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Docket No. 50-320



MEMORANDUM FOR: Roger J. Mattson, Director, Lessons Learned Task Force

FROM: Warren Minners, Lessons Learned Task Foece

SUBJECT: JAPANESE RESPONSE TO TMI

The recommendations of NUREG 0578 were discussed with Mr. K. Aisaka, Director, Division of Nuclear Power Examination Safety, Agency of Natural Resources and Energy, Ministry of International Trade and Industry (MITI) in Bethesda on July 30 & 31, 1979. The proposed changes to Japanese plants as a result of the TMI accident and an incident at the Ohi 1 plant were also discussed.

Proposed Changes

All operating PWRs in Japan are of Westinghouse design and the only proposed change resulting from the TMI-2 accident is the modification of the pressurizer pressure/level coincident signal for ECCS initiation. The coincident low pressure and low level signal (which is a 1/3 logic) will be retained but a partially independent low pressure ECCS initiation signal will be added. This signal will have independent logic (2/4 in two loop plants and 2/3 in three loop plants) but will use the same pressure transmitters as and will be set 100 psi lower than the pressure in the coincident circuit.

The Japanese have more concern than we that EECS will unnecessarily actuate and subject the system to a thermal cycle. Therefore the Ohi 1 & 2 units will not have the additional pressure signal because they are ice condenser plants with a very low setting of the containment pressure ECCS signal. Following a FW trip with a stuck open relief valve, the containment high pressure safety injection signal occurs relatively early (600 sec) and the core quality is always low (2%). They apparently feel that the possible consequence of this event does not justify the possible increase in the frequency of unnecessary ECCS actuations.

In the other plants the containment signal is late (1367 to 4000 sec) and quality in the core is greater (up to 7%). These other plants will be modified to include the independent pressure signal.

In plants with the added independent pressure signal, interlocks will also be added to prevent unnecessary ECCS actuation for two possible events. If the pressurizer pressure control logic caused the spray valve to fall open, the coincident signal would not be actuated because the pressurizer level would not

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reach the set point, but the pressure would go below the independent pressure set point. Therefore an interlock will be added to the spray valve control to prevent opening the valve below 154 kg/cm$^2$ (2193 psig).

If a reactor coolant pump starts at a pressure below 140 kg/cm$^2$ (1993 psig) when ECCS actuation is blocked, the pressure will rise above this pressure and then fall below the independent pressure signal set point. To prevent ECCS actuation in this case the independent pressure, but not the coincident pressure signal, will be interlocked with the intermediate neutron flux.

Two other events were analyzed, but no changes were judged to be necessary. Loss of the pressurizer heaters would also result in the pressure falling below the independent pressure signal set point. However this would not occur until after one hour, which is considered sufficient time for the operator to take corrective action. The final event analyzed was continued FW flow after a reactor trip which would reduce pressure but not low enough to actuate the independent pressure signal.

Ohi 1 Incident

A recent incident at Ohi 1 was interpreted by the operators to be a TMI-2 type event. A short caused by twisted wires at a connector initiated a low flow reactor trip signal. (The circuit had a 1/1 logic.) The resulting transient caused the secondary system relief valve to open 2 minutes after the reactor tripped because the valve set point was inadvertently set too low. The blowdown through the valve caused the steamline differential pressure (between steamlines) to trip and actuate ECCS. During the transient the RCS pressure fell and returned rapidly to near the initial valve. The high rate of pressure change caused the pressurizer relief valve to open. The operator checked the pressure control system and primary to secondary leakage. After 9 minutes the operators plotted the RCS pressure and temperature to assure adequate subcooling, checked pressurizer level (increased to 75% from normal 60%), AFW pump operation, SG level, main steamline valves closed, and containment sump level and then reset safety injection after 13 minutes. About two tons of water were added by the HPIS during the incident.

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