

POWER REACTOR				EVENT NUMBER: 27030			
FACILITY: CALVERT CLIFFS		REGION: 1		NOTIFICATION DATE: 04/01/94			
UNIT: [1] [2] []		STATE: MD		NOTIFICATION TIME: 15:16 [ET]			
RX TYPE: [1] CE, [2] CE				EVENT DATE: 04/01/94			
NRC NOTIFIED BY: WENGER & SLY				EVENT TIME: 00:00[EST]			
HQ OPS OFFICER: RUDY KARSCH				LAST UPDATE DATE: 04/01/94			
EMERGENCY CLASS: NOT APPLICABLE				NOTIFICATIONS			
10 CFR SECTION:							
CDEF 21.21(b)(2)		DEFECTS/NONCOMPLIANCE					
UNIT	SCRAM CODE	RX CRIT	INIT PWR	INIT RX MODE	CURR PWR	CURR RX MODE	
1	N	N	0	REFUELING	0	REFUELING	
2	N	Y	100	POWER OPERATION	100	POWER OPERATION	

EVENT TEXT

UNDERSIZED ANTI-ROTATION KEY FOR VELAN VALVES RECEIVED.

REPLACEMENT ANTI-ROTATION KEYS FOR VELAN SIX INCH MOTOR OPERATED GLOBE VALVES AS RECOMMENDED BY NRC IN 93-42 WERE UNDERSIZED. FAILURE OF THESE VALVES AFFECTS LOCA MITIGATION, LPSI HEADER ISOLATION VALVES (SIAS OPEN SIGNAL). THE LICENSEE WILL INFORM THE NUCLEAR NETWORK, AND HAS INFORMED THE NRC RESIDENT INSPECTOR.

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UNDERSIZED VELAN ANTI-ROTATIONAL KEYS

Baltimore Gas & Electric Company has recently discovered a problem with anti-rotational keys in some 6-inch Velan motor-operated globe valves at our Calvert Cliffs Nuclear Power Plant. This problem is considered to have presented deviation in a basic component that could have created a substantial safety hazard at our facility and thus appears to be reportable in accordance with Part 21 requirements

Calvert Cliffs Unit 1 is currently in a refueling outage. One of the actions performed during the outage was to replace the anti-rotation keys on our Velan Forged Bolted Bonnet Globe Valves. Replacement of the keys is recommended in NRC Information Notice 93-42 and Velan Service Bulletin SB-106. The replacement keys are made of a tougher steel alloy that will not fail in a manner similar to that noted at other nuclear power plants. Calvert Cliffs has four 6-inch valves and eight 2-inch valves of this type installed at each unit and key replacements are being done on all twelve valves

After installing the new keys, the valves were stroked to verify proper operation. A key on one of the 6-inch valves was observed to slip through its yoke (valve bushing) so that it was no longer performing its anti-rotation function. The valve stem then rotated freely preventing its closing. This problem was noted for all the 6-inch valves 1-MOV-615, 625, 635 and 645. These valves are safety-related low pressure safety injection (LPSI) loop isolation valves. The problem did not exist for the 2-inch high pressure safety injection (HPSI) loop isolation valves that are of a similar design.

Investigation of the issue concluded that the keyway depth in the 6-inch valve stems are deeper than the vendor drawings show. It is currently postulated that during initial fabrication of the valves (20 years ago), the valve stem key slots were machined deeper than specified. The deeper key slot was then compensated for by fabricating keys of proper dimensions to fit into the resulting keyways. This discrepancy was not adequately documented in the drawings at the vendor for these specific valves. When new keys were fabricated from the drawing dimensions, they were too small for our valves.

The LPSI loop isolation valves isolate the LPSI supply headers from the HPSI supply headers. Both the high pressure and low pressure safety injection systems utilize the same injection flow path upstream of their isolation valves. The LPSI and HPSI loop isolation valves are normally shut. Each valve has a hand switch in the control room and 0-100% open valve position indication. The valves can be throttled to supply flow at a desired rate during an accident scenario. The valves automatically open on receipt of a Safety Injection Actuation Signal to inject coolant into the Reactor Coolant System after a loss-of-coolant accident. Failure of the valves to operate properly could adversely affect the ability of the plant to adequately respond to a loss-of-coolant accident event. This problem would also prevent local manual operation of the valves.

Our operating unit, of similar design, is not susceptible to this mode of failure because the new style keys have not been used on similar Unit 2 valves.

Questions should be directed to Craig Sly, Senior Engineer, Compliance Unit at (410) 260-4858

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To: Dan McDonald	From: Craig Sly
Co: NRC	Co: BGE/Calvert Cliffs
Dept:	Phone: 410-260-4858
Fax #: 301-504-2102	Fax #: