

83-908-005

Babcock & Wilcox

a McDermott company

Nuclear Power Generation Division

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December 3, 1982

Mr. Richard C. DeYoung, Director
Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: 10 CFR 21 Report

Dear Mr. DeYoung:

Pursuant to the requirements of 10 CFR 21, this report in three copies is submitted concerning loose locking clips that are used to secure terminal boards to the rear terminal panels of safety-related instrumentation cabinets.

Dr. D. H. Roy, acting for Mr. D. E. Guilbert, Vice-President, Utility Power Generation Division, was informed of this reportable concern at 12:00 Noon, December 2, 1982.

A telephone report of this concern was made to Mr. W. R. Mills of the Office of I&E at 4:30 P.M., December 2, 1982.

The attachment presents the necessary information relative to this matter. If you have any questions you may contact Mr. D. Mars of my staff at 804-385-2852.

Yours very truly,
T. L. Baldwin
J. H. Taylor
J. H. Taylor

JHT/fw
cc: R. B. Borsum, B&W Bethesda Office

Attachment

IE19
1/1

Loose Terminal Board Locking Clips

1. Introduction

Several loose locking clips (also known as speed nuts) that are used to secure terminal boards to the rear terminal panels of NNI, ESFAS and RPS cabinets were discovered at Oconee Unit 1. This report concludes that this occurrence and associated generic concern are reportable to the NRC under the requirements of 10 CFR 21.

2. Description of Concern

2.1 Discovery of Loose Clips

Loose clips were discovered during a cursory inspection of instrument cabinets at Oconee Unit 1 by Duke personnel. The clips, which are Tinnerman Push-On Speed Nuts, catalog No. C 7818-014-67, are used to secure the terminal blocks to the rear terminal panels of instrument cabinets. A speed nut or clip is a thin rectangular strip of spring steel, approximately 1/2"x 5/8", with a central hole. The strip has a slight curvature and is perforated to form 2 jaws that grip the post on which the clip is placed in such a manner as to allow the clip to be pressed on but to resist removal from the post. The speed nut is pushed on over the insulated post which surrounds each terminal on the system wiring side of the panel (see attached sketch). The following discrepancies were discovered at Oconee Unit 1:

1. One clip was loose on an NNI terminal board. The clip was still on the insulated portion of the terminal but was approximately 1/4" away from the cabinet wall. The clip was loose enough to move freely on the terminal.
2. One clip was found on the floor underneath the rear terminal panel in an ESFAS cabinet. Apparently the clip had come loose from a terminal that did not have a wire soldered to it and slid off the end of the terminal.
3. In another ESFAS cabinet, a clip had come loose, slid off the end of the terminal and was hanging on the wire that was soldered to the terminal.
4. A clip was found on an RPS terminal board that had apparently shorted from the uninsulated end of the terminal to the cabinet.

2.2 Generic Concern

In addition to the specific discrepancies discovered at Oconee 1, there is a general concern with this type of attachment device. It is possible that some termination panels on NNI, ESFAS and RPS panels in other B&W plants use Tinnerman Speed Nuts Cat #C7818-014-67 to fasten the terminal blocks to the panel and they may not adequately grip the outside diameter of the insulated post. It is possible that one or more speed nuts may work loose or completely come off of the insulated posts. This may result in (a) the terminal block becoming loose, (b) a speed nut contacting the uninsulated portion of a terminal and shorting to adjacent terminals or the cabinet, or (c) a speed nut falling off of a terminal and into the area below (this is possible where there is no wire on the terminal).

The safety concern is that loose clips can result in NNI, RPS or ESFAS signal paths being shorted to each other or to cabinet ground. While there are redundant signal paths in these systems, it is possible that if several clips were to become loose, a number of circuits could be affected and some safety functions could be defeated.

Suspect clips have been found in safety systems only at Oconee 1. It is not presently known to what extent other B&W plants have the suspect speed nuts in safety-related systems.

3. Reportability

In consideration of the common mode failure potential that loose clips could disable a safety system, it is concluded that the discrepant clips are reportable under the provisions of 10 CFR 21.

4. Corrective Action

4.1 Oconee

B&W has advised Duke Power Company (letter No. ONS-82-118 dated August 20, 1982) to locate and remove all speed nuts No. C7818-014-67 (aluminum finish) and replace them with speed nuts No. C185-014-4 (dull, dark finish). There are significant differences between the two fasteners in inside dimensions, material thickness and material hardness. The superior properties of No. C185-014-4 have led to its current exclusive use by Bailey Controls Company (BCCo).

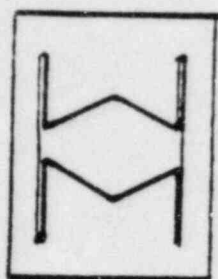
4.2 Generic

Bailey Controls Company, supplier of the ICS, NNI, ESFAS and RPS systems, has advised B&W that it is not aware of the exact locations of suspect fasteners. All B&W plants in operation and under construction, therefore, are being advised that a search be made for defective clips and that they be replaced with the superior clips. Accordingly, Service Bulletins have been sent to the other B&W operating plants (the Oconee Units were advised as described above), namely,

Three Mile Island Units 1 and 2 289 320
Crystal River 3 302
Arkansas Nuclear One Unit 1 313
Rancho Seco 312
Davis Besse 1 346

Notification is also being made to the plants under construction, namely

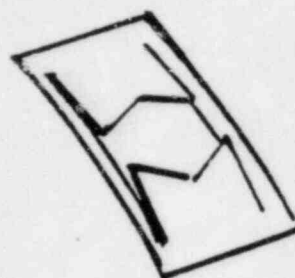
Midland Units 1, 2
Bellefonte Units 1, 2
WNP-1
North Anna 3, 4
Pebble Springs



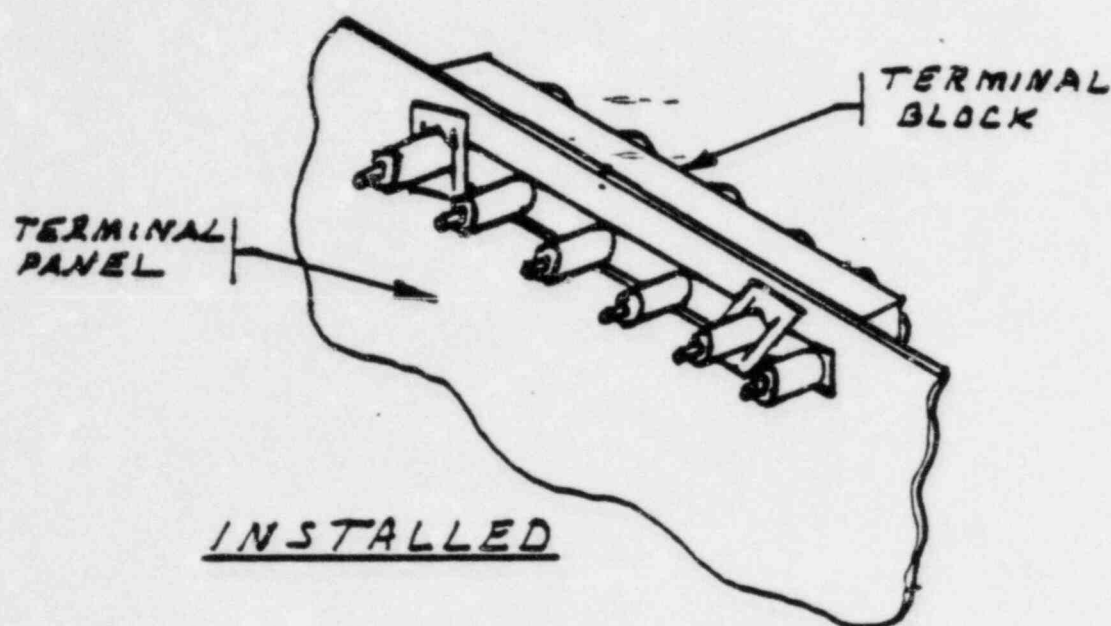
TOP
VIEW



SIDE
VIEW



PERSPECTIVE



TINNERMAN SPEED NUT
USED AS A TERMINAL
BLOCK FASTENER