

TENNESSEE VALLEY AUTHORITY

Browns Ferry Nuclear Plant
Post Office Box 2000
Decatur, Alabama 35609-2000
April 30, 1990

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

Dear Sir:

TVA - BROWNS FERRY NUCLEAR PLANT (BFN) UNIT 2 - DOCKET NO. 50-260 - FACILITY
OPERATING LICENSE DPR-52 - REPORTABLE OCCURRENCE REPORT BFR0-50-260/90002

The enclosed report provides details concerning an unplanned Reactor Protection System Actuation due to an undetermined reason during functional testing of the scram discharge instrument volume level switches. This report is submitted in accordance with 10 CFR 50.73(a)(2)(iv).

Very truly yours,

TENNESSEE VALLEY AUTHORITY



J. R. Bynum
Vice President
Nuclear Power Production

Enclosure

cc (Enclosure):

Regional Administration
U.S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
Region II
101 Marietta Street, Suite 2900
Atlanta, Georgia 30323

INPO Records Center
Suite 1500
1100 Circle 75 Parkway
Atlanta, Georgia 30339

NRC Resident Inspector, BFN

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Browns Ferry Unit 2 DOCKET NUMBER (2) PAGE (3)
050002 6 0 1 OF 04

TITLE (4) Unplanned Reactor Protection System Actuation Due to Undetermined

Reason During Functional Testing of Scram Discharge Instrument Volume Level Switches

EVENT DAY (5) LER NUMBER (6) REPORT DATE (7) OTHER FACILITIES INVOLVED (8)
° SEQUENTIAL REVISION FACILITY NAMES DOCKET NUMBER(S)
MONTH DAY YEAR YEAR NUMBER NUMBER MONTH DAY YEAR
0 3 2 9 9 0 9 0 0 0 2 0 0 0 4 3 0 9 0

OPERATING THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §:

MODE (Check one or more of the following)(11)

(9) N 20.402(b) 20.405(c) X 50.73(a)(2)(iv) 73.71(b)
POWER 20.405(a)(1)(i) 50.36(c)(1) 50.73(a)(2)(v) 73.71(c)
LEVEL 20.405(a)(1)(ii) 50.36(c)(2) 50.73(a)(2)(vii) OTHER (Specify in
(10) 0 0 0 20.405(a)(1)(iii) 50.73(a)(2)(i) 50.73(a)(2)(viii)(A) Abstract below and in
20.405(a)(1)(iv) 50.73(a)(2)(ii) 50.73(a)(2)(viii)(B) Text, NRC Form 366A
20.405(a)(1)(v) 50.73(a)(2)(iii) 50.73(a)(2)(x)

LICENSEE CONTACT FOR THIS LER (12)

NAME TELEPHONE NUMBER
AREA CODE
Steven W. Austin, Mechanical Engineer, Compliance Licensing 2 0 5 7 2 9 - 2 0 4 9

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE SYSTEM COMPONENT MANUFACTURER TO NPRDS REPORTABLE
CAUSE SYSTEM COMPONENT MANUFACTURER TO NPRDS REPORTABLE

SUPPLEMENTAL REPORT EXPECTED (14)

EXPECTED MONTH DAY YEAR
SUBMISSION
YES (If yes, complete EXPECTED SUBMISSION DATE) X NO DATE (15)

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

At approximately 0925 hours, on March 29, 1990, a full actuation of the Unit 2 Reactor Protection System occurred while performing Surveillance Instruction "Reactor Protection System High Water Level Instrument Scram Discharge Functional Test."

The root cause of the event has not been determined. The sequence of event recorder was out of service during the event, thus making it impossible to pinpoint the exact cause of the full actuation. The probable cause of the full actuation can be attributed to continued problems with the "B" Scram Discharge Instrument Volume level switch.

The immediate corrective action was to stop the functional test; the SOS instructed the maintenance foreman to verify the proper valve alignment. The valve alignment was verified correct and the functional test completed. Further corrective action will be to return the first out printer and sequence of events recorder to service and retest the "B" channel level switch to ensure proper operation.

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TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	NUMBER	REVISION			
Browns Ferry Unit 2	0500026090	00	02	00	02	04	

TEXT (If more space is required, use additional NRC Form 366A's) (17)

Description of Event

At approximately 0925 hours, on March 29, 1990, a full actuation of the Unit 2 Reactor Protection System (RPS) [JC] occurred while performing surveillance instruction "Reactor Protection System High Water Level Instrument Scram Discharge Functional Test."

On March 28, 1990, at 1000 hours, the alarm "East Control Rod Drive (CRD) Discharge Volume Water Level Half Scram" [AA] was received in the Unit 2 main control room. Operations personnel investigated the cause of the alarm and determined there was no condition in the East Scram Discharge Volume to warrant the alarm. A work request was then issued to troubleshoot and repair the scram discharge instrument volume level switch "B".

At 0925 hours, on March 29, 1990, as part of the maintenance activity, the plant instrument maintenance technicians were performing the "Reactor Protection System Discharge Functional Test." During performance of that test, a full RPS actuation was received.

At 1315 hours, the Scram Discharge Instrument Volume high-level signal was bypassed and the RPS actuation was reset.

During this event, Units 1, 2, and 3 were defueled. This event is being reported under 10 CFR 50.73(a)(2)(iv) as an automatic actuation of an engineered safety feature, including the Reactor Protection System.

Analysis of Event

There are two scram discharge volumes for each reactor. The scram discharge volume is designed to receive and contain the water exhausted from the CRDs during a reactor scram, thereby limiting the loss of reactor coolant from the vessel during a reactor scram. The scram discharge volume instrumentation provides a means for measuring the amount of water in the scram discharge instrument volume. Normally, the scram discharge volume is empty. If the scram discharge instrument volume was to inadvertently become filled, control rod insertion may be prevented during a scram. Each scram discharge instrument volume has two channels of (one out of two taken twic logic) level switches which monitor level in the scram discharge volume. Actuation of either of these level switch channels will cause actuation of half the logic for the RPS.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)	PAGE (3)								
Browns Ferry Unit 2		<table border="1"> <tr> <td>YEAR</td> <td>NUMBER</td> <td>REVISION</td> <td>NUMBER</td> </tr> <tr> <td>05</td> <td>00</td> <td>02</td> <td>00</td> </tr> </table>	YEAR	NUMBER	REVISION	NUMBER	05	00	02	00	03 OF 04
YEAR	NUMBER	REVISION	NUMBER								
05	00	02	00								

TEXT (If more space is required, use additional NRC Form 366A's) (17)

Troubleshooting was being conducted just prior to the event. During the troubleshooting activity as instrument maintenance technicians were removing the protective cover from the "B" channel switch, its associated trip channel relay chattered and then locked in. This caused the actuation of the B channel of the Unit 2 RPS. Several attempts were made to repeat this by cycling the switch. As part of the troubleshooting activity, the switch was cleared and cycled. Each time the switch was cycled, the switch and its associated relay logic performed satisfactorily.

During the event, as part of the functional test, an actuation signal was intentionally initiated on RPS Channel "A" by actuating the "A" level switch. At approximately the same time, an unidentified actuation signal was received on RPS Channel "B." It is believed that since the "B" level switch has been operating improperly, this switch completed the logic to generate the full RPS actuation.

The RPS is designed to protect the reactor from operational transients. The RPS instrumentation and logic is designed to fail in the safe condition and subsequently cause a reactor scram. Had this event occurred at power, the scram would have still occurred.

The first out printer and sequential event recorder are designed to help plant personnel determine what causes a reactor scram and the sequence of events after the scram. During this event, both of these devices were out of service. Thus making it hard to identify the exact signal that gave the full scram during the functional test.

Cause of Event

The root cause of the event has not been determined. The sequence of event recorder was out of service during the event thus making it impossible to pinpoint the exact cause of the full actuation. There are numerous plant parameters that have the potential for causing an RPS actuation. The probable cause of the full actuation can be attributed to continued problems with the "B" level switch.

The instrument maintenance technicians tested "B" level switch several times during the troubleshooting activity without failure which led them to believe that there was no problem with the switch. A contributing factor in this event was the performance of the SI prior to determining the cause of the unplanned actuations of the "B" level switch. The SI was performed in the order written. This SI functionally tested the "A" channel level switch first and thus challenged the RPS logic prior to declaring the "B" level switch operable.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
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Browns Ferry Unit 2	050000	90	02	00	04	01	4

TEXT (If more space is required, use additional NRC Form 366A's) (17)

Corrective Action

The immediate corrective action was to stop the functional test. The instrument maintenance technicians were directed to exit the Scram Discharge Instrument Volume cage without making any changes. The SOS directed the instrument maintenance foreman to verify the east side Scram Discharge Instrument Volume valve alignment. The valve alignment was verified to be correct. The Scram Discharge Instrument Volume Level was bypassed and the Reactor Protection System Actuation was reset. After further troubleshooting, the instrument maintenance technicians completed the functional test without incident.

Further corrective action included the performance of the necessary maintenance to return to service the first out printer and sequence of events recorder.

The "B" channel level switch will be tested twice a month for two and one-half consecutive months to verify its proper operation. If during this accelerated testing the "B" level switch is found defective, the level switch will be replaced.

Previous Similar Events

None

Commitments

Test the "B" channel level switch twice a month for two and one-half consecutive months to verify its proper operation. This will be completed by July 1, 1990. If "B" level switch is found defective the switch will be replaced.

Energy Industry Identification System (EIIS) codes are identified in the text as [XX].