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UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

April 25, 1986

IE INFORMATION NOTICE NO. 86-29: EFFECTS OF CHANGING VALVE MOTOR-OPERATOR SWITCH SETTINGS

Addressees:

All nuclear power reactor facilities holding an operating license (OL) or a construction permit (CP).

Purpose:

This notice is provided to alert recipients to potential significant safety effects of changing valve motor-operator switch settings as part of a program to meet the requirements of Inspection and Enforcement Bulletin (IEB) 85-03, "Motor-Operated Valve Common Mode Failures During Plant Transients Due to Improper Switch Settings." Changes to switch settings can effect valve position indication and signals such as "permissives" to other equipment. It is expected that recipients will review the information for applicability to their facilities. However, suggestions contained in this notice do not constitute NRC requirements; therefore, no specific action or written response is required.

The information herein is being provided as an early notification of a possibly significant matter that is still under consideration by the NRC staff. If NRC evaluation so indicates, licensees will be kept informed of further developments.

Description of Circumstances:

On January 23, 1986 the Southern California Edison Company notified NRC [licensee event report (LER) 85-036] that it had exceeded the cooldown rate limitation of its Technical Specifications at Unit 3 of the San Onofre Nuclear Generating Station on December 24, 1985. The licensee failed to fully followup on the effect of changing the valve motor-operator torque bypass switch setting as a part of the program to meet the requirements of IEB 85-03.

The plant had entered Mode 3 on December 18, 1985 following their first refueling outage. The plant entered Mode 4 on December 22, 1985 to perform maintenance on a reactor coolant pump. Cooldown continued, and on December 24, 1985 the shutdown cooling system (SDCS) was aligned for warmup. At the time of alignment, the SDCS heat exchangers were thought to be bypassed and isolated, as indicated by observation of the isolation valve position in the control room. When SDCS flow was aligned, an initial increase in the reactor coolant

system (RCS) cooldown rate was expected; however, RCS temperature was found to decrease at a rate which was considerably greater than expected and which exceeded the technical specification limitations. When the plant operators recognized the excessive cooldown rate, they attempted to reduce the rate of RCS temperature decrease by throttling the SDCS loop injection valves to reduce the SDCS flow rate. As part of this process, the control room switches for the SDCS heat exchanger isolation valves were depressed and held in the closed position to confirm the existing control room indication that these valves were indeed in the closed position. The RCS cooldown rate was immediately noted to decrease, thereby indicating SDCS flow had, until then, been permitted to pass through the SDCS heat exchangers, contrary to the control room indication. With the SDCS heat exchanger isolation valves truly closed, the RCS cooldown rate was adjusted and maintained within the limitations of the Technical Specifications.

Another limiting condition of the plant's Technical Specifications requires that two independent emergency core cooling system (ECCS) subsystems be operable in Modes 1, 2, and 3 (with the pressurizer pressure greater than or equal to 400 psia). The valve alignment to assure this condition is verified twice a day by observation of the control room position indications. Subsequent investigation indicated that both of the SDCS heat exchanger isolation valves could have been as much as 16 percent open while the control room indication of their position showed closed.

The valve motor-operator torque bypass switches on the SDCS heat exchanger isolation valves had been adjusted because of concerns raised in IEB 85-03. The motor operators on these valves are protected from overload by torque switches. It was determined that the torque bypass switch had to be precisely set such that the increased torque required to initially open valves against high differential pressure would not result in deenergizing the motor operator. However, due to the design of the valve control circuitry, the torque bypass switch and the valve position indicating limit switch are on the same position indicating rotor. Therefore, when the position of the rotor was changed to extend the range of the torque bypass switch, it also affected the closed position indication.

The valves involved are throttle, or "jog", valves and are operated by holding the control switch in the direction of valve travel until the desired position is reached. Both maintenance and operations personnel were aware of the premature fully closed indication which resulted from the recent adjustment to the torque bypass switches on the valve motor operators. They planned on compensating for this condition by holding the valve control switch in the close position for a brief period of time after the "closed" indication was observed. However, the exact time to hold the switch was not specified in the procedures, and apparently, when the valves were operated on December 18, 1985, for the surveillance test, they were not fully closed. Subsequent observation of the valve operation by operations personnel determined that it was necessary to hold the valve switch in the closed position for at least 15 seconds after the "closed" indication was observed in the control room. This information is being incorporated into the appropriate operating procedures.


Discussion:

This LER points up the importance of fully understanding the effects of changing any of the valve motor-operator switch settings. Even though the plant operations personnel were aware of the premature valve "closed" signal, they did not fully appreciate how early this signal was being produced; hence the operator did not hold the close switch for a long enough time when they performed the initial valve verification as they entered Mode 3.

This problem occurred on a throttle valve that did not have a "seal-in" feature. Valves that do have the "seal-in" feature should continue to torque closed regardless of the setting of the close position limit switch, and thus should not experience this particular problem.

However, whether or not the valve has the "seal-in" feature, the changing of the valve motor-operator switch settings could have effects on other aspects of plant operation, because of the limited number of position rotors available in the typical valve motor operator. For instance, frequently the valve closed signal is used as a "permissive" signal to other pieces of equipment. Thus, increasing the torque bypass switch setting could result in the premature starting of some other plant operation--an action which may not have been fully analyzed with respect to its safety implications.

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact the Regional Administrator of the appropriate regional office or this office.


Edward L. Jordan, Director
Division of Emergency Preparedness
and Engineering Response
Office of Inspection and Enforcement

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Attachment:
List of Recently Issued IE Information Notices

LIST OF RECENTLY ISSUED
 IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
86-27	Access Control at Nuclear Facilities	4/21/86	All power reactor facilities holding an OL or CP, research and nonpower reactor facilities, and fuel fabrication & processing facilities
86-26	Potential Problems In Generators Manufactured By Electrical Products Incorporated	4/17/86	All power reactor facilities holding an OL or CP
86-25	Traceability And Material Control Of Material And Equipment, Particularly Fasteners	4/11/86	All power reactor facilities holding an OL or CP
86-24	Respirator Users Notice: Increased Inspection Frequency For Certain Self-Contained Breathing Apparatus Air Cylinders	4/11/86	All power reactor facilities holding an OL or CP; research and test reactor facilities; fuel cycle licensees and Priority 1 material licensees
86-23	Excessive Skin Exposures Due To Contamination With Hot Particles	4/9/86	All power reactor facilities holding an OL or CP
86-22	Underresponse Of Radition Survey Instrument To High Radiation Fields	3/31/86	All power reactor facilities holding an OL or CP and research and test reactors
86-21	Recognition Of American Society Of Mechanical Engineers Accreditation Program For N Stamp Holders	3/31/86	All power reactor facilities holding an OL or CP and all recipients of NUREG-0040 (white book)
86-20	Low-Level Radioactive Waste Scaling Factors, 10 CFR Part 61	3/28/86	All power reactor facilities holding an OL or CP

OL = Operating License
 CP = Construction Permit