(7-77) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT

CONTROL BLOCK: | | | | | | | (1) (PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

Line	Field	Value
0 1	LICENSEE CODE (2)	I L Z I S 2
	LICENSE NUMBER (3)	0 0 - 0 0 0 0 0 - 0 0
	LICENSE TYPE (4)	4 1 1 1 1
	CAT (5)	
CON'T 0 1	REPORT SOURCE (6)	L
	DOCKET NUMBER (7)	0 5 0 0 0 3 0 4
	EVENT DATE (8)	1 0 1 5 7 8
	REPORT DATE (9)	1 1 1 4 7 8

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

0 2 2D MSIV failed to close from the control room. The unit was in HSD and

0 3 repair work was planned for 2D MSIV. Operators locally closed the MSIV.

0 4 The FSAR accounts for the failure of one MSIV, therefore the health and

0 5 safety of the public were not affected. Previous LER's 50-304: 74-39,

0 6 74-41, 76-19, 78-14 and 50-295: 77-95.

0 7

0 8

Line	SYSTEM CODE (11)	CAUSE CODE (12)	CAUSE SUBCODE (13)	COMPONENT CODE (14)	COMP. SUBCODE (15)	VALVE SUBCODE (16)
0 9	C D	E	B	V A L V E X	X	E

LER/RO REPORT NUMBER (17)

EVENT YEAR		SEQUENTIAL REPORT NO.		OCCURRENCE CODE	REPORT TYPE		REVISION NO.
7 8	—	0 6 9	/	0 3	L	—	0

ACTION TAKEN (18)	FUTURE ACTION (19)	EFFECT ON PLANT (20)	SHUTDOWN METHOD (21)	HOURS (22)	ATTACHMENT SUBMITTED (23)	NPRD-4 FORM SUB. (24)	PRIME COMP. SUPPLIER (25)	COMPONENT MANUFACTURER (26)
X	X	Z	Z	0 0 0 0	Y	Y	A	T 0 8 3

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

1 0 Both DC solenoid valves (Teledyne Republic 21110-1202-5200) and AC

1 1 solenoid valve (Rexroth 4WE8E2.1/N/S) failed to operate properly. The

1 2 AC solenoid valve was replaced. Subsequent testing demonstrated MSIV

1 3 operability.

1 4

Line	FACILITY STATUS (28)	% POWER (29)	OTHER STATUS (30)	METHOD OF DISCOVERY (31)	DISCOVERY DESCRIPTION (32)
1 5	G	0 0 0	NA	A	Operator Observation

Line	ACTIVITY RELEASED (33)	CONTENT OF RELEASE (34)	AMOUNT OF ACTIVITY (35)	LOCATION OF RELEASE (36)
1 6	Z	Z	NA	NA

PERSONNEL EXPOSURES

Line	NUMBER (37)	TYPE (38)	DESCRIPTION (39)
1 7	0 0 0	Z	NA

PERSONNEL INJURIES

Line	NUMBER (40)	DESCRIPTION (41)
1 8	0 0 0	NA

LOSS OF OR DAMAGE TO FACILITY (43)

Line	TYPE (42)	DESCRIPTION
1 9	Z	NA

PUBLICITY

Line	ISSUED (44)	DESCRIPTION (45)	NRC USE ONLY
2 0	N	NA	

7811240178

NAME OF PREPARER M.A. Melnicoff PHONE 312/746-2084

ATTACHMENT TO LER

NO. 78 - 069 / 03 L - 0

COMMONWEALTH EDISON CO.

ZION GENERATING STATION

50-304

Description of Event

During a short outage (Unit 2 in hot shutdown) MSIV 2D was to be closed for maintenance on the hydraulic operating unit. MSIV 2D was actuated to close from the control room several times, but failed to close. Operating personnel went to the hydraulic unit and manually actuated closure from there. The valve closed, then reopened. The hydraulic pump was in the process of being removed from service and further attempts to again close the MSIV failed. The pump was reenergized but failed to close the MSIV until the 4 way test directional control valve was found to be stuck in the "opening" position. It was manually recentered, or placed in the "closed" position.

The closing side hydraulic pressure then built up sufficiently to close the MSIV and the valve remained closed.

Consequences of Occurrence

Technical Specification 3.9.4 requires all MSIV's to be operable whenever the plant is not in the cold shutdown condition. The inability to close MSIV 2D would have required loop isolation in accordance with the Technical Specifications, however, operating personnel were successful in achieving valve closure.

The safety analysis in the FSAR assumes the failure of one MSIV to operate, and the complete blowdown of one steam generator in the event of a steam line break. No event requiring the closure of the MSIV occurred during this time. Therefore, the health and safety of the public was not affected by this event.

Cause of Occurrence

In this occurrence there are actually two "sub-events" to analyze. The first is the actual failure of 2D MSIV to close during actuation from the control room. The two redundant DC solenoid-operated 3-way directional control pilot valves (Teledyne Republic Model No. 21110-1202-5200) which upon receiving a "close" signal are designed to shift, porting hydraulic fluid to the in-line pilot-operated check valves, establishing a closing hydraulic operating circuit, failed to perform this function. The reason for the valve failures

has been under investigation for some time. Discussions with several hydraulics experts have suggested that a phenomenon known as "silting", or the precipitation of extremely fine particles from suspension in the fluid, where they can plug the close clearances found in the internals of these directional control valves, causing the spools to stick.

The other "sub-event" was the reopening of the MSIV after it was closed by manually exercising the DC pilot valves. The AC solenoid-operated 4-way directional control exercise and test valve (Rexroth Model No. 4WE8E2.1/W120-60/N/5) was found to be jammed in the "opening" position, and had apparently failed to center by spring return after the pump had previously run, as it is electrically designed to do. Because of this much of the closing fluid was bypassed straight to the oil reservoir through the out-of-position 4-way valve, allowing pilot pressure to drop to the point where the pilot-operated check valves could no longer remain open, creating an opening hydraulic circuit to the MSIV operating cylinder. The hydraulic pump was removed from service before reclosure could occur. Thus it had to be restored to service in order to achieve final closure of the MSIV.

Corrective Actions

Following maintenance on the MSIV hydraulic unit, the MSIV was partially and fully stroked satisfactorily.

The exact cause of this failure and past MSIV solenoid's failures is not known at this time. Modifications are being considered to increase the reliability of the AC and DC solenoids. (Different style valves - poppet rather than spool type - are being investigated.) Filters are also under consideration to reduce the possible "silting" problem. During past refuelings, Unit 1 & 2 MSIV units have been drained, cleaned and flushed to reduce the possibility of "silting" failures in the solenoid operated valves.

This problem is being followed by the station by Action Item Report #5-78.