C7-1192

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TO: R. Muller

FROM: Ivan Catton

SUBJECT: NUREG-0600

THIS DOCUMENT CONTAINS
POOR QUALITY PAGES

NUREG-0600 implies that the reactor operators were at fault for not following the plant procedures as written. It is concluded that the operators were not properly trained and that their re-training was inadequate. It was also implied that the operators should have known that primary system cooling by natural circulation would have been difficult with a voided system. One is left with the belief that if the operators would have been more alert the accident would not have occurred. NUREG-0600 is unsatisfactory in that it does not attempt to go beyond a very legalistic view of the incident.

There were examples of instruments being improperly located (quench tank instruments behind the console), of data not available (in-core T/Cs) and of instruments with insufficient range (hot and cold leg T/Cs) as well as the poor performance of the plant computer that received little or no comment by I&E. If an operator action is incorrect as a result of how information is supplied to him or what information is supplied to him during an emergency, then the operator should not be at fault. To call the incorrect action operator error without determining whether or not the operator was led into the action by poor control room engineering is improper and without it the report is incomplete.

An operator who is considered poorly trained is not at fault for an action he takes as a result of his training. The entire procedure from licensing an operator to his being at control should be suspect. The guide lines set forth by the NSSS vendor, the interpretation by the utility, the training program leading to licensing the operator and his retraining all play a role. An example of training leading to problems is operators being trained to respond to pressurizer level yet expected to do otherwise. Further, the operators did not know to expect saturation on the primary side and as a result only looked at ΔT to determine whether or not they could go to natural circulation. Who is at fault? The weak link can only be found by a critical review of the process and some aspect, or many, should be faulted. It is my opinion that the NRC investigatory branch, I&E, should do so and their report should reflect the results of such a review.

The amount and quality of operator training must be a consideration when deciding whether or not a particular procedure is adequate. The report implies that the operators were at fault for not following the plant procedures. If one keeps the operator training in mind while reading procedures for mitigating a LOCA, one cannot conclude that the operators were at fault.

Loss of coolant was always described by two symptoms connected by an "and". Without the benefit of hindsight, the procedures do not seem to cover the event that occurred. Certain questions need to be considered before one can decide where the problem lies. Knowledge of the pressurizer level being inadequate for RCS status determination had been known by some for two or more years. Why wasn't this information fed into the

training program? Another example of inadequacies in the process is operators not knowing that saturation can affect natural circulation. Procedures for going over to natural circulation do not mention avoidance of saturation. Is it the fault of the NSSS vendor, the utility, the NRC licensing process or all three when the operator tries to use natural circulation for cooling under saturated conditions? A proper and complete investigation of the TMI-2 incident should address all facets of an action that is improper.

The accident description is incomplete. It is my belief that the learning process would be enhanced if more detail about actions leading to the early water hammer and subsequent degrading of the secondary side were to be included. The rigid wall connection of air lines leading to air operated valves could not tolerate large amounts of pipe movement. It is not clear whether this was a design error or bad design not uncovered during review. It is, apparently, well known that water hammer is a common event and frequently leads to problems with the secondary side. The interconnection of plant air and instrument air coupled with certain practices for resin removal could have initiated the event. It would be helpful to know if any guidelines are given to a utility in this area and if guidelines exist, are they used.

NUREG-0600 contains a very good description of most of what took place during the TMI-2 incident. For the most part the long wait for its publication did not add substantially to knowledge available a few days following the accident. In depth assessment of where the Vendor-Utility-NRC-operator system was inadequate or in-violation does not seem to have been accomplished. Many of the details of the accident that would help us in the future do not seem to be covered.

The charter of the I&E investigative staff may have been too limited or its staff may have been poorly trained for such a task. If the I&E investigatory staff did not have proper training, experience or manpower for the task then NRC should look within and remedy the problem.