 02875-821-5X (FIELD MOD.)
ESS COG.E. J. Andrus DATE 7-31-87
QUALIF. REPORT TRANSMITTAL TO DEEOF REQUIRED: YES/NO/(N/A)