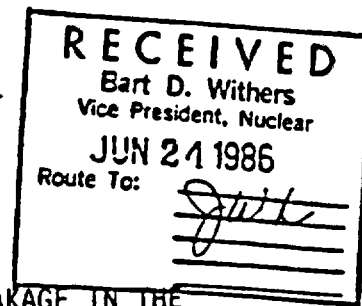


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SSINS No.: 6835
IN 86-51

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

June 18, 1986



IE INFORMATION NOTICE NO. 86-51: EXCESSIVE PNEUMATIC LEAKAGE IN THE
AUTOMATIC DEPRESSURIZATION SYSTEM

Addressees:

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

Purpose:

This notice is being provided to alert recipients to a potentially significant problem pertaining to possible pneumatic supply leakage through pathways near the accumulators serving automatic depressurization system (ADS) safety relief valves. It is expected that recipients will review this notice 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.

Past Related Documents:

IE Bulletin No. 80-01: "Operability of ADS Valve Pneumatic Supply,"
January 11, 1980

IE Bulletin No. 80-25: "Operating Problems with Target Rock Safety-Relief
Valves at BWRs," December 19, 1980

IE Information Notice 85-35: "Failure of Air Check Valves to Seat,"
April 30, 1985

IE Inspection Report 50-458/84-18: "Integrated Design Inspection of the River
Bend Station," Section 2.4, "Automatic Depressurization System Design,"
August 16, 1984

Description of Circumstances:

On March 19, 1986, after noting that the booster compressors were operating more than was normal, the licensee at Grand Gulf determined that excessive instrument air flow was required to maintain the ADS's normal operating pressure of 183 psig. The licensee isolated the air supply and observed header pressure to decrease from 183 to 155 psig in 1 hour. Based on licensee measurements, the air system was leaking at a rate of 600-1200 standard cubic

Copies to: Withers, Yundt, Lentsch, Orser, Steele, E. Burton, E. Jordan, A. Holm,
LIS, C. A. Olmstead, S. Hoag, S. Sautter, TNP:GOV REL F:NRC CHRONO,
TNP:GOV REL F:NRC IE Information Notice 86-51

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feet per hour (SCF/hr). This pressure decrease and the previously observed excessive air makeup indicated that the ADS receiver and accumulator combined leakage exceeded the long-term requirements for ADS safety relief valve actuation specified in the final safety analysis report (FSAR). The FSAR assumes a leak rate of 1.0 SCF/hr for each valve on the system. Technical Specifications (TS) require that eight ADS valves be operable, but they do not specify leakage requirements.

The air supply to the ADS valves was reinstated and the instrument air pressure remained above the minimum operating pressure of 150 psig. However, if there had been a failure of the non-safety portions of the instrument air system (the compressors or the piping upstream of the receiver), the ADS system would have not remained operable. Therefore, the licensee declared the ADS inoperable and shut down the reactor for repairs. Investigation of the cause of the high leak rate showed that the accumulator relief valves in the drywell were defective. It was determined that 16 of 17 were leaking and required rework and these valves were repaired. Normal operating pressure was reduced from 183 psig to 165 psig. This increases the margin between the operating pressure and the relief set point (190 psig). The operating pressure is now below the pressure (171 psig) at which seat leak tightness is tested yet sufficiently above the minimum required pressure (110 psig) for meeting FSAR commitments.

Discussion:


Previous generic correspondence has identified problems in pneumatic systems that could affect ADS operability. IE Bulletins 80-01 and 80-25 noted problems with the control air system in maintaining operability of the ADS. In the case of Bulletin 80-01, the ADS was not operable for all events because of combined misapplication of the accumulator inlet check valve, lack of accumulator testing, and seismic considerations. For Bulletin 80-25, excessive pressure in the pneumatic supply system caused an ADS safety relief valve to stay open when it should have closed. The reactor coolant system was then depressurized while the reactor was operating at power.

The problem at Grand Gulf described above is analogous to the situation described in Information Notice 85-35 and the referenced inspection report on the River Bend plant. In that case, back leakage through the inlet check valve (rather than accumulator relief valves) resulted in reduced accumulator pressure. The Grand Gulf ADS accumulators are designed as Section III, Class 3 components, according to the ASME Boiler and Pressure Vessel Code. Relief valves are attached to the accumulators for overpressure protection. Such relief valves may not be found at all plants, depending on the accumulator design. This event indicates that such leaking relief valves and any other leaking mechanical joints provide pathways for air leakage that compromise the operability of the ADS during accident conditions.

Only portions of pneumatic systems in nuclear power plants are designed as safety systems. In general, the air compressors are not powered from emergency buses; therefore, the supply of air is dependent on the availability of off-site power. Further, piping between the air compressors and the safety grade

portions of the system is not designed to withstand major seismic events. Thus the components that require compressed air to perform their safety function are heavily dependent on the leak-tightness of the seismic resistant portions of the pneumatic systems, including appurtenances such as relief valves and check valves. Although the TS do not require monitoring of the ADS pneumatic supply system makeup rate, lack of monitoring the makeup rate subjects the ADS to potentially undetected excessive leakage. This could result in the ADS being unable to meet its design bass requirements upon loss of the non-safety-related instrument air system.

No written response to this information notice is required. If there are any questions regarding this matter, please contact the Regional Administrator of the appropriate NRC regional office or this office.


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

Technical Contact: Vern Hodge, IE
(301) 492-7275

Attachment: List of Recently Issued IE Information Notices

LIST OF RECENTLY ISSUED
 IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
86-50	Inadequate Testing To Detect Failures Of Safety-Related Pneumatic Components Or Systems	6/18/86	All power reactor facilities holding an OL or CP
86-49	Age/Environment Induced Electrical Cable Failures	6/16/86	All power reactor facilities holding an OL or CP
86-48	Inadequate Testing Of Boron Solution Concentration In The Standby Liquid Control System	6/13/86	All BWR facilities holding an OL or CP
86-47	Feedwater Transient With Partial Failure Of The Reactor Scram System	6/9/86	All BWRs and PWRs facilities holding an OL or CP
86-46	Improper Cleaning And Decontamination Of Respiratory Protection Equipment	6/12/86	All power reactor facilities holding an OL or CP and fuel fabrication facilities
86-45	Potential Falsification Of Test Reports On Flanges Manufactured By Golden Gate Forge And Flange, Inc.	6/10/86	All power reactor facilities holding an OL or CP and research and test facilities
86-44	Failure To Follow Procedures When Working In High Radiation Areas	6/10/86	All power reactor facilities holding an OL or CP and research and test reactors
86-43	Problems With Silver Zeolite Sampling Of Airborne Radioiodine	6/10/86	All power reactor facilities holding an OL or CP

OL = Operating License
 CP = Construction Permit