



NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

CHAIRMAN

March 25, 1982

Dr. Paul G. Shewmon, Chairman
Advisory Committee on Reactor Safeguards
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Dr. Shewmon:

During the Committee's recent meeting with the Commission, and on other occasions, I have expressed interest in resolving the questions associated with pressurized thermal shock for nuclear power plants. The NRC staff has briefed the Commission on the status of their efforts. I understand that the staff is working on a proposed plan of action which will be forthcoming by about the middle of this year.

I would appreciate an ACRS critique of the staff's program on pressurized thermal shock. I am particularly interested in obtaining your views on short-term steps that should be taken by the NRC to lessen the chances of a severe problem occurring because of pressurization following thermal shock to a pressure vessel. Your critique would appear most valuable if it could be done prior to publication of the NRC plan. In that way the staff will have the advantage of knowing your views before their plan is made final.

By copy of this letter to the EDO, I am asking that NRC staff representatives and their contractors would be available to meet with the Committee or an appropriate Subcommittee to discuss this issue at a mutually convenient time.

Sincerely,

Nunzio J. Palladino

cc: Commissioner Gilinsky
Commissioner Ahearne
Commissioner Roberts
EDO
SECY
OPE
OIA

POE
XA

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ATTACHMENT 1



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

April 6, 1982

The Honorable Nunzio J. Palladino
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUBJECT: INSTRUMENTATION FOR MONITORING WATER LEVEL OR INVENTORY

Dear Dr. Palladino:

During its 264th meeting, April 1 and 2, 1982, the Advisory Committee on Reactor Safeguards met with representatives of Babcock and Wilcox Company, Combustion Engineering, Inc., and Westinghouse Electric Corporation to discuss several proposed systems designed to indicate the approach to or the existence of inadequate core cooling (ICC). The Committee also had the benefit of comments from the NRC Staff. A Subcommittee meeting was held on March 31, 1982 to discuss the design features of these systems and their use in the management of reactor transients.

We are pleased to observe that the NRC Staff has developed an approach which will integrate the installation and use of ICC systems with that of other new systems which are being installed in response to other post-TMI-2 requirements. We were told that the scheduling of installation and use of ICC monitoring systems is expected to be done on a plant-by-plant basis, and will take into account the commercial availability of these systems as well as the schedule for installation of other backfit items.

The NRC Staff has indicated that they believe that use of the ICC monitoring system should be introduced into operating and emergency procedures very carefully and only after appropriate operator training, including experience on simulators, if feasible. We support this approach. Both the use and the testing of these systems must take into account the probability they are likely to be most useful in emergency situations. It is important that operators understand both the capabilities and the limitations of the systems in order to use them with confidence when they are needed.

The NRC Staff has concluded that the proposed Westinghouse system and the proposed Combustion Engineering system are acceptable on a generic basis, subject to further exploration of a small number of unresolved issues. The approach being taken by the Staff seems reasonable.

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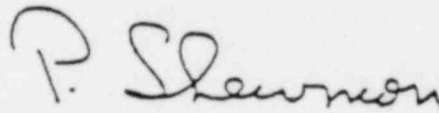
We agree with the following tentative conclusions of the NRC Staff:

1. Core exit thermocouples and saturation margin monitors are not sufficient for an adequate ICC monitoring system for PWRs.
2. Both the Westinghouse and Combustion Engineering vessel inventory monitoring systems correct identified deficiencies in present ICC monitoring instrumentation.
3. A multi-step review process remains to be completed to assure careful phasing-in and full integration of inventory monitors.

We believe that the current approach of the NRC Staff to dealing with the ICC problem has sufficient merit that it should continue in the proposed direction. We plan to continue our review of this area as further developments occur.

Additional comments by Members M. Bender and H. Lewis are presented below.

Sincerely,



P. Shewmon
Chairman

Additional Comments by ACRS Member M. Bender Concerning Reactor Vessel Level Indication System

Although a great deal of valuable study has clarified the use and application of the inadequate core cooling monitoring system for PWRs, the feature intended to show reactor vessel coolant level has not been shown to have great operational value. The proposed systems are not unambiguous in their response under all circumstances.

The Westinghouse RVLIS uses differential pressure to determine liquid level and measures differential pressures of 1 to 10 PSI against a background system pressure of 1500 to 2000 PSI. It must correct for density and dynamic head. The emergency operating procedures would need very thorough development to make RVLIS diagnostically useful. It would have been of doubtful value in the Ginna event or the TMI-2 accident.

The Combustion Engineering heated junction thermocouple system would be more effective under TMI-2 conditions and is less subject to ambiguity due to system operating conditions, but it, too, has some limitations.

The basic requirement is to provide guidance for operator action. The urgent need indicated by both Ginna and TMI-2 circumstances is rapid primary system depressurization and reliable shutdown cooling. I believe emphasis should be placed on being sure that such operator actions are unambiguously permissible regardless of liquid level indicating devices.

Additional Comments by ACRS Member H. Lewis Concerning "Water Level Indicators"

I see no reason to repeat all the comments I have previously made on this subject. In the interim, the Staff has commendably adopted a far more systematic and considered approach to this question, and that has mitigated but not extinguished my concerns. The remaining ones are:

1. To change the name from "water level indicators," which they are not to "inventory monitors," which they are also not, does little good. In the absence of dynamic effects, the Combustion Engineering system measures the mean void fraction in the upper plenum, no more and perhaps a bit less when dynamic effects are important. The Westinghouse system measures differential pressure, and, in the absence of dynamic effects, this is more closely but not precisely related to pressure vessel inventory. That they each give some information is indisputable.
2. Since the information they do provide depends upon many things such as pump status, flow problems and dynamic effects, etc., it is not clear to me that an operator dealing with an unfamiliar upset can know whether his upset is of such a nature that he can believe the instrument. I do wish the Staff would decide whether it is better to know partial inventory (Westinghouse) or void appearance (Combustion Engineering). This is scenario-dependent and I have not seen the issue clarified.



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

April 5, 1982

The Honorable Nunzio J. Palladino
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUBJECT: COMMENTS ON NRC LONG-RANGE RESEARCH PLAN, FY 1984 - FY 1988 (DRAFT
NUREG-0784)

Dear Dr. Palladino:

As requested by the Commission, the ACRS has reviewed the draft of the Long-Range Research Plan, FY 1984-1988 (NUREG-0784) dated March 15, 1982. This draft was discussed with the Safety Research Program Subcommittee on March 31, 1982 and with the full ACRS during its 264th meeting on April 1, 1982.

Our review has been limited in scope, for the following reasons:

- (a) The draft Plan was not received by the Committee in time for detailed review by the several cognizant subcommittees.
- (b) The user-office comments from NRR, dated March 25, 1982, have not yet been responded to by RES or incorporated into the Plan. The same is true for the NRR comments on the Nuclear Plant Severe Accident Research Plan (Draft NUREG-0900), dated February 4, 1982.
- (c) We have not yet seen comments from other user offices.

For these reasons, we are not able at this time to provide detailed comments on the nature and scope of the numerous program elements and subelements.

We will continue to review the proposed Long-Range Research Plan, and the final Plan when it becomes available, as the basis for our review of the NRC research program and budget for FY 1984 and FY 1985. These reviews by the several cognizant subcommittees, and eventually by the full ACRS, will provide the basis for our report to the Commission in connection with its action on the RES budget request for FY 1984 and FY 1985 in July of this year. That report will include comments on the programs proposed for the out-years FY 1986 through FY 1988, as appropriate.

At this time, we offer the following general comments on the Long-Range Research Plan. The current Plan format represents a significant improvement as compared to the initial effort last year. In this respect, it is

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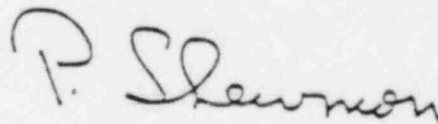
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responsive to several of the suggestions in the ACRS letter dated April 14, 1981. For example, although the format is still by Decision Units, numerous cross-cuts by problem areas are included. The Plan also reflects a considerable effort to identify research being done by others and its relation to the NRC's needs. Although progress has been made in better defining the objectives of the various research programs in terms of questions to be answered, much still remains to be done in identifying and assigning priorities to those problems that represent the greatest potential contributors to risk.

We repeat our previous comment that the Plan is not a true long-range plan but only a projection of current programs and programs planned to answer current questions. There has been little or no effort to anticipate future questions. For example, the Plan does not address research on LMFRs or other advanced-reactor types beyond the CRBR. Although the scope of the Plan may be consistent with the Commission's desires and directives, it seems inappropriate to call it a Long-Range Research Plan.

We hope to continue discussions with the RES Staff, and perhaps also with the Commission, regarding the purpose, philosophy, scope, and effectiveness of a Long-Range Research Plan, and its usefulness to the Commission, to RES and the user offices, and to the ACRS. In addition, we would be happy to discuss further with you how the timing and content of our review and reports on the research program might be conducted in the future if the Long-Range Research Plan were to be made available to the ACRS in final or near final form in December of forthcoming years.

Sincerely,



P. Shewmon
Chairman