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February 1, 1985  
EF2-70239

Mr. James G. Keppler  
Regional Administrator  
Region III  
U. S. Nuclear Regulatory Commission  
799 Roosevelt Road  
Glen Ellyn, Illinois 60137

Dear Mr. Keppler:

Reference: (1) Fermi 2  
NRC Docket No. 50-341  
  
(2) Letter, W. H. Jens to J. G. Keppler  
January 11, 1985, EF2-70234

Subject: Final Report of 10CFR50.55(e) Item 142  
"Failure of Two Target Rock Solenoid Valves"

This is Detroit Edison's final report of Item 142, "Failure of Two Target Rock Solenoid Valves." Item 142 was originally reported as a potential deficiency on December 13, 1984 and was subsequently documented in Reference 2. The valves were manufactured by the Target Rock Corporation of E. Farmingdale, New York.

Description of Deficiency

During the Primary Containment Integrated Leak Rate Test, 2 Target Rock solenoid valves (E41-F402 and E11-F415) were found to operate improperly. Valve E11-F415 isolates one of the drywell pressure instrument lines; valve E41-F402 isolates one of the torus pressure/level instrument lines. Each of these valves had remote position indication which showed the opposite of the true position of the valve. Additionally, operation of the valve actuators for these valves caused the valve to travel to the opposite position from that intended.

Valve Actuation: Two types of Target Rock solenoid valves are used at Fermi 2: dual solenoid and single solenoid. The single solenoid valve will operate properly regardless of the actuator coil polarity although there is a preferred coil polarity. Detroit Edison has been informed by the vendor, Target Rock Corporation, that dual solenoid valves may not operate properly when the coil polarity is reversed.

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Improper operation of the dual solenoid valves was caused by incomplete vendor information which did not identify the convention for marking positive and negative terminals or that reversing the coil polarity could cause improper operation of the valve. The drawings did not identify that the positive leads on each coil were differentiated from the negative leads with a marking ring. Additionally, the vendor procedure for aligning position indication included reversing coil polarity during the alignment procedure.

Valve Position: Position indication for Target Rock solenoid valves is provided by 2 reed switches. The reed switches detect valve position by their proximity to the plunger and not direct contact; and, either switch can be adjusted to close with the valve either open or closed. Since the design of the valve does not permit visual verification of the plunger position, the valve position reed switches were adjusted to agree with the expected plunger position based on control room demand signal. As a result, position indication was adjusted to correlate to the improper valve position.

Other problems had previously been identified with position indication for these valves. The reed switch mounting bracket is difficult to install, can be tipped easily and is susceptible to loosening from vibration. Also, the reed switch adjustment procedures lack sufficient detail to ensure proper adjustment. Although not directly related to improper operation of the valves these previous difficulties contributed to the delay in the identification of the problem.

Scope: Improper valve actuator operation is peculiar to the Target Rock dual solenoid valve because of sensitivity of the valve to the polarity of the actuator coil. Additionally, the coil polarity was identified on the drawings for the single solenoid valves while coil polarity was not identified on the drawings for the dual solenoid valves. Of the 41 QA Level I Target Rock solenoid valves installed, 10 are the dual solenoid type. Four of the ten dual solenoid valves were found to operate incorrectly.

#### Analysis of Safety Implications

Target Rock dual solenoid valves are remote manually operated from the control room and are used to isolate containment instrumentation lines related to the Reactor Protection System and Emergency Core Cooling Systems.

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Improper operation and position indication of these valves could result in the isolation of instrumentation sensing containment pressure.

Corrective Action

Updated vendor drawings have been received. An Engineering Design Package and Field Modification Request has been issued to change field wiring. The incorporation of these documents will revise the engineering drawing to show the required polarity.

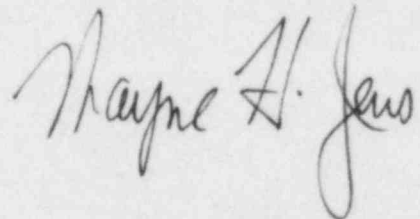
Improved procedures have been developed for position indication alignment and general maintenance of Target Rock solenoid valves.

All 10 Target Rock dual solenoid valves have been inspected for polarity, wiring convention, operating direction, reed switch adjustment and position indication.

An improved reed switch mounting bracket is now available from the manufacturer. These brackets are being procured and will be installed on a schedule based on the availability of the valves for maintenance.

This is Detroit Edison's final report of this item. If you have questions concerning this matter, please contact Mr. Lewis P. Bregni, (313) 586-5083.

Sincerely,



cc: Mr. P. M. Byron  
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