

March 13, 2002

MEMORANDUM TO: Michael R. Johnson, Chief
Inspections Program Branch
Division of Inspection Program Management
Office of Nuclear Reactor Regulation

FROM: Richard J. Barrett, Chief/**signed by M. Rubin for**
Probabilistic Safety Assessment Branch
Division of Systems Safety and Analysis
Office of Nuclear Reactor Regulation

SUBJECT: REFINEMENT OF THE END USER OF THE SHUTDOWN
SIGNIFICANCE DETERMINATION PROCESS (SDP) PHASE 2 TOOL

A feasibility test of the shutdown tool for performing phase 2 Significance Determination Process (SDP) assessments was performed in February of 2002 by members of SPSB OST. The tool is structured similar to the full power SDP phase 2 tool and uses worksheets similar to the full power tool. However, shutdown risk is driven by operator error; every interruption of RHR requires a successful operator response to prevent core damage. An assessment of shutdown risk or a specific shutdown findings often needs to consider two types of shutdown errors. First, the analyst must consider the likelihood of successful operator response *following* a loss of RHR. Second, the analyst must consider the increase in likelihood of having a loss of RHR given certain findings (such as a loss of RCS inventory that is terminated before RHR is lost). The second type of finding quantifies the likelihood that the operator can mitigate the event successfully before RHR is lost.

Both types of operator response are *significantly* impacted by the (1) availability of instrumentation and alarms, (2) time for successful operator response, and (3) awareness of the plant configuration. Therefore, the shutdown SDP tool requires the user to recognize these two types of operator errors and change the affected human error probabilities (HEPs). The phase 2 shutdown SDP tool provides look-up tables to scale up or down the HEPs based on the availability of instrumentation, alarms, and time. The phase 2 shutdown SDP tool also allows the user to scale up or down the HEPs based on poor procedures and poor environmental conditions such as steam and radiation.

The SPSB OST concluded that the tool cannot be further simplified, or the significance of the operator will not be assessed correctly. Consequently, the team concluded that the tool should be used by the SRAs rather than inspectors because their training in PRA is more extensive than the training received by the inspectors. The SRAs have a better understanding of how the role of the operator should be quantified in the individual core damage scenarios.

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Currently, all shutdown phase 2 findings are reviewed or performed by one member of SPSB, so the additional burden on the SRAs should not be significant. We will proceed with preparing the shutdown SDP phase 2 tool training materials for the SRAs. We feel that we can perform this task with existing staff resources.

cc: DCoe
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