

September 17, 1999

Dr. William D. Travers
Executive Director for Operations
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Dr. Travers:

SUBJECT: PROPOSED RESOLUTION OF GENERIC SAFETY ISSUE-145, "ACTIONS TO REDUCE COMMON CAUSE FAILURES"

During the 465th meeting of the Advisory Committee on Reactor Safeguards, September 1-3, 1999, we reviewed the proposed resolution of Generic Safety Issue (GSI)-145, "Actions to Reduce Common Cause Failures." During our review, we had the benefit of discussions with representatives of the NRC staff. We also had the benefit of the documents referenced.

Recommendations

- We recommend that the staff issue an additional Administrative Letter summarizing the major insights derived from the common-cause failure (CCF) research project to make them more readily available to licensee management.
- After issuing the Administrative Letter, we recommend that GSI-145 be closed out without further regulatory action.

Discussion

Common-cause failures of redundant safety systems have been of concern ever since quantitative estimates of the availability and reliability of these systems were developed starting in the early 1970s. CCFs are intended to represent causes of dependent failures that are not modeled explicitly in the probabilistic risk assessment (PRA). The fact that a class of diverse failure causes must be modeled has created unusual challenges for the analyst. The difficulty is compounded by the realization that the operating experience contains a wealth of information on potential CCFs, i.e., partial failures that could have evolved into the complete failure of redundant components within a "small" period of time.

The efforts over the last 25 years to understand CCFs have been successful. The rate of occurrence of complete CCFs has been steadily decreasing (see attached Figure). Both the industry and the NRC staff have been sensitized to the significance of CCFs. A major contributor to this success has been the work sponsored by the former Office for Analysis and

Evaluation of Operational Data and continued by the Office of Nuclear Regulatory Research, to collect and analyze relevant operational experience, as well as disseminating this information.

On July 30, 1998, the staff issued NRC Administrative Letter 98-04 to inform the licensees about the availability of CCF database, CCF analysis software, and associated technical reports. Subsequently, the staff transmitted the multi-volume report NUREG/CR-6268 on CCF through a letter dated July 30, 1998. We are concerned that, although this report will eventually be used by PRA analysts, utility managers who could take specific actions to further reduce the potential for CCFs in the near term are unlikely to read this massive report. We, therefore, believe that before GSI-145 is declared as resolved, an additional Administrative Letter should be issued summarizing the insights from the CCF project in a way that will be useful to plant managers.

We are somewhat concerned that the staff does not plan to determine whether the licensees are implementing any actions based on the insights of NUREG/CR-6268 to reduce the potential for CCFs. However, given the general awareness of the CCF issue that we mentioned earlier, we do not believe that this is a sufficient reason to justify delaying the resolution of GSI-145. The staff should, of course, be vigilant to identify any signs that the downward trend in the CCF rate has reversed.

Sincerely,

/s/

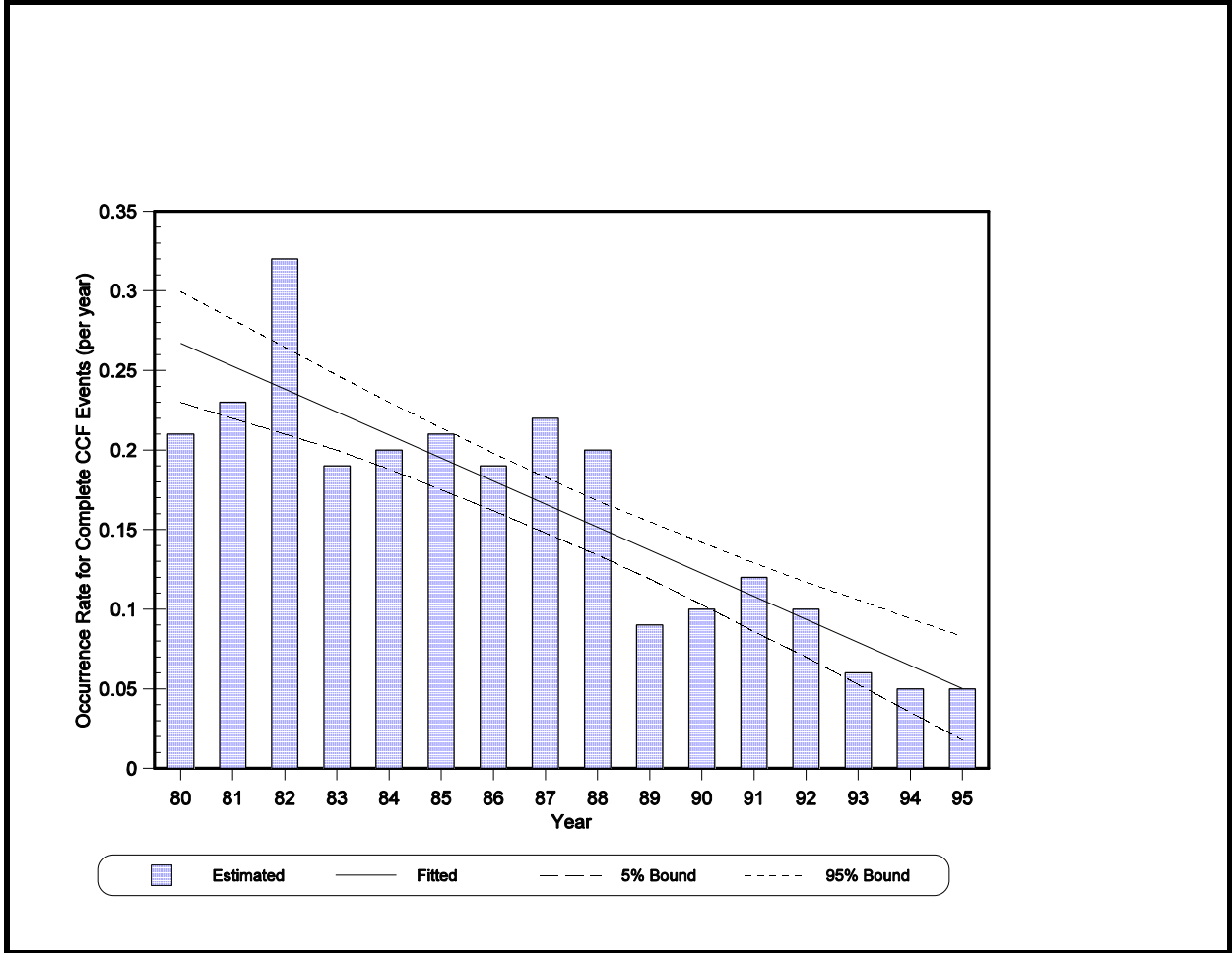
Dana A. Powers
Chairman

References :

1. Memorandum dated July 30, 1999, from Charles E. Rossi, Office of Nuclear Regulatory Research, NRC, to John T. Larkins, Executive Director, ACRS, Subject: Proposed Resolution of Generic Safety Issue 145, "Actions to Reduce Common Cause Failures."
2. U. S. Nuclear Regulatory Commission Administrative Letter 98-04, "Availability of Common-Cause Failure Database," dated July 30, 1998.
3. Letter dated July 30, 1998, from Charles E. Rossi, Office for Analysis and Evaluation of Operational Data, NRC, to a list of Senior Licensee Officials, Subject: Common Cause Failure Database Distribution.
4. U. S. Nuclear Regulatory Commission, NUREG/CR-6268, June 1998, Vol. 1, "Common-Cause Failure Database and Analysis System: Overview;" Vol. 2, "Common-Cause Failure Database and Analysis System: Event Definition and Classification;" Vol. 3, "Common-Cause Failure Database and Analysis System: Data Collection and Event Coding;" Vol. 4, "Common-Cause Failure Database and Analysis System: Software Reference Manual."
5. U. S. Nuclear Regulatory Commission, NUREG/CR-5485, "Guidelines on Modeling Common-Cause Failures in Probabilistic Risk Assessment," November 1998.
6. U. S. Nuclear Regulatory Commission, NUREG/CR-5497, "Common-Cause Failure Parameter Estimations," October 1998.

7. U. S. Nuclear Regulatory Commission, NUREG/CR-4780, Volumes 1 and 2, "Procedures for Treating Common Cause Failures in Safety and Reliability Studies," January 1988 and January 1989, respectively.
8. U. S. Nuclear Regulatory Commission, NUREG/CR-5460, "A Cause-Defense Approach to the Understanding and Analysis of Common Cause Failures," March 1990.

Attachment: Figure



Yearly occurrence rate for complete CCF events, with 90 percent confidence band on the fitted trend.

FIGURE

(Figure Attached to Memorandum dated July 30, 1999, from Charles E. Rossi, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, to John T. Larkins, Advisory Committee on Reactor Safeguards.)