

From: Melvin Holmberg, *MH*
To: Lipa, Christine; Passehl, Dave; Randal Baker
Date: 2/17/04 9:09AM
Subject: RAM Closure Final Draft AOVs

Attached is the final version of my RAM closure (for publication) based upon incorporation of the 0350 Panel comments last Friday.

Mel

CC: Hills, David

B-11

RAM Item No. - LER-03-001

Closed: Y

Description of Issue - Inability of Air-Operated Valves to Function During Design Basis Conditions

Description of Resolution - On January 30, 2002, with the reactor defueled, the licensee identified that several air operated valves (AOV) had negative operating margins and subsequently determined that eight valves were not capable of performing their safety functions for all required conditions as discussed below.

Valve MU3 is an air operated isolation valve which is normally open to allow letdown flow to pass from the letdown coolers to the purification demineralizers. Upon loss of instrument air, this valve is designed to fail closed. However, the licensee identified that upon loss of instrument air the spring force alone was not sufficient to close valve MU3 against maximum reactor coolant system differential pressure. The licensee implemented ECR 03-0111-00 to replace the valve actuator with a new larger piston actuator and nitrogen bottles which would ensure this valve shuts with design differential pressure.

Valve CC1495 is an air operated valve which is normally open to provide cooling water to non-essential components such as the spent fuel pool heat exchangers or reactor coolant pump seal return coolers. This valve is designed to close on a safety features actuation system(SFAS) Level 3 signal or a low level in the component cooling water (CCW) surge tank. However, the licensee identified that upon loss of instrument air, the air accumulator was undersized and would not ensure that the valve would fully close. The licensee implemented ECR 03-0136-00 to install a larger air accumulator associated with the actuator for valve CC1495.

Service water isolation valves SW1356, SW1357, and SW1358, are normally open to provide a flow path for SW to the containment air coolers (CACs). During normal and emergency operation two of the three CACs are in service and the remaining CAC will have its SW isolation valve closed to support containment isolation. However, with a loss of instrument air, the air accumulators for these valves did not have sufficient capacity to hold the valves shut for up to 30 days to support containment isolation. The licensee implemented ECR 02-0836 to install larger air accumulators.

Service water isolation valves SW1424, SW1429 and SW1434 serve as temperature control valves for by throttling SW flow through the CCW heat exchangers. During emergency operation, these valves go to their full open position upon receipt of an SFAS Level 2 signal to maximize SW flow through the CCW heat exchangers. These valves are required to fail open upon loss of instrument air. These valves have spring air cylinder actuators which require the presence of air to position the valve. Upon loss of instrument air, the licensee identified that these valves would not fully open. The licensee performed a dynamic differential pressure test (without instrument air) for valve SW 1434 and the valve only opened to 28 degrees from fully shut. The licensee initiated ECR 03-0299-00 to install an air accumulator for each valve, to provide safety related air during accident conditions.

The licensee performed a calculation of the as found conditions as described in LER 2003-001 to determine the increase in core damage frequency, core damage probability, large early

release frequency and large early release probability due to the condition. Based upon the results of this calculation, the licensee determined that these valve conditions were considered to have minimal safety significance. The licensee's calculation and risk evaluation will be reviewed by a Senior Reactor Analyst (SRA) in Region III to confirm the licensee's conclusions.

The licensee implemented the corrective actions for each of the inoperable valves as stated above to restore these systems to an operable condition. In the original version of LER-03-001, the licensee had identified that the decay heat removal heat exchanger outlet valves CC1467 and CC1469 were not operable because of undersized operators. The licensee subsequently determined that these valves were operable based upon a revised calculation C-ME-016.04-035 "Component Level Review Calc for AOV CC1467/1469" which demonstrated that these valves had adequate operating margins with the existing accumulators. The inspectors reviewed calculation C-ME-016.04-035 to confirm that the licensee had used industry accepted methodologies to demonstrate sufficient operating margins (e.g. to account for uncertainties) existed for these valves to be considered operable. Because the licensee intended to apply the same approach to demonstrate operating margins for each of the modified AOVs, the inspectors did not identify any operability concerns for the modified AOVs.

Reference Material - The Mechanical Engineering Branch performed an in-office review in accordance with inspection procedure 71153 focused on evaluating the proposed licensee corrective actions documented in the LER and associated condition reports. Based upon this review, the Mechanical Engineering Branch will provide a report input to close this LER in an integrated resident inspection report after the SRA completes a review of the licensee's risk evaluation.