

**ENVIRONMENTAL QUALIFICATION OF CERTAIN STEM MOUNTED LIMIT SWITCHES
INSIDE REACTOR CONTAINMENT****Description of Circumstances:**

As a result of a recent review by Westinghouse of the seismic and environmental qualifications of the electrical circuitry used for valve operation, certain stem mounted limit switches (SMLS) associated with various safety related valves were found not to be environmentally qualified for loss of coolant accident (LOCA) conditions. The switches in question are installed on certain motor operated valves and certain air-operated valves located in primary containment. The functions of these valves provide either containment isolation or emergency core cooling system (ECCS) alignment during accident conditions.

Westinghouse has stated that for air operated valves the SMLS function is to provide "latch-in" capability to the actuation control circuitry of the valve. It therefore is designated as safety-related and must receive seismic and environmental qualification.

The concern arises if the SMLS contacts short circuit during LOCA conditions. If this occurs and if the valve control switch is in the "AUTO" position (and control air is available to the valve operator), the valve will move from its post accident position to the normal operating position when either the safety injection or containment isolation signal is reset. A limited number of the switches are also used in safety related motor operated valve circuits in Westinghouse designed plants.

The attached Westinghouse Technical Bulletin, NSD-TB-77-13 issued on September 30, 1977, further describes the problem and provides suggestions for correcting the problem in air-operated valve actuation circuitry. One of the corrective actions considered by Westinghouse involves replacement of the switch with a switch that is environmentally qualified. An alternative corrective action utilizes a circuit modification to the "latch-in" feature associated with the air-operated valve circuitry so that no adverse effect on valve operation can occur during post accident conditions. For example, VEPCO has initiated a modification to the valve control circuitry at North Anna to remove the SMLS contacts from the valve operation circuitry.

The SMLS in question is identified as NAMCO Model D2400X or EA-170-302 SNAP LOCK. NAMCO can provide qualified switches to replace unqualified ones upon request from the user. Because all NAMCO SNAP LOCK type switches have been seismically qualified by tests, only environmental qualification is a concern in this issue. This problem may be generic for all power reactor facilities with an operating license or a construction permit.

Action to be Taken by Licensees and Permit Holders:

For all power reactor facilities with an operating license or a construction permit:

1. Determine if your facility utilizes or plans to utilize NAMCO D2400X or EA-170-302 SNAP LOCK switches in any safety related equipment in the primary containment, including the valve control circuitry previously discussed.
2. If any such applications are identified, review these applications to determine the adequacy or qualification testing for these switches and submit the qualification documentation or references to NRC for review.
3. If evidence is not available to support a conclusion of adequacy, submit your plans and programs, including schedules, for corrective action.
4. Provide your response in writing within 30 days for facilities holding an operating license and within 60 days for those facilities with a construction permit. Reports should be submitted to the Director of the appropriate NRC Regional office and a copy should be forwarded to the U. S. Nuclear Regulatory Commission, Office of Inspection and Enforcement, Division of Reactor Operations Inspection, Washington, D. C. 20555.

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

Attachment:
Westinghouse Technical Bulletin
NSD-TB-77-13.



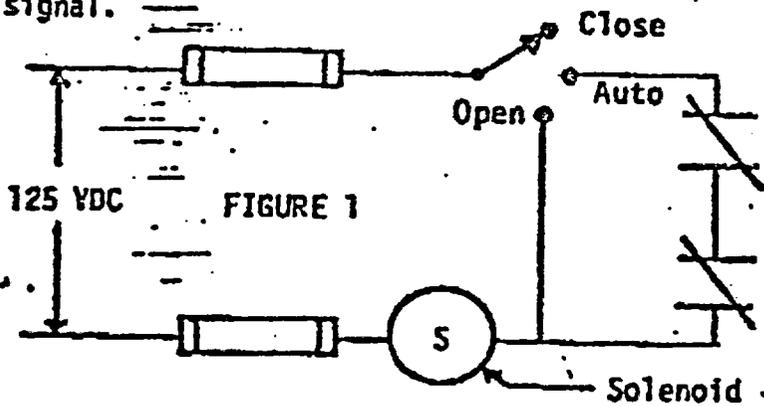
advisory notice of a recent technical development pertaining to the installation or operation of Westinghouse-supplied Nuclear Plant equipment. Recipients should evaluate the information and recommendation, and initiate action where appropriate.

P.O. Box 1778, Pittsburgh, PA 15230

Subject	Number
Safety Related Stem Mounted Limit Switches	NSD-TB-77-13
System(s)	Date
Safety Related Air Operated Valve Control Circuits	September 30, 1977
Affected Plants	S.O.(s)
A11	
References	Sheet
POE-SO-144 (Paraphrased Below)	1 of 2

The following paragraphs describe a possible safety problem based on the use of seismically and environmentally unqualified limit switches in control circuits of safety related valves. The limit switches are mounted on the stems of air operated valves and are used as a lock-in/lock-out feature in these valves. As these limit switches are unqualified, it is possible to postulate a common mode failure in the post seismic or post accident environment. If the limit switch fails closed (shorted), an unsafe or unwanted position of the air operated valves will occur when resetting the "SI" or "T" signal provided that the air supply is still available to the valves.

The air operated valve solenoid control circuit consists of a three position switch (Auto-Close) in which the "Auto" position circuit has the stem-mounted limit switch contact and the "SI" or "T" signal contact as shown in Figure 1 (Normal Operating Condition). When an "SI" or "T" is initiated, the solenoid is de-energized, causing the valve to close. When the "SI" or "T" signal is reset, normally, the limit switch contact would be open and prevent the valve from reopening. If failure of the limit switch is postulated (contacts shorted), due to post seismic or post accident environmental conditions, the valve would be repositioned open upon resetting the "SI" or "T" signal.



"SI" or "T" signal - when no signal is present, contact is closed.

Stem-mounted limit switch contact - closed when valve is fully open.

Additional Information, if Required, may be Obtained from the Originator. Telephone 412 - 256-5409

or (WIN) 236 - 5409

Originator

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Some considerations to correct this problem are:

1. Replace the limit switches with seismically and environmentally qualified limit switches. At the present time, we are investigating the feasibility of qualifying limit switches that are available.
2. Procedurally require operators to place the appropriate control switches in the "close" position prior to resetting the "SI" or "T" signal. By following this procedure, the valve would not move to an unwanted position even if the stem mounted limit switch failed.
3. Depending upon the individual plant arrangement, another solution is possible. For example, at Farley an alternative would be to delete the limit switch function and provide a separate "SI" or "T" signal reset for these valves. A separate reset is already used in connection with the Farley switchover procedure for the RHR suction valves and could be used for this purpose.
4. Still another alternative would be to have a separate reset for the appropriate limit switch circuitry.

Westinghouse has notified the NRC of this condition (NS-CE-1489, 8/19/77), and recommends that all plants review their safety related air operated valve control circuits.

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IE Bulletin No. 78-04
February 21, 1978

LISTING OF IE BULLETINS
ISSUED IN 1978

BULLETIN No.	Subject	Date Issued	Issued To
78-01	Flammable Contact - Arm Retainers in G.E. CR120A Relays	1/16/78	All Power Reactor Facilities with an Operating License (OL) or Construc- tion Permit (CP)
78-02	Terminal Block Qualification	1/30/78	All Power Reactor Facilities with an Operating License (OL) or Construc- tion Permit (CP)
78-03	Potential Explosive Gas Mixture Accumula- tions Associated with BWR Offgas System Operations	2/8/78	All BWR Power Reactor Facilities with an Operating License (OL)

Enclosure 2