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Mario H. Fontana - 12/4/96

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
SEVERE ACCIDENTS SUBCOMMITTEE
MEETING MINUTES
NOVEMBER 6, 1996
ROCKVILLE, MARYLAND

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INTRODUCTION

The Advisory Committee on Reactor Safeguards (ACRS) Subcommittee on Severe Accidents held a meeting on November 6, 1996, in Room T-2 B3, 11545 Rockville Pike, Rockville, Maryland, with representatives of the U.S. Nuclear Regulatory Commission (NRC), the Nuclear Energy Institute (NEI), and Entergy Operations, Inc. The purpose of this meeting was to gather information concerning the use of the NUREG-1465, "Accident Source Terms for Light-Water Nuclear Power Plants. The entire meeting was open to the public. Mr. Amarjit Singh was the Cognizant ACRS staff engineer for this meeting. The meeting was convened at 1:00 p.m. and adjourned at 4:00 p.m.

ATTENDEES:

ACRS Members

Dr. M. Fontana, Chairman
Dr. W. Shack, Member
Dr. T. Kress, Member

Dr. D. Powers, Member
Dr. R. Seale, Member

Nuclear Energy Institute

Mr. K. Cozens
Dr. D. Leaver

Entergy Operations, Inc.

Ms. S. Mahoney

Principal NRC Speakers

Mr. R. Emch, Office of Nuclear Reactor Regulation (NRR)

No written comments or requests for time to make oral statements were received from members of the public. Approximately seventeen members of the public attended the meeting. A list of those who registered is available in the ACRS Office.

OPENING REMARKS BY THE SUBCOMMITTEE CHAIRMAN

Dr. Mario Fontana, Chairman of the Severe Accidents Subcommittee, convened the meeting at 1:00 p.m. and stated that the purpose of the meeting was to discuss the proposed SECY paper on the use of NUREG 1465, "Accident Source Terms for Light-Water Nuclear Power Plants." He also stated that the subcommittee will gather information, analyze relevant issues and facts, and formulate proposed positions and actions, as appropriate, for deliberation by the full Committee.

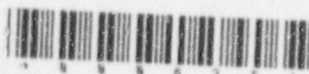
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NRC Staff Presentation

Mr. Richard Emch, NRR, presented the background on the proposed SECY Paper concerning the use of the NUREG-1465 and the approval of licensee applications using a revised source term at operating reactors. He also summarized the staff's review of NEI's generic frame work document (GFD).

Background

During the 413th meeting of the ACRS, September 8-10, 1994, the staff discussed the proposed final version of NUREG-1465 and issued a report to Chairman Selin. The staff subsequently issued NUREG-1465 in February 1995. On November 15, 1995, NEI submitted Electric Power Research Institute (EPRI) report TR-105909, "Generic Framework for Application of Revised Accident Source Term for Operating Plants," to the NRC for review. Four licensees have submitted licensing amendment requests, which the staff is reviewing as part of a pilot program. In a Staff Requirements Memorandum (SRM) of July 2, 1996, the staff was requested to return to the Commission for guidance and not to proceed down a path of de-facto exemptions if rule changes are necessary. In response to the SRM, the staff prepared a proposed SECY paper on its proposed action plan.

Discussion

Mr. Emch presented the staff's report on the proposed SECY paper, which primarily responded to the GFD. The objective of the GFD was to establish a generic methodology for applying the revised source term at operating plants. This document presents four fundamental principles for implementation of the revised source term for operating reactors. The GFD also categorizes the following four types of plant changes the industry wants to justify with the revised source term.

- ° Allowable leak rate changes pertaining to containment leak rates or changes in leak rates for penetrations.
- ° Isolation valve timing changes in relation to the closure times-for instance, how fast main steamline isolation valves or containment isolation valves would need to be closed.
- ° Filtration unit simplification, which involves the removal of charcoal high efficiency particulate air filtration units for the control room and for some of the engineered safety feature systems.

- Timing of mitigation system actuation, which involves the standby gas treatment systems or similar systems used to draw a partial vacuum or negative pressure on a secondary containment. It has been suggested that the 15 minute draw down requirement could be relaxed.

Mr. Emch stated that the staff focused its review on the following four fundamental principles described in the GFD.

- First principle: Continued use of the existing licensing basis is acceptable for operating plants. This principle affirms that it is not necessary for licensees to change source term assumptions and that such undertakings are voluntary and optional. The staff determined that a mandatory backfit of the revised source term at operating plants is not required.
- Second principle: The implementation of NUREG 1465 as a substitute for the existing licensing-basis source term is acceptable if an adequate margin of safety is maintained. The staff believes that the integrated impact on a plant as a result of implementing the revised source term needs to be assessed. The staff however, is reluctant to accept the removal of existing accident mitigation equipment, such as charcoal filtration systems, solely on the basis of the revised term.
- Third principle: Selective implementation of some, but not all, aspects of the revised source term is acceptable if the technical justification is adequate. The staff believes that selective implementation should be limited to "timing-only" applications, which are based solely on the qualitative timing insights of the revised source term. The staff also believes that more extensive implementation of the revised source term would involve detailed dose calculations and, therefore, would require a thorough evaluation as part of a complete implementation of the revised source term.
- Fourth principle: Dose calculations using the limits in 10 CFR Part 100 and current licensing-basis methods are acceptable for applications of these revised source term. According to EPRI report TR-105909, it is unlikely that a plant using the NUREG-1465 source term as a revised design basis could fall within the 300-rem thyroid dose limit in 10 CFR Part 100 and still exceed any reasonable total effective dose equivalent (TEDE) dose limit.

Mr. Emch briefly discussed the analytical framework, including TEDE, and any two-hour dose evaluation period that may be necessary. He stated that 10 CFR Part 100 does not require a specific source term but Atomic Energy Commission report references

TID-14844. The staff believes that there is a possible need for rulemaking and the granting of exemptions with respect to the two hour dose evaluation period. This is for phased timing of the revised source term immediately following onset of release. There are additional radionuclides in the revised source term. Existing 10 CFR Part 100 requires evaluation of whole-body and thyroid doses.

The staff plans to forward the evaluation of TR-105909 to NEI formally and to begin reviewing the pilot plant applications. The schedule is to complete baselining and the decisions on the need for rulemaking and exemptions by the middle of 1997 and to complete the pilot plant reviews by late 1997.

Mr. Emch stated that the staff had also briefed the Committee To Review Generic Requirements (CRGR) and that the proposals were received well, but that CRGR wanted to review the cases later when implementation is about to start.

Entergy Operations, Inc., Presentation

Ms. Sheri Mahoney, Entergy Operations, Inc., presented the "Entergy Viewpoint on the Revised Source Term Implementation." Ms. Mahoney stated that rulemaking is not necessary and would cause a delay in implementing safety improvements in plants other than pilot plants. Specifically, she stated that safety benefits could accrue from elimination of the automatic isolation function of selected primary and secondary containment penetrations, particularly those that do not communicate directly with the containment atmosphere, such as instrument air lines and fire water and service water penetrations. This is largely to the need for operating staff to manually re-open the lines after the automatic closure to allow cooling systems to operate. In concluding, she requested that the ACRS endorse early implementation of the revised source term through 10 CFR 50.59.

Nuclear Energy Institute (NEI) Presentation

Mr. Kurt Cozens presented the NEI position on the implementation of the revised source term. He stated that the NEI approach would be to perform parallel calculations for 10 CFR Part 100 using a new source term, but following Part 100 requirement, that is, whole-body and thyroid doses for zero to two hour release, primarily for regulatory compliance, and a TEDE and maximum release in any two hours for technical information.

Mr. David Leaver presented the key elements of the NEI/EPRI, "Revised Design Basis Accident Source Term Methodology and Applications." Mr. Leaver's presentation was an update on EPRI report TR-105909. This work was conducted in support of the utilities requirement document for advanced light-water reactors

and was extended to apply to the operating plants. Three pilot plant applications were submitted in 1996 and several more are expected in 1997. Mr Leaver stated that the four principles summarized previously in Mr. Emch's presentation were modified and two additional ones were added. A fifth principle is applies to the source term for TEDE calculations for control room dose to meet General Design Criterion (GDC) 19 of Appendix A to 10 CFR Part 50, and the sixth principle is to consider the integrated safety impact of aspects of the plant licensing basis as affected by the revised source term with associated plant changes.

The updated framework document methodology calls for the use of NUREG-1465 for timing, chemical form, and release magnitude and aerosol removal. In concluding Mr. Leaver stated that existing regulations were adequate for application to operating plants and exemptions were not required.

SUBCOMMITTEE ACTION

The Subcommittee recommended that the staff not to provide a presentation to the full committee at November 7-9, 1996 ACRS meeting, and the Subcommittee Chairman would provide a brief to the full Committee.

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NOTE: Additional details of this meeting can be obtained from a transcript of this meeting available in the NRC Public Document Room, 2120 L Street, N.W., Washington, D.C. 20006, (202) 634-3274, or can be purchased from Neal R. Gross & Co., Inc., Court reporters and Transcribers, 1323 Rhode Island Avenue, N.W., Washington, D.C. 20005, (202) 234-4433.