

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

June 15, 1983

USNRC REGION II
ATLANTA, GEORGIA
83 JUN 16 P 8:59

WBRD-50-390/83-36
WBRD-50-391/83-36

U. S. Nuclear Regulatory Commission
Region II
Attn: Mr. James P. O'Reilly, Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30303

Dear Mr. O'Reilly:

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2 - SOLID-STATE PROTECTION SYSTEM TEST PROCEDURES - WBRD-50-390/82-91, WBRD-50-391/82-87 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector D. Quick on August 31, 1982 in accordance with 10 CFR 50.55(e) as NCR WBN NEB 8217. Our second interim report was submitted on December 16, 1982. Enclosed is our final report. We consider 10 CFR Part 21 applicable to this deficiency.

If you have any questions, please get in touch with R. H. Shell at FTS 858-2688.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills
L. M. Mills, Manager
Nuclear Licensing

Enclosure

cc: Mr. Richard C. DeYoung, Director (Enclosure)
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Records Center (Enclosure)
Institute of Nuclear Power Operations
1100 Circle 75 Parkway, Suite 1500
Atlanta, Georgia 30339

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ENCLOSURE

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2
SOLID-STATE PROTECTION SYSTEM TEST PROCEDURES
NCR WBN NEB 8217
WBRD-50-390/82-91, WBRD-50-391/82-87
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

During periodic testing of the Solid State Protection System (SSPS), the master relays which actuate safeguards systems are energized. The master relays, in turn, actuate the slave relays under operating conditions. However, during testing the voltage to the slave relays is reduced from 120V ac to 15V dc which allows checking electrical continuity through the slave relay coil without energizing the relay and actually starting the safeguards equipment. There is a test light in series with the slave relay which normally has a shunt around it. During testing the shunt is removed such that when the master relay contacts close, if the slave relay circuit is continuous, the test lamp will light. If, after testing, the switch which opens the shunt does not reclose, then a subsequent accident signal would apply 120V ac to the lamp which would cause it to burn open. This would prevent actuation of the slave relay. With present test procedures, this failure is undetectable. Both the SSPS and the test procedures were provided by Westinghouse Corporation, Pittsburgh, PA, who has determined that this deficiency was caused by a design error committed in a 1974 revision to the SSPS design.

Safety Implications

This undetected switch failure could result in a subsequent slave relay circuit failure. Since the slave relays are required to actuate safeguards equipment, their failure could result in a partial or complete failure of a system to achieve its safety function.

Corrective Action

TVA has implemented a procedural change (S. I. 3.1.26, revision 3) which initiates use of a test probe with an indicator lamp connected to ground and to a point between the shunt switch and the slave relay. (See attachment)

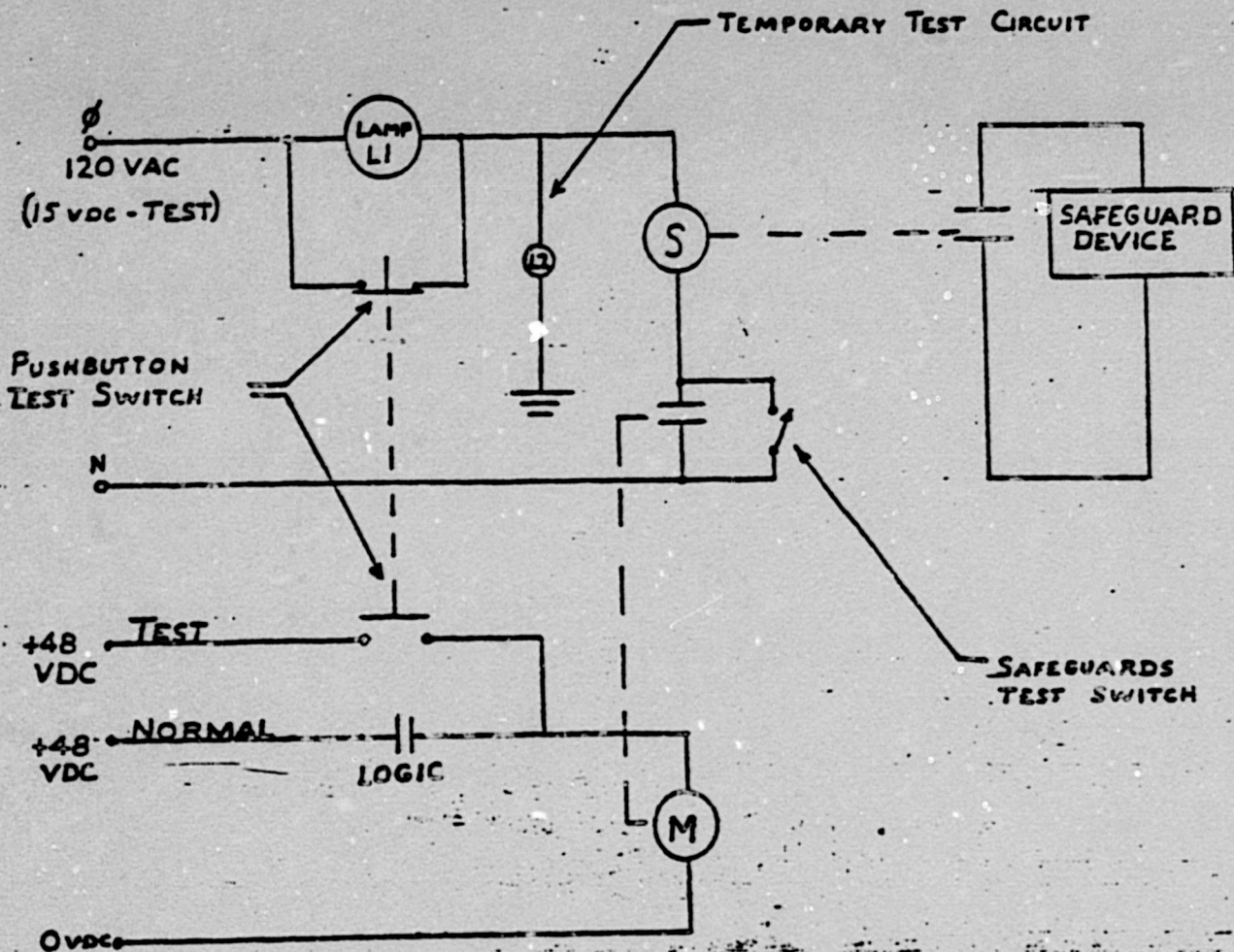
After returning the shunt switch to its normally closed position, this additional test circuit would give one of three indications:

1. Both the probe lamp and the relay test lamp would light which would indicate failure of the shunt switch.
2. Neither lamp would light which would indicate failure of both the shunt switch and the relay test lamp.
3. The probe lamp would light while the relay test lamp would remain dark. This would indicate proper restoration of the shunt.

If the shunt has been restored, then the probe circuit would be removed and the operating voltage of 120V ac would be restored to the slave relay circuit.

In order to prevent future recurrences, Westinghouse has put in place a design control manual to assure that all changes to safety system receive an independent design review and a nuclear safety staff review.

ATTACHMENT
SIMPLIFIED SKETCH OF SSPS TEST CIRCUIT
(SAFEGUARDS ACTUATION RELAY)



Normal Operation: "Logic contacts close to pick up Master relay M.
 Master relay contacts close to apply 120V ac to Slave relay S.
 Slave relay contacts close to power the Safeguards device.

During Testing: Relay mode selector switch (not shown) to "Test" position switches 120V ac to 15V dc.
 Pushbutton test switch picks up Master relay M and applies 15V dc to Slave relay coil thru proving lamp L.
 Slave relay is not energized because of reduced voltage of 15V dc.
 Test Circuit 2 indicates correct return of pushbutton.
 Test Switch by Lit-Unlit status of L2. Circuit is removed before returning slave circuit to 120V ac.