

Commonwealth Edison Company  
Zion Generating Station  
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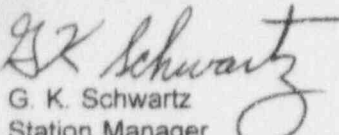


September 25, 1996

U.S. Nuclear Regulatory Commission  
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The enclosed Licensee Event Report number 96-023-00, Docket No. 50-295/DPR-39 from Zion Generating Station is being transmitted to you pursuant to 10 CFR 50.73(a)(2)(i)(A) which requires a thirty-day written report after the completion of any nuclear plant shutdown required by the plant's Technical Specifications.

Very truly yours,

  
G. K. Schwartz  
Station Manager  
Zion Generating Station

GKS/hjw

Enclosure: Licensee Event Report

cc: NRC Region III Administrator  
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# LICENSEE EVENT REPORT (LER)

FACILITY NAME ZION NUCLEAR POWER STATION UNIT 1	DOCKET NUMBER 0 5 0 0 0 2 9 5 1	PAGE 1 OF 0 4
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TITLE  
POWER OPERATED RELIEF VALVE BLOCK VALVE FAILURE CAUSED BY MECHANICAL MAINTENANCE PERSONNEL ERROR RESULTED IN UNIT 1 SHUTDOWN.

EVENT DATE			LER NUMBER			REPORT DATE			OTHER FACILITIES INVOLVED													
MONT	DAY	YEAR	YEAR	SEQ.	REV.	MONTH	DAY	YEAR	FACILITY NAMES		DOCKET NUMBER(S)											
0	8	2	6	9	6	9	6	-	0	2	3	-	0	0	0	9	2	5	9	6		

OPERATING MODE 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (CHECK ONE OR MORE OF THE FOLLOWING)											
	20.402(b)			20.405(e)			50.73(a)(2)(iv)			73.71(b)		
	20.405(a)(1)(i)			50.36(c)(1)			50.73(a)(2)(v)			73.71(c)		
	20.405(a)(1)(ii)			50.36(c)(2)			50.73(a)(2)(vii)			OTHER (Specify in Abstract below and in Text, NRC Form 366A)		
	20.405(a)(1)(iii)			X 50.73(a)(2)(i)			50.73(a)(2)(viii)(A)					
20.405(a)(1)(iv)			50.73(a)(2)(ii)			50.73(a)(2)(viii)(B)						
20.405(a)(1)(v)			50.73(a)(2)(iii)			50.73(a)(2)(x)						

LICENSEE CONTACT FOR THIS LER									
NAME  N. M. Brennan, Regulatory Assurance, ext. 2380							TELEPHONE NUMBER		
							8 4 7 7 4 6 - 2 0 8 4		

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT									
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NFRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NFRDS
SUPPLEMENTAL REPORT EXPECTED					EXPECTED SUBMISSION DATE				
<input type="checkbox"/> YES (if yes, complete EXPECTED SUBMISSION DATE)					<input checked="" type="checkbox"/> NO				

ABSTRACT (limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines).

On August 26, 1996, at 0926 hours the 1MOV-RC8000B power operated relief valve (PORV) block valve was stroked closed to support Instrument Maintenance Testing. During the stroking of 1MOV-RC8000B valve in the closed direction, it tripped on thermal overload and its position indication was lost. Operating personnel declared the 1MOV-RC8000B valve inoperable and verified that the associated PORV was closed and de-energized. The unit was placed on a 48 hour Limiting Condition of Operation (LCO) for inoperable valve position indication per Technical Specification 3.8.9-1 and a 72 hour LCO for the inoperable block valve per Technical Specification 3.3.1.F.d. Shift personnel shut down Unit 1 and achieved cold shutdown at 1022 hours on August 29, 1996.

The mechanics removed 1MOV-RC8000B actuator from the valve, inspected it and found the hypoid gear locating pin missing. The hypoid gear locating pin locks the hypoid gear in position on the drive sleeve after the locating pin and gear are aligned. The hypoid gear drives a limit switch which stops the motor at a preset value of stem travel in the open and closed directions. The hypoid gear became misaligned during previous valve cycling because the locating pin was not installed. The motor continued to drive the valve beyond its preset travel setpoint and the motor tripped on thermal overload. A review of the work history on the 1MOV-RC8000B indicated that during a modification performed on September 5, 1995, the mechanics failed to install the hypoid gear locating pin as required by maintenance procedure.

The cause of this event is personnel error in that the mechanical maintenance mechanics failed to follow maintenance procedure correctly.

Corrective actions: replaced and successfully tested the 1MOV-RC8000B valve actuator; inspected the other motor operated valves similarly modified; performed an operability assessment on the remaining 111 similar motor operated valves; removed the mechanics from MOV maintenance until they re-establish their proficiency. An evaluation of the mechanics other work will be conducted.

The safety significance of this event is minimal.

# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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TEXT Energy Industry Identification System (EIIIS) codes are identified in the text as [XX]

## A. PLANT CONDITIONS PRIOR TO EVENT

Unit 1 MODE 1 - Power Operations Rx Power 100% RCS [AB]Temperature/Pressure 559 degrees F / 2235 psig

## B. DESCRIPTION OF EVENT

On August 26, 1996 at 0926 hours the 1MOV-RC8000B power operated relief valve (PORV) block valve was stroked closed to support Instrument Maintenance Testing. During the stroking of 1MOV-RC8000B valve in the closed direction, the control room operator saw dual light indication on the position indicating lights in the control panel. Shortly thereafter, the 1MOV-RC8000B tripped on thermal overload and its position indication was lost. Operations personnel declared the 1MOV-RC8000B valve inoperable and verified that the associated PORV, 1PCV-RC455C, was closed and de-energized. The unit was placed on a 48 hour Limiting Condition of Operation (LCO) for inoperable valve position indication per Tech Spec. 3.8.9-1 and a 72 hour LCO for the inoperable block valve per Technical Specification 3.3.1.F.d. Shift personnel shut down Unit 1 and achieved cold shutdown at 1022 hours on August 29, 1996.

The mechanical maintenance mechanics removed the 1MOV-RC8000B SB-00 actuator from the valve, disassembled and inspected it. The valve's structural limits were evaluated for the over-thrust and determined it to be acceptable. The hypoid gear locating pin was found missing with the hypoid gear rotated 180 degrees from its intended position. The hypoid gear locating pin locks the hypoid gear in position on the drive sleeve. The hypoid gear drives a limit switch which stops the motor at a preset value of stem travel in the open and closed directions. The absence of the locating pin defeats the function of the limit switch because the hypoid gear is able to rotate on the drive sleeve. The hypoid gear had become misaligned during previous valve cycling. The motor continued to operate beyond its closed position travel setpoint, the motor stalled and tripped on thermal overload.

A review of the maintenance history on the 1MOV-RC8000B valve indicated that modification E22-1-95-201B modified this valve actuator on September 5, 1995 along with five other valves. A total of fifteen (15) additional MOV's actuators were inspected, ten with modified SB-00 actuators and five with modified SMB-00 actuators. Of the remaining population inspected, only the 1MOV-RC8000A SB-00 actuator had the hypoid gear locating pin missing. However, the 1MOV-RC8000A hypoid gear was found properly aligned to the hypoid gear locating pin position with the gear tightly attached to the drive sleeve. The operation of the 1MOV-RC8000A was not adversely affected during the period the hypoid gear locating pin was missing.

The original work packages showed that a specific procedural step for the hypoid gear locating pin installation was missed by the same mechanics who worked on the 1MOV-RC8000A and 1MOV-RC8000B actuators. Different mechanics worked on the other MOVs.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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TEXT Energy industry identification System (EIS) codes are identified in the text as (XX)

### C. CAUSE OF EVENT

The cause of this event is personnel error in that the mechanics failed to follow the maintenance procedures correctly. Because of the time lapse between the modification and the discovery, it cannot be determined why the mechanics failed to install the locating pin.

### D. SAFETY ANALYSIS

In the Zion safety analysis of the design basis accidents, the PORVs are not credited with performing a safety function. The pressurizer safety valves are used to satisfy the function of the pressure relief for the reactor coolant system. Failure of the PORV block valve requires that the PORV be verified closed and de-energized per Technical Specification 3.3.1.F.d. within one hour.

The pressurizer PORV's provide the reactor coolant system Low Temperature Overpressure Protection (LTOP) during low temperature operation of the reactor coolant system. Technical Specification 3.3.2.G. requires that both PORV's be operable when taking credit for the PORV's as the LTOP method. With 1MOV-RC8000B inoperable in the closed position, the action statement for Technical Specification 3.3.2.G required the reactor coolant system to be depressurized to less than 100 psig and lower pressurizer level to less than 25% or depressurize the reactor coolant system and open at least one PORV and its block valve.

PORV block valve 1MOV-RC8000A was inspected following plant shut down. 1MOV-RC8000A was inspected and the hypoid gear locating pin was found to be missing. The gear was not rotated and was capable of functioning properly without the pin due to friction between the gear and the shaft. The valve was also demonstrated to be operable by successfully passing its functional test.

The unaffected pressurizer PORV remained operable and available. The PORVs are sized such that one of the two valves is capable of mitigating damage following a tube rupture or loss of secondary plant feedwater. The PORVs are operated manually for both the depressurization of the reactor coolant system following a tube rupture and to allow feed and bleed core cooling after loss of auxiliary feedwater. The code safety valves were also operable to provide pressure protection of the reactor coolant system. The safety significance of this event was minimal and at no time was the health and safety of the public adversely affected.

# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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TEXT      Energy Industry Identification System (EIS) codes are identified in the text as [XX]

## E.      CORRECTIVE ACTIONS

1.      The IMOV-RC8000B valve's structural limit for over thrust was evaluated and determined to be acceptable.
2.      The 1MOV-RC8000B valve's actuator, stem and yoke were replaced, the MOV was successfully tested, and the operation of the MOV was verified acceptable.
3.      Fifteen additional actuators were disassembled and inspected, ten from Unit 1 and five from Unit 2.
  - a)      All Unit 1 MOVs were successfully tested and the operation verified acceptable.
  - b)      The Unit 2 actuators were rebuilt previously, awaiting to be installed in the Z2R14 refueling outage.
4.      The 1MOV-RC8000A actuator's hypoid gear locating pin was installed, the MOV was successfully tested, and the operation the MOV was verified acceptable.
5.      An operability assessment was performed on the 111 remaining MOVs with SMB-00 actuators and determined that the MOVs are operable.
6.      The mechanics were removed from MOV maintenance until they re-establish proficiency.
7.      Other work performed previously by the mechanics will be reviewed and evaluated. (29518096203901)

## F.      PREVIOUS EVENTS SEARCH AND ANALYSIS

A review of Zion's Nuclear Tracking System (NTS) indicated a similar event occurred in March of 1994 due to personnel error, where the automatic feature of the MOV was not connected in the circuit as required. The Nuclear Plant Reliability Data System (NPRDS) review indicated that the industry has experienced MOVs failures. However, none of the industry MOV failures were similar to the hypoid gear locating pin not installed in an actuator drive sleeve.

## G.      COMPONENT FAILURE DATA

None.