



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

July 15, 1983

MEMORANDUM FOR: W. J. Dircks
Executive Director for Operations
M. W. Libarkin
FROM: M. W. Libarkin, Acting Executive Director
Advisory Committee on Reactor Safeguards
SUBJECT: ADDITIONAL ACRS COMMENTS ON THE PRIORITIZATION OF GENERIC
ISSUES

During its 278th meeting, June 9-11, 1983, the ACRS reviewed the adequacy of the NRC Staff's assignment of priority rankings to a group of generic issues, and transmitted its comments to you through a memorandum from R. F. Fraley, dated June 20, 1983.

During its 279th meeting, July 7-9, 1983, the ACRS reviewed the proposed priority rankings of an additional group of remaining generic issues, and its comments are contained in the following attachments:

- Attachment 1 lists those items for which the ACRS agrees with the priority rankings proposed by the NRC Staff.
- Attachment 2 includes a list of items for which the ACRS agrees with the priority rankings proposed by the NRC Staff, but has comments.
- Attachment 3 contains a list of items for which the ACRS disagrees with the NRC Staff's proposed priority rankings along with the reasons therefor.

It is requested that the NRC Staff provide written responses to the ACRS comments identified in Attachments 2 and 3. Cognizant ACRS Subcommittees or the ACRS may review the NRC Staff's responses.

Please note that in the June 20, 1983 memorandum from R. F. Fraley to W. J. Dircks, Subject: ACRS Comments on the Prioritization of Generic Issues, the following issues had inadvertently been included in Attachment 1, the list of items for which the ACRS indicated agreement with the NRC Staff's assignment of priority:

- II.J.3.1 Organization and Staffing to Oversee Design and Construction
- III.A.3.4 Nuclear Data Link

The ACRS actually disagrees with the priority rankings proposed by the NRC Staff for these issues, and the Committee's recommendations and the reasons therefor are contained in Attachment 3 to this memorandum.

The ACRS will continue its review of the proposed priority rankings for the remaining generic issues and will provide additional comments as they become available.

Attachments: As Stated

ATTACHMENT 1

LIST OF ITEMS FOR WHICH THE ACRS
AGREES WITH THE PRIORITY RANKINGS
PROPOSED BY THE NRC STAFF

New Generic Issues

Title

8	Inadvertent Actuation of Safety Injection in PWRs
9	Reevaluation of Reactor Coolant Pump Trip Criteria
10	Surveillance and Maintenance of TIP Isolation Valves and Squib Charges
13	Small-Break LOCA from Extended Overheating of Pressurizer Heaters
18	Steam-Line Break With Consequential Small LOCA
24	Automatic Emergency Core Cooling System Switch to Recirculation
27	Manual Vs Automated Actions

Task Action Plan
Items

A-16	Steam Effects on BWR core Spray Distribution
A-27	Reload Applications
A-30	Adequacy of Safety-Related DC Power Supplies
B-10	Behavior of BWR Mark III Containments
B-11	Subcompartment Standard Problems
B-13	Marviken Test Data Evaluation
B-15	CONTEMPT Computer Code Maintenance
B-17	Criteria for Safety-Related Operator Actions
B-18	Vortex Suppression Requirements for Containment Sumps
B-19	Thermal-Hydraulic Stability
B-20	Standard Problem Analysis

ATTACHMENT 1 (Cont'd)

Task Action Plan
Items
(Cont'd)

B-52	Fuel Assembly Seismic and LOCA Responses
B-54	Ice Condenser Containments
B-59	N-1 Loop Operation in BWRs and PWRs
B-61	Allowable ECCS Equipment Outage Periods
B-69	ECCS Leakage Ex-Containment
C-3	Insulation Usage Within Containment
C-4	Statistical Methods for ECCS Analysis
C-5	Decay Heat Update
C-6	LOCA Heat Sources

TMI Action Plan
Items

I.A.1.4	Long-Term Upgrading
I.A.2.2	Training and Qualifications of Operations Personnel
I.A.2.4	NRR Participation in Inspector Training
I.A.2.6(1)	Revise Regulatory Guide 1.8
I.A.2.6(2)	Staff Review of NRR 80-117
I.A.2.6(3)	Revise 10 CFR 55
I.A.2.6(4)	Operator Workshops
I.A.2.6(6)	Nuclear Power Fundamentals
I.A.2.7	Accreditation of Training Institutions
I.A.3.3	Requirements for Operator Fitness
I.A.3.4	Licensing of Additional Operations Personnel
I.A.3.5	Establish Statement of Understanding with INPO and DOE

ATTACHMENT 1 (Cont'd)

TMI Action Plan
Items
(Cont'd)

- | | |
|------------|---|
| I.A.4.1(1) | Short-Term Study of Training Simulators |
| I.A.4.1(2) | Interim Changes in Training Simulators |
| I.A.4.2(1) | Research on Training Simulators |
| I.A.4.2(2) | Upgrade Training Simulator Standards |
| I.A.4.2(4) | Review Simulators for Conformance to Criteria |
| I.A.4.3 | Feasibility Study of Procurement of NRC Training Simulator |
| I.A.4.4 | Feasibility Study of NRC Engineering Computer |
| I.C.1(4) | Confirmatory Analyses of Selected Transients |
| I.D.5(2) | Plant Status and Post-Accident Monitoring |
| I.D.5(3) | On-Line Reactor Surveillance System |
| I.D.6 | Technology Transfer Conference |
| I.G.2 | Scope of Test Program |
| II.E.2.1 | Reliance on ECCS |
| II.E.2.2 | Research on Small-Break LOCAs and Anomalous Transients |
| IV.A.1 | Seek Legislative Authority |
| IV.A.2 | Revise Enforcement Policy |
| IV.D.1 | NRC Staff Training |
| IV.F.1 | Increase IE Scrutiny of the Power-Ascension Test Program |
| IV.F.2 | Evaluate the Impacts of Financial Disincentives to the Safety of Nuclear Power Plants |
| IV.G.1 | Develop a Public Agenda for Rule Making |
| IV.G.2 | Periodic and Systematic Reevaluation of Existing Rules |
| IV.G.3 | Improve Rule Making Procedures |
| IV.G.4 | Study Alternatives for Improved Rule Making Process |

ATTACHMENT 2

LIST OF ITEMS FOR WHICH THE ACRS
AGREES WITH THE PRIORITY RANKINGS
PROPOSED BY THE NRC STAFF, BUT WITH COMMENTS

Issue No: 22

Title: Inadvertent Boron Dilution Events

Proposed NRC
Staff Priority: DROP

ACRS Comments: Considering the "worst" of the designs, it should be ascertained that the probability of a radiation injury or fatality to plant personnel working in the vicinity of the core is acceptably low.

Issue No: B-8

Title: Locking Out of ECCS Power Operated Valves

Proposed NRC
Staff Priority: DROP

ACRS Comments: The NRC Staff suggests dropping this item since no significant accident initiators have been identified to date. However, the Staff has not examined any plant PRAs in this regard. Although the ACRS agrees with the proposed priority ranking for now, it plans to explore the significance of this item vis-a-vis available PRAs. In the event of significant findings, the ACRS may request a reopening of this item.

ATTACHMENT 2 (Cont'd)

Issue No: B-53

Title: Load-Break Switch

Proposed NRC
Staff Priority: REGULATORY IMPACT ISSUE
(Possible Resolution Identified for Evaluation)

ACRS Comments: The question as to whether the grid or the plant main generator should be used as the preferred source of AC power should be examined in the near future either under this activity or under a new activity.

Issue No: I.A.3.2

Title: Operator Licensing Program Changes

Proposed NRC
Staff Priority: RESOLVED

ACRS Comments: The ACRS agrees that the specific actions called for under this item have been adequately addressed. However, significant operator licensing program changes are still under way and necessary. The appropriate content and form of licensing examinations are in question. The qualifications required for license examiners need to be specified.

ATTACHMENT 3

LIST OF ITEMS FOR WHICH THE ACRS
DISAGREES WITH THE PRIORITY RANKINGS
PROPOSED BY THE NRC STAFF

Issue No: A-29

Title: Nuclear Power Plant Design for the Reduction of Vulnerability to Industrial Sabotage

Proposed NRC Staff Priority: MEDIUM

ACRS Recommendation: HIGH

Reasons: The ACRS believes that the topic of interest is the reduction of nuclear power plant vulnerability to industrial sabotage. Industrial sabotage at nuclear power plants is a sensitive issue which receives significant public attention. A-29 should not be restricted in scope so as to address only design changes to nuclear power plants. The Staff needs to consider sabotage in the broadest possible terms and to ensure that the opportunities and likelihood for sabotage are as low as reasonably achievable. The ACRS recognizes the difficulties inherent in using probabilistic techniques to determine public risk due to acts of sabotage. "Resolution" of this issue most probably will consist of applying serious, broad, and continuing attention to the matter. The ACRS believes that the scope of A-29 should be expanded and a priority ranking of HIGH should be assigned.

Issue No: A-41

Title: Long-Term Seismic Program

Proposed NRC Staff Priority: MEDIUM

ACRS Recommendation: HIGH

Reasons: This program should be augmented or a new activity established as per the ACRS letter of January 11, 1983, to Chairman Palladino, related to the Quantification of Seismic Safety Margins.

ATTACHMENT 3 (Cont'd)

Issue No: B-30
Title: Design-Basis Floods and Probability
Proposed NRC Staff Priority: LICENSING ISSUE
ACRS Recommendation: HIGH
Reasons: The NRC currently lacks a quantitative basis for evaluating this event.

Issue No: B-50
Title: Post-Operating Basis Earthquake Inspection
Proposed NRC Staff Priority: REGULATORY IMPACT ISSUE
ACRS Recommendation: MEDIUM
Reasons: Some advanced planning as to what would be required before plant startup should be done to avert unnecessarily long and expensive shutdowns and to assure that the proper actions would be taken.

Issue No: D-1
Title: Advisability of a Seismic Scram
Proposed NRC Staff Priority: DROP
ACRS Recommendation: MEDIUM
Reasons: The NRC Staff has not adequately evaluated this issue nor obtained an understanding as to the basis for this requirement by the Japanese. Similarly, the British are currently reviewing the advisability of a seismic scram.

ATTACHMENT 3 (Cont'd)

Issue No: D-2

Title: Emergency Core Cooling System Capability for Future Plants

Proposed NRC Staff Priority: Covered in USI A-45

ACRS Recommendation: MEDIUM

Reasons: The focus of USI A-45 is on current-generation plants, not future plants as Item D-2 implies. In addition, based on its review and discussion with the cognizant NRC Staff, the ACRS believes that this item is not covered in USI A-45. As the ACRS has noted in a recent report to the Commission on the NRC Safety Research Program Budget for FY 1985 and 1986, the current Appendix K requirements have influenced, and will continue to influence the design and operation of ECC systems in a manner that could be deleterious to the overall concerns of ECC.

The ACRS believes that the NRC Staff should carry this as a separate generic issue, with a MEDIUM priority, and explore it in the context of the ongoing RES effort to revise Appendix K of 10 CFR Part 50.

Issue No: I.A.2.5

Title: Plant Drills

Proposed NRC Staff Priority: LOW

ACRS Recommendation: MEDIUM or HIGH

Reasons: The ACRS questions the technical basis for the assumptions made to compute the risk reduction potential associated with this issue. Because of uncertainties in the assumptions made, coupled with the fact that the Value/Impact Score indicated that the ranking of this issue would be LOW to MEDIUM, the conservative approach would be to assign a MEDIUM priority to this issue (at least until better information is obtained). Also, matters related to simulator fidelity and validity of training programs are being pursued with high priority under several human factors generic issues. This suggests that a higher priority might be warranted.

ATTACHMENT 3 (Cont'd)

Issue No: I.A.2.6(5)

Title: Develop Inspection Procedures For Training Program

Proposed NRC
Staff Priority: RESOLVED

ACRS
Recommendation: MEDIUM

Reasons: Why is this considered RESOLVED when RES has a research program under way that should provide some criteria for assisting in training effectiveness evaluation? In addition, Staff efforts are under way to respond to Public Law 97-425. The Staff's proposed package in response to the Act includes a new training and qualification rule, a new training regulatory guide, and revised NRC inspection modules. Since the training regulatory guide and inspection modules (not yet developed) will provide detailed guidance to the industry and inspectors, and since the Staff intends to recommend 2-5 years for Industry to comply with the new training rule/guidance, a MEDIUM priority seems appropriate. Finally, one of the 23 tasks contained in the Human Factors Program Plan also deals with this specific topic. Since extensive Staff resources are being expended in this area, how can this issue be considered RESOLVED?

Issue No: I.A.4.2(3)

Title: Regulatory Guide on Training Simulators

Proposed NRC
Staff Priority: RESOLVED

ACRS
Recommendation: MEDIUM or HIGH

Reasons: While Regulatory Guide 1.149, "Nuclear Power Plant Simulators For Use in Operator Training" was published to endorse the revised ANSI/ANS 3.5-1981, additional training simulator changes still need to be made. Regulatory Guide 1.8 should be evaluated and revised as necessary in light of the ongoing simulator research. The Staff plans to make another revision to Regulatory Guide 1.149. This revision will continue to endorse ANSI/ANS 3.5-1981 (with some exceptions) but will require nuclear power plants to have a plant referenced simulator or other facility proposed device acceptable to the NRC. Continued expenditure of Staff resources in this area appears appropriate.

ATTACHMENT 3 (Cont'd)

Issue No: I.B.1.1

Title: Organization and Management of Long-Term Improvements, including:

I.B.1.1(1) Prepare Draft Criteria

I.B.1.1(2) Prepare Commission Paper

I.B.1.1(3) Issue Requirements for the Upgrading of Management and Technical Resources

I.B.1.1(4) Review Responses to Determine Acceptability

I.B.1.1(6) Prepare Revisions to Regulatory Guides 1.33 and 1.8

I.B.1.1(7) Issue Regulatory Guides 1.33 and 1.8

Proposed NRC Staff Priority: MEDIUM

ACRS Recommendation: HIGH

Reasons: The ACRS believes that improvements to a utility's management and organization will reap benefits other than human-error rate reduction. These other benefits (e.g., improved productivity, improved plant quality, reduced absenteeism and turnover rate, etc.) should be taken into account when determining the priority for these items. The ACRS believes that such an analysis would indicate that these items should receive a HIGH priority. The ACRS would also like to caution the Staff that human-error rates vary greatly with managerial systems (probably much more than 0-20%). Human factors experts should be actively involved in evaluating the assumptions made to arrive at the total risk reduction.

ATTACHMENT 3 (Cont'd)

Issue No: I.B.1.1(5)

Title: Review Implementation of the Upgrading Activities

Proposed NRC Staff Priority: RESOLVED

ACRS Recommendation: HIGH

Reasons: The Staff states that, since the Office of Inspection and Enforcement (IE) routinely develops and issues inspection procedures which address new or revised regulations and requirements, this item is considered as RESOLVED. Since utilities will be required to submit a new proposed organization and management plan which will be reviewed by the NRC (including a site review), and since the IE Staff will perform annual assessments to assure each utility is satisfactorily meeting NRC management and organization requirements (as identified in the initial NRR plant review), it seems that this issue should remain open until after the first IE audit subsequent to NRC approval of each utility's organization and management plan. The priority assigned to this item should be commensurate with other items in I.B.1.1.

ATTACHMENT 3 (Cont'd)

Issue No: I.C.9

Title: Long-Term Program Plan for Upgrading of Procedures

Proposed NRC
Staff Priority: MEDIUM

ACRS
Recommendation: HIGH

Reasons: The Staff's analysis concludes that resolution of this item might result in a total reduction in public risk of 5×10^4 man-rem. This is the safety importance at which an item would change from a MEDIUM to a HIGH priority. This risk reduction is based on a uniform 30% improvement in human error, including maintenance, through the dominant accident sequences. This 30% improvement includes improvements due to upgraded Emergency Operating Procedures (EOPs) which are no longer being considered as part of I.C.9. The Staff assumes that 70% of the 30% improvement will result from upgrading EOPs and the remaining 30% will result from upgrading other procedures (e.g., normal, abnormal, maintenance, etc.). In view of the high safety importance associated with this item and the ACRS' belief that more than 30% of the total benefits derived from upgrading procedures (including EOPs) will be accrued by upgrading normal, abnormal, and maintenance procedures (excluding EOPs), the ACRS believes that this item should be assigned a HIGH priority. It is also important for the NRC to recognize that improving job design (e.g. procedures, hardware, etc.) is as important as modifying people (e.g., training) in reducing human errors at nuclear power plants.

ATTACHMENT 3 (Cont'd)

Issue No: I.D

Title: Control Room Design, including:

I.D.3 Safety System Status Monitoring

I.D.4 Control Room Design Standard

I.D.5(5) Disturbance Analysis Systems

Proposed NRC
Staff Priority: MEDIUM

ACRS
Recommendation: HIGH

Reasons: There is overwhelming evidence that poorly designed control rooms contribute to operator error. Emphasis on the machine side of the man-machine interface (to reduce human error) is as important as the selection and training of plant personnel. In addition, the weak link in reactor operations appears to involve diagnosis of the root cause of a plant's upset condition. Diagnosis involves cognitive skills such as judgment, problem solving, and decision making. Control room operators need all the help they can get in a time of upset plant conditions.

ATTACHMENT 3 (Cont'd)

Issue No: I.D.5(1)

Title: Operator-Process Communication

Proposed NRC
Staff Priority: RESOLVED

ACRS
Recommendation: HIGH

Reasons: While RES has issued a Research Information Letter (RIL-124) that provides recommendations for future action related to the operator-machine interface in reactor control rooms, this item should not be considered as RESOLVED until either those actions are carried out or they are deemed unnecessary. The ACRS believes that this item should be assigned a HIGH priority similar to other items under general topic I.D, Control Room Design.

Issue No: I.D.5(4)

Title: Process Monitoring Instrumentation

Proposed NRC
Staff Priority: RESOLVED

ACRS
Recommendation: HIGH

Reasons: NRC has been evaluating number of systems (e.g., liquid level monitoring) at the LOCA experimental facilities at ORNL and INEL. While this work is almost completed, this item should remain open until research results are documented and regulatory guidance has been provided to the nuclear power industry. The ACRS believes that completion of this ongoing work should be given a HIGH priority.

ATTACHMENT 3 (Cont'd)

Issue No: II.E.2.3
Title: Uncertainties in Performance Predictions
Proposed NRC Staff Priority: LOW
ACRS Recommendation: MEDIUM
Reasons: Higher priority should be given to the evaluation of uncertainties for small breaks.

Issue No: II.E.6.1
Title: Test Adequacy Study
Proposed NRC Staff Priority: MEDIUM
ACRS Recommendation: HIGH
Reasons: Disagree with the reliability initially assigned to new valves operating under adverse or design conditions. Also, the Staff's analysis assumes that an improved testing program would reduce valve failures by 5 percent. Can this number be justified?

Improved inservice testing of valves should make use of baseline data obtained from the valve in its new condition, e.g., a strip chart recording taken as the valve was cycled would show the approach to inoperability better than the leak rate tests or periodic cycling that are now used. In addition, effort should be made to develop dynamic tests for both new and inservice valves to assure their operability under design loads.

ATTACHMENT 3 (Cont'd)

Issue No: II.J.3.1
Title: Organization and Staffing to Oversee Design and Construction
Proposed NRC Staff Priority: MEDIUM
ACRS Recommendation: HIGH
Reasons: See comments related to I.B.1.1 (Page 5, Attachment 3)

Issue No: III.A.3.4
Title: Nuclear Data Link
Proposed NRC Staff Priority: MEDIUM
ACRS Recommendation: DROP
Reasons: The ACRS believes that the proposed Nuclear Data Link should not be implemented.