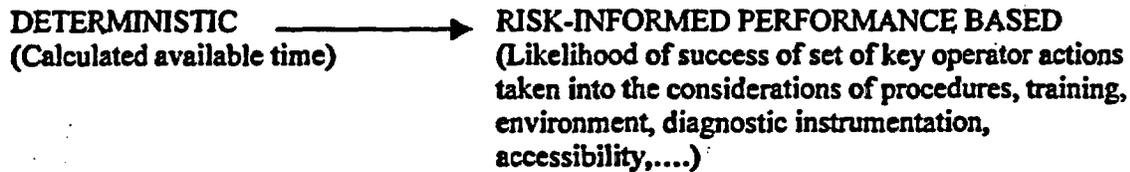


**Fire Protection Manual Actions Framework for Safe Shutdown Working Group Meeting  
3/13/03**



**Performance Goals (i.e., Appendix R, III.L)**

- Achieve and maintain hot standby for PWR & hot shutdown for BWR
- Achieve cold shutdown (72 hours)
- Adequate makeup capability
- Maintain DHR function (i.e., Aux, SG cooling,...)
- Direct instrumentation indications
- HVAC and support systems

**Identify Manual Action under consideration**

- Manual action is event dependent
- Time available for action equals time to reach limiting condition (i.e., low level alarm,...)
- $T = 0$
- Minimum delay time where early operator actions are not beneficial
- FSAR chapter 15 analysis

**Calc Assumptions for time T**

- Available makeup equipment
- Rate of change of coolant
- Types of transients
- Available direct indications (diagnostic instrumentations)
- Procedures
- Training & staffing
- Environment
- Dedicated tools and communication equipment

*When is  $t = 0$  (fire identified/Rx trip/CR evaluation?)*

*What type of response procedure (i.e., direct or symptom based)?*

*Applicable generic set of manual actions for PWR and BWR? Detailed study needed (contract support)?*

D/46

## **Human Reliability Factor**

- **Screening criteria for key actions**
- **Failure probability of certain operator actions (not follow procedures, training, lack of dedicated tools...)**
- **Environment effects**
- **Probability of success of a single action**
- **Cumulative effects of failure of multiple manual actions**

*Identified methodology to address them?*

*How much delta change from cumulative effect is accepted (contract support?)*

## **POLICY QUESTIONS**

*Can manual actions alone be used or in combination with auto suppression systems as an additional alternative to III.G.2?*

*Proposed rulemaking to modify Appendix R to include this. Can manual actions be introduced in 50.48 for broader use (i.e., relationship with NFPA 805)?*

## GENERIC EXAMPLE TO EXPLAIN TIME CONSIDERATION

Spurious opening of PORV. Net coolant loss rate, Pressurizer volume factors needed to determine response time. What about margin?

Example from Quad Cities and ANO where inspectors used deterministic methods to not allow credit for the MA.

\* Quad had 30 <sup>mins</sup> SCBA bottles, good for 15-20 minutes of exertion. MA for a turbine building lube oil fire (heavy smoke), was to use SCBA, go up 2 flights of stairs, open 16 energized electrical cabinets to find and remove fuse blocks. Required to reach and maintain HSD.

\* ANO credited local start of EDG without control power. No emergency procedure, never actually performed by the licensee to demonstrate that it was possible. Required to reach and maintain HSD.

Recent example concerning FO transfer to refill day tank which we did deterministically agree with licensee. Not require for 2-4 hours after fire start, simple operation.

Where is the dividing line that we can defend with engineering and risk insights?