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

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LICENSEE: Yankee Atomic Electric Company (Yankee)

FACILITY: Yankee-Rowe

SUMMARY OF MEETING HELD ON NOVEMBER 6, 1975, TO DISCUSS THE CORE XII ECCS SUBMITTAL IN REGARDS TO SINGLE FAILURES

On November 6, 1975, we met with representatives of Yankee to discuss single failures in the Yankee-Rowe ECCS, in connection with Yankee's ECCS submittal for operation of Yankee-Rowe with Core XII.

A list of attendees is attached.

During the review of Yankee's ECCS cooling performance evaluation for Core XII (scheduled for operation by December 1, 1975), the staff identified several manually-controlled, electrically-operated valves in the ECCS which could adversely affect ECCS performance if any one of these valves failed to function due to operator error or spurious failure. In their Core XII submittal Yankee proposed to remove valve operating switch handles and place them under administrative control to preclude single operator errors. However, Yankee did not propose any measures to preclude spurious valve failures. The staff had advised Yankee that measures to preclude spurious failures of ECCS valves at Yankee-Rowe must be implemented in order to meet the single failure assumption in the Core XII ECCS analysis for Yankee-Rowe.

The purpose of this meeting was to review the operation of the ECCS components including valves in detail and to explore what acceptable measures can be taken to preclude valve failures that could adversely affect the ECCS performances. The significant highlights of this meeting are summarized below.

- Yankee described in detail the operation of the ECCS from receipt of a safety injection signal through the long-term recirculation heat removal phase. Yankee explained the function of each valve which the staff had previously identified as not meeting the single failure criterion (see Attachment).

- Yankee stated that they had not proposed measures to preclude spurious failures of motor operated valves (MOV's) because they thought that spurious (passive) failures of MOV's need not be considered in the short-term phase of ECCS operation. For the long-term a spurious failure of MOV's (except two valves in the recirculation system cross over to the hotleg) can be tolerated because of the available redundant flow path in the ECCS. We

explained to Yankee that this is not in accordance with the staff's position and examples were given Yankee why short-term spurious failures of MOV's cannot be ignored.

- A discussion of functions of each valve identifed in the attachment showed that the Yankee-Rowe ECCS has redundant flow paths and associated MOV's. The ECCS also has capabilities provided by several MOV's for operating flexibility that could be removed (by racking out power) without decreasing the safety margins in the ECCS cooling performance evaluation or steam line break accident analysis.

- The staff's position is that racking out power from the MOV breakers with the valve in the operating position is an acceptable short-term fix to preclude spurious valve motion. In cases where the operating positions of MOV's must be changed, manual restoration of power to the valves is acceptable provided sufficient time ($\sim$15 minutes) is available before valve motion is necessary.

- Examination of the control equipment for the ECCS MOV's has shown that several have breakers which are located in a motor control center that would be inaccessible following a LOCA. Therefore, manual restoration of power to these MOV's would not be possible.

- Many of the MOV's with breakers in the inaccessible area could be permanently racked out, with consequent loss of some operating flexibility but without loss of safety margins.

- Valves S1-MOV-4 and S1-MOV-46 are powered from a single bus. Yankee agreed to connect the valve motors to separate busses. Also, these valves are connected to breakers which are inaccessible following a LOCA. Therefore, a temporary fix to preclude spurious operation does not appear to be feasible, because restoration of power to these valves is required for performance of ECCS functions.

- Spurious opening of solenoid valves (S1-SV-56 or S1-SV-57) at the time of LOCA could significantly reduce the nitrogen pressure in the accumulator. Yankee was requested to provide information that will show that such a single failure would not reduce injection flow from the accumulator below that assumed in the ECCS analysis.

- Yankee agreed to defeat the automatic throwover of the two electrical emergency busses and to use the manual switch for load transfer.

Yankee agreed to develop short-term and permanent fixes using the guidance given by the staff during this meeting. It was pointed out to Yankee that they should provide the information on proposed acceptable short-term fixes promptly to enable the staff to complete the Core XII ECCS review in time for their scheduled December 1, 1975, resumption of operation.

Alfred Burger, Project Manager
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Enclosures:
1. List of Attendees
2. Single Failures

cc: See next page

LIST OF ATTENDEES

NRC

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SINGLE FAILURES

MOV	COMPONENT FUNCTION	FAILURE MODE
SI-MOV-1	Accumulator Isolation valve.	Inadvertent closing of this valve would stop accumulator flow into system.
CS-MOV-535	Containment Isolation valve.	This valve is in series with the accumulator isolation valve. Inadvertent closing would stop all flow to system.
SI-MOV-4	Crossover from LPSI discharge to HPSI pumps.	Spurious actuation of this valve would prevent the boosting of flow to the HPSI pumps for small break capabilities.
CS-MOV-533	Regulates flow from the LPSI pumps.	Premature closure can reduce injection to less than required flow rates.
SI-MOV-46	Flow control from HPSI pumps.	If this valve should spuriously close flow would be cut off from the HPSI pumps.
SV-1&SV-2	Nitrogen pilot relief valves.	Premature opening would result in decreasing the accumulator driving force.
CH-MOV-523 & CH-MOV-524	Isolation valve from charging pump discharge header to hot leg of loop 4. (provides H.L. Inj. for long term recirc.).	Closure of these valves during long term cooling would cut off flow to hot leg.
MC-MOV-301 302, 309, 310, 318, 319, 325 and 326.	RCS Loop isolation valves	Closure of any of these valves would Isolate a RCS loop.
CS-MOV-49	HPSI Test/Recirc. Line valve (Mini-flow)	Fail closed - overheat pump.
CH-MOV-522	Isolation valve between charging pump discharge header + LPSI discharge header.	Identified by licensee, not clear what problem exists for this valve.
CS-MOV-532	Recirculation valve used for testing pump (LPSI)	Opening of this valve during a LOCA would reduce flow from LPSI pumps.

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NRR Reading