



Nebraska Public Power District

COOPER NUCLEAR STATION
P.O. BOX 98, BROWNVILLE, NEBRASKA 68321
TELEPHONE (402) 825-3811

CNSS887255

June 29, 1988

Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Subject: Supplemental Response to IE Bulletin 84-02

- References:
1. IEB 84-02, "Failures of General Electric Type HFA Relays in Use in Class 1E Safety Systems".
 2. NLS 8400018, Letter from L. G. Kuncl (NPPD) to John T. Collins (NRC), dated July 16, 1984, NPPD Response to IEB 84-02.
 3. CNS Special Test Procedure 88-001, "Testing of 125 VDC HFA Relays in Safety Systems".

Gentlemen:

The above referenced IE Bulletin advised of failures of normally energized AC HFA relays due to thermal aging and eventual failure of the coil wire insulation. The IEB recommended replacing normally de-energized, as well as normally energized, HFA relays in safety-related applications within two years from the date of the bulletin.

The NPPD response to IEB 84-02, also referenced above, indicated that all safety-related HFA relays at CNS would be changed out during the 1984 Refueling Outage.

Since that response was submitted to the NRC, the District has replaced all 120 VAC safety-related HFA relays, as required. Subsequent discussions with General Electric, however, indicate that the Direct Current HFA relays operate at lower temperatures than the Alternating Current relays, and therefore, should exhibit significantly less coil insulation deterioration and a resultant longer life. To verify this, the District initiated a test to detect shorted coil turns that result from winding insulation deterioration and eventually lead to relay failure. General Electric was contracted to perform the test during the 1988 Refueling Outage. The test results indicated that none of the installed Class 1E DC HFA relays exhibited evidence of shorted turns.

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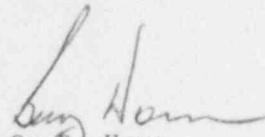
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Additionally, at G.E.'s recommendation, two of the tested relays were removed from service for further testing at the G.E. facility in San Jose, California. One normally energized and one normally de-energized DC relay were selected for the test. A temperature rise test was performed to verify that the relays were operating correctly. After this test, the relay coils were dissected to obtain samples of the windings for a flexure mandrel test. This test involved winding the coil wire samples around successively smaller diameter mandrels to determine insulation elasticity and adhesion. From the satisfactory results of these tests, along with the shorted turns test, it can be concluded that the DC HFA relays in safety-related systems at CNS have not reached an end of life condition due to thermal aging and will perform acceptably for at least five years from the date of the tests.

Based on the test data and General Electric's recommendations, the District will initiate a replacement of all normally energized DC safety-related relays at CNS during the 1989 Refueling Outage and a replacement of the remaining normally de-energized DC safety-related relays within five years.

Sincerely,



G. R. Horn
Division Manager of
Nuclear Operations

GRH:ss

cc: D. J. Brager, G.E., Omaha
J. Cintas, G.E. San Jose