U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

May 2, 1979

IE Circular No. 79-07

UNEXPECTED SPEED INCREASE OF REACTOR RECIRCULATION MG SET RESULTED IN REACTOR POWER INCREASE

Description of Circumstances:

On November 24, 1978, an unexpected rapid speed increase was experienced on the 'B' Reactor Recirculation MG set (RRMG) at the Cooper Nuclear Station. Prior to the event, the RRMG set had been inadvertently tripped during the performance of routine maintenance. Upon restart, the MG set would not respond to a speed increase signal. Licensee personnel commenced trouble shooting this problem in accordance with the instructions in the manufacturer's technical manual.

One step of these instructions suggested removing the fuse from the Bailey scoop tube actuator circuit (a blown fuse would de-energize the actuator and not permit the scoop tube to move). When the terminal panel cover was removed, licensee personnel noted two fuses instead of one as shown on the vendor drawings. When licensee personnel removed the second fuse to verify fuse integrity, a rapid speed increase of the MG set occurred. This increase was terminated by replacement of the fuse or tripping of the MG set by the control room operator (both actions took place almost simultaneously).

The input signal to the scoop tube actuator is received from the speed controller via a function generator. This signal is a scoop tube position demand signal. As the actuator drives the scoop tube in or out of the fluid coupler, a position followup signal is generated to null the input signal and stop scoop tube motion at the required position. The vendor's drawings of the scoop tube actuator circuit showed only one fuse in the circuit. The licensee contacted the vendor regarding the second fuse and was informed that this fuse had been added as a change in the initial circuit design to provide protection for certain electronic components in this circuit. This additional fuse is located in the position followup circuit. Removal or loss of the fuse would result in a loss of the nulling signal and would cause the scoop tube to drive to the maximum speed position.

The licensee examined the circuit for the 'A' RRMG set scoop tube actuator and discovered that it contained only the single fuse as indicated on the vendor's drawings.

At the time of the speed increase, the reactor was operating at 27 percent power. The speed increase on the RRMG set caused power to increase rapidly to 75 percent until terminated by the manual trip of the RRMG set. The short term reactivity increase corresponded to a reactor period of less than 5 seconds.

A check of reactor parameters after this event verified that no core limits were exceeded. The FSAR contains an analysis of a similar transient which is failure of a speed controller causing one RRMG set to drive to the maximum speed condition. This analyzed transient starts from a 100 percent power rod pattern, whereas the observed transient commenced from a lower power rod pattern. Therefore, this observed transient falls within the bounds of the FSAR analysis.

As part of the corrective action for this event, the licensee has placed a warning sign on the control panel cover to remind technicians of the effect of removing the second fuse.

Recommended Actions for Licensee's Consideration:

All holders of operating licenses for BWR plants employing variable speed Reactor Recirculation Motor Generator sets should be aware of the potential for occurrences of the type indicated above. It is recommended that this area be reviewed at your facility in the following respects:

1. A review of the scoop tube actuator circuit should be conducted to verify that the circuit diagram indicates the actual number of fuses installed.

2. Where the actual circuit configuration contains the second fuse (in the scoop tube position follow-up circuit) a warning statement describing the consequences of its removal when the unit is operating should be incorporated into the troubleshooting guides. A permanent label to the same effect should be placed on the control panel cover which houses the fuse. In addition, operating personnel and maintenance technicians should be apprised of the effect of removing the fuse from the circuit.

3. Review procedural controls for troubleshooting systems and components that have the potential to affect significant plant parameters such as power level, water level pressure etc. Ensure that when a vendor's technical manual is being used in lieu of a detailed procedure, all personnel are sensitive to differences between the actual equipment and the manual description. When discrepancies are identified, resolution should be obtained before proceeding.

This circular is being forwarded to all holders of BWR construction permits for information.

No written response to this Circular is required. If you require additional information regarding this matter, contact the Director of the appropriate NRC Regional Office.

Enclosure:
List of IE Circulars
Issued in the Last
Twelve Months

LISTING OF IE CIRCULARS ISSUED IN LAST TWELVE MONTHS

Circular No.	Subject	Date of Issue	Issued To
78-03	Packaging Greater Than Type A Quantities of Low Specific Activity Radioactive Material for Transport	5/12/78	All Holders of Reactor OLs, CPs, Fuel Cycle, Priority I Material and Waste Disposal Licenses
78-04	Installation Error That Could Prevent Closing of Fire Doors	5/15/78	All Holders of Reactor OLs or CPs
78-05	Inadvertent Safety Injection During Cooldown	5/23/78	All Holders of Reactor OLs or CPs
78-06	Potential Common Mode Flooding of ECCS Equipment Rooms at BWR Facilities	5/23/78	All Holders of Reactor OLs or CPs
78-07	Damaged Components of a Bergen-Paterson Series 25000 Hydraulic Test Stand	5/31/78	All Holders of Reactor OLs or CPs
78-08	Environmental Qualification of Safety Related Equipment at Nuclear Power Plants	5/31/78	All Holders of Reactor OLs or CPs
78-09	Arcing of General Electric Company Size 2 Contactors	6/5/78	All Holders of CPs
78-10	Control of Sealed Sources Used in Radiation Therapy	6/14/78	All Medical Licensees in Categories G and G1
78-11	Recirculation M-G Set Overspeed Stops	6/15/78	All Holders of BWR OLs or CPs

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Circular No.	Subject	Date of Issue	Issued To
78-12	HPCI Turbine Control Valve Lift Rod Bending	6/30/78	All Holders of BWR OLs or CPs for plants with HPCI Terry Turbine
78-13	Inoperability of Multiple Service Water Pumps	7/10/78	All Holders of Reactor OLs and CPs except for plants located in: AL, AK, CA, FL, GA, LA, MS, SC
78-14	HPCI Turbine Reversing Chamber Hold Down Bolting	7/12/78	All Holders of BWR OLs or CPs for plants with a HPCI Terry Turbine excepting Duane Arnold and Monticello
78-15	Checkvalves Fail to Close In Vertical Position	7/20/78	All Holders of Reactor OLs or CPs
78-16	Limitorque Valve Actuators	7/26/78	All Holders of Reactor OLs or CPs
78-17	Inadequate Guard Training/ Qualification and Falsified Training Records	10/13/78	All Holders of and applicants for Reactor OLs
78-18	UL Fire Test	11/6/78	All Holders of Reactor OLs or CPs
78-19	Manual Override (Bypass) of Safety Actuation Signals	12/28/78	All Holders of CPs
79-01	Administration of Unauthorized Byproduct Material to Humans	1/12/79	All Medical Licensees except Teletherapy Medical Licensees and each Radiopharmaceutical Suppliers

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Circular No.	Subject	Date of Issue	Issued To
79-02	Failure of 120 Volt Vital AC Power Supplies	2/16/79	All Holders of Reactor OLs and CPs
79-03	Inadequate Guard Training-Qualification and Falsified Training Records	2/23/79	All Holders of and applicants for Special Nuclear Material Licenses in Safeguards Group I
79-04	Loose Locking Nut On Limitorque Valve Operators	3/16/79	All Holders of Reactor OLs or CPs
79-05	Moisture Leakage In Stranded Wire Conductors	3/20/79	All Holders of Reactor OLs or CPs
79-06	Failure to Use Syringe and Battle Shields in Nuclear Medicine	4/19/79	All Holders of Medical Licensees except teletherapy licensees