UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

September 23, 1991

ADDRESSEES: ALL POWER REACTOR LICENSEES AND APPLICANTS

SUBJECT: OPERATING EXPERIENCE FEEDBACK REPORT, SOLENOID-OPERATED VALVE PROBLEMS AT U.S. REACTORS (GENERIC LETTER 91-15)

This generic letter informs addressees of a case study report of operating experience problems with solenoid-operated valves (SOVs) prepared by the Office for Analysis and Evaluation of Operational Data (AEOD) and published as NUREG-1275, Volume 6, "Operating Experience Feedback Report--Solenoid-Operated Valve Problems," February 1991 (copy enclosed). The case study integrates what has been learned over the past several years and provides an extensive assessment of SOV operating experience. The study describes deficiencies in design and application, manufacture, maintenance, surveillance testing and feedback of failure data, and concluded that problems with SOVs need additional attention by the industry. While the recommendations in the case study are not intended to establish regulatory requirements, many of the problems described in the report already are addressed by current environmental qualification and quality assurance rules.

In the study, several events are described in which SOV failures affected redundant safety components, multiple trains of safety systems or multiple safety systems. Three of the most significant events were isolated occurrences involving the failure to close of both main steam isolation valves (MSIVs) in the same line, the inability to start two redundant emergency diesel generators, and simultaneous failure of several BWR control rods to insert. The examples illustrate the vulnerability of safety-related equipment to common mode failure or degradation of SOVs. The NRC is concerned about the reliability of SOVs used in safety applications. As part of NRC's ongoing regulatory activities, inspections such as Safety System Functional Inspections (SSFIs) include the reliability of SOVs as well as other components required by safety related applications. The NRC also is providing technical advice to the Electric Power Research Institute's (EPRI) Nuclear Maintenance Application Center (NMAC) to assist in preparing an SOV maintenance guide. The first draft of the SOV maintenance guide is anticipated to be available towards the end of 1991.

It has been estimated that many hundreds of SOVs are in wide-spread use in each nuclear power facility. They are used in safety-related systems indirectly as pilot operators working with control system fluid (such as pneumatic or hydraulically operated isolation valves) and directly in fluid systems (such as to vent the reactor vessel head or to supply air to the starting system for emergency diesel generators). Many SOVs are also used in nonsafety-related systems that can significantly affect safety systems (such as plant instrument air drier systems). Over the years, many failures of plant systems and components have been attributed to SOV problems. To address specific SOV failures, the Nuclear Regulatory Commission (NRC) has issued numerous information notices

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and bulletins that provide the immediately attributed root cause for the failure. Because these communications frequently were focused on a specific failure, licensees may have made assessments and taken corrective actions that were focused on the specific failures and not on broader issues.

In the case study, the staff reviewed many SOV failures and degradations and discussed those having a similar failure mechanism, thereby showing how only slight differences frequently are all that separate operation from failure. Correcting only one obvious and specific deficiency at a time without awareness of other mechanisms for degradation may permit another problem in a short time to lead to unnecessary recurrent SOV failures. In addition, correcting problems only in SOVs used in the specific application in which the problem was found can allow similar SOV degradation to develop in other applications.

No specific action or written response is required by this generic letter. However, it is expected that recipients will review the information presented in the case study for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. Since this generic letter and enclosure do not contain new or revised regulatory requirements, the Backfit Rule, 10 CFR 50.109, does not apply. If you have any questions about this matter, please contact one of the technical contacts listed below or the appropriate NRR project manager.

Sincerely,

James G. Partlow
Associate Director for Projects
Office of Nuclear Reactor Regulation

Enclosure:
NUREG-1275, Volume 6

Technical Contacts: H. Ornstein, AEOD
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Computer Printout: See Jacket

LIST OF RECENTLY ISSUED GENERIC LETTERS

Generic Letter No.	Subject	Date of Issuance	Issued To
91-14	EMERGENCY TELECOMMUNICATIONS	09/23/91	ALL HOLDERS OF OP LICENSES OR CONST. PERMITS
91-13	REQUEST FOR INFO RELATED TO RESOLUTION OF GI130, "ESSENTIAL SERVICE WATER SYS FAILURES AT MUTLI-UNIT SITES," PURSUANT TO 10CFR50.54(f)	09/19/91	LICENSEES AND APPLICANTS Braidwood, Byron Catawba, Comanche Peak Cook, Diablo, McGuire
91-12	OPERATOR LICENSING NAT. EXAMINATION SCHEDULE	08/27/91	ALL PWR REACTOR AND APPLICANTS FOR AN OPERATING LICENSE
91-11	RESOLUTION OF GENERIC ISSUES 48, "LCOs FOR CLASS 1E VITAL INSTRUMENT BUSES," and 49, "INTERLOCKS AND LCOs FOR CLASS 1E TIE BREAKERS" PURSUANT TO 10CFR50.54(f)	07/18/91	ALL HOLDERS OF OPERATING LICENSES
91-10	EXPLOSIVES SEARCHES AT PROTECTED AREA PORTALS	07/08/91	TO ALL FUEL CYCLE FACILITY LICENSEES WHO POSSESS, USE, IMPORT OR EXPORT FORMULA QUANTITIES OF STRATEGIC SPECIAL NUCLEAR MATERIAL
88-20 SUPP. 4	INDIVIDUAL PLANT EXAMINATION OF EXTERNAL EVENTS (IPEEE) FOR SEVERE ACCIDENT VULNERABILITIES - 10 CFR 50.54 (f)	06/28/91	ALL HOLDERS OF OLs AND CPs FOR NUCLEAR POWER REACTORS
91-09	MODIFICATION OF SURVEILLANCE INTERVAL FOR THE ELECTRICAL PROTECTIVE ASSEMBLIES IN POWER SUPPLIES FOR THE REACTOR PROTECTION SYSTEM	06/27/91	ALL HOLDERS OF OLs FOR BWRs
91-08	REMOVAL OF COMPONENT LISTS FROM TECHNICAL SPECIFICATIONS	05/06/91	ALL HOLDERS OF OLs OR CPs FOR NUCLEAR POWER REACTORS
91-07	GI-23 "REACTOR COOLANT PUMP SEAL FAILURES" AND ITS POTENTIAL IMPACT ON STATION BLACKOUT	05/02/91	ALL POWER REACTOR LICENSEES AND HOLDERS OF CPs