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IN 86-93

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF INSPECTION AND ENFORCEMENT  
WASHINGTON, DC 20555

November 3, 1986

IE INFORMATION NOTICE NO. 86-93: IEB 85-03 EVALUATION OF MOTOR-OPERATORS  
IDENTIFIES IMPROPER TORQUE SWITCH SETTINGS

Addressees:

All nuclear power reactor facilities holding an operating license or a construction permit.

Purpose:

This notice is provided to alert recipients of a potentially significant safety problem discovered while performing the evaluations requested by IE Bulletin 85-03, "Motor-Operated Valve Common Mode Failures During Plant Transients Due to Improper Switch Settings," (IEB 85-03). It is expected that recipients will review the information for applicability to their facilities and consider actions, if appropriate, to preclude similar problems from occurring at their facilities. However, suggestions contained in this notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

As a result of followup on IEB 85-03, Duke Power Company (DPC) discovered problems with valves operated by Rotork valve actuators at McGuire Nuclear Station. Specifically, the problem involved valves for which the factory-set torque switch settings had been previously changed at the plant site using a generic correlation between actuator torque output and torque switch setting. This could cause valve actuator motors to switch off before the valves complete their travel. Arbitrarily raising the torque switch setting to its maximum may result in damage to the valve and/or motor especially since thermal overload protection has been eliminated in many applications. Based upon this information, DPC has declared safety systems inoperable and shut down McGuire Units 1 and 2.

Discussion:

The vendor states that whenever the factory torque switch setting is changed in the field, an individual calibration curve or a bench test is required to accurately determine torque output.

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According to information recently provided by the vendor, torque switch settings of 1, 2, 3, 4, and 5, do not always correspond to rated torque output values between 40 and 100 percent as was used based on general information available several years ago. Tests and analytical evaluations by the licensee now confirm that the correlation used by the licensee was incorrect for some actuators. For example, evaluation of several valve actuator certificates for the same model revealed that the actual torque output with a switch setting of "1" varied through a range of 11 to 55 percent of maximum actuator torque output. The review did not indicate a variation in maximum output at the number 5 setting.

Analysis of two valves installed in the normal charging path, which would be required to close during safety injection, indicated that they may not be able to do so under differential pressure conditions which could exist following a loss-of-coolant accident. Although the as-found switch setting agreed with the design setting determined by DPC the application of output torque values being linear between 40 and 100 percent was not correct for all actuators.

Preliminary data indicates that up to 41 nuclear units may have some Rotork valve actuators. It is not known whether or not these are used in safety related applications.


The above example specifically deals with improper setting of the torque switches and illustrates the need for exercising extreme care in the setting of motor-operator switches because all types of switches must be set properly to ensure that the valves will function properly when needed. In fact, the specific event that prompted the issuance of IEB 85-03 was caused by improperly set torque bypass switches. Improperly set thermal overload switches recently (October 22, 1986) rendered the high-pressure coolant injection system inoperable at the Hope Creek Nuclear Station Unit 1. Both of these instances involved actuators manufactured by a company other than Rotork.

In addition, care must be taken to insure that all of the ramifications of changes to any of the motor-operator switches are fully understood. For instance, IE Information Notice 86-29, "Effects of Changing Valve Motor-Operator Switch Settings," describes how the changing of the limit switches on certain motor-operated valves resulted in a control room indication that the valves were closed when, in fact, they were partially open. This led to an excessive cooldown rate in the reactor coolant system at San Onofre Nuclear Generating Station Unit 3.

The information herein is being provided as an early notification of a possibly significant matter that is still under consideration by the NRC staff. Recipients should review the information for possible applicability to their facilities. If NRC evaluation so indicates, further licensee actions may be requested.

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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.

  
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and Engineering Response  
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Attachment: List of Recently Issued IE Information Notices

Attachment 1  
IN 86-93  
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LIST OF RECENTLY ISSUED  
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
86-82 Rev. 1	Failures Of Scram Discharge Volume Vent And Drain Valves	11/4/86	All power reactor facilities holding an OL or CP
86-92	Pressurizer Safety Valve Reliability	11/4/86	All PWR facilities holding an OL or CP
86-91	Limiting Access Authorizations	11/3/86	All power reactor facilities holding an OL or CP; fuel fabrication and processing facilities
86-90	Requests To Dispose Of Very Low-Level Radioactive Waste Pursuant to 10 CFR 20.302	11/3/86	All power reactor facilities holding an OL or CP
86-89	Uncontrolled Rod Withdrawal Because Of A Single Failure	10/16/86	All BWR facilities holding an OL or CP
86-05 Sup. 1	Main Steam Safety Valve Test Failures And Ring Setting Adjustments	10/16/86	All power reactor facilities holding an OL or CP
86-25 Sup. 1	Traceability And Material Control of Material And Equipment, Particularly Fasteners	10/15/86	All power reactor facilities holding an OL or CP
86-88	Compensatory Measures For Prolonged Periods Of Security System Failures	10/15/86	All power reactor facilities holding an OL or CP; fuel fabrication and processing facilities
86-87	Loss Of Offsite Power Upon An Automatic Bus Transfer	10/10/86	All power reactor facilities holding an OL or CP
86-86	Clarification Of Requirements For Fabrication And Export Of Certain Previously Approved Type B Packages	10/10/86	All registered users of NRC certified packages

OL = Operating License  
CP = Construction Permit

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