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UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

JULY 3, 1980

IE BULLETIN NO. 80-17

FAILURE OF 76 OF 185 CONTROL RODS TO FULLY INSERT DURING A SCRAM AT A BWR

Description of Circumstances:

On June 28, 1980, 76 of the 185 control rods failed to fully insert during a routine shutdown at TVA's Browns Ferry Unit No. 3 located at Athens, Alabama. The reactor was manually scrammed from about 30 percent power in accordance with routine shutdown procedures. The shutdown was initiated to repair the feedwater system. The 76 control rods that failed to fully insert were all on the east side of the core.

Following scram discharge volume (SDV) high level bypass and a short drain period of the SDV, a second manual scram was initiated and all partially inserted rods were observed to drive inward, but 59 remained partially withdrawn. A third manual scram was made, again following high level in the SDV and bypassing for another short drain of the SDV, with the result that 47 rods remained partially withdrawn. Following a longer drain of the SDV, an automatic scram occurred that was initiated by a scram discharge volume tank high water level signal when the scram reset switch was placed in "Normal"; with this scram all remaining rods fully inserted. The total time elapse from the initial scram to the time that all rods were inserted was approximately 15 minutes. Core coolant flow, temperature and pressure remained normal for plant conditions. The unit is now shutdown and additional testing indicates that a possible cause of the malfunction was the retention of a significant amount of water in the east bank scram discharge volume. In view of these interim findings and pending results of continued investigation, the following actions are to be taken.

Actions To Be Taken By Licensees:

All General Electric Boiling Water Reactors with operating licenses which are operating at any power on the date of this Bulletin shall perform the following steps in the time stated. Those that are presently shutdown shall perform the following steps prior to operating at power.

1. Within 3 days from the date of this Bulletin, perform surveillance tests to verify that there is no significant amount of water in the Scram Discharge Volume (SDV) and associated piping and that the SDV vent valves are operable and vent system is free of obstruction.

2. Within the next 20 days, perform one manual and one automatic scram in that order at normal operating temperature and pressure and with more than 50 percent of the rods fully withdrawn, and obtain the following information on each scram:
 - a) All rod insert times and as many individual rod scram times as practicable.
 - b) Voltage at the scram solenoid valve buses to verify that these solenoids are de-energized upon receipt of scram signal.
 - c) Verify that scram valve air is relieved through the backup valves and that the backup valves are fully open and remain open during the presence of a scram signal.
 - d) Measure fill time of the instrument volume from scram initiation to closure of the scram instrument volume high level alarm switch, to closure of the rod withdraw block switch on the instrument volume and to the closure of the scram instrument volume reactor scram switch.
 - e) Measure vent and drain valves opening and closing times utilizing the valve stem mounted switches. This measurement may be made independent of the scrams.
 - f) Measure the delay time from scram initiation to closure of the SDV vent and drain valves utilizing the stem mounted position switches.
 - g) Sample water from the instrument volume discharge after each scram for particulates.
 - h) Measure the time to drain the SDV down to a repeatable reference level.
 - i) Monitor the SDV and associated piping for residual water.
 - j) Verify that the ten (10) second delay on scram reset is functioning properly to prevent resets of momentary scram signals.
 - k) Compare the results of the two sets of data taken above with each other and with any previously obtained data.
3. At the conclusion of the scram tests and all other scrams, verify that all vent lines on the SDV are functional. Verify that there is no significant amount of water in the SDV and associated piping.
4. Within 10 days, complete a review of emergency operating procedures by the licensee and the NSSS vendor to assure that, for scram, operator actions include:

- a) Place the reactor mode switch in a position other than RUN.
 - b) Determine whether either of the two conditions below exist:
 - (1) Five (5) or more adjacent rods not inserted below the 06 position.
 - (2) Thirty (30) or more rods not inserted below the 06 position.
 - c) If either condition 4.b.(1) or 4.b.(2) exists:
 - (1) Trip the recirculation pumps.
 - (2) Insert rods manually. If rods cannot be inserted manually, alternately reset the RPS and scram the reactor until all rods are fully inserted.
 - (3) Vent the scram air header.
 - (4) Manually open or bypass the scram instrument volume drain and vent valves, if possible.
 - d) If, at any time, either condition 4.b.(1) or 4.b.(2) exists and either RPV water level cannot be maintained or suppression pool water temperature cannot be maintained below the suppression pool water temperature scram limit, initiate the SLCS.
 - e) Review the Browns Ferry occurrence with all licensed operators and train them in the procedures to recognize and mitigate the event. Verify that preliminary training of operators is completed within 10 days of the date of this Bulletin and that full training is completed within 30 days of the date of this Bulletin.
5. Review and develop surveillance procedures such that scram discharge volume is monitored daily for residue water for 6 days and, if results are acceptable the interval may be extended to 7 days.
6. In order to mitigate the consequences of an ATWS event, enhanced operability of HPCI, RCIC, SLCS, RPT/RHR/pool cooling and main steam bypass is essential. Accordingly, the following actions are requested:
- a) Prompt notification (within 24 hours) of any of the above systems when it is less than fully operable and when it is restored to service. Operability of both pumps in the SLCS is required for full operability. Surveillance tests and preventive maintenance less than 24 hours need not be reported.
 - b) Operate all the available suppression pool cooling whenever the suppression pool exceeds the normal operating temperature limit.
 - c) Perform a 50.59 review to increase SLCS flow to the maximum consistent with safety (2 pumps, unless unsafe).

7. For plants without ATWS related RPT, perform an analysis of the net safety of derating such that, in the event of an ATWS, calculated peak pressures do not exceed the service Level "C" limit (approximately/1500 psig) by taking into consideration the heat removal capability of safety valves, isolation condenser, bypass to the main condenser and other available heat removal systems.
8. Report in writing within 5 days of the performance of each of the tests results (except for the daily tests) and the results of your review and include a list of all devices which respond as discussed above, actions taken or planned to assure adequate equipment control, and a schedule for implementation of corrective action. Report in writing within 10 days, the analyses specified by Item 7 above. This information is requested under the provisions of 10 CFR 50.54 (f). Accordingly, you are requested to provide within the time periods specified above, written statements of the above information signed under oath or affirmation. Reports shall be submitted to the Director of the appropriate NRC Regional Office and a copy shall be forwarded to the NRC Office of Inspection and Enforcement, Division of Reactor Operations Inspection, Washington, DC 20555.

For all boiling water power reactor facilities with a construction permit, this Bulletin is for information only and no written response is required.

Approved by GAO, B180225 (R0072); clearance expires 7-31-80. Approval was given under a blanket clearance specifically for identified generic problems.

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July 3, 1980

Enclosure

RECENTLY ISSUED
IE BULLETINS

Bulletin No.	Subject	Date Issued	Issued To
80-16	Potential Misapplication of Rosemount Inc., Models 1151 and 1152 Pressure Transmitters with Either "A" or "D" Output Codes	6/27/80	All Power Reactor Facilities with an OL or a CP
80-15	Possible Loss Of Hotline With Loss Of Off-Site Power	6/18/80	All nuclear facilities holding OLs
80-14	Degradation of Scram Discharge Volume Capability	6/12/80	All BWR's with an OL
80-13	Cracking In Core Spray Spargers	5/12/80	All BWR's with an OL
80-12	Decay Heat Removal System Operability	5/9/80	Each PWR with an OL
80-11	Masonry Wall Design	5/8/80	All power reactor facilities with an OL, except Trojan
80-10	Contamination of Nonradioactive System and Resulting Potential for Unmonitored, Uncontrolled Release to Environment	5/6/80	All power reactor facilities with an OL or CP
80-09	Hydramotor Actuator Deficiencies	4/17/80	All power reactor operating facilities and holders of power reactor construction permits
80-08	Examination of Containment Liner Penetration Welds	4/7/80	All power reactors with a CP and/or OL no later than April 7, 1980
80-07	BWR Jet Pump Assembly Failure	4/4/80	All GE BWR-3 and BWR-4 facilities with an OL
79-03A	Longitudinal Weld Defects In ASME SA-312 Type 304 Stainless Steel Pipe	4/4/80	All power reactor facilities with an OL or CP