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MEMORANDUM FOR: Edson G. Case, Acting Director
Office of Nuclear Reactor Regulation

FROM: Saul Levine, Director
Office of Nuclear Regulatory Research

SUBJECT: RESEARCH INFORMATION LETTER #11, IEEE NUCLEAR
RELIABILITY DATA MANUAL

This memorandum transmits the results of completed research on the development of a failure rate data manual. This data manual is applicable in risk and reliability analysis of reactor systems. The work has been performed by IEEE with contractual support provided by the NRC. The enclosed handbook is the published version of the data manual. The data manual is published by IEEE and is being distributed in cooperation with Wiley-Interscience.

The data manual contains the following information:

1. Hourly and cyclic failure rates (per demand) and failure mode information for over 1000 electrical, electronic and sensing components used in nuclear plants.
2. A method of collecting and presenting reliability data for quantitative reliability and availability evaluations of safety related nuclear power plant systems.
3. Uncertainty bounds for each component failure rate estimate. These uncertainty bounds permit the quantification of the uncertainty associated with system reliability estimates.
4. Information peculiar to each component type. Examples of the type of information included are maintenance recommendations and environmental effects.

Evaluation and Applicability

- 1) This program and its results have been reviewed by the Reliability Subcommittee of the IEEE Nuclear Power Engineering Committee and the Probabilistic Analysis Branch of the Office of Nuclear Regulatory Research. The manual has also been informally reviewed by representatives from the Offices of Standard Development, Management Information and Program Control, Nuclear Material Safety

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and Safeguards, Nuclear Reactor Regulation and representatives from the Office of the Executive Director for Operations. In addition to the above reviews, draft forms of the manual have also been reviewed by data experts in both the U.S. and other countries. The consensus has been that the data manual has been developed in a competent fashion with sufficient attention to technical detail and accuracy. Care was taken to eliminate inconsistencies.

- 2) Dissemination of the failure rate data contained in the document provides one data source for utilization in risk assessment studies. In particular these failure rate data can be used in studies concerned with evaluating system availability and reliability in nuclear power plants.

NRC has supported this research in its continuing efforts to establish an interim data base that is intended to meet NRC data needs in the electrical and electronic area until NPRDS can provide significant operating data on components used in the nuclear industry.

Original Signed by
Saul Levine

Saul Levine, Director
Office of Nuclear Regulatory Research

Enclosure:
IEEE Nuclear Reliability Data Manual

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