



UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

April 16, 1980

Honorable John F. Ahearne
Chairman
U.S. Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: REPORT ON NRC STAFF REPORT ON ANTICIPATED TRANSIENTS WITHOUT SCRAM,
NUREG-0460

Dear Dr. Ahearne:

At its 240th meeting, April 10-12, 1980 the Advisory Committee on Reactor Safeguards reviewed the Nuclear Regulatory Commission Staff Report, "Anticipated Transients Without Scram for Light Water Reactors" NUREG-0460, Volume 4. The Committee previously reviewed Volumes 1 and 2 at its 221st and 222nd meetings, September 7-9, 1978 and October 5-7, 1978, and reviewed Volume 3 at its 225th and 227th meetings January 4-6 and March 8-10, 1979. Subcommittee meetings were held to review Volumes 1-4 of NUREG-0460 on April 20, May 26, July 13, and August 1-2, 1978, January 31, and March 2, 1979, and January 25 and March 26, 1980. During these meetings the Advisory Committee on Reactor Safeguards discussed the report with representatives of the NRC Staff, Atomic Industrial Forum, Electric Power Research Institute, reactor vendors and some utilities. The Committee had the benefit of the documents listed.

Early Operating Plants

The ACRS agrees that the early operating plants (the list is given on page 53 of NUREG-0460, Volume 4) should comply with Alternate 2A as described in NUREG-0460, Volume 4. However it is recommended that discretion be used in implementing this requirement on these older plants to attempt to assure that those changes made in equipment or circuitry decrease rather than increase risk.

Plants Now Operating and Those Under Construction

For operating BWRs, and for those in advanced stages of construction, it is recommended that Alternate 3A be implemented. However, consideration should be given to the possibility that risk might be decreased by treating some plants, because of equipment arrangement, construction schedule, or other relevant considerations, as special cases.

For operating Westinghouse PWRs, and those under construction, it is recommended that the ATWS mitigating system circuitry as described in Alternate 3 of Volume 3 of NUREG-0460 be implemented. In consideration of the pressure relieving capability of the existing Westinghouse systems, and the possibilities for installation errors and unexpected systems interactions that can occur in backfitting, the Committee does not recommend changes in the scram system circuitry or in the scram breakers for these plants.

For B&W and for CE reactors now operating, and for those under construction, it is recommended that Alternate 3A, as described in NUREG-0460, Volume 4 be implemented. The information now available to the Staff indicates that calculated primary system pressures for B&W and CE plants exceed Service Level C stress limits. Because of these calculated pressures, the Staff is recommending installation (under Alternate 4A) of additional safety or relief valve capacity. The ACRS agrees that additional steps are needed if further investigation corroborates these calculations. However, before making a final decision on requiring additional valves, the Committee recommends that full consideration be given to mitigation capability inherent in possible adjustment of, better measurement of, or better calculation of the moderator temperature coefficient. There appear, for example, to be differences between the methods used for calculation of the peak pressures by the different vendors. These should be investigated to assure that appropriate assumptions and methods are being used. Consideration should also be given to any additional mitigating capability that may exist because of control rod insertion that may be initiated independently of the scram system logic.

The Committee recognizes the desirability of an implementation schedule which produces an expeditious resolution of the ATWS issue. However, the Committee recommends that whatever schedule is adopted permit sufficient time for the design, procurement, and installation of the necessary systems. Because of the large number of plant changes being required by TMI, the schedule being proposed by the Staff may be unrealistic or even counterproductive. It is important that the changes made contribute to risk reduction rather than risk enhancement.

New PWR Plants

For plants on which construction has not begun, the ACRS recommends that additional pressure relieving capability be added to CE and B&W plants. For Westinghouse reactors not yet under construction, the Committee recommends that both the NRC Staff and the vendors give consideration to changes in the scram system that might increase its reliability.

New BWR Plants and Those in Early Stages of Construction

For new GE plants and those in early stages of construction, it is recommended that increased reliability be incorporated in systems which can deliver water

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to the vessel under the operating pressure expected after an ATWS. It is also recommended that further analyses of possible oscillatory behavior of reactor power level after failure to scram be made, and a larger capacity standby liquid control system (SLCS) be required if it is needed to reduce the oscillation to an acceptable level. The Committee also recommends that the SLCS capacity be evaluated giving consideration to the possibility of boron wash-out due to the addition of make-up water to the primary system during an ATWS event.

Plants at Sites With Higher Population Density

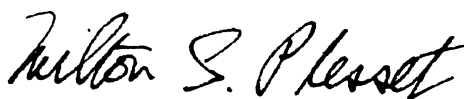
The ACRS believes that for those reactors at sites with higher population densities, additional considerations are appropriate. The Committee recommends that mitigation features be considered for Oyster Creek if study shows they are practical and may provide a significant reduction in risk. Limerick should be provided with a boron injection system having the reliability and reactivity reduction capability of Alternate 4A. Midland should, if practical, be limited to the Service Level C stress limits during an ATWS. Possible improvements in scram reliability should receive consideration as part of the ongoing review of risk reduction at Indian Point and Zion.

Schedule

The ACRS recommends that, in the interest of enhanced safety and efficient use of resources, the changes required by the NRC in connection with treating the ATWS issue be considered in the context of changes required because of the accident at TMI-2. For example, integration of the schedule for equipment installation required by the two programs may be feasible. It is also suggested that requirements imposed by ATWS that deal with specific subsystems (e.g. the auxiliary feedwater system and the requirement for containment isolation) be made compatible with those required because of TMI-2.

Mr. Jeremiah J. Ray did not take part in Committee deliberations regarding this matter.

Sincerely,



Milton S. Plesset
Chairman

References:

1. U.S. Nuclear Regulatory Commission, "Anticipated Transients Without Scram for Light Water Reactors", USNRC Report NUREG-0460, Volumes 1 and 2, April 1978, Volume 3, December 1979, and Volume 4, March 1980.
2. Letter, J. B. Randazza, Maine Yankee Atomic Power Company, to M. Plesset, ACRS, Subject: Anticipated Transients Without Scram (ATWS), dated April 8, 1980.
3. Letter, L. H. Heider, Vermont Yankee Nuclear Power Corporation, to M. Plesset, ACRS, Subject: Anticipated Transients Without Scram (ATWS), dated April 7, 1980.
4. Letter, F. Schwoerer, Westinghouse ATWS Owner's Group, to W. Kerr, ACRS, Subject: Comments on NRC NUREG-0460, Volume 4 Requirements, dated April 7, 1980.
5. Letter, Wayne H. Jens, Detroit Edison to W. Kerr, ACRS, Subject: Detroit Edison Position on ATWS, dated April 3, 1980.
6. Letter, D. L. Peoples, Commonwealth Edison Company, to W. Kerr, ACRS, Subject: Comments on ATWS, dated March 25, 1980.
7. Letter, J. Taylor, Babcock and Wilcox, to S. Hanauer, NRC, Subject: Transmittal of Addendum to B&W Topical Report, "Analysis of B&W NSS Response to ATWS Events", BAW-1610, dated February 26, 1980.
8. Babcock and Wilcox, "Analysis of B&W NSS Response to ATWS Events" BAW-1610, January 1980.
9. General Electric Company, "Assessments of BWR Mitigation of ATWS, Volume II (NUREG-0460 Alternate Number 3)", NEDE-24222, December 1979 (Proprietary).
10. General Electric Company, "Assessment of BWR/3 Mitigation of ATWS (Alternate 3)", NEDE-24223, December 1979 (Proprietary).
11. Westinghouse Electric Company report "Anticipated Transients Without Scram for Westinghouse Plants", December 1979.
12. Letter, R. H. Buchholz, General Electric Company, to S. Hanauer, NRC, Subject: BWR Capability to Accommodate ATWS, dated December 14, 1979.
13. Combustion Engineering Inc., "ATWS Early Verification-Response to NRC Letter of February 15, 1979 for Combustion Engineering NSSS's" CENPD-263-NP, November 1979.
14. Letter, R. J. Mattson, NRC to all NSSS Vendors, concerning generic ATWS analysis to meet requirements of NUREG-0460, Volume 3, dated February 15, 1979.