

July 9, 1980

SECY-80-325

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COMMISSIONER ACTION

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For: The Commissioners

From: Harold R. Denton, Director
Office of Nuclear Reactor Regulation *H.R. Denton*

Thru: Executive Director for Operations

Subject: SPECIAL REPORT TO CONGRESS IDENTIFYING NEW UNRESOLVED SAFETY ISSUES

Purpose: To obtain Commission approval of new Unresolved Safety Issues for reporting to the Congress in a special report in accordance with a commitment made in the 1979 NRC Annual Report.

Discussion: The 1979 NRC Annual Report includes a progress report on Unresolved Safety Issues as required by Section 210 of the Energy Reorganization Act of 1974 as amended. This progress report does not identify any new Unresolved Safety Issues, however, because an in-depth review considering all candidate issues was not possible in late 1979 when the Annual Report was prepared. Instead, the Annual Report includes a commitment to provide a special report to the Congress in July 1980 identifying new Unresolved Safety Issues following a systematic review of all candidate issues from the Three Mile Island investigations and other sources.

A systematic review of candidate issues has been performed by NRR. This Commission Paper provides the results of that review and requests the Commission's approval of the six issues listed below for designation as Unresolved Safety Issues and reporting to the Congress. These issues are described in Enclosure 1.

The process for selecting the issues is described in Enclosure 2. It is based on the definition of an

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Unresolved Safety Issue and the explanatory statements

in NUREG-0510,^{1/} regarding what constitutes an issue that "poses important questions regarding the adequacy of existing safety requirements." The issues subjected to the selection process came from three principal sources-- the TMI Action Plan, ACRS letters and Reports since January 1979 and the NRC staff. Many are derived from operating experience. Listings of all of the issues considered are provided in Enclosure 3.

The initial step in the selection process was a screening of issues based on a set of initial screening criteria that considered attributes of an Unresolved Safety Issue other than the level of safety significance, e.g., an Unresolved Safety Issue must apply to a number of plants; it must relate to nuclear power plant safety, etc. Forty-four candidate issues were identified as a result of the initial screening. The results of the initial screening are provided in Enclosure 3.

Each of the forty-four candidate issues was then subjected to a systematic review to judge its safety importance on the basis of whether the issue involved equipment, operations or emergency response and whether it was a potentially significant safety deficiency or a potentially significant safety improvement. The judgment as to which issues should be designated and reported as Unresolved Safety Issues was of necessity based principally on qualitative information provided as answers to these questions. The answers were developed through discussions with staff experts in the areas being considered. More quantitative information would have been preferable as an aid in judging many of the issues. This was not possible, however, because of the limited time available to consider the large number of issues and the unavailability of key personnel from the Probabilistic Analysis Staff. However, an individual from the Probabilistic Analysis Staff did review and provide comments on the information developed and the judgments made; these comments were incorporated into the NRR evaluation. The development of more quantitative information to aid in such decisions by NRR in the future is intended as the new Reliability and Risk Assessment Branch in NRR develops its capabilities in these areas.

As a result of the application of the process described

^{1/} NUREG-0510, "Identification of Unresolved Safety Issues Relating to Nuclear Power Plants," January 1979.

in Enclosure 2, the six issues listed below are recommended for designation as new Unresolved Safety Issues.

- ✓ 1. Long-Term Upgrading of Training and Qualifications of Operating Personnel
- ✓ 2. Operating Procedures
- ✓ 3. Control Room Design
- ✓ 4. Consideration of Degraded or Melted Cores in Safety Reviews
- ✓ 5. Shutdown Decay Heat Removal Requirements
6. Seismic Qualification of Equipment in Operating Plants

Four related candidate issues were combined into one of the above recommended Unresolved Safety Issues, Control Room Design.

A brief discussion of each of the thirty-five candidate issues that were considered but not recommended for reporting is provided in Enclosure 4.

Seven of these issues have been designated as requiring "further study" to determine whether or not they should be reported as Unresolved Safety Issues. Further investigation of these issues will be conducted over the next several months and a decision made as to whether any should be reported as Unresolved Safety Issues in the 1980 NRC Annual Report. In preparation of the 1980 Annual Report, the NRR staff will also review all generic safety issues identified in NUREG-0510, but not designated as Unresolved Safety Issues at that time, to determine whether any of these warrant designation as USI's in the light of today's knowledge.

The Advisory Committee on Reactor Safeguards has been briefed on the review process described in Enclosure 2. The Committee, however, has not had the opportunity to provide its advice on the results of the Staff's review because of the limited time available to conduct the review and achieve NRR management and Commission approval before the July deadline. The Committee's advice will be solicited as our efforts continue to select additional

Unresolved Safety Issues for reporting in the 1980 NRC Annual Report.

The NRR staff has begun to prepare the NUREG report that will be transmitted to Congress in accordance with the commitment in the 1979 NRC Annual Report. The information contained in that report will include:

1. a description of the review process as provided in Enclosure 2;
2. a discussion of each issue selected as provided in Enclosure 1; and,
3. a discussion of our plans to develop detailed Task Action Plans and allocate resources for the resolution of the selected issues.

In connection with Item "3," NRR fiscal planning is based on the addition of about six new Unresolved Safety Issues in FY-81 and six more in FY-82 after which it is estimated that new Unresolved Safety Issues will be added at a slower rate of about three per year.

The special report is due to the Congress in July. For this reason, it is important that we obtain Commission comments and approval by no later than mid-July to allow sufficient time to revise the text of the report to reflect Commission comments and have it printed before the end of July.

Recommendation: That the Commission: (1) approve the six issues recommended for designation as new Unresolved Safety Issues by NRR; and, (2) note that NRR will prepare a NUREG report for transmittal to the Congress as outlined above.

Coordination: The Office of the Executive Legal Director has no legal objection.



Harold R. Denton, Director
Office of Nuclear Reactor Regulation

Enclosures:

1. Description of Proposed New Unresolved Safety Issues
2. Description of Unresolved Safety Issue Selection Process
3. Results of Initial Screening
4. Summary Discussion of Candidate Issues Not Recommended as Unresolved Safety Issues

NOTE: Commissioners' comments should be provided directly to the Office of the Secretary by c.o.b. Wednesday, July 23, 1980.

Commission Staff Office comments, if any, should be submitted to the Commissioners NLT July 16, 1980, with an information copy to the Office of the Secretary. If the paper is of such a nature that it requires additional time for analytical review and comment, the Commissioners and the Secretariat should be apprised of when comments may be expected.

Distribution

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Enclosure 1

DESCRIPTION OF PROPOSED NEW
UNRESOLVED SAFETY ISSUES

This enclosure includes descriptions of the 6 issues proposed for designation as new Unresolved Safety Issues. Five of the issues are derived from items included in the TMI Action Plan. The sixth issue regards a concern related to the seismic qualification of equipment at older plants.

Long Term Upgrading of Training and Qualifications of Operating Personnel

The ability of operators and technicians of nuclear power plants to correctly respond to abnormal conditions and to avoid errors which could lead to abnormal conditions is principally dependent upon the individual's training, experience, and education. A number of varied incidents that have occurred throughout the history of commercial nuclear power, and in particular the TMI-2 accident, have involved errors of omission or commission by the operations personnel. Consequently, the risks associated with human errors could be significantly reduced by improving the scope and content of the training programs for reactor operators, specifying minimum training requirements for other operations personnel, and imposing stricter qualifications requirements for all operations personnel.

10 CFR Part 55 currently specifies the requirements for reactor operator qualification and requalification. As a result of the short-term recommendations of the TMI-2 Lessons Learned Task Force, the staff issued a letter to all power reactor licensees and applicants, dated March 28, 1980, which specified revised criteria for reactor operator qualifications that could be implemented under the existing regulation, and provided guidance for operator training. Related short-term actions have been taken to expand the scope

of the licensee training programs, to emphasize the team aspect of the operations personnel and utility management, and to provide broader based training for mitigating core damage. These short term actions are not part of this proposed Unresolved Safety Issue.

A related short-term activity involved a study performed by the Basic Energy Technology Associates (NUREG/CR 1280). This study compared the selection, training, and qualification practices of the nuclear industry to those used in the Naval Nuclear Propulsion Program. The results of this study presented a number of recommendations which will be considered in this proposed Unresolved Safety Issue in developing training and qualification requirements for nuclear power plant operations personnel.

The principal objective of the proposed Unresolved Safety Issue is the longer-term development of new regulations and regulatory guides which will provide improved requirements for the training and qualification of reactor operators, senior operators, shift supervisors, auxiliary operators, technicians, and possibly other operations personnel. These requirements will be developed from studies of selection, training, and qualification programs by the staff and contracted consultants in the field. In a related program (NUREG 0660, Task I.A.4) that is not part of this proposed Unresolved Safety Issue, the staff will review improvements in reactor simulators that could enhance the training of operations personnel.

This activity relates specifically to Task I.A.2.6 in the TMI-2 Action Plan, NUREG 0660. The revised requirements and the subsequent rulemaking activities are expected to be completed in approximately two years.

Operating Procedures

The actions performed by plant operators for both normal plant operation and off-normal plant conditions are described in a set of written procedures. These instructions reduce the reliance on the operator's memory in order to assure the proper sequence of manual actions. A number of reported events have been directly related to deficiencies in the written procedures. This experience has suggested that the procedures are not sufficiently explicit and may not contain sufficient diagnostic information to assist the operator to quickly identify and readily cope with abnormal conditions. In addition, the inter-relationship between the administrative, operation, test, surveillance, and maintenance procedures may contribute to events, when the required actions are not clearly defined. Consequently, the potential for procedural errors can be significantly reduced by providing consistent format and content to the procedures and improving the delineation of symptoms, events, and plant conditions that identify abnormal situations.

For the short-term, the staff has required (letters dated September 13 and 27, October 10 and 30, and November 9, 1979) that licensees and applicants perform analyses of several accidents and transients and from the results of these analyses, develop improved operational procedures for off-normal plant conditions. The short-term actions include clarifying the delineation of authority, shift change practices, and control room access. These short term actions are not part of this proposed Unresolved Safety Issue.

Although the short-term actions are considered adequate to ensure the health and safety of the public, this proposed Unresolved Safety Issue involves development of a detailed program plan for the upgrading of plant procedures. This plan will include guidelines on procedure content and format review procedures, and auditing techniques that could provide significant additional improvements in the operating procedures and further reduce the potential for procedural-related errors.

The plan development will include consideration of related criteria resulting from other activities, such as the system response analyses, reliability analyses, human factors engineering, crisis management, and operator training. In addition, specific emphasis will be placed on guidelines to assure that procedures identifying symptoms of accident and transient scenarios not presently being investigated, with selected consideration of current accident and transient scenarios (e.g., small break loss-of-coolant accidents, steam generator tube rupture, loss of feedwater, and uncovering the reactor core). The resultant plan will form the basis for reviewing operating procedures for off-normal plant conditions for their quality and diagnostic capabilities.

This proposed Unresolved Safety Issue relates specifically to Task I.C.9 in the TMI-2 Action Plan, NUREG 0660. The plan is scheduled to be completed in 1981.

Control Room Design

The design and layout of a nuclear power plant control room can significantly affect the operators' ability to deal with abnormal plant conditions. This conclusion was drawn by several of the studies of the TMI-2 accident. The operators' effectiveness in periods of high stress, following an accident or severe transient, is dependent upon both the type of information provided and the manner in which it is displayed. By improving these aspects of the control room design, the potential for human errors can be significantly reduced.

Consequently, the objective of the proposed Unresolved Safety Issue is to establish improved design requirements and standards for the control room instrumentation and arrangement and identification of important controls. As a first step, the staff will establish guidelines and requirements for control room design reviews, including site visits to establish existing control room design capabilities. In addition, the staff will establish requirements for a plant safety parameter display console. These activities are expected to be completed in approximately a year.

As a second step, the staff will develop final control room design requirements, related standards and regulatory guides, and improved control room instrumentation research. The research activities will investigate audio-visual alarms, plant surveillance instrumentation, and post-accident monitoring instrumentation. Revised regulatory requirements and implementation schedules are expected to be issued in mid-1982.

This proposed Unresolved Safety Issue relates to Tasks I.D.1, 2, 4, and 5 in the TMI-2 Action Plan, NUREG 0660.

Consideration of Degraded or Melted Cores in Safety Review

Historically, the design basis for nuclear power plants has been predicated on preventing core damage. Consequently, very little investigation has been done regarding provisions to deal with degraded or melted cores. As a result of the TMI-2 accident, the staff is now considering the extent to which the plant design basis should include damaged core conditions. Providing equipment and procedures to deal with damaged core conditions can significantly reduce the risks to the public from events that go beyond the original design basis.

For the short-term, the staff has issued criteria (letters dated September 13 and 27, October 10 and 30, and November 9, 1979) which require that licensees and applicants develop design provisions for reactor coolant system vents, access shielding, and post-accident sampling. Requirements and guidelines are currently being developed to train operations personnel to deal with core damage events. In addition, the staff is currently reviewing design changes and additional measures that could reduce the consequences of a severe accident for plants located in high population densities (Zion Units 1 and 2 and Indian Point Units 2 and 3). These interim measures are intended to provide an immediate increase in the capability to deal with degraded core conditions.

The principal objective of the proposed Unresolved Safety Issue will be the longer-term rulemaking that will formalize the design requirements for degraded core conditions. The rulemaking activity will specifically consider the use of filtered-vented containment systems, the use of core-retention devices, design criteria for decay heat removal, radwaste, and ventilation-filtration systems, provisions for post-accident recovery, criteria for locating highly radioactive systems, and the effects of multiple reactors on a given site. This activity relates specifically to Task II.B.8 in the TMI-2 Action Plan, NUREG 0660.

A number of related activities have bearing and may potentially impact this rulemaking. These include core melt research studies (NUREG 0660, Task II.B.5), siting policy (NUREG 0660, Task II.A.1 and 2), emergency preparedness (NUREG 0660, Task II.A.2), and the licensing actions for Zion and Indian Point (NUREG 0660, Task II.B.6). This last activity will have to be closely coupled with the proposed Unresolved Safety Issue.

The rulemaking is expected to occur in approximately two years, depending on the extent of public comment, the progress on research and design studies, and the possible need for a hearing.

Shutdown Decay Heat Removal Requirements

Following a reactor shutdown, the radioactive decay of fission products continues to produce heat (decay heat) which must be removed from the primary system. The principal means for removing this heat in a pressurized water reactor (PWR), in the absence of a large loss-of-coolant accident, is through the steam generators to the secondary side of the plant. The Reactor Safety Study (WASH 1400), later reliability studies, and related experience from the TMI-2 accident have shown that the loss of the capability to remove heat through the steam generators is a significant contributor to the probability of a core melt event. Although many improvements to the steam generator auxiliary feedwater system were required by the NRC following the TMI-2 accident, providing an alternative means of heat removal would substantially increase the plants' capability to deal with a broader spectrum of transients and accidents and potentially could, therefore, significantly reduce the overall risk to the public.

Consequently, the proposed Unresolved Safety Issue will investigate alternative means of decay heat removal in PWR plants, using existing equipment where possible. This study will consist of a generic systems evaluation and will result in recommendations regarding the desirability of and possible design requirements for an alternative decay heat removal method, other than that normally associated with the steam generator and secondary system.

This activity relates to Task II.E.3.3 in the TMI-2 Action Plan, NUREG 0660. The study is scheduled to be completed in 1981.

Seismic Qualification of Equipment in Operating Plants

The design criteria and methods for the seismic qualification of mechanical and electrical equipment in nuclear power plants have undergone significant change during the history of the commercial nuclear power program. Consequently, the margins of safety provided in existing equipment to resist seismically induced loads and perform the intended safety functions may vary considerably. The seismic qualification of the equipment in operating plants must, therefore, be reassessed to assure the ability to bring the plant to a safe shutdown condition when subjected to a seismic event.

The need for such a reassessment was identified as a result of experience with the Systematic Evaluation Program (SEP) for eleven older operating plants and the staff's Seismic Qualification Review Team (SQRT) reviews of recent operating license applications. During the course of the SEP and SQRT activities, the staff identified a concern with the anchoring and supports used for electrical equipment in the SEP plants. These plants have been required to resolve this issue by September 1980. An Information Notice concerning this issue was sent to all other operating plants. The staff has concluded that if sufficient anchoring is provided for equipment, it should function properly in the event of an earthquake, during the interim period until the overall seismic qualification issue can be resolved.

The objective of the proposed Unresolved Safety Issue is to establish an explicit set of guidelines that could be used to judge the adequacy of the seismic qualification of mechanical and electrical equipment at all operating plants. These guidelines are expected to be completed in 1981. On a longer term basis, a research study is currently underway that will establish probabilistic methods to estimate the margin of failure for the seismic design of structures, systems, and components. The results of the research studies will be used to confirm the guidelines developed under this proposed Unresolved Safety Issue.

Enclosure 2

DESCRIPTION OF THE UNRESOLVED
SAFETY ISSUES SELECTION PROCESS

In order to evaluate safety concerns, recommendations or general safety issues and determine if these should be designated "Unresolved Safety Issues" and reported to Congress as such, the process described below was developed. This process was intended to provide a systematic and consistent approach to evaluating these issues and judging their impact on risk to public health and safety.

By amendment of December 13, 1977 to the Energy Reorganization Act of 1974, Section 210 required that a plan be developed for the identification and resolution of Unresolved Safety Issues and that progress reports be provided in the annual report to Congress.

The following definition of an unresolved safety issue was developed to satisfy the intent of Section 210; this definition was used in identifying the Unresolved Safety Issues previously reported to Congress by NUREG-0510 in January 1979:

"An Unresolved Safety Issue is a matter affecting a number of nuclear power plants that poses important questions concerning the adequacy of existing safety requirements for which a final resolution has not yet been developed and that involves conditions not likely to be acceptable over the lifetime of the plants affected."

In applying this definition, matters that pose "important questions concerning the adequacy of existing safety requirements" were judged to be those for which

resolution is necessary to (1) compensate for a possible major reduction in the degree of protection of the public health and safety, or (2) provide a potentially significant decrease in the risk to the public health and safety. Those issues that satisfy (1) above are basically "backward" looking; that is, they bring the degree of protection back up to the assumed level. Those issues that satisfy (2) are "forward" looking; that is, they are improvements that decrease the risk significantly below the assumed level.

The process that was developed includes a set of initial screening criteria to screen out those issues that do not satisfy certain elements of the definition for an Unresolved Safety Issue. This initial screening was done without addressing the issue's importance to safety. A screening using roughly the same criteria was used in identifying Unresolved Safety Issues for the 1978 NRC Annual Report. The following criteria were used for the initial screening:

Initial Screening Criteria

(an issue or recommendation has been screened out from further considerations as an Unresolved Safety Issue if it meets one or more of the following)

1. The issue or recommendation is not related to nuclear power plant safety, e.g., transportation of radioactive materials.
2. A staff position on the issue or recommendation has been developed or could be developed within 6 months. The purpose of this criterion is to eliminate those issues that are near resolution and, therefore, do not constitute truly "unresolved" issues. Such issues do not warrant the attention and resources normally associated with an Unresolved Safety Issue.

3. The issue is not generic.
4. The issue or recommendation is only indirectly related to nuclear power plant safety, e.g., recommended changes in the licensing process, NRC organization, etc.
5. Definition of the issue requires long term confirmatory or exploratory research. The basis for this criterion is that investigative studies of matters for which no clearly defined safety deficiency or improvement has been identified, although an appropriate regulatory activity, do not warrant designation as Unresolved Safety Issues.
6. The issue or recommendation is related to one already being addressed as a USI and can reasonably be or already is included in the current program.
7. The issue or recommendation requires a policy decision rather than a technical solution. The purpose of this criterion is to eliminate those issues that only require a management decision and do not represent potential deficiencies in existing safety requirements that require development of a resolution. In some cases, the results of these policy decisions may require designation of new Unresolved Safety Issues.

The results of this initial screening were a set of candidate Unresolved Safety Issues to be evaluated for importance to safety. Enclosure 3 provides the summary list of candidates and the results of the initial screening.

To assess the importance to safety of each of these issues, a set of questions was developed to assist in evaluating the issue's general impact on various factors affecting safety. Attachment 1 to this Enclosure provides an overview of the process. After the initial screening, the issue is: (1) identified as either a deficiency or an improvement; (2) determined to be an issue related to either operations, equipment, or emergency response; and, (3) evaluated in terms of potential for significantly affecting risk. We evaluated the impact of each candidate issue on: probability of an accident or transient; probability of losing mitigating functions, given the event; and consequences, given the event and loss of mitigating functions, by answering various questions as shown in Attachment 1, and then arriving at an overall conclusion based on these answers as to the potential for significantly affecting fission product barrier integrity, frequency of transients or accidents, safety functions, or emergency response capability. For example, if the issue being evaluated passes the initial screening criteria, is determined to be a deficiency (i.e., possible major reduction in the assumed degree of protection), is primarily an equipment concern, and impacts on the capability to perform safety functions, the following questions would be asked:

(1) What is the potential deficiency?

(This question is intended to obtain a clear and concise description of the deficiency, including identification of plants affected and the cause of the deficiency).

(2) What is the likelihood that the potential deficiency exists?

(The answer should be "Low", "Low to Medium", "Medium," "Medium to High," or "High." If insufficient information is available, the answer

could be "Further Study" to assess the likelihood. Quantitative information could be used if available).

- (3) What equipment/systems could be affected by the potential deficiency?
(Should identify those safety and non-safety systems that could be affected).
- (4) What is the likelihood that, given the above deficiency, the affected equipment will fail as a result?
(Use similar likelihood estimates as described for question (2) above).
- (5) What safety functions could be affected by failure of the equipment/systems?
(Identify safety functions that may be performed using any of the equipment/systems identified in response to question (3) above).
- (6) What is the likelihood of loss of the affected safety functions when needed, if the affected equipment/systems fail?
(Use similar likelihood estimates as described for question (2) above).
- (7) Based on the above, is it likely that a safety function will be lost due to this deficiency?
(Based on the answers to questions (1) through (6), a conclusion was made as to the potential for losing a safety function due to this deficiency. If potential is judged to be significant, the answer is

"yes", and the deficiency is designated as an Unresolved Safety Issue. If insufficient information is available to answer any of these question, the answer is that "Further Study" is required to obtain the information necessary in order to determine if the deficiency should be an Unresolved Safety Issue.)

A sample question form that was used for an operations concern (i.e., possible major reduction in the assumed degree of protection due to a potential operations' deficiency) is shown in Attachment 2 to this Enclosure. Where possible, quantitative information was used to answer the questions and arrive at conclusions on potential impact. However, in most cases relevant quantitative information was not available so that qualitative estimates were developed for the likelihoods and the conclusions were based on these. The qualitative estimates were based on the engineering judgement of individuals knowledgeable of the issue, with input and review by a group of staff personnel from various technical disciplines. These included an individual from the Probabilistic Analysis Staff and an individual with plant operations experience.

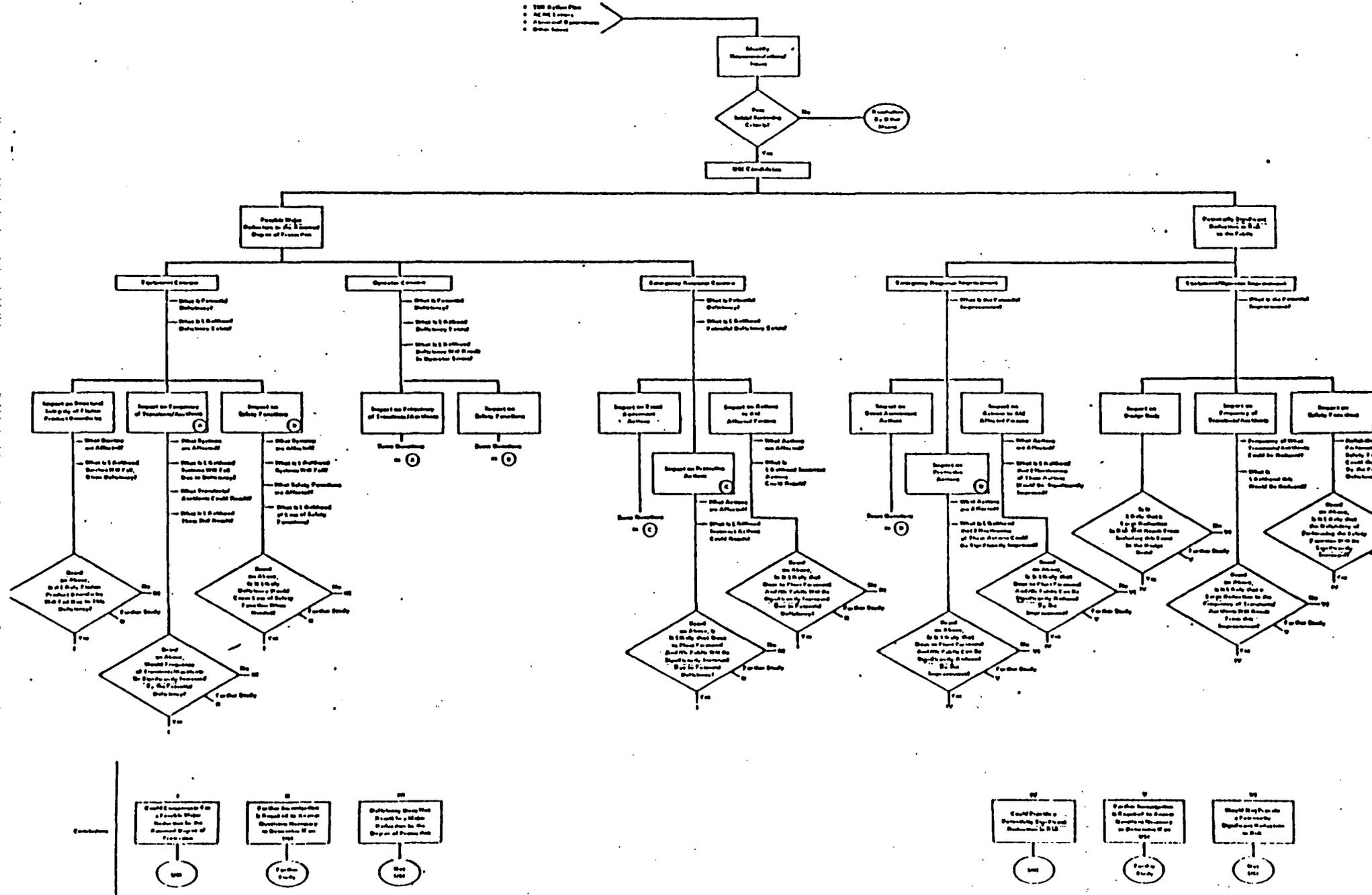
The result of this evaluation is: (1) a set of new Unresolved Safety Issues; (2) a set of issues requiring further study to determine if they should be Unresolved Safety Issues; and (3) a set of issues that are not Unresolved Safety Issues. The items that are identified as Unresolved Safety Issues will be evaluated and resolutions established in the same manner as the previously identified Unresolved Safety Issues. This will include development of Task Action Plans with a high staff priority placed on resolution of the issue. Progress on these issues will be provided bimonthly in the "Aqua" Book, and in the annual report to Congress.

Items requiring further study will be evaluated to determine if they should be classified as Unresolved Safety Issues. Results of this further study will be included in the next annual report.

Items not classified as Unresolved Safety Issues may still have some benefits in terms of safety, and accordingly will have priorities assigned to them by the Safety Program Evaluation Branch and will have their resolution monitored by the Generic Issues Branch.

IDENTIFICATION OF NEW UNRESOLVED SAFETY ISSUES

- IIR Action Plan
- ACME Letters
- Annual Safety Statement
- Other Issues



Conclusions

- 1. IIR Unresolved Safety Issues to be Added to the Annual Report of Progress
- 2. Further Study
- 3. Safety Issues that do not require an IIR

- 4. IIR Unresolved Safety Issues to be Added to the Annual Report of Progress
- 5. Further Study
- 6. Safety Issues that do not require an IIR

POSSIBLE MAJOR REDUCTION IN THE ASSUMED DEGREE
OF PROTECTION OF THE PUBLIC HEALTH AND SAFETY

Operations Concern - Title:

Long Term Program for Upgrading of Procedures (Task I.C.9)

What is the potential deficiency?

Description:

Present procedures, as evidenced by the TMI-2 accident, may not be explicit enough and may not present enough of a diagnostic and systematic set of instructions to assist the operator in his efforts to quickly identify and readily cope with an abnormal situation. Also, the interrelationship of administrative, operating, test, surveillance, and maintenance procedures may actually contribute to transients and accidents, if the required actions are not clearly defined.

What Plants are Affected?

All

What Type of Deficiency? Operator Qualifications - Training - Procedures
Equipment Aides - Technical Support

What is the likelihood that the potential deficiency exists?

Likelihood

Remarks

High

The review of several procedures has shown them to be ambiguous, hard to follow, replete with references to other procedures, etc.

What is the likelihood that the potential deficiency will result in operator errors by plant personnel?

<u>Likelihood</u>	<u>Remarks</u>
Medium - High	Errors in procedures lead the operators to mistrust the procedures. Although the operators understand the plant and systems extremely well and don't usually need to rely on the procedures for immediate actions, this underlying mistrust could lead to errors of commission or omission in times of high stress.

IMPACT ON FREQUENCY OF TRANSIENTS/ACCIDENTS

What equipment/systems could be affected by these errors?

All systems are potentially affected, but the greatest emphasis should be on those areas in which errors during maintenance or testing could result in a transient and in which errors during an accident could increase the severity.

What is likelihood these equipment/systems will fail or maloperate; given these errors?

Medium, depending on the system involved and, more important, on the evolution being performed with a faulty or ambiguous procedure.

What transients/accidents could be initiated as a result of these equipment/system failures or maloperations?

Any number of transients is possible, such as that which occurred at Oyster Creek when the improper operation of a valve caused a high pressure signal that ultimately isolated the reactor. The only accidents postulated are those in which operation of the components affecting reactor coolant pressure integrity (e.g., relief valves) are performed improperly.

What is the likelihood that these transients/accidents will result, given the equipment/system failures or maloperations?

<u>Likelihood</u>	<u>Remarks</u>
High	Improper operation of the system in the manner postulated above will result in a substantially increased likelihood of the transients described.

Based on the above, is the frequency of occurrence of the transient/accident significantly increased by the potential deficiency?

Yes.

IMPACT ON SAFETY FUNCTIONS NECESSARY TO MITIGATE EVENTS AND CONTAIN STORED RADIOACTIVITY

What equipment/systems could be affected by the resulting operator errors?

All systems and equipment.

What is the likelihood that the affected equipment/systems will fail, given that these errors occur?

<u>Likelihood</u>	<u>Remarks</u>
Medium	Alarms, indicators, and the other operators could cause an error to be corrected when that error is the result of an ambiguous procedure.

What safety functions could be affected by failure of the equipment/systems?

The ability to mitigate the accident and retain stored radioactivity, and all paths for accomplishing safety functions that rely on operator actions in accordance with the established procedures.

What is the likelihood of loss of the affected safety functions when needed, if affected equipment/systems fail?

<u>Likelihood</u>	<u>Remarks</u>
Medium	As before, alarms, indicators, and the other operators serve to mitigate the errors in system operation caused by ambiguous procedures. In addition, the safety-related systems typically have backup systems available.

Based on the above, is it likely that a safety function will be lost when needed due to this potential deficiency?

There is a "medium" probability that a safety function could be lost when needed due to misuse or misapplication of the procedural controls.

Conclusions/Basis

This task should be designated an Unresolved Safety Issue. Events at TMI-2 and the review of other facility have shown the procedures to be less than satisfactory and in most cases ambiguous. They require operator evaluation and shifting to other procedures at a time (accident conditions) when such a luxury does not exist.

**SAFETY FUNCTIONS TO MITIGATE EVENTS
AND CONTAIN STORED RADIOACTIVITY**

SAFETY FUNCTION	PURPOSE	PERFORMANCE OF SAFETY FUNCTIONS	AREAS OF POTENTIAL DEFICIENCY THAT COULD AFFECT PERFORMANCE OF EQUIPMENT OR OPERATORS
Reactivity Control Reactor Coolant System Inventory Control Reactor Coolant System Pressure Control Core Heat Removal Reactor Coolant System Heat Removal	Shut reactor down to reduce heat production Maintain a coolant medium around core Maintain the coolant in the proper state Transfer heat from core to a coolant Transfer heat from the core coolant	Equipment	Design Construction, Fabrication, Installation Materials Testing Inspection Maintenance Quality Assurance Qualification Verification
Containment Isolation Containment Temperature and Pressure Control Combustible Gas Control Maintenance of Vital Auxiliaries Indirect Radioactivity Release Control	Close openings in containment to prevent radiation releases Keep from damaging containment and equipment Remove and redistribute hydrogen to prevent explosion inside containment Maintain operability of systems needed to support safety systems Contain miscellaneous stored radioactivity to protect public and avoid distracting operators	Operators	Qualifications Training Operating Procedures Equipment Aides Technical Support

Enclosure 3

RESULTS OF INITIAL SCREENING

This enclosure includes the results of the initial screening of all issues considered for reporting as Unresolved Safety Issues. The screening criteria used are described in Enclosure 2. The issues are grouped in this enclosure by source. The three principal source groups are: (1) The TMI Action Plan, (2) ACRS Letters/Reports and (3) Other Potential Issues. The screening results for all issues are presented. Each issue was determined to be either (1) screened on the basis of one or more of the screening criteria, (2) included within the definition of another issue being considered (e.g., many of the ACRS recommendations were included in TMI Action Plan items), or (3) a candidate issue for further consideration for reporting as an Unresolved Safety Issue. The candidate issues were subjected to further review as described in Enclosure 2. A list of all candidate issues precedes the screening results for the three groups of issues.

LIST OF CANDIDATE UNRESOLVED SAFETY ISSUES
AFTER INITIAL SCREENING

TMI ACTION PLAN ITEMS

Item

1. Section I.A.2.2 - Training and Qualification of Operations Personnel
2. Section I.A.2.6 - Long-term Upgrading of Training and Qualifications
3. Section I.A.4.2 - Long-term Training Simulator Upgrade
4. Section I.A.3.3 - Requirements for Operator Fitness
5. Section I.B.1.1 - Organization and Management Long-Term Improvements
6. Section I.C.9 - Long-Term Program Plan for Upgrading of Operating Procedures
7. Section I.D.1 - Control Room Design Reviews
8. Section I.D.2 - Control Room Design - Plant Safety Parameter Display Console
9. Section I.D.4 - Control Room Design - Control Room Design Standard
10. Section I.D.5 - Control Room Design - Improved Control Room Instrumentation Research
11. Section I.F.1 - Expand QA list
12. Section I.F.2 - Develop More Detailed QA Criteria
13. Section I.G.1 - Preoperational and Low-Power Testing - Training Requirements
14. Section II.B.8 - Consideration of Degraded or Melted Cores in Safety Review - Rulemaking Proceeding
15. Section II.E.2.1 - Reliance on ECCS
16. Section II.E.2.3 - Emergency Core Cooling System - Uncertainties in Performance Predictions
17. Section II.E.3.3 - Decay Heat Removal - Coordinated Study of Shutdown Heat Removal Requirements
18. Section II.E.4.3 - Containment Design - Integrity Check
19. Section II.E.5.1 - Design Sensitivity of B&W Reactors - Design Evaluation
20. Section II.E.6.1 - In Situ Testing of Valves

21. Section II.F.4 - Study of Control and Protective Action Design Requirements
22. Section II.F.5 - Classification of Instrumentation, Control and Electrical Equipment
23. Section III.A.3.5 - Improving NRC Emergency Preparedness - Training, Drills, and Tests
24. Section III.D.1.3 - Radiation Source Control - Ventilation System and Radioiodine Adsorber Criteria
25. Section III.D.3.3 - Inplant Radiation Monitoring
26. Section II.K.3.33 - Action Plan Recommendations - Evaluate elimination of PORV function

ACRS Items

27. Reliability of Ventilation Monitoring Equipment
28. Protective Device Reliability
29. Instrumentation Set-Point Drift
30. End-Of-Life and Maintenance Criteria
31. Design Check and Audit of Balance-of-Plant Equipment
32. BWR Control Rod Worth
33. Flow Induced Vibration
34. Inadvertent Actuation of Safety Injection
35. Reevaluation of Reactor Coolant Pump Trip Criteria

Other Items

36. Turbine Disk Cracking
37. D.C. Power System Reliability
38. BWR Jet Pump Integrity
39. Seismic Qualification of Equipment at Operating Plants
40. Small Break LOCA from Extended Overheating of Pressurizer Heaters

41. PWR Pipe Cracks
42. BWR Main Steam Isolation Valve Leakage Control Systems
43. Radiation Effects on Reactor Vessel Supports
44. Loss of Offsite Power Subsequent to a LOCA

KEY: Initial Screening Criteria
(an issue or recommendation has been screened out from further considerations as an Unresolved Safety Issue if it meets one or more of the following)

1. The issue or recommendation is not related to nuclear power plant safety, e.g., transportation of radioactive materials.
2. A staff position on the issue or recommendation has been developed or could be developed within 6 months. The purpose of this criterion is to eliminate those issues that are near resolution and, therefore, do not constitute truly "unresolved" issues. Such issues do not warrant the attention and resources normally associated with an Unresolved Safety Issue.
3. The issue is not generic.
4. The issue or recommendation is only indirectly related to nuclear power plant safety, e.g., recommended changes in the licensing process, NRC organization, etc.
5. Definition of the issue requires long term confirmatory or exploratory research. The basis for this criterion is that investigative studies of matters for which no clearly defined safety deficiency or improvement has been identified, although an appropriate regulatory activity, do not warrant designation as Unresolved Safety Issues.
6. The issue or recommendation is related to one already being addressed as a USI and can reasonably be or already is included in the current program.
7. The issue or recommendation requires a policy decision rather than a technical solution. The purpose of this criterion is to eliminate those issues that only require a management decision and do not represent potential deficiencies in existing safety requirements that require development of a resolution. In some cases, the results of these policy decisions may require designation of new Unresolved Safety Issues.

INITIAL SCREENING RESULTS

TMI ACTION PLAN ITEMS

USI INITIAL SCREENING
TMI ACTION PLAN ITEMS

ACTION PLAN ITEM	INITIAL USI SCREENING *	CANDIDATE
I.A.1 Operating Personnel and Staffing		
1. Shift Technical Advisor	2	--
2. Shift Supervisor Admin. Duties	2	--
3. Shift Manning	2	--
4. Long-term Upgrading	7	--
I.A.2 Training and Qualification of Operating Personnel		
1. Immediate Upgrading of Operator and Senior Operator Training and Qualifications	2	--
2. Training and Qualifications of Operations Personnel	--	Candidate
3. Administration of Training Programs for Licensed Operators	2	--
4. NRR Participation in IE Inspector Training	2	--
5. Plant Drills	2	--
6. Long-Term Upgrading of Training and Qualifications	--	Candidate
7. Accreditation of Training Institutions	4	--
I.A.3 Licensing and Requalification of Operating Personnel		
1. Revise Scope and Criteria for Licensing Exams	2	--
2. Operator Licensing Program Changes	2	--
3. Requirements for Operator Fitness	--	Candidate
4. Licensing of Additional Operations Personnel	7	--
5. Establish Statement of Understanding with INPO and DOE	4	--

*See Key on page preceding tables.

ACTION PLAN ITEM	INITIAL USI SCREENING	CANDIDATE
I.A.4 Simulator Use and Development		
1. Initial Simulator Improvement	2	--
2. Long-Term Training Simulator Upgrade	--	Candidate
3. Feasibility Study of Procurement of NRC Training Simulator	4	--
4. Feasibility Study of NRC Engineering Computer	4	--
I.B.1 Management for Operations		
1. Organization and Management Long-Term Improvements	--	Candidate
2. Evaluation of Organization and Management Improvements of NTOL Applicants	2	--
3. Loss of Safety Function	4	--
I.B.2 Inspection of Operating Reactors		
1. Revise IE Inspection Program	4	--
2. Resident Inspector at Operating Reactors	2,4	--
3. Regional Evaluations	2,4	--
4. Overview of Licensee Performance	2,4	--
I.C Operating Procedures		
1. Short-Term Accident Analysis and Procedure Revision	2	--
2. Shift and Relief Turnover Procedures	2	--
3. Shift Supervisor Responsibilities	2	--
4. Control Room Access	2	--
5. Procedures for Feedback of Operating Experience	2	--
6. Procedures for Verification of Correct Performance of Operating Activities	2	--
7. NSSS Vendor Review of Procedures	2	--

ACTION PLAN ITEM	INITIAL USI SCREENING	CANDIDATE
8. Pilot Monitoring of Selected Emergency Procedures for NTOL Applicants	2	--
9. Long-Term Program Plan for Upgrading of Procedures	--	Candidate
I.D Control Room Design		
1. Control Room Design Reviews	--	Candidate
2. Plant Safety Parameter Display Console	--	Candidate
3. Safety System Status Monitoring	2,7	--
4. Control Room Design Standard	--	Candidate
5. Improved Control Room Instrumentation Research	--	Candidate
6. Technology Transfer Conference	4	--
I.E Analysis and Dissemination of Operating Experience		
1. Office of Analysis and Evaluation of Operational Data	2,4	--
2. Program Office Operational Data Activities	2,4	--
3. Operational Safety Data Analysis	2,4	--
4. Coordination of Licensee, Industry, and Regulatory Programs	2,4	--
5. Nuclear Plant Reliability Data System	2,4	--
6. Reporting Requirements	4	--
7. Foreign Sources	4	--
8. Human Error Rate Analysis	Included under issues more directly related to plant safety e.g., IREP.	

ACTION PLAN ITEM	INITIAL USI SCREENING	CANDIDATE
I.F Quality Assurance		
1. Expand QA List	--	Candidate
2. Develop More Detailed QA Criteria	--	Candidate
I.G Preoperational and Low-Power Testing		
1. Training Requirements	--	Candidate
2. Scope of Test Program	2	--
II. Siting and Design		
II.A Siting		
1. Siting Policy Reformulation	7	--
2. Site Evaluation of Existing Facilities	7	--
II.B Consideration of Degraded or Melted Cores in Safety Review		
1. Reactor Coolant System Vents	2	--
2. Plant Shielding to Provide Access to Vital Areas and Protect Safety	2	--
3. Post-accident Sampling	2	--
4. Training for Mitigating Core Damage	2	--
5. Research on Phenomena Associated with Core Degradation and Fuel Melting	5	--
6. Risk Reduction for Operating Reactors at Sites with High Population Densities	2,3	--
7. Analysis of Hydrogen Control	3	--
8. Rulemaking Proceeding	--	Candidate
II.C Reliability Engineering and Risk Assessment		
1. Interim Reliability Evaluation Program (IREP)	IREP and follow on programs are viewed as major programs that may identify new issues, but are not issues in themselves.	
2. Continuation of IREP		
3. Systems Interaction	6	--
4. Reliability Engineering	II.C.4 is viewed as an IREP	

ACTION PLAN ITEM	INITIAL USI SCREENING	CANDIDATE
II.D Reactor Coolant System Relief and Safety Valves <ol style="list-style-type: none"> 1. Testing Requirements 2. Research on Relief and Safety Valve Test Requirements 3. Relief and Safety Valve Position Indication 	2 2,5 2	-- -- --
II.E System Design		
II.E.1 Auxiliary Feedwater System <ol style="list-style-type: none"> 1. Auxiliary Feedwater System Evaluation 2. Auxiliary Feedwater System Automatic Initiation and Flow Indication 3. Update Standard Review Plan and Develop Regulatory Guide 	2 2 4	-- -- --
II.E.2 Emergency Core Cooling System		
<ol style="list-style-type: none"> 1. Reliance on ECCS 	--	Candidate
<ol style="list-style-type: none"> 2. Research on Small Break LOCAs and Anomalous Transients 	5	--
<ol style="list-style-type: none"> 3. Uncertainties in Performance Predictions 	--	Candidate
II.E.3 Decay Heat Removal		
<ol style="list-style-type: none"> 1. Reliability of Power Supplies for Natural Circulation 	2	--
<ol style="list-style-type: none"> 2. Systems Reliability 	--	I.C.1, I.C.2
<ol style="list-style-type: none"> 3. Coordinated Study of Shutdown Heat Removal Requirements 	--	Candidate
<ol style="list-style-type: none"> 4. Alternate Concepts Research 	5	--
<ol style="list-style-type: none"> 5. Regulatory Guide 	2	--

ACTION PLAN ITEM	INITIAL USI SCREENING	CANDIDATE
II.E.4 Containment Design		
1. Dedicated Penetrations	2	--
2. Isolation Dependability	2	--
3. Integrity Check	--	Candidate
4. Purging	2	--
II.E.5 Design Sensitivity of B&W Reactors		
1. Design Evaluation	--	Candidate
2. B&W Reactor Transient Response Task Force	2	--
II.E.6 In-Situ Testing of Valves		
1. Test Adequacy Study	--	Candidate
II.F Instrumentation and Controls		
1. Additional Accident Monitoring Instrumentation	2	--
2. Identification of and Recovery from Conditions Leading to Inadequate Core Cooling	2	--
3. Instrumentation for Monitoring Accident Conditions (Reg. Guide 1.97)	2	--
4. Study of Control and Protective Action Design Requirements	--	Candidate
5. Classification of Instrumentation, Control and Electrical Equipment	--	Candidate
II.G Electrical, Power		
1. Power supplies for PORV, block valves, level indicators	2	--
II.H TMI-2 Cleanup and Examination		
1. Maintain Safety of TMI-2 and Minimize Environmental Impact	3	--
2. Obtain Technical Data on the Conditions Inside the TMI-2 Containment Structure	3	--

ACTION PLAN ITEM	INITIAL UST SCREENING	CANDIDATE
3. Evaluate and Feedback Information Obtained from TMI	4	--
4. Determine Impact of TMI on Socioeconomic and Real Property Values	5	--
II.J General Implications of TMI for Design and Construction Activities		
II.J.1 Vendor Inspection Program		
1. Establish a Priority System for Conducting Vendor Inspections	4	--
2. Modify Existing Vendor Inspection Program	4	--
3. Increase Regulatory Control Over Present Non-licensees	4	--
4. Assign Resident Inspectors to Reactor Vendors and Architect-Engineers	4	--
II.J.2 Construction Inspection Program		
1. Reorient Inspection Program More Toward Direct Observation, Proper Work Performance, and Verification of as-built Configurations Versus Design	4	--
2. Increase Emphasis on Independent Measurement in the Construction Inspection Program	4	--
3. Assign Resident Inspectors to all Construction Sites	4	--
II.J.3 Management for Design and Construction		
1. Organization and Staffing to Oversee Design and Construction	4	--
2. Issue Regulatory Guide	4	--
II.J.4 Revise Deficiency Reporting Requirements		
1. Revise Deficiency Reporting Requirements	4	--

ACTION PLAN ITEM	INITIAL USI SCREENING	CANDIDATE
<p>II.K Measures to Mitigate Small-Break LOCAs and Loss of Feedwater Accidents</p>		
<p>1. IE Bulletins</p>	2	--
<p>2. Commission Orders on B&W Plants</p>	2	--
<p>3. Final Recommendations of B&O Task Force (57 items total, see Table C.3 attached)</p>	See Table C-3	--
<p>III. Emergency Preparations and Radiation Effects</p>		
<p>III.A.1 Improve Licensee Emergency Preparedness - Short Term</p>		
<p>1. Upgrade Emergency Preparedness</p>	2	--
<p>2. Upgrade Licensee Emergency Support Facilities</p>	2	--
<p>3. Maintain Supplies of Thyroid Blocking Agent (Potassium Iodide)</p>	7	--
<p>III.A.2 Improving Licensee Emergency Preparedness - Long-term</p>		
<p>1. Amend 10 CFR 50 and 10 CFR 50, Appendix E</p>	7,2	--
<p>2. Development of Guidance and Criteria</p>	2	--
<p>III.A.3 Improving NRC Emergency Preparedness</p>		
<p>1. NRC Role in Responding to Nuclear Emergencies</p>	2	--
<p>2. Improve Operations Center</p>	7,2	--
<p>3. Communications</p>	2	--
<p>4. Nuclear Data Link</p>	2	--
<p>5. Training, Drills, and Tests</p>	--	Candidate
<p>6. Interaction of NRC with Other Agencies</p>	4	--

ACTION PLAN ITEM	INITIAL USI SCREENING	CANDIDATE
III.B Emergency Preparedness of State and Local Governments		
1. Transfer of Responsibilities to FEMA	4	--
2. Implementation of NRC's and FEMA's Responsibilities	4	--
III.C Public Information		
1. Have Information Available for the News Media and the Public	1	--
2. The Office of Public Affairs will Develop Agency Policy and Provide Training for Interfacing with the Parties	1	--
III.D.1 Radiation Source Control		
1. Primary Coolant Sources Outside the Containment Structure	Included in II.D.8	--
2. Radioactive Gas Management	5	--
3. Ventilation System and Radioiodine Adsorber Criteria	--	Candidate
4. Radwaste System Design Features to Aid in Accident Recovery and Decontamination	--	II.D.8
III.D.2 Public Radiation Protection Improvement		
1. Radiological Monitoring of Effluents	5	--
2. Radioiodine, Carbon-14, and Tritium Pathway Dose Analysis	5	--
3. Liquid Pathway Radiological Control	5	--
4. Offsite Dose Measurements	5	--
5. Offsite Dose Calculation Manual	2	--
6. Independent Radiological Measurements	2	--
III.D.3 Worker Radiation Protection Improvements		

ACTION PLAN ITEM	INITIAL USI SCREENING	CANDIDATE
1. Radiation Protection Plans	2	--
2. Health Physics Improvements	2,5	--
3. Inplant Radiation Monitoring	--	Candidate
4. Control Room Habitability	2 11.B.8	--
5. Radiation Worker Exposure Data Base	2	--
IV. Practices and Procedures		
IV.A Strengthen Enforcement Process		
1. Seek Legislative Authority	4	--
2. Revise Enforcement Policy	4	--
IV.B Issuance of Instruction and Information to Licensees		
IV.B.1 Revise Practices for Issuance of Instructions and Information to Licensees	4	--
IV.C Extend Lessons Learned to Licensed Activities Other Than Power Reactors		
IV.C.1 Extend Lessons Learned from TMI to Other NRC Programs	4	--
IV.D NRC Staff Training		
IV.D.1 NRC Staff Training	4	--
IV.E Safety Decision-Making		
1. Expand Research on Quantification of Safety Decision-Making	5	--
2. Plan for Early Resolution of Safety Issues	4	--
3. Plan for Resolving Issues at Construction Permit Stage	4	--
4. Resolve Generic Issues by Rulemaking	7	--
5. Assess Currently Operating Reactors	7	--

ACTION PLAN ITEM	INITIAL USI SCREENING	CANDIDATE
IV.F Financial Disincentive to Safety		
1. Increased IE Scrutiny of Power Ascension Test Program	4	--
2. Evaluate the Impact of Financial Disincentives to the Safety of Nuclear Power Plants	4	--
IV.G Improve Safety Rulemaking Procedures		
1. Develop a Public Agenda for Rulemaking	4,7	--
2. Periodic and Systematic Reevaluation of Existing Rules	4,7	--
3. Improve Rulemaking Procedures	4,7	--
4. Study Alternative for Improved Rulemaking Process	4,7	--
IV.H NRC Participation in the Radiation Policy Council	4	--
V. NRC Policy, Organization, and Management		
1. Develop NRC Policy Statement on Safety	4,7	--
2. Study Elimination of Non-safety Responsibilities	7	--
3. Strengthen Role of ACRS	7	--
4. Study Need for Additional Advisory Committees	7	--
5. Improve Public and Intervenor Participation in Hearing Process	7	--
6. Study Construction-During - Adjudication Rules	7	--
7. Study Need for TMI-Related Legislation	7	--
8. Study the Need to Establish an Independent Nuclear Safety Board	7	--
9. Study the Reform of the Licensing Process	4,7	--
10. Study NRC Top Management Structure and Process	4,7	--
11. Reexamine Organization and Functions of NRC Offices	4,7	--
12. Revise Delegation of Authority to Staff	7	--
13. Clarify and Strengthen the Respective Roles of Chairman, Commission, and EDO	1,7	--
14. Authority to Delegate Emergency Response Functions to a Single Commissioner	7	--
15. Achieve Single Location - Long-Term	7	--

ACTION PLAN ITEM	INITIAL USI SCREENING	CANDIDATE
16. Achieve Single Location - Interim	7	--
17. Reexamine Commission Role in Adjudication	1,7	--
<u>TABLE C.3 - TASK II.K.3 ACTION PLAN RECOMMENDATIONS</u>		
1. Install automatic PORV isolation system and perform operational test	2	--
2. Report on overall safety effect of PORV isolation system	2	--
3. Report safety and relief valve failures promptly and challenges annually	2	--
4. Review and upgrade reliability and redundancy of non-safety equipment for small break LOCA mitigation	2	--
5. Continue to study need for Table C.1.4.c and need for automatic trip of RCPs, then modify procedures or designs as appropriate	2	--
6. Instrumentation to verify natural circulation	2	--
7. Evaluation of PORV opening probability during overpressure transient	2	--
8. Further staff consideration of need for diverse decay heat removal method independent of SG's	II.E.3	--
9. Pressure Integral Derivative controller modification	2	--
10. Anticipatory trip modification proposed by some licensees to confine range of use to high power levels	2	--
11. Control use of PORV supplied by Control Components Inc. until further review complete	2	--
12. Confirm existence of anticipatory trip upon turbine trip	2	--
13. Separation of IIPCI and RCIC system initiation levels. Analysis and implementation	2	--
14. Isolation of isolation condensers on high radiation	2	--
15. Modify break detection logic to prevent spurious isolation of IIPCI and RCIC systems	2	--
16. Reduction of challenges and failures of relief valves - feasibility study and system modification	2	--
17. Report on outage of ECC systems - licensee report and proposed technical specification changes	2	--

ACTION PLAN ITEM	INITIAL USI SCREENING	CANDIDATE
18. Modification of ADS logic - feasibility study and modification for increased diversity for some event sequences	2	--
19. Interlock on recirculation pump loops	2,3	--
20. Loss of service water for Big Rock Point	2,3	--
21. Restart of core spray and LPCI systems on low level - design and modification	2	--
22. Automatic switchover of RCIC system suction - verify procedures and modify design	2	--
23. Central water level recording	2	--
24. Confirm adequacy of space cooling for LPCI and RCIC systems	2	--
25. Effect of loss of AC power on pump seals	2	--
26. Study effect on RHR reliability of its use for fuel pool cooling	11.E.2.1	--
27. Provide common reference level for vessel level instrumentation	2	--
28. Study and verify qualification of accumulators on ADS valves	2	--
29. Study to demonstrate performance of isolation condensers with non-condensibles	2	--
30. Revised small-break LOCA methods to show compliance with 10 CFR 50, Appendix K	2	--
31. Plant-specific calculations to show compliance with 10 CFR 50.46	2	--
32. Provide experimental verification of two-phase natural circulation models	2	--
33. Evaluate elimination of PORV function	--	Candidate
34. RELAP-4 model development	6, 11.E.2.2	--
35. Evaluation of effects of core flood tank injection on small-break LOCAs	2	--
36. Additional staff audit calculations of B&W small-break LOCA analyses	6,2 I.C.1	--
37. Analysis of B&W plant response to isolated small-break LOCA	2, I.C.1	--
38. Analysis of plant response to a small-break LOCA in the pressurizer spray line	2, I.C.1	--
39. Evaluation of effects of water slugs in piping caused by HPI and CFT flows	2, I.C.1	--
40. Evaluation of RCP seal damage and leakage during a small-break LOCA	2, I.C.1	--
41. Submit predictions for LOFT Test L3-6 with RCPs running	2, I.C.1	--

ACTION PLAN ITEM	INITIAL USI SCREENING	CANDIDATE
42. Submit requested information on the effects of non-condensable gases	2, I.C.1	--
43. Evaluation of mechanical effects of slug flow on steam generator tubes	2	--
44. Evaluation of anticipated transients with single failure to verify no significant fuel failure	2	--
45. Evaluate depressurization with other than full ADS	2	--
46. Response to list of concerns from ACRS consultant	2	--
47. Test program for small-break LOCA model verification pretest prediction, test program and model verification	I.C.1 II.E.2.2	--
48. Assess change in safety reliability as result of implementing B&OTF recommendations	2, I.C.1	--
49. Review of procedures (NRC)	2, I.C.9	--
50. Review of procedures (NSSS vendors)	2, I.C.9	--
51. Symptom-based emergency procedures	2, I.C.9	--
52. Operator awareness of revised emergency procedures	2, I.B.1	--
53. Two operators in control room	2	--
54. Simulator upgrade for small-break LOCAs	2, I.A.4.1	--
55. Operator monitoring of control board	2	--
56. Simulator training requirements	2	--
57. Identify water sources prior to manual activation of ADS	2	--

INITIAL SCREENING RESULTS
ACRS, LETTERS AND REPORTS

USI INITIAL SCREENING
ACRS LETTERS - JANUARY 1979 TO MARCH 1980

(Note: "Pass" under Initial Screening Column means that the issue passed the initial screening criteria)

Date	Subject	Recommendation/Issue	USI Initial Screening *	TMI Action
1/9/79	Concurrence in RG 1.141, Rev. 1	None	No issue	--
2/15/79	Report on Salem Unit 2	Establish criteria for implementing RG 1.97	No (2)	--
2/16/79	Report on Fluor Power Services BOP Std. SAR - B&W 205 Std. NSSS	None	No (3)	--
3/12/79	Concurrence in RG 1.137, Rev. 1 and 1.143, Rev. 1	None	No issue	--
3/13/79	Transportation of Rad. Mat'ls	None	No (1)	--
3/13/79	Report on Zimmer Unit 1	None	No (3)	--
3/14/79	Combination of Dynamic Loads	None	No (6)	--
3/21/79	Status Rpt. No. 7 on Generic Items	No new generic items	No (6)	--
4/7/79	Interim Report on TMI-2 Accident	Further Analyses of transients and accidents in PHRs that involve initially or at sometime during their course, a small break in the primary system	Pass (See Note above)	I.C.1-
		Additional instrumentation for operator to follow small breaks - provision for unambiguous level in reactor vessel.	No(2)	--
		High-point primary system vents.	No(2)	--
4/10/79	Concurrence in RG 1.140, Rev. 1	None	No issue	--
4/18/79	Transmits copy of 4/17/79 ACRS oral recommendations on TMI to Commissioners	Detailed analyses of Mat'l Circulation supported by experiment.	Pass	II.K.3-
		Placing of Pressurizer heaters on emergency power for pressure control during nat'l circ.	No(2)	--

Date	Subject	Recommendation/Issue	USI Initial Screening	TMI Action
		Subcooling meter and flow exit temp. instruments as indication of nat'l circ.	No(2)	--
		Use of core thermocouples - other instruments for operator assistance	No(2)	--
4/20/79	Memo to Gilinsky on Implementing 4/17/79 oral recommendations	None	No issue	--
5/15/79	Review of Proposed Rules on Shipment of Spent Fuel	None	1	--
5/16/79	Report on Quantitative Safety Goals	Establish quantitative safety goals for overall safety of reactors.	Pass	IV.E.
5/16/79	Interim Rpt. #3 on TMI Unit 2	Reactor Vessel level instrumentation (same as #3).	No(2)	--
		Develop changes to operator qualifications, training and licensing.	No(2)	--
		Eval. of LERs -	No(4)	--
		Review of operating procedures	No(2)	--
		Improved reliability of offsite and onsite AC and DC.	No(6)	--
		Station Blackout - Water Hammer	No(6)	--
		Licensee/NRC Emergency Planning	No(4,2)	--
		Design to facilitate the decontamination and recovery of major reactor systems.	Pass	III.D.1-4 II.B.8.a
		Staff Review Procedures	No(4)	--
		Capability of NRC Staff	No(4)	--
		Adequacy of the single failure criterion.	Pass	II.C.2 IV.E.1
		Safety Research	No(4)	--
		Controlled filtered venting of containment	Pass	II.B.B

Date	Subject	Recommendation/Issue	USI Initial Screening	TMI Action Plan
5/16/79	Interim Report #2	Natural Circ. Procedures -	No(2)	--
		Pressurizer heaters from Emergency Power Sources	No(2)	--
		Subcooling meter	No(2)	--
		Use of core exit thermocouples	No(2)	--
		Instruments to follow the course of an accident.	No(2)	--
		Safety Research - Transients/Accidents	No(5)	--
		Status monitoring of availability of ESF	Pass	I.D.3
6/18/79	Power level increase at Millstone Unit 2	None	No(3)	--
6/18/79	Comparison of Stainless steel and Zircaloy Fuel Rod Cladding (to Gilinsky)	None	No issue	--
6/19/79	Concurrence in RG 1.9, Rev. 2	None	No issue	--
6/19/79	Requests, Agreements and Commitments	None	No issue	--
7/16/79	Report on Bailly Pile Foundations	None	No(3)	--
7/18/79	Relationship of NRC & DOE Research on Improved Reactor Safety	None	No issue	--
7/19/79	Research Request Requirements	None	No issue	--
8/13/79	Report on Short Term Lessons Learned (others already included above or in STILL)	Reexamination of Hydrogen Generation and Control.	Pass	II.B.8
8/14/79	Near Term Operating Licenses	None	No issue	--

Date	Subject	Recommendation/Issue	USI Initial Screening	TMI Action I
8/14/79	Studies to Improve Reactor Safety	Analysis of MSLB plus small LOCA	Pass	II.E.2-2
		Systematic Reevaluation of Compressed Air Systems.	Pass	II.C.2
		Study of interrelationship between AFWS, MFWS, AD and Control Systems.	Pass	II.C.2
		Study of effects of shared systems.	Pass	II.C.2 + II.B.8
		Study of how operating procedures should be written.	Pass	I.C.9
		Reevaluation of basis for environmental qualification for equipment.	No(2)	--
		Design, Construction & Operation Review	No(2),(3)	--
		Reevaluation of DMR design basis.	Pass	II.E.3.3 II.E.3.4
		Review of Reliability Improvements that could be achieved by employing direct safety signals	Pass	II.F.4;
		Systems Interactions Involving Air, Instrument and Hydraulic Lines	No(6)	--
		Analyses of transients that would lead to gross overfilling of secondary side of steam generator and equivalent in BWRs.	Pass	II.C.2
		Use of probabilistic techniques to examine the reliability of safety systems.	Pass	IV.E.1, II.C.2 + II.C.4
8/16/79	Pipe Cracking in LWRs	Expanded Scope of pipe crack studies to address potential consequences, e.g., increased potential for common mode failures. Develop optimum water specifications.	Pass	Already cluded a an item "Other P tential
9/79	Review of LERs (1976-1978) NUREG-0572	Separation of Control Rod from its drive and BWR High Rod Worth Events (3.2.1.1, page 3-2).	Pass	Issue Candidat

Date	Subject	Recommendation/Issue	USI Initial Screening	TMI Action Plan
9/79 (Continued)		Unavailability of Vital Services (3.2.1.2, page 3-2)	Pass	II.E.3-4
		Failures Due to Water Hammer and Flow Vibration (3.2.1.3, page 3-2)	Water Hammer No(6) Flow Vibration Pass	-- Candidate
		Systems Interaction (3.2.1.4, page 3-3)	No(6)	--
		Valve Failures (3.2.1.5, page 3-3)	Pass	II.C.2
		Leakage Between Interconnected Fluid Systems (3.2.1.6, page 3-4)	No(2)	--
		Problems in Containment Isolation and Monitoring (3.2.1.7, page 3-4)	No(2)	--
		Failure of Containment Monitoring Systems Due to Environmental Conditions (3.2.1.8, page 3-4)	No(2)	--
		Inadequate Design Criteria (3.2.1.9, page 3-5)	No(4)	--
		Engineered Safety Features Degraded by Human Errors (3.2.1.10, page 3-5)	Pass	II.A.1, I.C I.D.1-5
		Loss of High-Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) Systems (3.2.1.11, page 3-6)	Pass	II.K.3-#24
		Failures in Monitoring Equipment for Air-Cleaning and Ventilating Systems (3.2.2.1, page 3-6)	Pass	Candidate
		Failure to Recognize and Correct the Cause of an Event (3.2.2.2, page 3-6)	Pass	I.E.6
		Failures of Protective Devices for Essential Equipment (3.2.2.3, page 3-7)	Pass	Candidate

Date	Subject	Recommendation/Issue	USI Initial Screening	TMI Action Plan
9/79 (Continued)		Failures of Diesel Generators (3.2.2.4, page 3-7)	No (2,6)	--
		Set Point Drift in Instrumentation (3.2.3.1, page 3-8)	Pass	Candidate
		End-of-Life and Maintenance Criteria (3.2.3.2, page 3-8)	Pass	Candidate
		Inadvertent Actuation of Safety Injection in PWRs (3.2.3.3, page 3-8)	Pass	Candidate
10/9/79	Xenon releases in accidents	Study to determine the applicability and desirability of available technology to minimize release of rad. noble gases.	Pass	III.D.1-2
10/11/79	SEP	None	No(4)	--
10/12/79	Systems Interactions Study for IP #3	Consideration for Phase II of A-17	No(6)	--
11/14/79	ACRS Action on Proposed Rev's. to Reg Guides.	(1) Make R.G. 1.141, Rev. 1, implementation consistent with Lessons Learned recommendations.	No(2)	--
		(2) Concur in R.G. 1.97, Rev. 2 being issued for public comment.	No issue	--
11/14/79	NUREG-0600, Investigation of TMI-2 Accident by I&E	Preparation and Issuance of a Summary Report of the findings of the various NRC Task Forces on TMI.	No(4)	--
12/10/79	Recommendations of President's Commission regarding ACRS Activities	Concur in Recommendation by President's Commission to strengthen ACRS role.	No(4)	--
12/11/79	Adequacy of Procedures for Transmitting ACRS comments to the NRC staff	ACRS Recommendations may require Commission attention to indicate priority and authorization of resources.	No(4)	--
12/11/79	Interim Low Power Operation of Sequoyah Nuclear Power Plant Unit 1	Plans by staff and TVA to monitor performance of ice condenser containments should be implemented.	No(3)	--

Date	Subject	Recommendation/Issue	USI Initial Screening	TMI Action Plan
12/11/79	Comments on the Pause in Licensing	(1) Perform lowpower testing of systems or the entire plant.	Pass	I.G.
		(2) For new plants that meet NUREG-0578, allow startup and testing at 50-75% level; then shutdown, available for call in the event of a national need, until sufficient resolution of TMI related requirements to allow normal operation.	No(4)	--
		(3) Expeditiously act on Recommendations from TMI Task Forces, the President's Commission, and ACRS, but assign a timetable for implementation (i.e., shortterm items, long term).	No(7)	--
		(4) Provide guidance to early CP plants or those not yet in construction to general guidance and design changes that will result from TMI.	No(4)	--
12/13/79	Identification of NRC Regulatory Requirements which need changing	A procedure to define ACRS participation in rulemaking would be useful.	No(4)	--
12/13/79	Report on TMI-2 Lessons Learned Task Force Initial Report	(1) Personnel Qualifications <ul style="list-style-type: none"> . Better definition of qualification requirements for Shift Supervisor. 	No(2)	--
		<ul style="list-style-type: none"> . Adequacy of staffing of perator Licensing Branch 	No(4)	--
		<ul style="list-style-type: none"> . Criteria on adequate degree of in-house technical capability for each licensee; 	Pass	I.B.1.1
		<ul style="list-style-type: none"> . Availability of NSSS technical support for design changes or accident conditions. 	No(2),(3)	--
		(2) Emergency Procedures <ul style="list-style-type: none"> . NRC give priority to emergency procedures at operating plants 	No(4)	--

Date	Subject	Recommendation/Issue	USI Initial Screening	TMI Action Pl
12/13/79 (Continued)		. Licensees use interdisciplinary groups to develop these procedures.	Pass	I.C.9
		(3) Man/Machine Interface - . Licensee evaluation should include data recording and recall requirements of parameters critical to safety.	Pass	I.D.2
		(4) Reliability Assessment - Licensees perform Reliability assessments in addition to IREP.	Pass	II.C.4
		(5) Studies by licensees of hydrogen control and filtered venting systems.	Pass	II.B.8
		(6) Interim measures for ice-condenser containments.	Pass	II.B.8
		(7) Periodic review of NRC rules, philosophy, etc.	No(4)	--
		(8) Better definition of NRC role in emergency response.	No(4)	--
		(9) Need to develop methods to uncover significant design errors, equipment degradation, and to test systems under conditions simulating transient and accident situations.	No(2)	--
		(10) Effect of large radioactive release on ability to safely shutdown another unit on the same site.	Pass	II.B.8
		(11) Studies to ascertain contingency design measures, beyond LL Task Force recommendations, that may improve ability to cope with accidents beyond the design basis.	Pass	II.B.8

Date	Subject	Recommendation/Issue	USI Initial Screening	TMI Action Plan
12/13/79 (Continued)		(12) Seismic capability of auxiliary feedwater supplies; failure of non-seismic Class I equipment, earthquake emergency procedure.	Pass	II.C.3
		(13) Provision of dedicated shutdown heat removal systems, possibly able to function at normal system pressure.	Pass	II.E.3.3+4
12/17/79	Review of NRC Regulatory Processes and Functions by the ACRS, dated December, 1979	(1) Regulatory function requires strong leadership	No(4)	--
(2) Oversight committee is not required.		No(4)	--	
(3) Future organizational arrangements at NRC should recognize need to investigate beyond the "design basis"..		No(4)	--	
(4) Need to strengthen certain NRC staff functions.		No(4)	--	
(5) Role of ACRS should be strengthened.		No(4)	--	
(6) Nuclear industry must strengthen its technical and managerial capability to handle safety matters.		Pass	I.B.1-1	
(7) Knowledge gained during plant design and construction should be transferred more effectively to personnel responsible for plant operation.		No(2); (3)	--	
(8) Consider accidents beyond design basis on future reactors; should further reduce probability of serious accidents and provide measures to mitigate their consequences.		Pass	II.B.8	
(9) Safety goals should be as good as reasonably achievable		Pass (Repeat from 5/16/79 letter)	IV.E.1.	

Date	Subject	Recommendation/Issue	USI Initial Screening	TMI Action Pl.
12/17/79 (Continued)		(10) Use quantitative approach to set safety criteria; assess enhancement of safety; and to provide comparative risk assessment to other technological aspects of society.	Pass (Repeat from 8/14/79 letter)	IV.E.1, II.C.2, II.C.4
		(11) Modify single-failure-criterion for more consideration of progressive, common cause, and multiple failures arising from a single initiating event; Establish reliability requirements for components, eqt., and systems based on safety importance.	Pass (Related to item in 5/16/79 letter); also part of Systems Interaction-A-17 Pass (Related to 9 and 10 above)	II.C.2 IV.E.1, II.C.2
		(12) Use separate and dedicated safety systems, consider safety influence of ROP.	Pass	II.E.3.3 II.E.3.4 II.C.2
		(13) Give increased attention to systems interaction.	No(6)	--
		(14) Give more attention to man/machine interactions.	Pass	Also part A-17, II.C.4 II.C.4
		(15) Seek improvements beyond those required by regulations; investigate filtered vented containment, dedicated shutdown systems and design changes to reduce the probability of successful sabotage, and implement those found appropriate.	Pass	II.B.8, II.E.3.4
		(16) Apply techniques of probabilistic analysis to identify areas for reducing risk.	Pass (Repeat of item in 8/14/79 letter).	II.C.2 II.C.4

Date	Subject	Recommendation/Issue	USI Initial Screening	TMI Action P ^s
12/17/79 (Continued)		(17) Periodically reexamine operating plants in light of current criteria and standards.	No(4)	--
		(18) Reorient NRC safety research to assisting resolution of identified safety concerns and by exploring for issues or problems of potential significance.	No(4)	--
		(19) Requires NSSS vendors, A-E's and licensee's to report safety concerns raised in their organizations (IAW Part 21).	No(2)	--
		(20) Maintain high level of competence in NSSS organizations or develop equivalent source of knowledge to support licensees.	Pass	I.B.1.1
		(21) Change approach by A-E and plant owners to emphasize safety.	No(4) IV.F of TMI AP	--
		(22) Design check and audit of BOP	Pass (Related to item 12 above)	Candidate
		(23) Continue to develop LER evaluation program.	No(4)	--
		(24) Encourage standard LWR plant designs.	No(7)	--
1/15/80	Recommendations of President's Commission on ACRS Role	ACRS Comments	No(4)	--
1/15/80	Draft NUREG-0660 (TMI Action Plan)	Develop priorities and identify items of primary importance.	No(4)	--
2/11/80	Low Pressure Turbine Disc Cracking	Reevaluate problems associated with turbine missiles, safety consequences.	Pass	Included "Other Potential I
2/11/80	NUREG-0660, Draft 2 (TMI Action Plan)	Same as above, but requests opportunity for ACRS comment before implementation.	No(4)	--

Date	Subject	Recommendation/Issue	USI Initial Screening	TMI Action Plan
2/13/80	NRC Acceptance Criteria for Mark I Long Term Program	SRV discharge piping failure; verification of Mark I containment modifications.	No(6)	--
2/13/80	Qualifications of Radioactive Waste System Operating personnel	Strengthen requirements for personnel and management attention and direction for radioactive waste systems.	Pass	I.A.2.2 (in ref)
2/14/80	NUREG-0625, "Report of the Siting Policy Task Force"	Criteria on siting should be strengthened	Pass	II.A.1
3/11/80	NTOL Plant Test Programs	Verification testing of decay heat removal under upset conditions; (for low power testing on NTOL's).	No(2),(3)	--
3/11/80	NTOL Items From Draft 3 of NUREG-0660, TMI Action Plan	(1) Organization and Management Capabilities at NTOL Applicants.	No(2)	--
		(2) AE review of Emergency Procedures.	No(2)	--
		(3) Non-scheduled random checking of operating personnel w.r.t. ability to cope with accidents.	No(2)	--
		(4) Reevaluate criteria in IE bulletins related to RCS Pump trip; HPSI termination; automatic PORV blocking;	No(2)- HPI & PORV Pass - RCP Trip	II.K.3 - II.K.3 -
		(5) Improve control room habitability requirements.	Pass	III.D.3
		(6) Consider hydrogen accumulation at high points in containment in location of recombiner penetrations.	Pass	II.E.4 (Ref.)
		(7) Utility should have lead in handling an emergency.	No(7)	--
		(8) Systems for measuring concentrations of contaminants in containment and in effluents should be designed so that samples are representative, and should receive attention to assure adequacy and reliability.	No(2) (see TMI Action Plan II.B.3)	--

Date	Subject	Recommendation/Issue	USI Initial Screening	TMI Action
3/11/80 (Continued)		(9) Require NTOL Applicants and licensees to develop reliability assessments of their plants	Pass (Related to earlier one)	II.C.2
		(10) Hydrogen control and filtered vented containment, and interim measures for ice-condenser containments.	No(5)	--
3/11/80	Recommendations of the NRC Task Force on Bulletins and Orders	(1) Review criteria for HPI termination and RCP trip.	Pass (Related to #4 in letter of 3/11/80 on NTOL Items)	RCP: candida HPI: NC
		(2) Availability of diverse heat removal path, such as feed and bleed, is desirable.	Pass	II.E.3.1 II.E.3.2
		(3) Reevaluate lowering of high-pressure reactor trip setpoint in B&W plants	Pass	II.E.5-2
		(4) Auto initiation of aux. feedwater in the event of a main steam line break in containment.	No(2)	--
		(5) Schedule for NRC position related to small break LOCA analysis should be compatible with schedule required for NSSS vendors to revise their models.	No(4)	--
		(6) Extend schedule for review and implementation.	No(4)	--
3/12/80	ACRS Comments on Recommendations of NRC Special Inquiry Group Regarding ACRS Activities	Use of ACRS as alternative to Nuclear Safety Board; selective ACRS role; advisory and not formal participant role in licensing.	No(4)	--

INITIAL SCREENING RESULTS

OTHER POTENTIAL ISSUES

USI INITIAL SCREENING

OTHER POTENTIAL ISSUES

POTENTIAL ISSUE	Source	Initial USI Screening *	TMI Action Plan Section
Degraded Engineered Safety Features - Deficiencies in electrical distribution system operation and design at ANO Units 1 and 2	Abnormal Occurrence 79-1	2	--
Deficiencies in Piping Design - Errors in seismic design	Abnormal Occurrence 79-2	2	--
Three Mile Island	Abnormal Occurrence 79-3	--	A11
Indication of Low Water Level at Oyster Creek	Abnormal Occurrence 79-5	2,3	--
Damage to New Fuel Assemblies at Surry	Abnormal Occurrence 79-6	2,3	--
Deficient Procedures at ANO Unit 1 - Emergency Feedwater System controls positioned such that automatic actuation would not occur	Abnormal Occurrence 79-7	2,3	--
Major degradation of primary containment boundary - valve misalignment at Palisades	Abnormal Occurrence 79-8	2,3	Related to II.E.4.3

*See key on page preceding tables.

POTENTIAL ISSUE	Source	Initial USI Screening	TMI Action Plan Section
Turbine Disk Cracking	Misc.	Candidate	--
PWR Pipe Cracks	Misc.	Candidate	--
The Need for additional pipe crack studies should be determined and if so generic tasks developed. BWRs (See Memo Denton to Carbon, 10/24/79).	Misc.	No. (5,6)	--
An analysis of the probability and consequences of a loss-of-offsite power subsequent to a LOCA should be undertaken to determine if actions are necessary on plants (old ACRS concern not considered as a USI last year - see 3/3/78 memo Boyd to Case).	Misc.	Candidate	--
An investigation of the effects of control system failures and design inadequacies is needed (see Gossick to Alhearne memo, 10/22/79).	Misc.	Candidate	USI A-17; II. I.C.2; II.F. I.F.1
Analyses of the effects on plant safety of (1) failures of non-seismically qualified components on the operation of seismically qualified components and (2) multiple failures of non seismically qualified components. (See letter Fleischaker to Denton, 10/19/79).	Misc.	--	II.C.3
Emergency procedures should prepare operators for anomalies in system behavior likely to occur during an earthquake (Fleischaker letter).	Misc.	--	I.C
Human factors considerations in control room designs should be analyzed to optimize operator response during and following a severe earthquake (Fleischaker letter).	Misc.	--	I.D
Testing requirements for valves isolating low pressure systems from the reactor coolant system should be optimized to further reduce the risk associated with an inter system LOCA. (Told Commission we would reconsider as a USI - see excerpt from SECY-616).	Misc.	No(2)	--

POTENTIAL ISSUE	Source	Initial USI Screening	TMI Action Plan Section
An assessment of the potential for and consequences of a small LOCA from burned out pressurizer heaters should be undertaken.	Misc.	Candidate	--
<p>The issue is one of assessing the need to 1) require filtration (HEPA and charcoal (or equivalent)) of PWR auxiliary building and certain other gaseous release pathways; and 2) upgrade requirements for charcoal adsorbers to provide greater assurance that radioiodine is effectively removed from gaseous effluents. Presently, release pathways need to be filtered only if it is necessary to meet Appendix I requirements or if filtration is necessary to reduce Part 100 accident consequences. TMI-2 has shown that public tolerance to even small accidental releases is very low. A systematic evaluation to look at 1) accident scenarios; 2) other improvements that are being implemented as a result of TMI-2, such as improved containment isolation and system integrity; 3) placing all or most systems which contain primary coolant inside containment; and 4) benefits and cost of requiring filtration which satisfies existing guidance and benefits and costs of requiring improved filtration is needed. (DSE)</p>	DSE Proposal	--	II.B.8
Definition of exclusion area boundary over large bodies of water. (DSE)	DSE Proposal	No. (4,7)	
Automated remote real-time acquisition of onsite meteorological data by NRC and persons responsible for making decisions during a nuclear power plant incident. (DSE)	DSE Proposal	--	III.A.3.3
Requirements for upgrading of onsite meteorological programs at operating nuclear power plants where serious deficiencies exist. (DSE)	DSE Proposal	--	III.A.1

POTENTIAL ISSUE	Source	Initial USI Screening	TMI Action Plan Section
<p>There have been a number of LERs relating to excessive leakage in Main Steam Isolation Valves (MSIVs) in BWR facilities. It was this type of experience that led to the development of Regulatory Guide 1.96, "Design of Main Steam Isolation Valve Leakage Control Systems for Boiling Water Reactor Nuclear Power Plants" and the Unresolved Safety Issue C-8 "Main Steam Line Leakage Control Systems." However, not only have the LERs relating to excessive MSIV leakage continued, but recent LERs have identified failures in the MSIV leakage control systems (MSIV-LCSs).</p> <p>We believe that C-8 should be expanded to include:</p> <ol style="list-style-type: none"> 1. Review MSIV and MSIV-LCS operating experience in consideration for a potential revision to RG 1.96. 2. Consider an MSIV reliability improvement program, similar to the program currently underway for Target Rock safety/relief valves (B-55). 	DOR Proposal	Candidate	--
<p>We are concerned that consequential control system failure due to the hostile environment (humidity, pressure, temperature, jet impingement) following a high energy pipe break may occur. Such failures might compound anticipated accident scenarios and hamper the operators ability to successfully cope with a potential accident.</p> <p>We have informed all operating plant licensees of our concerns and received and screened their responses. We have found no specific identifiable safety problem to date. We are concerned about the adequacy of the breadth and depth of these initial licensee reviews and will be proposing a long term systematic and methodical plant-by-plant review.</p> <p>This issue may be incorporated in NRC efforts to resolve recommendation 9, TMI-2 Lessons Learned Task Force Final Report, NUREG-0585, Control Systems Interactions.</p>	DOR Proposal	Candidate	(II.C.1, II.C.2, II.C.3, II.F.4, II.F.9)

POTENTIAL ISSUE	Source	Initial USI Screening	TMI Action Plan Section
<p>The Transverse Incore Probe (TIP) monitoring system in a BWR penetrates the primary containment. In order to provide effective isolation capability when the TIP probes are in the reactor core, each line is equipped with an explosive (squib) isolation valve which will sever and seal the line when manually actuated. These valves would be used when containment isolation is needed and the TIP probe(s) could not be withdrawn from the core.</p> <p>At present, there are no surveillance requirements for these valves, since they can only be destructively tested. Nevertheless, there is a finite "shelf-life" associated with the squib charges. Periodic replacement of the squib chargers and circuit checks should be included in the Technical Specifications of each BWR plant, similar to the requirements for the explosive valves in the Standby Liquid Control System.</p>	DOR Proposal	No. (2)	--
<p>The Architect/Engineers' structure and practices should be reviewed for all operating plants. This review should include the study of:</p> <ol style="list-style-type: none"> 1) The management structure incorporated for the design and construction of the plant to insure that they were adequate to encourage and allow for required interfaces between various groups. 2) The required procedures for interface between the various groups. 3) The mechanisms for insuring that required procedures were implemented. <p>The results of this study should be evaluated and the impact on overall plant safety assessed.</p>	DOR Proposal	No specific Issue - Should be In- cluded under Systematic Review of Operating Plants	--

POTENTIAL ISSUE	Source	Initial USI Screening	TMI Action Plan Section
<p>The design/analysis/construction practices and procedures used by architect/engineers for all operating reactors should be reviewed to determine that the design and analysis of structures, systems, equipment and components reflected their as-built configurations and that modifications to these items, required as a result of design and analysis, were properly incorporated. This review should include an assessment of the impact of the practices and procedures on overall plant safety.</p>	DOR Proposal	No Specific Issue - Sys. Program for Review of Operating Plants	--
<p>The methods and criteria (loads, load combinations and acceptance criteria) used for the design and analysis of structures, systems equipment and components should be re-reviewed for all operating reactors. This should not be an effort which is as in-depth as that being conducted under the SEP, but should be detailed enough to identify and cursorily evaluate the methods and criteria actually used in the design and analysis of the plant. This would supplement and update the FSAR's which are either incomplete, out of date, or do not represent the criteria actually used to design the facility.</p>	DOR Proposal	No Specific Issue - Should Be Included Under Systematic Review of Operating Plants & FSAR Update Rule	--
<p>Design, fabrication, and operation of the secondary system of PWRs should be reviewed and evaluated as they relate to long term mechanical and materials performance of the primary system, primary and secondary systems interaction, and primary and secondary systems response and integrity during normal and postulated accidents. Specific items include component design, materials, and integrity; significant secondary system transients which may affect primary system integrity; and the general safety aspects of the balance of plant on the primary system.</p>	DOR Proposal	--	<p>II.C.1, II.C.2 II.C.3, II.F.5.</p> <hr/> <p>TAP-A3,A4,A5 Materials Impact on S/G Tube Integrity TAP-A17, System Interact</p>

POTENTIAL ISSUE	Source	Initial USI Screening	TMI Action Plan Section
<p>Operability and reliability of safety related pumps and valves required for safe shutdown of power plants in the event of an accident is a requirement of a plant license. Recent reviews of specific systems and components indicate that these vital components may be designed improperly, misapplied or that simply manufacturers Quality assurance is inadequate. Further, the requirements for demonstration of operability are either nonexistent or are left to the discretion of endors or licensees. Potential failures of this equipment could affect the operation of required safety systems during and after a postulated accident.</p>	DOR Proposal	--	II.C.1 II.C.2 II.C.4 and Seismic Qualification Issue immediately below
<p>Safety-related mechanical and electrical equipment are required by the staff to be seismically qualified. Recent reviews of the seismic qualifications on SEP plants have indicated potential generic deficiencies. These deficiencies are both in the equipment installation practices and in the seismic qualification procedures and records. Potential failures of this equipment could affect the operation of required safety systems during a seismic event.</p>	DOR Proposal	Candidate	--
<p>In a post accident situation, as at TMI-2, gases that evolve from reactor coolant in the makeup and purification system are collected in the waste gas system. Small leaks in these systems can cause very high concentrations of airborne activity in the auxiliary building and fuel handling building and can result in much higher than normal environmental releases via ventilation exhausts from these buildings.</p> <p>Because of the variety of problems associated with these high radiation levels a review of the need for leak tightness in these systems or containment within sealed areas should be considered.</p>	DOR Proposal	--	II.B.8

POTENTIAL ISSUE	Source	Initial USI Screening	TMI Action Plan Section
<p>During a recent feedwater transient at Oconee Unit 3 all electrical power was temporarily lost to the integrated control system. The power loss was due to the failure of a non-safety grade inverter power supply to transfer automatically from the D.C. power source to the regulated AC power source. All RCS indicators and recorders (except one widerange RCS pressure recorder) were also lost. The ability of the operator to be aware of and to adequately control temperature and pressure are of concern. In this case, all parameters were powered from a single non-safety grade bus. The licensee is installing a redundant transfer switch, but this does not resolve the problem of all parameters being powered from a single bus nor the question of whether these parameters should in fact be on a safety grade bus.</p>	DOR Proposal	--	II.C.1 II.C.2 II.C.3 II.F.4 II.F.5
<p>In November 1978, we issued a generic letter on containment purging during normal plant operations (copy attached). Two earlier events, subsequently classified as abnormal occurrences, involving the manual override of isolation signals required to automatically close containment purge valves, also resulted in the safety signals for containment isolation in the event of an accident to be defeated. The staff's position is detailed on page 5 of the letter. Responses from licensees indicate that this issue will not be easily or quickly resolved. Therefore, in October 1979, we transmitted a second letter (copy attached) that requested that licensees commit to an interim position as described in the enclosure to that letter.</p> <p>Before the long term resolution to this issue can be finalized, several questions such as the advisability of a complete restriction on containment purging during plant operation, need to be answered.</p>	DOR Proposal	--	II.E.4
BWR Jet Pump Integrity (Memo-Michaelson to Denton, 5/23/80)	OAEOD	Candidate	--
Reactor Vessel Supports Fracture Toughness	DOR Proposal	Candidate	--
DC Power System Reliability	Last year	Candidate	May be included in II.C.1, II.C.2 and II.C.4
Atmospheric Dump Valve Opening on Loss of Power to ICS (Memo-Michaelson to ...)	OAEOD	Candidate	Combined with related issue on ...

Enclosure 4

SUMMARY DISCUSSION OF CANDIDATE ISSUES
NOT RECOMMENDED AS UNRESOLVED SAFETY ISSUES

Of the issues that passed the initial screening criteria, most were not recommended for designation as Unresolved Safety Issues. Certain of these issues were identified as requiring further study to better define the safety concern or to assess their safety significance in order to determine whether they should be designated as Unresolved Safety Issues. The issues recommended for further study are listed below.

Further Study

1. Reliance on ECCS (II.E.2.1)
2. In-Situ Testing of Valves (II.E.6.1)
3. Protective Device Reliability
4. D.C. Power System Reliability
5. PWR Pipe Cracks
6. BWR Main Steam Isolation Valve Leakage Control Systems
7. Radiation Effects on Reactor Vessel Supports

The following provides a summary discussion of the candidate issues not recommended for reporting as Unresolved Safety Issues, including those requiring further study, and the bases for these conclusions. The numbers in parenthesis following titles of certain of the issues refer to the corresponding action item in the TMI Action Plan (NUREG 0660). The issues are listed in the order that they appear in the candidate issue list of Enclosure 3.

Training and Qualifications of Operations Personnel (Item I.A.2.2)

This issue involves a short term potential improvement in the training and qualifications of operations personnel, other than plant operators, and includes maintenance and technical personnel. Human error in the performance of plant operations can dominate the unavailability of plant equipment. Such errors, however, appear to be more a result of poor procedures, administrative controls and communications than a significant deficiency in the training and qualification of operations personnel. In any case this involves a short term improvement by licensees with limited guidance from NRC. The development of firm guidelines in this area is included in an issue that is recommended for designation as an Unresolved Safety Issue "Long Term Upgrading of Training and Qualifications of Operating Personnel" (Item I.A.2.6). Because a large reduction is not likely to result from these short term improvements alone, this issue has not been recommended for designation as an Unresolved Safety Issue.

Long Term Training Simulator Upgrade (Item I.A.4.2)

This issue involves a potential improvement in operator performance by upgrading the capabilities of training simulators to include programming of WASH 1400 accident sequences and adding capability to test operator diagnostic capability. The issue is not recommended for designation as an Unresolved Safety Issue because significant improvements in operator performance will be obtained by resolution of the proposed Unresolved Safety Issues on "Long Term Upgrading of Training and Qualifications of Operating Personnel" and on "Operating Procedures" (see Enclosure 1) and by improvements in areas where requirements have already been established and implementation is underway or planned, such as the short term simulator improvement (Item I.A.4.1), use of a shift technical advisor (Item I.A.1.1), improvements in shift manning (Item I.A.1.3), and improvements in

operating procedures (Item I.C). The short term simulator upgrade includes: establishing and sustaining a higher degree of realism in training using simulators including dealing with transients; modeling saturation conditions; programming multiple failure accident sequences, incorrect instrument responses, and active and passive failures; and including training on natural circulation operation under solid water conditions. These actions already taken or underway will provide the significant improvement in operator performance; the long term simulator upgrade is expected to provide refinements on the actions previously taken and, although these will provide some improvement in operator performance, and will be implemented as part of the NRC Action Plan (NUREG 0660), it is not expected to be large enough to designate this issue as an Unresolved Safety Issue.

Requirements for Operator Fitness (Item I.A.3.3)

This issue involves a potential deficiency with respect to lack of qualification criteria to screen out individuals with a poor ability to perform under stress or that have dependencies on alcohol or drugs. The issue is not recommended for designation as an Unresolved Safety Issue because: (1) there is no evidence of any significant problem in this area; (2) additional operators and use of a shift technical advisor will reduce the likelihood of operator errors due to this deficiency; (3) operator errors would generally only result in interruption of some equipment but not necessarily a failure of the equipment; (4) alarms and indicators would warn the other operators of conditions, resulting from the error, that require corrections; and (5) corrective

action may be taken by the operator or other operators to restore the safety function. Resolution of this issue will provide some safety improvement and will be implemented as part of the NRC Action Plan (NUREG 0660), but it does not warrant designation as an Unresolved Safety Issue.

Organization and Management - Long Term Improvements (Item I.B.1.1)

This issue involves a potential improvement in plant organizations and management regarding their capability to assure safe plant operation and to respond to emergencies. This issue has not been recommended for designation as an Unresolved Safety Issue because it is judged that additional upgrading in this area beyond that already implemented is not likely to result in a large reduction in risk. The first line of defense in an accident situation are the operators who are directly supported by a Shift Technical Advisor. Upgrading in operator training, qualifications, procedures, etc. have already been made and more are planned. In addition, interim upgrading of plant emergency organizations and management have already been implemented. Resolution of this issue will provide some improvement in licensee response to emergencies, but does not warrant designation as an Unresolved Safety Issue.

Expand QA List (Item I.F.1)

This issue involves a potential improvement related to application of 10 CFR 50 Appendix B QA criteria to systems and components that in the past have not been considered safety related. Such equipment would include balance of plant equipment that could perform a safety function or whose failure could place demands on safety related equipment. The

issue is not recommended for designation as an Unresolved Safety Issue because: (1) Many of the criteria for the electrical equipment are being established under Action Plan item II.F.5, and II.F.5 and was found to not warrant designation as an Unresolved Safety Issue; (2) application of QA criteria to this balance-of-plant equipment will not provide a large improvement in reliability of the equipment; and (3) licensees already place importance on reliability of such equipment because of economic considerations. Note that implementation of this issue will rely on the results of other ongoing studies such as IREP and Systems Interaction.

Develop More Detailed QA Criteria (Item I.F.2)

This issue involves a potential deficiency related to insufficient detail being specified in certain QA criteria. Such lack of detail could lead to incorrect interpretation of how to satisfy the intent of the QA criteria. The issue is not recommended for designation as an Unresolved Safety Issue because: (1) experience has shown that in general licensees and applicants have been making a conscientious effort to satisfy the intent of the QA criteria; (2) even if the intent is not satisfied in a particular area, other QA measures such as technical specification surveillance will provide means to prevent and detect faults in equipment; and (3) the potential deficiency involves developing further detail in only a limited number of areas. Although resolution of this issue will provide some improvement in application of QA criteria, it does not warrant designation as an Unresolved Safety Issue.

Preoperational and Low Power Testing-Training Requirements (Item I.G.1)

This issue involves a potential improvement in operator training by requiring "hands on" training during low power test programs. The issue has not been

recommended for designation as an Unresolved Safety Issue because it is not likely that such training can significantly improve the operator's ability to respond to potentially serious accidents. Classroom and simulator training are better able to provide such training. Although resolution of this issue may provide some improvement in safety, it does not warrant designation as an Unresolved Safety Issue.

Reliance on ECCS (Item II.E.2.1)

This issue involves a potential deficiency in the reliability of Emergency Core Cooling Systems. The concern results from a higher than anticipated frequency of ECCS challenges in operating reactors, due in part to reliance on ECCS for other than loss-of-coolant accidents. The reliability of ECCS is believed to be high, but it is not clear that it is sufficiently high to accomplish its safety function with high assurance considering the increase in expected challenges. Further study is recommended to determine if this issue should be reported as an Unresolved Safety Issue. The further study would be in the form of scoping calculations related to ECCS challenges and system reliability.

Emergency Core Cooling System - Uncertainties in Performance Predictions (Item II.E.2.3)

This issue involves potential uncertainties in small break ECCS performance evaluations as a result of uncertainties due to modeling assumptions or inaccuracies. The issue has not been recommended as an Unresolved Safety Issue because small break analyses are believed to be conservative. Resolution of this issue is needed to confirm the adequacy of the existing analyses.

Containment Design - Integrity Check (Item II.E.4.3)

This issue involves a potential improvement related to developing a method to verify gross integrity of the containment structure. Containment integrity is presently verified by monitoring the integrity of components (valves, penetrations, etc.) and by administrative controls on valve positions and seal integrity. The issue has not been recommended for designation as an Unresolved Safety Issue because monitoring or periodically verifying gross integrity is expected to only provide marginal improvement over current practice. Study of the feasibility, need, and possible methods for such testing will be carried out as part of the NRC's Action Plan (NUREG 0660); however, it does not warrant designation as an Unresolved Safety Issue.

Design Sensitivity of B&W Reactors (Item II.E.5.1)

This issue involves a potential improvement that might be achieved by modifications in systems or procedures to reduce B&W reactor sensitivity to transients. Under Item II.E.5.2 of the NRC's Action Plan recommendations were made, based on a short term study, on improvements that should be made to reduce B&W reactor sensitivity to transients. These recommendations are contained in NUREG 0667, "Transient Response of Babcock and Wilcox Designed Reactors," May 1980. Because NUREG-0667 has been issued, Item II.E.5.2 was screened out from being a candidate issue as noted in Enclosure 3. Item II.E.5.1 of the Action Plan involves a longer term evaluation of B&W reactor sensitivity and identification of any further recommended improvements to those identified in NUREG 0667. The staff does not believe that this longer-term study will result in significant improvements beyond

those resulting from NUREG 0667 (Item II.E.5.2). The results of the long-term evaluation are expected to confirm the adequacy of the changes resulting from NUREG 0667. Accordingly, this issue is not recommended for designation as an Unresolved Safety Issue.

In-Situ Testing of Valves (Item II.E.6.1)

This issue involves a potential improvement that might be achieved by demonstrating the functional performance of valves in Engineered Safety Feature Systems. In-service testing and technical specification surveillance provides some measure of the operability of valves. However, these tests are not performed under the same loadings and conditions that the valve may experience in an accident or emergency situation. A valve reliability study, based on test and operational data, indicates valve reliability is about the same as was estimated in WASH-1400. However, a current study of valve test frequency and further consideration of testing valves under severe conditions may indicate a potential for risk reduction greater than currently anticipated. Accordingly, further study is recommended to estimate if the test adequacy study to be performed under Item II.E.6.1 is likely to result in: (1) a significant improvement in valve reliability by changing the test frequency, and (2) a significant reduction in risk if methods were developed for testing of valves closer to the design conditions.

Study of Control and Protective Action Design Requirements (Item II.F.4).

This issue involves a potential deficiency related to: (1) basing protective actions on derived variables rather than direct reading of process variables; (2) protective actions relying on coincidence of independent process variables rather than relying on either variable; and (3) lack of testing of control circuit components at expected degraded power supply conditions. It is believed that existing requirements already preclude these deficiencies. The issue is not recommended for designation as an Unresolved Safety Issue because the recommended action involves adding further clarification to existing requirements in the Standard Review Plan and only minor improvement in protection is expected to result.

Classification of Instrumentation, Control and Electrical Equipment (Item II.F.5)

This issue involves a potential improvement by developing a standard for establishing design criteria and performance requirements for instrumentation, control and electrical equipment in accordance with the equipment's safety importance. This would likely result in upgraded requirements for some equipment. The current classification scheme (Class IE) is judged to provide reasonably good criteria for many systems and components important to safety. Additionally, Revision 2 to Regulatory Guide 1.97, "Instrumentation to Follow The Course Of An Accident" has been developed and issued for public comment. Although development of an improved classification scheme could improve the reliability and performance of some equipment, and will be done in accordance with the NRC's Action Plan, the issue is not recommended for reporting as an Unresolved Safety Issue because the reduction in risk is not expected to be large from this improvement.

NRC Emergency Preparedness - Training, Drills, and Tests
(Item III.A.3.5)

This issue involves a potential improvement in NRC emergency preparedness through NRC observation and evaluation of joint exercises between the licensees, State and local agencies, and Federal response organizations (including FEMA). The issue is not recommended for designation as an Unresolved Safety Issue because: (1) the significant reduction in risk resulting from improvements in the area of emergency preparedness at each NRC licensed nuclear facility will evolve from an intensive NRC program to upgrade emergency preparedness and issuance of upgraded emergency preparedness regulations, the criteria and requirements have already been established for these rules; and (2) the NRC has developed a program for the improvement of NRC emergency preparedness that encompasses far more than just observation of joint exercises. The importance of observation of joint exercises should not be down-played, but they will provide only a small impact on the improvement of NRC emergency preparedness.

Radiation Source Control-Ventilation System and Radioiodine Adsorber
Criteria (Item III.D.1.3).

This issue is a potential deficiency in means to control and process airborne radioactivity in the auxiliary and radwaste buildings and in maintaining filter media efficiency. Operating experience and research have identified certain areas where charcoal filter efficiency and use may be improved; further research is planned. The issue is not recommended for designation as an Unresolved Safety Issue because; (1) existing criteria on charcoal filters are believed to be generally quite good, with perhaps only minor changes required based on operating experience and research; and (2) the improvements that will be made are not expected to result in a significant reduction in risk. It should be noted that the rule change under item II.B.8 of the TMI Action Plan may also require further changes to ventilation system filtration capability; the impact of these further changes is not considered under this issue.

Inplant Radiation Monitoring (Item III.D.3.3)

This issue involves a potential improvement that might be achieved by increased in-plant radiation monitoring capability, including installation of radiation monitors with remote readout, high dose rate readout instruments, and additional portable radiation monitoring equipment. This issue is not recommended for designation as an Unresolved Safety Issue because the increase in radiation monitoring equipment will provide only an incremental improvement in reducing dose to plant personnel for postulated accidents beyond the protection provided by present monitoring capability.

Evaluate Elimination of PORV Function (Item II.K.3(33))

This issue involves a potential improvement that might be achieved by either reducing demands on the PORV (revising set-points) or providing an improved means to cope with a stuck open PORV (automatic operation of the PORV block valve). The issue is not recommended for designation as an Unresolved Safety Issue because: (1) a study by the Probabilistic Analysis Staff has indicated that these improvements would not significantly reduce the potential for core damage; (2) licensees have already been required to provide improved methods of indication to the operator of a stuck-open PORV; and (3) changes to operator training and emergency procedures are being made so that the operator is better able to cope with a stuck open PORV.

Reliability of Ventilation Monitoring Equipment

This issue involves a potential deficiency related to low reliability of air flow monitoring equipment. The issue was identified in the ACRS report

on Licensee Event Reports, NUREG-0572. The issue is not recommended for designation as an Unresolved Safety Issue because loss of the air monitoring equipment, in itself, will not cause loss of a safety function. Loss of a safety function would also require the following to occur: a failure in the ventilation equipment, a failure in the plant operator shift tours, a failure in the redundant system to that affected by the ventilation failure, and failures in any non-safety systems that could perform the safety function.

Protective Device Reliability

This issue involves a potential deficiency in that high failure rates of protective devices (fuses, circuit breakers), could result in a lower reliability of safety equipment. The issue was identified in the ACRS report on Licensee Event Reports (LER's) NUREG-0572. This report noted an apparent large number of LER's related to failures of protective devices. Such failures will result in unavailability of the related safety equipment. However, it was not known whether the failure rate of safety equipment might be greater than previously assumed (in WASH-1400 or other reliability reports) as a result of protective device failures, or if the reliability of safety equipment could be significantly improved by increasing protective device reliability. Accordingly, further study has been recommended to estimate protective device failure rate and to determine (1) if this failure rate is excessive and leads to a lowering of failure rate estimates for essential equipment, or (2) if the failure rate estimates for essential equipment could be significantly reduced by improving protective device reliability. Such a study should be conducted before a decision is made on whether this issue should be designated as an Unresolved Safety Issue.

Instrumentation Set-Point Drift

This issue involves a potential deficiency related to an excessive drift in instrumentation set points beyond Technical Specification limits.

The issue was identified in the ACRS report on Licensee Event Reports, NUREG-0572. The issue is not recommended for designation as an Unresolved Safety Issue because: (1) given the set point drift, the affected channel in most cases would be only slightly out of tolerance and therefore would trip at close to the desired setting; (2) other channels would generally be available; and (3) in most cases operators may take manual actions to accomplish the safety function.

End-of-Life and Maintenance Criteria

This issue involves a potential deficiency related to lack of adequate criteria for establishing maintenance periods and end-of-life expectancy for materials that may degrade significantly with time or use. The issue was identified in the ACRS report on Licensee Event Reports, NUREG 0572. The issue is not recommended for designation as an Unresolved Safety Issue because: it is not likely that failures due to this deficiency will occur simultaneously in redundant systems; periodic testing of equipment and in-service inspection will detect such degradation; and requirements are being established for certain identified issues related to material degradation and these have been previously designated as Unresolved Safety Issues, (A-3, A-4, A-5) Steam Generator Tube Integrity and (A-11) Reactor Vessel Materials Toughness. Although establishment of such criteria may provide some improvement in safety, it does not warrant designation as an Unresolved Safety Issue.

Design Check and Audit of Balance-of-Plant Equipment

This issue involves a potential improvement that might be achieved by requirements for verification that the balance-of-plant "as built" configuration satisfies the design intent. Such action could improve the reliability of balance-of-plant equipment and reduce demands on safety equipment. The issue was identified in the ACRS report on Licensee Event Reports, NUREG 0572. The issue is not recommended for designation as an Unresolved Safety Issue because transients or safety systems challenges result more frequently from operator errors and "random" component failures rather than from deviations from the intended plant design. Additionally other ongoing studies (IREP and Systems Interactions) will identify potential adverse impacts from balance-of-plant equipment.

BWR Control Rod Worth

This issue involves a potential deficiency in the manner of accounting for xenon following a reactor trip in assessing its effect on control rod worth. The issue was identified in the ACRS report on Licensee Event Reports, NUREG 0572. The issue is not recommended for designation as an Unresolved Safety Issue because an initial staff review has found that the rod worths are relatively insensitive to xenon distribution. The results of the final staff review will be documented when the review is completed.

Flow Induced Vibration

The issue involves the potential for single and multiple failures of piping, valves, snubbers, and nearby electrical and mechanical components as a result of flow-induced vibrations. The issue was identified in the ACRS report on Licensee Event Reports, NUREG-0572. The issue is not recommended

for designation as an Unresolved Safety Issue because: (1) failures in electrical equipment as a result of flow-induced vibrations would likely occur in only one safety division because of the physical separation of redundant components to satisfy other regulatory requirements such as flooding and fire protection; (2) failures in mechanical components are likely to be in piping restraints or supports rather than in the piping, and as such would not likely result in loss of a safety function; and (3) many sources of flow induced vibration failures noted in LER's have been identified and corrected, such as pump high cycle fatigue and reactor internal vibration.

Inadvertent Actuation of Safety Injection

This issue involves a potential tendency for operators to terminate safety injection when actually required, because their judgement has been influenced by the large number of inadvertent safety injections that have occurred in the past. The issue was identified in the ACRS report on Licensee Event Reports, NUREG-0572. The issue is not recommended for designation as an Unresolved Safety Issue because improvements in training and procedures, subsequent to TMI, related to safety injection operation have stressed the need for operators to obtain multiple indications to determine if actuation was inadvertent. Further evaluations of ECCS challenge frequency will be performed under Action Plan Item II.E.2.1, currently designated for further study.

Reevaluation of Reactor Coolant Pump Trip Criteria (Item II.K.3(5))

The issue involves a potential improvement that might be achieved by establishing better criteria on when to allow reactor coolant pump operation and when to trip the pumps. Better criteria might allow use of reactor coolant pumps to aid in recovering from certain transients, while still assuring that these pumps are tripped for a small break LOCA. The issue was identified by the ACRS in its letter of March 11, 1980 concerning recommendations of the NRC Task Force on Bulletins and Orders. A study is currently ongoing to resolve this issue and is expected to be completed in early 1981. The issue is not recommended for designation as an Unresolved Safety Issue because, although such use of reactor coolant pumps would provide a small improvement in safety, the safety evaluations of transients used for licensing acceptability do not assume the availability of the reactor coolant pumps.

Turbine Disk Cracking

This issue involves a potential deficiency related to turbine disk integrity that could increase the likelihood of a severe accident from turbine missiles. This issue has recently been raised because of the discovery of stress corrosion cracking in low pressure turbine disks. The issue has not been recommended for designation as an Unresolved Safety Issue because the probability of turbine missile generation assumed by the staff in accident calculations has been unaffected by the discovery of these cracks. Requirements for periodic inspection of the disks may actually decrease this probability. In addition, a serious accident is not considered likely even if the affected disks fail because to date the cracking has only been observed in the smaller, lower energy disks. Missiles generated from these disks would not likely escape the turbine casing or penetrate other structural barriers.

DC Power System Reliability

This issue involves a potential improvement related to DC power system reliability. The issue was originally raised by an ACRS consultant. The NRC staff has funded a contractor study of the probability of core damage following certain transients as a result of loss of shutdown cooling from DC power system failures. The DC power system analyzed in the study was a DC system meeting the staff's current minimum requirements. The preliminary results indicate that relatively significant reductions in the probability of core damage from event sequences involving DC power system failures could be realized by making certain improvements in the DC power system design. However, such improvements would have little effect on the overall core damage probability unless other improvements in the shutdown cooling system design are made. Further it is not clear how typical the DC power system analyzed is compared to those found at most plants. It is thought likely that most actual installations exceed the staff's minimum requirements. Accordingly, further study is recommended to determine if this issue should be designated as an Unresolved Safety Issue.

BWR Jet Pump Integrity

This issue involves the potential for degraded core cooling as a result of jet pump failure that occurs because of a large LOCA and degraded structural jet pump members. Failure could potentially result if jet pump structural members were cracked during normal service by water hammer events prior to the LOCA, or result from flow induced vibration caused by ECCS flow following a LOCA. This issue was the subject of a memorandum from C. Michelson

Radiation Effects on Reactor Vessel Supports

This issue involves a potential deficiency in reactor vessel supports related to a reduced fracture resistance as a result of irradiation damage from low energy neutrons. Although the consequences of reactor vessel support failure under large loads such as LOCA or earthquake loads could be severe, there are a number of uncertainties regarding the likelihood for low support fracture resistance. Further study to better characterize the support materials, the neutron spectra, the potential radiation damage and the structural loading of supports is recommended before making a judgment regarding whether this issue should be designated as an Unresolved Safety Issue.

Loss of Offsite Power Subsequent to a LOCA

This involves a potential improvement that might be achieved if it were required to consider loss of offsite power subsequent to a LOCA in the plant design. This issue has not been recommended for designation as an Unresolved Safety Issue because the probability of the combined event is judged to be very low (on the order of 10^{-6} /RY) and the consequences would likely be insignificant, because adequate core cooling would be provided by vessel inventory during the time required (less than 1 minute) for diesels to start and assume load.

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July 14, 1980

CORRECTION NOTICE

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To All Copyholders of SECY-80-325

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Attached are two pages, pps. 17 and 18, which were omitted from Attachment 4 of the subject paper. Please attach them to your copy.

The Secretariat

Attachment:
pages 17 and 18

to H. Denton dated May 23, 1980, and work has been underway in NRR on this subject since the first reports of degraded structural members. The issue is not recommended for designation as an Unresolved Safety Issue because the occurrence of degraded core cooling would require the combination of: (1) a large LOCA; (2) a degraded jet pump; and (3) a jet pump failure that results in inadequate core cooling. The likelihood of this combination of events is judged to be low.

Small Break LOCA from Extended Overheating of Pressurizer Heaters

This issue involves the potential for failure of the pressurizer pressure boundary in the event of extended overheating of the pressurizer heaters. The issue has not been recommended for designation as an Unresolved Safety Issue because the possible scenarios involved multiple equipment failures and operator inaction for relatively long time periods. Such scenarios are judged to be of low likelihood.

PWR Pipe Cracks

This issue involves a potential deficiency in plant equipment related to cracking in various PWR piping systems. The principal causes of cracking have been thermal fatigue, vibration induced fatigue and intergranular stress corrosion cracking. This issue has been the subject of a recent investigation by the Pipe Crack Study Group. Although thermal fatigue cracking has been observed in a number of feedwater lines, analyses indicate that such cracking is not likely to result in complete severance of the line even when severely loaded. Complete severance of small ($\sim 3/4$ ") vent or drain lines in certain locations in emergency core cooling systems

as a result of vibration induced fatigue could potentially result in degraded core cooling. However it is not evident that the particular scenarios envisioned are likely enough to involve a significant contribution to risk. Accordingly, further study has been recommended to determine if this issue should be designated as an Unresolved Safety Issue.

BWR Main Steam Isolation Valve Leakage Control Systems

This issue involves a potential deficiency in the ability to control leakage through the main steam isolation valves (MSIVs) in BWR plants. As a result of excessive leakage experience for the MSIVs in operating plants, the staff developed requirements for MSIV leakage control systems, as described in Regulatory Guide 1.96. However, the initial operating experience with the leakage control systems suggests that they are also prone to failures. In addition, it appears from recent leakage test results that there are improved maintenance procedures that may significantly reduce excessive leakage from the MSIVs. Accordingly, further study has been recommended to estimate the MSIV and leakage control system failure rates and to determine if the leakage control system failure rate is excessive in order to determine whether the issue should be designated as an Unresolved Safety Issue.