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CRR

OFFICE OF THE
CHAIRMAN

December 20, 1979

Mr. Gerald R. Day
Executive Director
Illinois Commission on Atomic Energy
Lincoln Tower Plaza
524 South Second Street, Room 415
Springfield, Illinois 62706

Dear Mr. Day:

Thank you again for sending me a copy of the Ad Hoc Committee's Report on Illinois nuclear power facilities. Your having provided the report on so timely a basis made it available for consideration in ongoing TMI-2 related studies within the NRC staff, particularly in the Lessons Learned Task Force effort. The report provided another useful perspective and reference point for the staff's endeavor. The final report of the Lessons Learned Task Force, incidentally, has been issued and a copy is enclosed (NUREG0585).

The NRC staff has now completed its analysis of the recommendations in the Ad Hoc Committee's report. The analysis (see Enclosure 1) indicates that, in all but two areas, the Committee's recommendations are in accord with actions planned or already initiated by one or more of the several Task Forces or special study groups which were established earlier within the NRC staff for dealing with TMI-2 related issues. In the case of Recommendation A.3, we would like to discuss with you the way in which the State of Illinois and the NRC can best interface if this recommendation is implemented. In the case of Recommendation D.3, the staff noted some possible problem areas but was unable to comment definitively for lack of additional information.

It is good to note that we share areas of commonality and general agreement on the important safety-related issues involved. I would like to express at this point our willingness to discuss with you any residual areas of difference, or any questions or comments which you have regarding the staff's analysis. Most of the supporting documentation cited in

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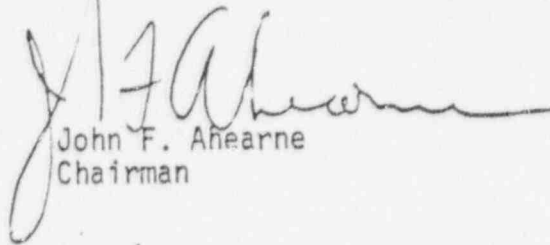
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the staff's analysis is already in the public domain (see Enclosure 2), but if I can be of further assistance to you with respect to obtaining any of that material, please let me know.

Sincerely,



John F. Ahearne
Chairman

Enclosures:

1. Analysis of Ad Hoc
Committee Recommendations
2. Listing of References/
Supporting Documentations
3. NUREG-0585

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ENCLOSURE 1

ANALYSIS OF AD HOC COMMITTEE RECOMMENDATIONS

Recommendation A.1

"It is recommended that the State of Illinois develop Emergency Plans, meeting NRC concurrence requirements, for each site of a major nuclear facility."

Coment

The general question of NRC concurrence in state/local plans was addressed recently by the EDO's Emergency Planning Task Force. This recommendation is consistent with the Task Force treatment of this question, and with NRC's objectives in this regard as outlined in "Action Plans" developed for the Office of State Programs and for the Office of Standards Development in connection with that effort. (See Reference 1, specifically the discussion of Problem Topics C-1, D-1, and D-4, and the OSP/OSD "Action Plans" included as part of that report.)

Recommendation A.2

"It is recommended that the State of Illinois review the desirability of becoming an Agreement State."

Comment

Any decision or action on this recommendation is within the province of the State of Illinois. No action by NRC is required at this time.

Recommendation A.3

It is recommended that the State of Illinois conduct Independent Safety Audits, as necessary, covering major nuclear facilities (operating and under construction) within its boundaries; these independent audits should also include a review of the performance of relevant Regulatory Agencies. It is further recommended that these audits be carried out under the responsibility of the Illinois Commission on Atomic Energy, and/or other appropriate State Agencies.

Cominent

The recommendation is directed to the State of Illinois, so no action by NRC is required at this time, except possibly with regard to the underlined passage. The intent of that wording is not totally clear, but it would appear to involve some potential for development

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of conflict between Federal/State safety review authority. Discussions regarding the use that will be made of the audits and the means that will be used to conduct them would be useful and may avoid any jurisdictional conflicts.

Recommendation A.4

"It is recommended that a better coordination be established between the State of Illinois and the U.S. Nuclear Regulatory Commission (NRC). A move in this direction might be the assignment of a Representative from the NRC Office of State Programs to the NRC Region III Office in Glen Ellyn, Illinois."

Comment

The general question of improved NRC/state/local coordination was addressed recently by the EDO's Emergency Planning Task Force. This recommendation is consistent with the Task Force treatment of this question, and with NRC's objectives in this regard as outlined in the "Action Plan" developed for the Office of State Programs in connection with that effort, including the assignment of OSP personnel to NRC regional offices. (See Reference 1, specifically the discussion of Problem Topics A-2, D-3, and F-3 and the OSP Action Plan included as part of that report.)

Recommendation A.5

"It is recommended that the NRC adopt quantitative health and safety goals and criteria for use in all facets of its regulatory process. Such goals and criteria shall be compatible with health and safety goals used for regulation of other relevant aspects of our technological society. Specifically, the permissible risk levels, to be adopted for the nuclear energy technology, shall in general be smaller (but not to an excessive degree) than those applied in alternative energy-production technologies (dams for hydro-electric power generation, fossil-fired stations, solar energy, etc.) and with those applied in the manufacture, storage, and disposal of other hazardous materials. Such NRC safety goals and criteria shall be developed by NRC under the auspices of bodies such as the National Academy of Sciences, or the National Academy of Engineers, and shall be commented on and approved by the U.S. Congress. The Committee strongly supports a recommendation of a similar nature made by the NRC Advisory Committee on Reactor Safeguards (ACRS) contained in the ACRS letter, Max W. Carbon to Joseph M. Hendrie, dated May 16, 1979."

Comment

In response to the 5/16/79 letter, the Commission asked the ACRS to provide their recommendations regarding appropriate quantitative health and safety goals and criteria. An ACRS subcommittee will examine this question in further detail in a planned series of meetings

over the coming months and attempt to develop recommendations in this regard.

The question of development and implementation of more definitive reactor safety goals is also addressed in the final report of the TMI-2 Lessons Learned Task Force. Action on the Lessons Learned Task Force recommendation in this area, and on the forthcoming ACRS recommendations in this regard, should satisfy the State's interest in this matter.

Recommendation A.6

"It is recommended that the NRC and the Department of Energy (DOE) extend and reinforce their capabilities and programs in the area of probabilistic risk assessment for nuclear and other energy technologies, and that they review and re-evaluate the potential contribution of operator error to the overall risk of nuclear power plants, in the light of the TMI accident."

Comment

This recommendation is similar to recent ACRS recommendations in these same topic areas (e.g., see Reference 3, Items 5 and 12). It is also consistent with a principal thrust of the Lessons Learned Task Force in its Short Term Report (NUREG-0578), i.e., major concern regarding the high incidence of safety-significant operator error and the need to improve overall operational reliability (see Reference 4, Section 2.2.3).

The concerns expressed in this recommendation are addressed explicitly in recent proposals by the Office of Research to increase substantially the funding for a category of programs entitled "Improved Risk Assessment", including specifically "Analysis of Human Error Rates and Impact of Human Error on Risk" (see Reference 5). Also, the Lessons Learned Task Force in its final report has a specific recommendation on the increased use of probabilistic analysis techniques by the NRC Staff in licensing, a recommendation that is consistent with work ongoing by the Office of Research in its development of the Integrated Risk Evaluation Program.

Recommendation A.7

"It is recommended that NRC and DOE review their nuclear reactor safety programs so as to place greater emphasis on anticipated events and incidents of moderate and low probability (i.e., plant conditions I, II, and III), and less emphasis on hypothetical limiting faults of extremely low probability (i.e., plant condition IV)."

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Comment

This recommendation is similar to several earlier ACRS recommendations in this regard (e.g., see Reference 2, Items A.1, B.4, and D.6). It is also consistent with the major reorientation of future research programs proposed recently by the Office of Research (see Reference 5). The general concern involved here is also addressed in a short term recommendation by the Lessons Learned Task Force relating to analysis of off-normal transients and accidents (see Reference 4, Section 2.1.9). The Lessons Learned recommendation is now being implemented by all licensees.

Recommendation A.8

"It is recommended that NRC review its extensive and complex body of regulatory requirements and guidelines (General Design Criteria, Regulatory Guides, Standards, Technical Branch Positions, etc.) in the light of the results of probabilistic risk analyses; it is recommended that areas, where possible changes may be introduced, be identified in order to obtain a more equal distribution of risk over the entire spectrum of potential accident-initiating events. It is further recommended that NRC strive to simplify its body of regulatory requirements so as to make it less specific to one reactor type. It is suggested that a review of regulatory requirements existing in other countries (Canada, UK, France, West Germany) may be helpful in this respect. It is noted in this connection that Canadian regulatory requirements have followed a probabilistic approach from their inception."

Comment

This recommendation is similar to one contained in the final report of the Lessons Learned Task Force. See also the answer to A.6, above.

Recommendation A.9

"It is recommended that NRC implement a closer coordination between its various branches; in particular, it is recommended that this be done between the Office of Reactor Regulation and the Office of Inspection and Enforcement."

Comment

The concern expressed in this recommendation is being addressed in several contexts within the agency. The need for improved coordination of various emergency planning functions within NRC was addressed by the EDO's Emergency Planning Task Force (see Reference 1, discussion of Problem Topics B-1 and E-2, and the NRR and IE "Action Plans" included as part of that report). The need for improved coordination within NRC in the evaluation and use of operational experience was

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addressed by the EDO's Task Force on Operations Data Analysis and Evaluation (see Reference 6). And, finally, the final report of the Lessons Learned Task Force recommends that a reorganization of the Office of Nuclear Reactor Regulation must specifically address means for improving coordination between the principal elements and functions of the reactor safety review and licensing process within NRR (e.g., design review, operating and emergency procedure review, operator licensing, and feedback of operational data into all of these areas).

Recommendation A.10

"It is recommended that the Illinois utilities require, in their dealings with the reactor manufacturers, that greater emphasis be placed on adequate protection against anticipated events and incidents of moderate and low probability (i.e., plant conditions I, II, and III)."

Comment

The NRR staff has taken decisive steps in the direction that this recommendation suggests - see A.7, above.

Recommendation A.11

"It is recommended that Illinois utilities, operating nuclear power plants, institute a greater managerial separation between the operating staffs of nuclear power plants and those of fossil-fueled power plants. This is in order to emphasize the substantial differences between power plants of the two types."

Comment

The need for greater managerial separation between nuclear and non-nuclear operating staffs of utilities has not been identified as a significant problem or deficiency, nor addressed explicitly to date, by any of the TMI-related Task Force of study efforts within NRC. A significant effort has already been initiated, however, within the Quality Assurance Branch, NRR, to assess and upgrade generally the managerial and technical competence of licensees.

Further, the Lessons Learned Task Force has addressed one of its strongest Short Term recommendations to the urgent need for increasing the level of awareness at upper levels of utility corporate management with respect to the nuclear facilities and operations under their cognizance, and to the need for increased attention to, and greater emphasis on, improved operational reliability in every aspect of those operations (including organizational alignments and qualifications of operating staffs) from those higher levels of corporate management. (See Reference 4, Section 2.2.3, "Revised Limiting Conditions for Operation"). Action on the rulemaking suggested by the Task Force is now underway in NRC's Office of Standards Development.

The subject of greater utility management involvement in reactor safety is also addressed in the final report of the Lessons Learned Task Force.

Recommendation A.12

"It is recommended that each Illinois utility, operating or constructing nuclear power plants, institute an internal Nuclear Reactor Safety Review Committee, charged with the responsibility of performing regular reviews of all aspects bearing on the safety of the operation, maintenance, design, and construction of nuclear power plants, as well as of operator training and performance. These Safety Review Committees shall have an advisory function, shall report directly to Top Management, and shall prepare regular safety review reports. These Committees shall be appointed by the utilities, and shall primarily, though not exclusively, consist of company employees knowledgeable in the area of operation of nuclear power plants, but not currently involved in such activities; the Committees may also have members which are not company employees. Most members of these Committees are to be appointed for part-time duty and for sufficiently long time periods (e.g., staggered three-year appointments) to provide adequate continuity."

Comment

This Ad Hoc Committee recommendation is somewhat more prescriptive than, but generally consistent with, the thrust of recommendations by the Lessons Learned Task Force in its final report outlining comprehensive programs to be required of utilities for improving significantly all aspects of operational reliability in licensed reactors (e.g., utility verification of operations activities, utility management involvement in safety, use of shift technical advisors, utility review of operating experience, etc.).

Recommendation A.13

"It is recommended that each Illinois utility, operating nuclear power plants, establish a formal mechanism for the review of Licensee Event Reports (LERs); these reviews should cover both those LERs generated within the companies and those generated by other utilities. It is suggested that the Nuclear Reactor Safety Review Committees mentioned under A.12 may be charged with the review of LERs. It is further recommended that a formal mechanism be established for incorporation of the "lessons learned" from LER review into the operating procedures and operator training."

Comment

The recommendation is similar to a short term recommendation of the Lessons Learned Task Force that is now being implemented on all operating plants, said implementation required to be complete by

January 1, 1980 (see Reference 4, Section 2.2.1.b). The related need for significant improvement in the evaluation and use of operational data by NRC was addressed by the EDO's Task Force on Operational Data Analysis and Evaluation (see Reference 6). Formation of an Office of Operational Data Analysis and Evaluation and counterpart organization in NRC Program Offices is now underway.

Recommendation A.14

"It is recommended that an Emergency Operation Center be established in the vicinity of each nuclear power plant. It is furthermore recommended that consideration be given to Alternate Emergency Operation Centers, to serve in case the primary centers were to become unavailable. Such centers are to be jointly used by State/Utility/NRC/Local Government representatives in case of a nuclear incident. These centers shall be maintained at all times in an operable condition and shall be provided with adequate and reliable communication facilities."

Comment

The need for establishing Emergency Operations Centers in the vicinity of all operating nuclear power plants was addressed by the EDO's Emergency Planning Task Force; and this recommendation is consistent with the objectives and planned course of action in this regard (already initiated), as outlined in "Action Plans" developed for the Office of Nuclear Reactor Regulation, State Programs, and Inspection and Enforcement in connection with that effort. (See Reference 1, discussion of Problem Topic E-6, and NRR/IE/SP Action Plans included as part of that report.) Also the Lessons Learned Task Force is developing additional detailed recommendations for inclusion in its final report regarding critical plant parameter monitoring capability in the reactor control room (and eventually for transmission to the EOC and the NRC Incident Response Center).

Recommendation A.15

"It is recommended that adequate and reliable Back-up Communication Systems be provided for each nuclear power plant, to serve in case of partial or total failure of the normal commercial telephone system."

Comment

The concern expressed in this recommendation is partially addressed by installation of direct, dedicated telephone communication circuits between NRC headquarters and each operating facility. That telephone link is still susceptible to "total failure of normal commercial telephone system."

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Recommendation A.16

"It is recommended that the need for, and advisability of, installing improved/additional Off-site and On-site Radiation Monitoring Systems be reviewed for each nuclear power plant. Such monitoring systems should be aimed at providing fast and accurate information in case of a nuclear incident. It is furthermore recommended that a clear definition of the objectives (e.g., amount and nature of the data, means of transmission of the data, etc.) be prepared, and that a study be performed concerning the various alternative solutions for achieving these objectives. Cost/benefit evaluations of the alternative solutions should also be made. The final proposal should clearly define the interfacing responsibilities of State, utility, and NRC with respect to ownership, operation, and maintenance of these radiation monitoring systems. It is recommended that the State of Illinois and Illinois nuclear utilities continue their current plans for a pilot project along the above lines, initially for a single station."

Comment

This recommendation is consistent with several actions already initiated within NRC to address the general need for improved accident diagnosis and monitoring capability, e.g.,:

- a) The Lessons Learned Task Force addressed the immediate need for improved on-site, in-plant monitoring capability in its short term report. (See Reference 4, Sections 2.1.8.a, b, & c.).
- b) The Office of Standards Development has undertaken a broader effort to identify all instrumentation required by the control room to properly diagnose and follow the course of an accident, and to revise Reg. Guide 1-97 appropriately. (See Reference 10.).
- c) The Office of Nuclear Reactor Regulation, the Office of Inspection and Enforcement, and the Office of State Programs have undertaken a coordinated effort to better define and upgrade monitoring capability required by NRC, licensees, and state and local authorities for dealing with accidents and other off-normal situations. (See Reference 1, discussion of Problem Topic E-7 and NRR/OSP/IE Action Plans included as part of that report.). The question of interfacing responsibilities is expected to receive further treatment by the President's Commission and by the NRC Special Inquiry.

Recommendations A.17, A.18, and A.19

"It is recommended that the State, NRC, and the utilities make adequate provisions and arrangements in order to avoid issuing conflicting public statements, which could cause public confusion in case of a nuclear incident."

"It is recommended that representatives of the State, NRC, or the utilities, when making public announcements following a nuclear incident, provide sufficient information so as to allow the general public to place the actual risk in the proper perspective. The data provided should be explained in laymen's language. As an example, the significance of radiation doses should be explained by making comparisons to doses due to, e.g., natural background (and its regional variations), air travel, use of X-rays and radioisotopes in medical treatments, etc. Also, factual information concerning radiation types (a, b, and q) and radiation sources (e.g., noble gasses, iodine, etc.) should be provided."

"It is recommended that representatives of the State, NRC, and/or the utilities, when publicly announcing a position which later turns out to be erroneous (e.g., due to misjudgement or lack of reliable information), correct this position publicly, swiftly, and with adequate emphasis, as soon as additional reliable information warrants doing so. (Example: During the TMI accident, NRC caused great public concern with its announcement about a large bubble consisting of an explosive mixture of hydrogen and oxygen. It turned out that the bubble was neither large nor explosive. Although this error was known to NRC shortly after the announcement was made, NRC did not correct its mistake publicly and with sufficient emphasis until required to do so in Congressional hearings.)"

Comment

These recommendations are similar to the conclusions drawn recently by the EDO's Task Force on Emergency Planning regarding the public information concerns involved, and are consistent with NRC's planned course of action in this regard as outlined in the Action Plan developed in connection with that effort for dealing with such problems. (See Reference 1, discussion of Problem Topic E-8 and ORG Action Plan included as part of that report).

Recommendation B.1

"It is recommended that the need for, and/or advisability of, appointing individuals (with job titles to be determined later) having in-depth knowledge of nuclear power plants and analytical ability (e.g., degree in engineering, or equivalent) be reviewed. A minimum of one of these individuals should be present during each operating shift. These individuals should have a reporting status to the Corporate Headquarters of the utility, and should serve in an advisory capacity to the Shift Supervisor/Engineer; they should not be responsible for the routine operation of the nuclear power plant. Their primary responsibilities under normal conditions may include the checking of control-room operations, the checking of safety-related systems, and the interaction with the NRC Resident Inspector. In case of an incident, these individuals may be called upon to assume primary

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responsibility during the incident and during the recovery operations, acting, however, still through the Shift Supervisor/Engineer."

Comment

This recommendations is partially satisfied by a Short Term recommendation by the Lessons Learned Task Force regarding the need for a "Shift Technical Advisor" (see Reference 4, Section 2.2.1.b). Further recommendations in the area of utility technical qualifications are contained in the final report of the Task Force. These would fully satisfy the Illinois recommendation.

Recommendation B.2

"It is recommended that the need for, and/or advisability of, a general upgrading of the training and re-training levels of operators be reviewed."

Comment

This recommendation is consistent with treatment of the operator training and qualifications already initiated within NRC in several contexts, e.g.:

- a) An Operator Licensing Branch has developed a set of sixteen specific recommendations for initially upgrading the present operator licensing program on a relatively short-term basis. (See Reference 7).
- b) The Lessons Learned Task Force has developed a set of recommendations in its final report addressing the broader and longer term question of upgrading the training and qualification of all utility personnel (on-site/off-site, licensed/non-licensed) involved in assuring the safe operation of licensed facilities and appropriate response to accident conditions.

Recommendation B.3

"It is recommended that the training program for the operating staff place adequate emphasis on the importance of adherence to Operating Procedures and Technical Specifications; in particular, the training program should inform the Operating Staff about the potential accidents, and their consequences, that could be caused by non-compliance. Furthermore, it is recommended that disciplinary actions, to be imposed by the utilities, as appropriate, in case of a clear violation of Operating Procedures, be clearly explained in the training program."

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Comment

This recommendation is similar to several recommendations made by the ACRS regarding the need for development of improved operating and emergency procedures and the training of operators in responding to accidents and off-normal transients (e.g., see Reference 2, Items A.3, B.1.b, B.1.c, and D.3). It also reflects concerns regarding adherence to prescribed procedures and technical specifications (and the need for disciplinary action for failure to adhere) which the Lessons Learned Task Force addressed in its Short Term recommendation regarding Revised Limiting Conditions for Operation (see Reference 4, Section 2.2.3). These same concerns are also reflected in a number of corrective actions already imposed upon licensees by a series of IE Bulletins (e.g., IE-79-05 A, B, & C and IE-79-06 A, B, & C).

Recommendation B.4

"It is recommended that the utilities make available upon request Statistical Data concerning the Performance of the Operating Staff during training and re-training programs to the Committee conducting the Independent Safety Audits (Recommendation A.3), if implemented."

Comment

The thrust of this recommendation is consistent with the approach taken, and the type of information considered, by the Operator Licensing Branch recently in examining the adequacy of current operator licensing criteria and requirements and current operator qualifications. It is also generally consistent with recommendations of the Lessons Learned Task Force in this regard. The specific approach of statistical analysis of training and retraining performance by operators may not be too valuable as we move to an era of multiple-failure event diagnosis in the training program, but it certainly will be considered.

Recommendations B.5 and B.6

"It is recommended that the utilities institute a clear Procedure for the Review of Suggestions from, and/or Dissenting Opinions of, members of the Operating and Technical Staff in the area of nuclear safety. It is suggested that the internal Nuclear Reactor Safety Review Committee (Recommendation A.12) may be charged with the execution of this review procedure. It is further recommended that the utilities actively encourage suggestions from the Operating and Technical Staff in the area of nuclear safety."

"It is recommended that the utilities institute a well-defined Incentive/Merit Program in the area of nuclear safety for the Operating Staff."

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Comment

These recommendations appear to have substantial merit; they are analogous to the policy statement developed internally recently governing the treatment of "Differing Professional Opinions" within NRC. Also, the recommendations are more specific (but similar to) recommendations in the area of utility management involvement in safety addressed in the final report of the Lessons Learned Task Force. It is likely that activities relating to the work of the newly formed Institute for Nuclear Power Operations will achieve the same results as those suggested by this recommendation.

Recommendation B.7

"It is recommended that the Operating Procedures and Technical Specifications be reviewed relative to the conditions under which the operating staff may be required to override/augment automatic safety-related functions. It is also recommended that Operator Training be reviewed in this respect."

Comment

This recommendation is similar to actions required of all operating reactor licensees recently by the Bulletins and Orders Task Force, e.g., in Bulletin IE-79-06A, Items 1, 2, & 7. The same concerns are also addressed in a somewhat more general context in a Short Term recommendation by the Lessons Learned Task Force (see Reference 4, Section 2.1.9). In addition the final report of the Lessons Learned Task Force calls for a one year review of emergency procedures and control rooms at all plants with this thought being one of the purposes of that review.

Recommendation B.8

"It is recommended that Operator Instructions and Training be reviewed relative to Periodic Testing, so as to prevent leaving safety-related systems in a degraded state of operability following periodic tests (e.g., leaving valves in the wrong status)."

Comment

This recommendation is similar to actions required recently of all operating plant licensees by the Bulletins and Orders Task Force, e.g. in Bulletin IE-79-06 A, Item 8. The subject is treated more broadly by the final report of the Lessons Learned Task Force.

Recommendation B.9

"It is recommended that Supervisory and Management Procedures be reviewed with the aim of providing adequate checks on operator actions."

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Comment

This recommendation appears consistent with the final recommendations of the Lessons Learned Task Force regarding licensee programs to be required by NRC for improving and assuring all aspects of operational reliability.

Recommendation B.10

"It is recommended that the need for, and/or advisability of providing an Improved Tagging System for indicating status on the control board be reviewed. Such an improved tagging system should preclude the possibility of covering up status lights, which may give important safety-related information."

Comment

This recommendation is similar to two recommendations made recently by the ACRS (see Reference 2, Items B.5 and D.4). It is also consistent with, and appears to be adequately addressed by,

- a) corrective actions required recently of all operating licensees by the Bulletins and Orders Task Force, e.g., in Bulletin IE-79-06 A, Items 8 and 10.
- b) final recommendations of the Lessons Learned Task Force relating to Control Room Design, Human Factors Considerations, and Safety System Status Monitoring.

Recommendation C.1

"It is recommended that the Pressurizer Level Signal be eliminated in PWRs from all logic circuitry capable of actuating safety-related systems."

Comment

This recommendation has been accomplished in accordance with a corrective action required of all Westinghouse PWR operating licensees by the Bulletins and Orders Task Force in Bulletin IE 79-06A, Item 3.

Recommendation C.2

"It is recommended to provide improved Containment Isolation. In particular, it is recommended to provide Containment Isolation with a lock-in feature (i.e., requiring positive operator action to defeat it), to be actuated simultaneously with the Emergency-Core-Cooling and Safety-Injection Systems."

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Comment

This recommendation has been addressed by immediate corrective actions required of all operating reactor licensees by the Bulletins and Orders Task Force, e.g., in Bulletins IE 79-06, Items 4 and 9. The concern was also addressed in a somewhat more general context by the Lessons Learned Task Force in its short term Report, now being implemented (see Reference 4, Section 2.1.4, Containment Isolation Provisions for PWRs and BWRs).

Recommendation C.3

"It is recommended that the need for, and/or advisability of, a more reliable Pressure Relief System on PWRs be reviewed (e.g., the Pilot-Operated Relief Valve, or PORV, is connected to the primary coolant pressure boundary; it may be desirable that it be safety-grade)."

Comment

This recommendation has been addressed directly in Short Term recommendations by the Lessons Learned Task Force relating to more reliable PORV power supplies and performance testing for PWR and BWR relief and safety valves (see Reference 4, Sections 2.1.1 and 2.1.2). Also, immediate corrective actions have been imposed on some PWR operating licensees with the purpose of reducing the challenge rate of PORVs, thus improving overall reliability, e.g., as in Bulletin IE 79-05B, Item 3.

Recommendation C.4

"It is recommended that the various Safety-related Signals be reviewed in order to determine the need for, and/or advisability of, using primary signals rather than derived signals. (Example: In case of the PORV it may be desirable to use a valve-position signal rather than a signal derived from the solenoid.)"

Comment

The recommendation is similar to a recommendation made by the ACRS (see Reference 3, Item 9); and the Lessons Learned Task Force addressed direct indication of PORV position in their Interim Report (see Reference 4, Section 2.1.3.a). Also, the Lessons Learned Task Force has in its final report a recommendation for a more general, year long review of control rooms by all licensees with the acceptability of indirect indicators being one aspect of the review.

Recommendation C.5

"It is recommended that the need for adequate Venting Capability of the primary cooling system be reviewed for PWRs, including installation of remote-control motor-operated valves for this purpose."

Comment

This recommendation is similar to an early recommendation by the ACRS in this regard (see Reference 2, Item A.2.b). It is addressed directly by a new licensing requirement defined and promulgated recently by the Director, NRR (see Reference 8).

Recommendation C.6

"It is recommended that the feasibility, and/or advisability, of providing Level Measuring Capability on pressure vessels of PWRs be reviewed."

Comment

This recommendation is similar to an early recommendation by ACRS in this regard (see Reference 2, Item A.2.a). It is also consistent with, and has been adequately addressed by, a Short Term recommendation by the Lessons Learned Task Force relating to instrumentation required to detect inadequate core cooling conditions (see Reference 4, Section 2.1.3.b). The latter recommendation is being implemented on all plants.

Recommendation C.7

"It is recommended that the need for, and/or advisability of, installing a continuous Monitoring System for the Degree of Subcooling of the coolant (i.e., $T_{sat} - T$) in the primary heat transport system be reviewed for PWRs."

Comment

This recommendation is similar to a recent recommendation made by ACRS (see Reference 2, Item B.1.c. (1)). It has also been addressed adequately in the short term by the Lessons Learned Task Force in its recommendation relating to instrumentation required to detect inadequate core cooling (see Reference 4, Section 2.1.3.b), now being implemented on all plants.

Recommendation C.8

"It is recommended that the need for, and/or advisability of, providing Remote-control Capability and clear Status Indication for valves with safety-related functions be reviewed."

Comment

The "Status Indication" portion of this recommendation is similar to a recommendation by ACRS regarding the need for additional monitoring of safety-related systems and supporting services (see Reference 2, Item B.5). It has also been addressed on an immediate-corrective

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action basis in the operating reactor context by requirements imposed by the Bulletins and Orders Task Force, e.g., as in Bulletin IE 79-05A, Item 3.

This general area is also addressed in the short term and final recommendations of the Lessons Learned Task Force (see C.5, C.4 and B.7 above), especially the recommendation for a year long licensee review of each control room with this problem being among those of concern.

Recommendation C.9

"It is recommended that the advisability of eliminating the Lead/Lag Networks in PWRs, used for speeding up the pressurizer pressure signal, be reviewed. This may be achieved by replacing in safety-related logic circuitry, the pressurizer pressure signal with a pressure signal derived from the pressure vessel or the primary system loops."

Comment

The concern expressed by the Ad Hoc Committee in this recommendation has not been identified or addressed as a significant problem by any TMI-related Task Force or study group within NRC, or by ACRS. It is related, generally, to the issue of use of direct or primary (as opposed to "derived") signals, for initiation of safety functions. It would likely fall out of the control room reviews, discussed in B.7, above, if it is a problem. This item will be documented by the Lessons Learned Task Force as a residual action item for further study, as appropriate.

Recommendation C.10

"It is recommended that the advisability of a greater application of computers in the Control Room be reviewed. These computers could be used for routine status checks of safety and operational systems, for collecting and processing of data, as well as for aiding the operating staff in decision making concerning diagnostic evaluation and the sequencing of corrective actions during an accident."

Comment

This recommendation is consistent with, and is adequately addressed by, final recommendations of the Lessons Learned Task Force relating generally to the Use of Process Computers, Critical Plant Parameter and Data Display, and Automatic System Status Monitoring.

Recommendation C.11

"It is recommended that the advisability of installing a separate Status Board, indicating the operability of safety-related systems, be reviewed."

Comment

This recommendation is similar to a recommendation by ACRS regarding the need for additional monitoring of safety-related systems (see Reference 2, Item B.5), and is addressed in the final Lessons Learned Task Force report in the general context of Improved Control Room Design and Human Factors Engineering Considerations.

Recommendation C.12

"It is recommended that the potential for Degraded Operation of the emergency core cooling and containment spray systems be reviewed, and that remedial measures be taken, if necessary. Such degraded operation could be due to accumulation of debris (e.g., piping insulation material), or vortex formation, in the containment sump."

Comment

This recommendation is similar to recommendations made by ACRS relating to the need to study further reactor behavior during anomalous transients and various degraded accident conditions (see Reference 2, Items A.1, B.4, D.6, etc.). It has also been addressed directly in actual accident analyses (submitted by licensees and vendors in connection with requirements imposed by the Bulletins and Orders Task Force) involving degraded operation of emergency cooling systems, and in a Short Term recommendation by the Lessons Learned Task Force (see Reference 4, Section 2.1.9). The subject of design features for degraded core and core-melt events is also treated in the final report of the Lessons Learned Task Force.

Recommendation C.13

"It is recommended that the need for, and/or advisability of, providing protection against potential Containment Overpressurization through controlled venting be reviewed."

Comment

The recommendation is similar to a recommendation made by the ACRS (see Reference 2, Item D.14). It is addressed directly in a recent proposal by the Office of Research for increasing future funding for a program to study "Improved Containment Concepts." Also, the final report of the Lessons Learned Task Force recommends that rulemaking be initiated to develop requirements for design features for core melt, including the provision of post-core-melt containment venting and filtration systems.

Recommendation C.14

"It is recommended that the entire range of Man-Machine Interfaces be reviewed for potential improvements. This pertains in particular

to the control room layout (with its many recorders, and visual and audible alarm signals) as well as to the check-out procedures for safety-related and operational systems."

Comments

The question of man-machine interface is addressed comprehensively by the Lessons Learned Task Force in its final report.

Recommendation C.15

"It is recommended that the need for, and/or advisability of, installing additional instrument, monitoring, and sampling systems (other than those recommended under C.6 and C.7) be reviewed for both currently-operating and future plants, in the light of the experience gained from the TMI accident. Such systems should be aimed at providing dependable information during accident conditions, as well as at giving a reliable and detailed record of all major events that took place. Areas of particular interest are the reactor core and the containment."

Comment

The responses to Recommendations A.16, C.6, and C.7 preceeding describe a very broad scope of actions already initiated within NRC to identify and implement (as appropriate) additional instrument, monitoring and sampling systems as recommended by the Ad Hoc Committee in this recommendation, and appear to adequately address the Committee's concern in this regard.

Recommendation C.16

"It is recommended that the need for adequate, and/or upgraded, environmental qualification be reviewed for safety-related systems (sensors, circuitry, motors, valves, etc.) in the light of the experience gained from the TMI accident."

Comment

This recommendation is similar to a recent recommendation by the ACRS in this regard (see Reference 3, Item 6). One aspect of this general question (i.e., design review for qualification in post-accident radiation environment) has been addressed by the Lessons Learned Task Force in its Interim Report (see Reference 4, Section 2.1.6.b). The concern expressed in this Ad Hoc Committee recommendation is also addressed directly in the longer-term, broader-scope context in a recent proposal by the Office of Research requesting increased funding for specific study of "Response of Plant Equipment and Structures to Accident Conditions (see Reference 5). The final report of the Lessons Learned Task Force calls for a comprehensive review of systems interaction at all plants. Such review will

definitively establish all systems or components requiring upgraded qualifications.

Recommendation D.1

"It is recommended that the feasibility, and/or advisability, of adopting a limited number of standard plant designs for future nuclear plants be seriously considered. Such considerations should include cost/benefit analyses, factoring in the risk of freezing plant designs, and the resultant reduced ability to meet individual utility needs. Due consideration should be given to the distinct advantages arising from such standard designs which include shortened NRC licensing review, simplification (standardization) of reactor operator training and economy of plant construction."

Comment

The thrust of this recommendation is similar to the question raised recently by Congressman Udall. At the time of this writing, the ACRS had responded to that inquiry (see Reference 9), and work is underway within the staff to develop a proposed NRC response.

Recommendations D.2 and D.4

"It is recommended that both NRC and the Illinois nuclear utilities give due consideration to on-going industry studies involving the concept of Reactor Operator Training Institute(s) in the private sector."

"It is recommended that Illinois nuclear utilities consider participation in industry programs aimed at reviewing, auditing, and upgrading reactor operating and training procedures."

Comment

These recommendations are consistent with, and are addressed in, the final recommendations of the Lessons Learned Task Force, especially with regard to the industry's recently announced Institute for Nuclear Power Operations.

Recommendation D.3

"It is recommended that Illinois nuclear utilities consider participation in nuclear industry plans concerning the dedication of one or more existing commercial nuclear power plants to research and training purposes."

Comment

The staff is unaware of any industry plans to dedicate one or more existing commercial nuclear power plants to research or training

purposes; further the intent of the recommendation is not totally clear. Certainly, any proposal to use an operating 300-1000 Mwe reactor, with its large fission product inventory, continually in an innovative or experimentation mode, or with continual turnover of operating personnel cycled in for training, implies significant, unreviewed safety questions. On the other hand, the use of a shut-down reactor facility in connection with development of decommissioning procedures or processes applicable generically to a number of such facilities in the future might be feasible or desirable for a number of reasons. NRC should certainly be kept aware of any developments in this area by the industry; but the lack of additional information precludes any more definitive comment by the staff regarding this recommendation at this time.

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ENCLOSURE 2

LISTING OF REFERENCES/SUPPORTING DOCUMENTATION

1. Memo, dated 8/8/79, T. F. Carter, Jr. to the Commission (thru L. V. Gossick), entitled "Final Report of the Task Force on Emergency Planning," and related attachments as follows:

Enclosure 1 - "List of Members - Task Force and Working Group"
Enclosure 2 - "Description and Critique of NRC's Emergency Preparedness Process"
Enclosure 3 - "Comprehensive Action Plan"
Enclosure 4 - "Draft Proposed Amendments to 10 CFR Part 50"
2. "Summary of ACRS Recommendations" contained in letters dated 4/7/79 thru 5/16/79. (See attached to this Enclosure.)
3. Letter dated 8/14/79, M. Carbon (ACRS) to Chairman Hendrie, containing 12 new recommendations relating to "studies to improve reactor safety"
4. Report, dated July 1979, entitled "TMI-2 Lessons Learned Task Force Status Report and Short Term Recommendations, NUREG-0578"
5. Commission Paper, dated 7/25/79, entitled "FY 1980 Budget Supplement for Additional Research, SECY-79-459" and related attachments as follows:

Enclosure 1 - "FY 80 Budget Amendment Detailed Description"
Enclosure 2 - "Assessment of FY79 Resource Impact Related to TMI"
6. Commission Paper, dated 6/4/79, entitled "Recommendations on Operational Data Analysis and Evaluation for Nuclear Power Plants (Task Force Report), SECY-79-371" and related attachments as follows:

Enclosure 1 - "Task Force Report"
Enclosure 2 - "Memo dtd 5/25/79, Implementation of Immediate Actions"
Enclosure 3 - "Memo dtd 5/25/79, Implementation of Staff Actions in Response to GAO Reports"
Enclosure 4 - "SD, RES and IE Comments"
7. Commission Paper, dated 7/30/79, entitled "Qualifications of Reactor Operators, SECY-79-330E" and related attachments as follows:

Enclosure 1 - "Review of Operator Licensing Program"
Enclosure 2 - "OLB Manpower Requirements"
8. Memo, dated 8/20/79, H. R. Denton, NRR, to the Commission (thru L. V. Gossick), entitled "Resumption of Licensing Reviews for Nuclear Power Plants" and related attachments as follows:

- Enclosure 1 - "ACRS ltr, Carbon to Hendrie, dated 8/13/79"
- Enclosure 2 - "Alternatives to Shift Technical Advisors"
- Enclosure 3 - "Instrumentation to Monitor Containment Conditions"
- Enclosure 4 - "Installation of Remotely Operated High Point Vents in the Reactor Coolant System"
- Enclosure 5 - "NUREG-0578 Errata"
- Enclosure 6 - "Implementation of Requirements for Operating Plants and Plants in OL Review"

- 9. Letter, dated 10/10/79, M. Carbon (ACRS) to Congressman Udall responding to recent Udall inquiry/proposal relating to feasibility of single standard reactor design.
- 10. Memo, dated 8/31/79, A. S. Hintze, OSD/NRC, to Multiple Addressees, entitled "Post Accident Monitoring" and related attachment as follows:
 - Enclosure - "Instrumentation to Follow the Course of an Accident"

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SUMMARY OF ACRS RECOMMENDATIONS

A. Letter, H. Carbon to Chairman Hendrie, dated April 7, 1979

NRR (Ross) Recommendation 1* - Perform further analyses of small break transients and accidents.

NRR (Mattson) Recommendation 2 - Provide operator additional information and means to follow the course of an accident; as a minimum, consider expeditiously:

(a)** unambiguous RV level indication

(b) remotely controlled vent for RCS high points

NRR (Ross) Recommendation 3 - Item 4b of Bulletin 79-05A considered unduly prescriptive in view of uncertainties in predicting course of anomalous small break transients/accidents.

B. Letter, R. Fraley to Commissioners, dated April 18, 1979

Recommendation 1 - Natural Circulation-related Items

NRR (Ross)/RES

a. * Detailed analyses of natural circulation mode, supported as required by experiment, by licensees and NSSS vendors.

NRR (Ross)

b. * Develop procedures for initiating natural circulation

NRR (Mattson)

c. * Provide operator means for assurance that natural circulation has been established, e.g., by installation of instruments to indicate flow at low velocities.

NRR (Mattson)

d. * Expeditiously survey operating PWR's to determine whether suitable arrangements of PZR heaters and reliable on-site power distribution can be provided to assure this vital aspect of natural circulation capability.

NRR (Ross)

e. * Operator should be adequately informed concerning RCS conditions which affect natural circulation capability, e.g.,

(1) indication that RCS is approaching saturation condition by suitable display to operator of T₁ & T₂ and PZR pressure in conjunction with steam tables

(2) use of fuel assembly thermocouples where available to indicate exit flow temperatures.

* Amplified in Interim Report #2 dtd 5/16/79

** Amplified in Interim Report #3 dtd 5/16/79

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ACRS Recommendations:

NRR (Mattson)

Recommendation 2 - Thermocouples used to measure fuel assembly exit temperatures should be used, where currently available, to guide operator concerning core status (full range capability).

Recommendation 3 - Operating reactors should be given priority regarding definition and implementation of instrumentation to diagnose and follow the course of a serious accident, including

NRR (Mattson)/OSD

(a) improved sampling procedures under accident conditions

NRR (Mattson)

(b) improved techniques to provide guidance to offsite authorities.

Recommendation 4 - Reiterates previous recommendations that high priority be given to "research to improve reactor safety."

RES/NRR (Mattson)

(a) research on behavior of LWR's during anomalous transients

RES/NRR (Mattson)

(b) NRC to develop capability to simulate wide range of postulated transients and accident conditions.

NRR (Mattson)/RES

Recommendation 5 - Consideration should be given to additional monitoring of ESF equipment status, and to supporting services, to help assure availability at all times.

C. Letter, M. Carbon to Acting Chairman Gilinsky dated April 20, 1979

NRR (Mattson)/IE

Recommendation 1 - Initiate immediately a survey of operating procedures for achieving natural circulation, including:

(a) event involving loss of offsite power

(b) consideration of role of PWR heaters.

* Amplified in Interim Report No. 2 dated 5/16/79

** Amplified in Interim Report No. 3 dated 5/16/79

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D. Interim Report No. 3 dated May 16, 1979

- (Mattson)/
IE/SD Recommendation 1 - Examine operator qualifications, training and licensing, and requalification training and testing.
- (D. Davis, Mattson)/IE Recommendation 2 - Establish formal procedures for the use of LER information:
- (a) in training supervisory and maintenance personnel
 - (b) in licensing and requalification of plant operating personnel
 - (c) in anticipating safety problems
- (Mattson)/
IE Recommendation 3 - Consider formal review of operating procedures for severe transients by inter-disciplinary team, and develop more standardized formats for such procedures.
- ES/NRR
(Hanauer) Recommendation 4 - Re-examine comprehensively the adequacy of design, testing and maintenance of offsite and onsite AC and DC power supplies with emphasis on:
- (a) failure modes & effects analyses
 - (b) more systematic testing of power system reliability
 - (c) improved quality assurance and status monitoring of power supply systems
- ES/NRR
(Hanauer) Recommendation 5 - Make a detailed evaluation of current capability to withstand station blackout, including:
- (a) examination of natural circulation capability under such circumstances
 - (b) continuing availability of components needed for long-term cooling under such circumstances
 - (c) potential for improvement in capability to survive extended blackout
- S/NRR
(Hanauer) Recommendation 6 - Examine a wide range of anomalous transients and degraded accidents which might lead to water hammer, with emphasis on:
- (a) controlling or preventing such conditions
 - (b) research to provide a better basis for control or prevention of such conditions

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- E/NRR
(Muller) Recommendation 7 - Plan and define NRC role in emergencies, including consideration of:
- (a) assurance that formal emergency plans, procedures and organizations are in place
 - (b) designation of emergency technical advisory teams (names and alternates)
 - (c) compilation of an inventory of equipment and materials needed in unusual conditions or situations
- R/IE Recommendation 8 - Review and revise within three months:
- (a) licensees' bases for obtaining offsite advice and assistance in emergencies from within and outside company
 - (b) licensees' current bases for notifying and providing information to offsite authorities in emergencies
- R (Mattson)/RES Recommendation 9 - Examine the lessons learned at TMI-2, including consideration of the following:
- (a) behavior, failure modes, survivability and other aspects of TMI-2 components and systems as part of the long-term recovery process
 - (b) determine if design changes are necessary to facilitate decontamination and recovery of major nuclear power plant systems
- R (Hanauer)/SD/RES Recommendation 10 - Expedite resolution of unresolved safety issues by the following means:
- (a) suitable studies on a timely basis by licensees to augment NRC staff efforts
 - (b) use of consultant and contractor support by NRC staff
- Recommendation 11 - Augment expeditiously the NRC staff capability to deal with problems in reactor and fuel cycle chemistry in the following areas:
- (a) behavior of PWR & BWR coolants and other materials under radiation conditions
 - (b) generation, handling & disposal of radiolysis (or other) H_2 at nuclear facilities
 - (c) performance of chemical additives in containment sprays
 - (d) processing and disposal techniques for high and low level radioactive wastes
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- (e) chemical operations in other parts of nuclear fuel cycle
 - (f) chemical treatment operations involved in recovery, decontamination or decommissioning of nuclear facilities
- R (Mattson)/Recommendation 12 - Reconsider whether or not use of the Single Failure Criterion establishes an appropriate level of reliability for reactor safety systems
RES/SD
- S Recommendation 13 - With respect to safety research:
- (a) consideration should be given to augmentation of the FY80 NRC safety research budget
 - (b) consider orienting a larger part of the safety research budget to and exploratory (as opposed to confirmatory) research
- S/NRR Recommendation 14 - Perform design studies of a filtered venting or purging option for containments for possible use in the event of a serious accident
(Mattson)

B. Report on Quantitative Safety Goals, dated May 16, 1979

- (Mattson)/Recommendation 1 - Consider the establishment of quantitative safety goals for overall safety of nuclear power reactors
- R(Mattson) Recommendation 2 - Solicit comment by the Public and the Congress on proposed quantitative safety goals with emphasis on the stability of such goals in relation to other relevant aspects of our technological society

C. Interim Report No. 2, dated May 16, 1979

Amplified many of the recommendations included in earlier ACRS letters dated April 7, April 18, and April 20, 1979, including ACRS views on relative priorities to be assigned a number of those earlier recommendations. (Address amplifications and suggested priority assignments as appropriate.)

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TMI-2 Lessons Learned Task Force Final Report

Office of
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