Auto-to-Manual:

>> 50.59 Screen is *adverse*.

>> 50.59 Evaluation - Response to question 2 is YES.

Example 3-5. Effects of Upgrade Affect Multiple Redundant Systems

An upgrade to multiple ESFAS functions is planned that encompasses several safety systems in a PWR. A susceptibility analysis reveals that failure of a selected group of power sources can result in a spurious closure of the MSIVs concurrent with loss of auxiliary feedwater actuation and control. ~~Multiple power sources must fail to cause these effects, and the susceptibility analysis concludes that the likelihood of these multiple failures is at Level 2 per Section 2.2.5. A DAS exists for ATWS purposes and provides backup actuation of AFW, but remote control of AFW flow remains vulnerable to the postulated loss of multiple power supplies. The failure mode given the loss of control power to the AFW flow control varies and could lead to either low steam generator levels or steam generator overfill, depending on the time of the power supply failure during a transient.~~

The subset of power supplies that could cause MSIV closure and at the same time have an effect on AFW flow control represent shared resources between these two systems. Several options are available to demonstrate the significance of these shared resources.

- While flow control valves in the AFW system cannot be controlled remotely if the power supplies are lost, there is significant time available for corrective action by the operators either before steam generator dryout or overfill would occur. ~~Thermal hydraulic analysis available in support of the PRA shows that steam generator dryout would take at least 30 minutes even if the control valves were completely closed at the beginning of the transient. Pressurizer relief valves would begin releasing coolant roughly 60 minutes into the transient with uncovering of the core at more than 2 hours.~~

  Local control of the AFW control valves in that time would restore secondary cooling. ~~Sufficient indication of steam generator and primary coolant system status is available to the operators to take these actions independent of the power supply failures.~~

- An alternate method of ensuring adequate core cooling in the presence of these power supply failures is to initiate feed and bleed operation by starting a high pressure safety injection pump and opening a PORV in accordance with EOPs. ~~Thermal hydraulic analyses available in support of the PRA demonstrate that taking these actions within an hour of the postulated loss of AFW flow provides adequate core cooling. Again, sufficient indication and controls are available in the control room to support these operator actions independent of the power supplies.~~

~~For the best estimate methods described above, coping analyses developed to support PRA conclusions regarding adequate core cooling in specific scenarios likely already exist. For the first approach involving credit for operator action to back up the digital I&C, the PRA includes such actions, and deterministic thermal hydraulic analyses exist identifying how long the operators have to accomplish this action and still meet the success criteria for the affected mitigating system. For the second approach, credit for backup systems, such as safety injection and PORVs for "feed-and-bleed" purposes, again are already evaluated in the deterministic thermal hydraulic analyses that support the PRA. Alternately, the plant staff may elect to use the thermal hydraulic software used for the safety analysis, and continue using conservative assumptions or adjust them as appropriate while reanalyzing applicable events in the safety analysis.~~

~~When examining the consequences of a best estimate coping analysis, it is worthwhile recalling that Risk = Likelihood x Consequences. In this regard, whether the I&C Failures leading to controlled SSC malfunctions are classified at Level 1 or Level 2 is useful to consider. Level 2 I&C failures have had applied sufficiently substantial P measures that their likelihood is considered to be on the order of or less than that of failures not typically considered in the safety analysis. Level 1 I&C failures, on the other hand, cannot necessarily be shown to conform to the recommended P measures. Because there is greater uncertainty with respect to the likelihood of Level 1 CCFs than for those classified as Level 2, it may be of value for the Level 1 CCFs to have more restrictive acceptance criteria in terms of consequences than Level 2 CCFs. In that regard, the following is recommended.~~

Fundamental Change in How Cooling is Performed (from *Continuous Flow* to *Feed and Bleed*):

>> 50.59 Screen is *adverse*.

>> 50.59 Evaluation - Focus is on Questions 2 and 6.