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SSINS No.: 6835
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

July 28, 1986

IE INFORMATION NOTICE NO. 86-61: FAILURE OF AUXILIARY FEEDWATER MANUAL ISOLATION VALVE

Addressees:

All licensees of nuclear power plants and holders of construction permits.

Purpose:

This notice is provided to alert licensees to a failure of a manual isolation valve as the result of a lack of maintenance on the valve during the operational life of the plant.

It is suggested that recipients review this information for applicability and consider actions, as appropriate, to preclude this and 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:

Following the loss of integrated control system (ICS) power at the Rancho Seco plant on December 26, 1985, the plant tripped and an overcooling transient occurred. Details of this event are documented in the NRC incident investigation team's report, "Loss of Integrated Control System Power and Overcooling Transient at Rancho Seco on December 26, 1985," NUREG-1195, February 1986. When power was lost to the ICS, the plant responded as designed; the auxiliary feedwater (AFW) ICS flow control valves, as well as other valves, went to the 50-percent open position. The auxiliary feedwater flow was excessive. When the local manual attempt to close the flow control valve to the "A" once-through steam generator (OTSG) was unsuccessful, the operator attempted to close the manual isolation valve. This isolation valve could not be moved, even when a valve wrench was used.

The NRC incident investigation team (IIT) found that the failure of the auxiliary feedwater manual isolation valve was the result of a lack of any maintenance on this valve during the operational life of the plant, about 10-12 years. The lack of a preventive maintenance program resulted in the valve being inadequately lubricated, which caused the valve to seize.

Discussion:

The AFW manual isolation valve is a locked-open valve located in the AFW discharge header to the "A" OTSG. The licensee, Sacramento Municipal Utility District (SMUD), considers that the entire AFW system, which would include this manual isolation valve, is safety-related. However, it appears that this valve was only intended to be used to isolate the AFW (ICS) flow control valve for maintenance. The valve is a 6-inch, ANSI Class 900-lb, pressure seal gate manufactured by Velan Engineering. It is categorized as an ASME "Category E" valve (i.e., it is normally locked open to fulfill its function). Section XI of the ASME Boiler and Pressure Vessel Code (1974 Edition) requires no regular testing of Category E valves. The positions of the valves are merely recorded to verify that each valve is locked or sealed in its correct position. The ASME Code no longer includes a Category E.

The Velan instruction manual provides the following guidance regarding maintenance and operation of the valve:

- ° Lubrication of the stem threads and other working components should be performed frequently and at least every 6 months. A lubrication schedule recommends stem thread lubrication whenever the threads appear dry and greasing of the yoke sleeve bearings concurrently with stem thread lubrication.
- ° Valves that are not operated frequently and may remain open or closed for long periods of time should be worked, even if only partially, about once a month.
- ° Proper lubrication of the stem and sleeve can reduce required operating torque by 7 to 30 percent.
- ° A caution also is provided not to use valve wrenches on the handwheels.


A review of the maintenance history of the "A" manual isolation valve indicated that no maintenance (preventive or corrective) had been performed on the valve during the operational life of the plant (i.e., since 1974). The licensee had no program for preventive maintenance of manual isolation valves in the plant.

Two similar valves had failed previously, which prevented movement of the valve from the open position. The discharge isolation valve from the "A" AFW pump failed on November 20, 1979 and the AFW manual isolation valve to the "B" OTSG failed on February 20, 1980. In both cases, the yoke bearings were found seized and had to be replaced.

During the December 26, 1985 incident, it was necessary to isolate AFW flow to the OTSG to terminate the overcooling. When the flow control valve could not be closed, the operator tried to close the manual isolation valve. Because of the lack of maintenance, the isolation valve could not be closed when it was needed. To address this problem, the SMUD has identified about 100 manual isolation valves with functions similar to the AFW manual isolation valve, that will now be included in their preventive maintenance program.

Additional discussion on the AFW manual isolation valve is included in Section 5.3 of NUREG-1195.

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


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