



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

GL-80-37

May 7, 1980

TO ALL OPERATING REACTOR LICENSEES

SUBJECT: FIVE ADDITIONAL TMI-2 RELATED REQUIREMENTS TO OPERATING REACTORS

Gentlemen:

Over the past few months, the NRC has been developing its requirements that flow from various reviews following the TMI accident of March 28, 1979. All TMI-related issues are being included in the NRC's TMI Action Plan. On September 13, 1979, you were informed of the first set of TMI-related actions based upon Lessons Learned that were required for operating reactors.

On February 8, 1980, the Commission preliminarily approved the Near-Term Operating License requirements of the TMI Action Plan. There are five items that are applicable to operating reactors and constitute a second set of requirements for operating reactors. They are as follows: (1) I.A.1.3-Shift Manning; (2) I.A.3.1 - Licensing Examinations; (3) I.C.5 - Licensee Dissemination of Operating Experiences; (4) II.K.3 - LOFW and Small Break LOCA Generic Review Matters; and (5) III.D.3.4 - Control Room Habitability. These matters are specified in the Task Action Plan (NUREG 0660, May 1980).

Items 1, 2, 3 and 5 involve actions for all reactor plants whereas item 4 concerns only specific light water reactor types. Item 4 involves 28 separate actions; i.e., 15 for BWR plants (including 1 for Big Rock); 7 for PWR plants (including 3 for Westinghouse designs); and 6 for all light water reactor plants. Five of the items are applicable to Fort St. Vrain. Requirements for the implementation of each of these actions are provided in this letter, except for items (1) and (2). Item (1) will be provided shortly through separate correspondence and Item (2) was provided to you by letter dated March 28, 1980.


The implementation schedule for the five action items as they apply to the various operating reactor designs is given in Enclosure (1). Enclosure (2); (3) and (4) are specific with regard to the three remaining items as they apply to any specific plant design. Each enclosure consists of two parts; i.e., the first part is the staff requirement and the second part is a copy of the applicable section of the plan. The NUREG reports referenced in these enclosures will be provided to you shortly through separate correspondence.

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Each of the specific actions includes an implementation schedule as to how and when the particular action is to be carried out. Three classes are indicated; i.e., Class 1 involves no hardware changes and requires that the action is to be implemented by the specified date; Class 2 involves possible hardware changes that may be effected without prior staff review; and Class 3 involves hardware changes that would be made subsequent to staff review and approval.

You are requested to reply within 30 days stating your commitment to meet these requirements and associated schedules.

Sincerely,

  
Darrell G. Eidenhut, Director  
Division of Licensing

Enclosures:  
Additional Operating  
Requirements as Stated

ENCLOSURE 1  
IMPLEMENTATION SCHEDULE & SUMMARY

<u>ITEM</u>	<u>TITLE</u>	<u>APPLICABILITY</u>	<u>CLASS OF ACTION (1)</u>	<u>IMPLEMENTATION SCHEDULE</u>
I.A.1.3	Shift Manning	LWRs*	I	Personnel Requirements: July 1, 1982 Overtime Procedures: August 1, 1980
I.A.3.1	Revise Scope and Criteria for Licensing Examinations	LWRs*	I	May 1, 1980
I.C.5	Procedures for Feedback of Operating Experience to Plant Staff	LWRs*	I	January 1, 1981
II.K.3	Final Recommendations of B&O Task Force [Measures to Mitigate Small Break Loss-of-Coolant Accidents and Loss of Feed-Water Accidents]			
	II.K.3.1	PWRs	III	Proposed design: July 1, 1981 Test: First refuel
	II.K.3.2	PWRs	I	January 1, 1981
	II.K.3.3	LWRs	I	January 1, 1981
	II.K.3.5	PWRs	I	Study: January 1, 1981 Modify: January 1, 1982
	II.K.3.9	W PWRs	II	July 1, 1980
	II.K.3.10	W PWRs	III	Plant by Plant as requested by licensees
	II.K.3.12	W PWRs	III	July 1, 1980
	II.K.3.13	BWRs	II	Analysis: October 1, 1980 Implementation Date: April 1, 1981
	II.K.3.14	BWRs	II	January 1, 1981

<u>ITEM</u>	<u>TITLE</u>	<u>APPLICABILITY</u>	<u>CLASS OF ACTION<sup>(1)</sup></u>	<u>IMPLEMENTATION SCHEDULE</u>
II.K.3	II.K.3.15	BWRs	II	January 1, 1981
	II.K.3.16	BWRs	III	Feasibility Study: January 1, 1981 Proposed System Mod: January 1, 1982
	II.K.3.17	LWRs*	I	January 1, 1981
	II.K.3.18	BWRs	III	Feasibility Study: January 1, 1981 Proposed Modifications: January 1, 1982
	II.K.3.19	BWRs	II	January 1, 1981
	II.K.3.20	Big Rock Pt.	I	January 1, 1981
	II.K.3.21	BWRs	III	Design: January 1, 1981 Modify: Refueling
	II.K.3.22	BWRs	II	Verify Design: January 1, 1981 Modify Design: January 1, 1982
	II.K.3.24	BWRs	II	January 1, 1982
	II.K.3.25	PWRs	I	January 1, 1982
	II.K.3.27	BWRs	II	October 1, 1980
	II.K.3.28	BWRs	II	January 1, 1982
	II.K.3.29	LWRs	I	April 1, 1981
	II.K.3.30	LWRs	I	July 1, 1983
	II.K.3.31	LWRs	I	After 1983
	II.K.3.44	LWRs	I	January 1, 1981
	II.K.3.45	BWRs	I	January 1, 1981

<u>ITEM</u>	<u>TITLE</u>	<u>APPLICABILITY</u>	<u>CLASS OF ACTION<sup>(1)</sup></u>	<u>IMPLEMENTATION SCHEDULE</u>
II.K.3	II.K.3.46	BWRs	I	July 1, 1980
	II.K.3.57	BWRs	I	October 1, 1980
III.D.3.4	Control Room Habitability	LWRs*	II	Review: January 1981 Modify: January 1983

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<sup>(1)</sup>Class of Action:

- I - Analysis/Evaluation/Procedural Changes
- II - Post-implementation review of modifications
- III - Pre-implementation review of modifications

\*This item also applies to Fort St. Vrain

**ENCLOSURE 2**

**PROCEDURES FOR FEEDBACK OF  
OPERATING EXPERIENCE TO PLANT STAFF**

**PART 1: Staff Requirements I.C.S**

**PART 2: Copy of Section I.C. to NRC Task Action Plan**

## 1.C.5 PROCEDURES FOR FEEDBACK OF OPERATING EXPERIENCE TO PLANT STAFF

### POSITION

In accordance with Task Action Plan I.C.5, Procedures for Feedback of Operating Experience to Plant Staff, each licensee shall review its procedures and revise them as necessary to assure that operating information pertinent to plant safety originating both within and outside the utility organization is continually supplied to operators and other personnel and is incorporated into training and retraining programs. These procedures shall:

- (1) Clearly identify organizational responsibilities for review of operating experience, the feedback of pertinent information to operators and other personnel and the incorporation of such information into training and retraining programs;
- (2) Identify the administrative and technical review steps necessary in translating recommendations by the operating experience assessment group into plant actions (e.g., changes to procedures; operating orders);
- (3) Identify the recipients of various categories of information from operating experience (e.g., Supervisory personnel, STA's, operators, maintenance personnel, H. P. technicians) or otherwise provide means through which such information can be readily related to the job functions of the recipients.
- (4) Provide means to assure that affected personnel become aware of and understand information of sufficient importance that should not wait for emphasis through routine training and retraining programs;
- (5) Assure that plant personnel do not routinely receive extraneous and unimportant information on operating experience in such volume that it would obscure priority information or otherwise detract from overall job performance and proficiency;
- (6) Provide suitable checks to assure that conflicting or contradictory information is not conveyed to operators and other personnel until resolution is reached; and,
- (7) Provide periodic internal audit to assure that the feedback program functions effectively at all levels.

### DISCUSSION

Each utility is expected to carry out an operating experience assessment function which will involve utility personnel having collective competence in all areas important to plant safety. In connection with this assessment function it is important that procedures exist to assure that important

information on operating experience originating both within and outside the organization is continually provided to operators and other personnel and that it is incorporated into plant operating procedures, and training and retraining programs.

Those involved in the assessment of operating experience will review information from a variety of sources. These include operating information from the licensee's own plant(s), publications such as IE Bulletins, Circulars and Notices, and pertinent NRC or industrial assessments of operating experience. In some cases, information may be of sufficient importance that it must be dealt with promptly (through instructions, changes to operating and emergency procedures, issuance of special precautions, etc.) and must be handled in such a manner to assure that operations management personnel would be directly involved in the process. In many other cases, however, important information will become available which should be brought to the attention of operators and other personnel for their general information to assure continued safe plant operation. Since the total volume of information handled by the assessment group may be large it is important that assurance be provided that high-priority matters are dealt with promptly and that discrimination is used in the feedback of other information so that personnel are not deluged with unimportant and extraneous information to the detriment of their overall proficiency. It is important, also, that technical reviews be conducted to preclude premature dissemination of conflicting or contradictory information.

#### CLARIFICATION

Review of and modifications to procedures governing feedback of operating experience to plant staff shall be completed and the procedures put into effect on or before January 1, 1981.

#### ACTION: (Class I)

- (1) Licensee to implement actions and submit documentation of the method for staff review by scheduled dates.



The following thirteen pages are from the May 1980 version of the TMI Action Plan, NUREG 0660, Section I.C. This section is provided for background information only and to note that the subject item being discussed with respect to our position on I.C.5. is a subpart.

## TASK I.C OPERATING PROCEDURES

A. OBJECTIVE: Improve the quality of procedures to provide greater assurance that operator and staff actions are technically correct, explicit and easily understood for normal, transient, and accident conditions. The overall content, wording, and format of procedures that affect plant operation, administration, maintenance, testing, and surveillance will be included. A principal part of this work is to improve procedures for dealing with abnormal conditions and emergencies by improving the delineation of symptoms, events, and plant conditions that identify emergency or off-normal situations that confront the operators and, once identified, to assure consistency with operator training.

B. NRC ACTIONS: NRC has taken action, and will take further action, to assure immediate improvement of selected emergency operating and some other operating procedures for operating reactors and near-term operating license applicants. Specific actions are being taken for near-term operations, and actions that will lead to new and better procedures will then be considered for the longer term. In the long term, symptoms-oriented approaches to abnormal and emergency procedures will be evaluated. This effort will be coordinated with control room, simulator, and training improvements. These actions will be integrated with new operating instruments for diagnostic purposes based on the assumption that adequately trained personnel can perform the specified actions. The need for coordination and training of plant personnel is recognized.

### 1. Short-term accident analysis and procedures revision.

a. Description: There is an ongoing three-phase program for improving the analysis of design basis and off-normal transients and accidents and the procedures for handling such transients and accidents (see NUREG-0578, Sec. 2.1.9)

(1) Small-break loss-of-coolant accidents (LOCAs). NRR sent letters of September 13 and 27, October 10 and 30, and November 9, 1979 referencing Section 2.1.9 of NUREG-0578 to licensees of operating plants, pending operating

license applicants, licensees of plants under construction, and applicants for construction permits. The staff required that analyses be performed and guidelines prepared to develop emergency operating instructions for handling small-break loss-of-coolant accidents. Appropriate retraining of operators was also required (see also Item I.A.2.1). Guidelines were prepared for each class of operating plants and were reviewed and approved by the NRR staff.

Detailed emergency operating procedures have been or are being prepared for each operating and near-term operating plant to implement the approved guidelines for handling small-break LOCAs. An NRC audit team (with NRR leading and IE participating) performed reviews of procedures for lead plants designed by each reactor manufacturer. Procedures for the remaining operating plants will be reviewed by IE. For each plant that is being reviewed for an operating license, NRR and IE will review the small-break LOCA emergency operating instructions.

(2) Inadequate core cooling. In letters of September 13 and 27, October 10 and 30, and November 9, 1979, NRR required operating licensees, pending operating license applicants, licensees of plants under construction, and applicants for construction permits to perform analysis including preparation of emergency procedure guidelines and to develop procedures and conduct training to assist the plant operating staff to (a) recognize and prevent impending core uncovering and (b) recover from a condition in which the core has experienced inadequate core cooling (see also Item I.A.2.1). An NRR team, with IE members, will review these procedures on an audit basis for lead operating plants. IE will review the procedures for the remaining operating plants.

(3) Transients and accidents. In letters of September 13 and 27, October 10 and 30, and November 9, 1979, NRR required licensees of operating plants, operating license applicants, licensees of plants under construction, and pending construction permit applicants to perform analyses of transients and accidents, prepare emergency procedure guidelines, upgrade emergency procedures, including procedures for operating with natural circulation conditions, and to conduct operator retraining (see also Item I.A.2.1). Emergency procedures are required to be consistent with the actions necessary to cope

with the transients and accidents analyzed. Through discussions with the owners' groups, NRR provided guidance for the performance of this task. NRR will review the responses, which are due in early 1980. In the course of review of these matters on B&W designed plants, the staff will followup on the Bulletin and Orders matters relating to analysis methods and results, as listed in Appendix C. See Table C.1, Items 3, 4, 16, 18, 24, 25, 26, 27; Table C.2, Items 4, 12, 17, 18, 19, 20; and Table C.3, Items 35, 37, 38, 39, 41, 42, 47, 55, 57.

(4) Confirmatory analyses of selected transients. In addition to the analyses performed by the reactor vendors, analyses of selected transients will be performed by NRR, using the best available computer codes, to provide the basis for comparisons with the analytical methods being used by the reactor vendors. These comparisons, together with comparisons to other data, will constitute the short-term verification effort to assure the adequacy of the analytical methods being used to generate emergency procedures. (See also Item II.E.2.2.) These analyses in the case of the B&W design will also be used to establish whether core-barrel check valves have been adequately modeled in the analysis by the vendor since the Three Mile Island accident.

b. Schedule.

(1) Guidelines for handling small-break LOCAs at operating reactors were reviewed and approved by NRR Bulletins and Orders Task Force in late 1979. Reviews of lead operating plants were performed as indicated in NUREG-0645. IE will conduct reviews of remaining operating plants by June 1, 1980. Reviews of operating license applicants will be consistent with operating license review schedules.

(2) Audits of lead operating plants will be completed in FY80. Reviews for the remaining operating plants will be conducted by IE by April 1, 1981. Reviews of operating licensee applicants will be consistent with operating license review schedules.

(3) Reviews of analyses of transients and accidents are to be initiated upon receipt of submittal from licensees and applicants in early 1980.

(4) Confirmatory analyses of selected transients are to be complete by June 1980.

c. Resources: NRR FY80 - 3.5 my and \$50,000, FY81 - 6.0 my; IE FY80 - 5.0 my, FY81 - 4.0 my; ADM FY80 - 0.1 my and \$17,000, FY81 - 0.1 my and \$17,000.

## 2. Shift and relief turnover procedures.

a. Description: Shift and relief turnover is required to ensure that each oncoming shift is aware of critical plant status information and system availability prior to assuming duty. To assure that these functions are adequately prescribed, NRR issued requirements in letters dated September 13 and 27, October 10 and 30, and November 9, 1979, to licensees and applicants to review and revise as necessary shift and relief turnover procedures. See also Table C.1, Item 5b, and Table C.3, Items 6 and 52.

b. Schedule: This work is complete except for IE confirming implementation.

c. Resources: IE FY80 - 0.1 my; NRR FY80 - 0.1 my.

## 3. Shift supervisor responsibilities.

a. Description: In letters of September 13 and 27, October 10 and 30, and November 9, 1979, NRC required licensees and applicants to review and revise as necessary plant procedures and directives to assure that the duties, responsibilities, and authority were properly defined to establish a definite line of command and clear delineation of the command decision authority of the supervisor in the control room relative to other plant management personnel. These letters also emphasized the primary management responsibility of the shift supervisor for safe operation of the plant. Training programs for shift supervisors were required to emphasize and reinforce the responsibility for

safe operation and management function of the shift supervisor to assure safe operation of the plant.

b. Schedule: This work is complete except for IE confirming implementation.

c. Resources: IE FY80 - 0.1 my; NRR FY80 - 0.1 my.

4. Control room access.

a. Description: Letters dated September 13 and 27, October 10 and 30, and November 9, 1979, were sent to all licensees and applicants requiring that the authority and responsibilities of the person in charge of control room access and clear lines of authority and responsibility in the control room in the event of an emergency be established in conformance to item 2.2.2.a of NUREG-0578.

b. Schedule: This work is complete except for IE confirming implementation.

c. Resources: IE FY80 - 0.1 my; NRR FY80 - 0.1 my.

5. Procedures for feedback of operating experience.

a. Description: NRR will require that licensee procedures be reviewed and revised as necessary to assure that important operating experience originating both within and outside the organization is continually provided to operators and other personnel and is incorporated into training and retraining programs. These procedures will assure that high-priority matters are dealt with promptly while keeping operating personnel from being deluged with paper or instructions on less important matters to the detriment of their overall proficiency. See also Table C.3, Item 52.

b. Schedule: The requirement will be issued by May 15, 1980. IE will audit implementation in normal course of routine inspections.

c. Resources: NRR FY80 - 0.3 my, FY81 - 0.1 my; IE FY80 - 0.2 my.

6. Procedures for verification of correct performance of operating activities.

a. Description: NRR will require that licensees procedures be reviewed and revised, as necessary, to assure that an effective system of verifying the correct performance of operating activities is provided as a means of reducing human errors and improving the quality of normal operations. This will reduce the frequency of occurrence of situations that could result in or contribute to accidents. Such a verification system may include automatic system status monitoring, human verification of operations and maintenance activities, independent of the people performing the activity (see NUREG-0585, Recommendation 5) or both.

Implementation of automatic status monitoring if required will reduce the extent of human verification of operations and maintenance activities but will not eliminate the need for such verification in all instances. The procedures adopted by the licensees may consist of two phases - one before and one after installation of automatic status monitoring equipment, if required, in accordance with Item I.D.3. See also Table C.1, Item 5.

b. Schedule: The requirement will be issued by July 1, 1980. IE will audit implementation in normal course of routine inspections.

c. Resources: NRR FY80 - 0.2 my; IE FY81 - 0.3 my.

7. NSSS vendor review of procedures.

a. Description: Applicants for near-term operating licenses will be required to obtain NSSS vendor review of low-power and power-ascension test and emergency procedures (see Regulatory Guide 1.33, Appendix A, Section 6) as a further verification of the adequacy of the procedures. After trial use of this requirement on a few pending operating license applications, the staff will decide whether its further use or expansion to include procedure review by the A-E is desirable. This decision will be made in light of the long-term program described in Item I.C.9. See also Table C.1, Item 4a and Table C.3, Item 50.

b. Schedule: The requirement will be issued by May 15, 1980. It will audit implementation in the normal course of routine inspections.

c. Resources: NRR FY80 - 0.1 my, FY81 - 0.1 my; IE FY80 - 0.1 my, FY81 - 0.2 my.

8. Pilot monitoring of selected emergency procedures for near-term operating license applicants.

a. Description: An interdisciplinary and interoffice NRC task force will audit emergency procedures received from near-term operating license applicants. They will look especially at the sections that discuss symptoms and immediate actions. This review will provide a sense of the adequacy of the emergency procedures. In conjunction with the procedure review, the task force will also review the training related to the symptoms of the postulated transients.

The task force will conduct an in-depth review of selected emergency procedures. The basic elements of the review will be the following: (1) select specific procedures for review (e.g., small-break LOCA, loss of feedwater, loss of alternating current and restart of engineered safety features that were reset prior to power loss, steam-line break, or steam-generator tube rupture); (2) meet with the vendor to discuss analyses and guidelines; (3) meet with the applicant to discuss procedure preparation; (4) observe a simulator walk-through of the selected procedures (with shift crew and shift technical advisor); (5) observe a plant walk-through for one of the emergency procedures (observe shift crew, shift technical advisor, technical support center operation, operational support center operation, etc.); and (6) make findings on preparedness for the accidents covered by the selected procedures. See also Table C.1, Item 4a and Table C.3, Item 49.

b. Schedule: This work will be completed on each pending operating license application prior to issuing a full-power license for that applicant. Consideration will be given in FY81 to the extension of this program to a few operating plants of different design to increase the experience base prior to conclusion of item I.C.9.



c. Resources: NRR FY80 - 3 my, FY81 - 2 my; IE FY80 - 1.3 my, FY81 - 5 my; ADM FY80 - 0.2 my and \$7,000.

9. Long-term program plan for upgrading of procedures.

a. Description: NRC will develop a long-term program plan that will integrate and expand on current efforts in the writing, reviewing, and monitoring of plant procedures. NRR will lead this effort and will receive significant support from IE, SD and RES. Studies to be considered in the plan will include how best to write plant procedures to assure that the wording of procedures is clear and concise; that the content of procedures reflects both engineering thinking and operating practicalities; and that the format of procedures is clear including clear diagnostic instructions for identifying the particular abnormal conditions confronting the operator. Studies will also address the proper interrelationships among administrative, operating, maintenance, test and surveillance procedures; and the depth and content of regulatory and licensee review and monitoring of procedures.

The scope of the plan will include the transient analyses that form the basis of many of the emergency procedures, reliability analysis, human factors engineering, crisis management, and operator training. Plant conditions in addition to those pertinent to the design basis will be considered, as well as administrative prohibitions to prevent improper operator actions during accident conditions that could cause serious threat to reactor safety. The plan will be coordinated with applicable industry groups. See also Table C.3, Item 49, 50, and 51.

b. Schedule: The plan will be developed by July 1981.

c. Resources: NRR FY80 - 0.5 my, FY81 - 2 my; IE FY80 - 0.5 my, FY81 - 1 my; SD FY81 - 0.5 my; RES FY80 - 0.1 my, FY81 - 0.3 my.

C. LICENSEE ACTIONS

1. Short-term accident analysis and procedures revision.

a. Description: The effort underway to improve design-basis and off-normal transient accident response and procedures has been coordinated through owner's groups and with individual licensee representatives. The three-phase effort is as follows:

(1) Small-break loss-of-coolant accidents (LOCAs). Licensees and applicants are required to perform small-break loss-of-coolant accident analyses, prepare emergency procedure guidelines, implement appropriate emergency procedures, and retrain operators.

(2) Inadequate core cooling. Licensees and applicants are required to perform analysis of inadequate core cooling, prepare emergency procedure guidelines, implement appropriate emergency procedures, and conduct retraining.

(3) Transients and accidents. Licensees and applicants are required to perform analysis of accidents and transients, prepare emergency procedure guidelines, implement appropriate procedures, and retrain operators.

b. Implementation.

(1) Operating reactors were required to complete small-break loss-of-coolant accident analysis, guideline preparations procedure revision, and retraining of operators by January 1, 1980. Operating license applicants must complete the work prior to fuel loading.

(2) Operating reactors were required to complete analyses, guideline preparation procedure revision, and retraining by January 1, 1980. Operating license applicants must complete the work prior to fuel loading.

(3) Analyses of transients and accidents are to be completed for operating reactors in early 1980. Implementation of emergency procedures and

retraining related to accidents and transients are to be completed for operating reactors 3 months after emergency procedure guidelines are established. Operating license applicants must complete the work on the same schedule as operating reactors or before operating licensed issuance, whichever is later.

c. Resources: FY80 - 4.6 my per plant, FY81 - 1.0 my per plant.

2. Shift and relief turnover procedures.

a. Description: Licensees are to revise plant procedures for shift and relief turnover to ensure that each oncoming shift is made aware of critical plant status information and system availability.

b. Implementation: Operating reactors were required to complete procedure revision by January 1, 1980. Operating license applicants are to complete this work prior to fuel loading.

c. Resources: 0.1 my per plant.

3. Shift supervisor responsibilities.

a. Description: Licensees are to revise plant procedures to assure that duties, responsibilities, and authority of the shift supervisor and control room operators are properly defined.

b. Implementation: Operating reactors were required to complete procedure revision by January 1, 1980. Operating license applicants are to complete this work prior to fuel loading.

c. Resources: 0.1 my per plant.

4. Control room access.

a. Description: Licensees are to revise procedures to assure that instructions covering the authority and responsibilities of the person in

charge of access and clear lines of authority and responsibility in the control room in the event of an emergency are established.

b. Implementation: Operating reactors were required to complete procedure revision by January 1, 1980. Operating license applicants are to complete this work prior to fuel loading.

c. Resources: 0.1 my per plant.

5. Procedures for feedback of operating experience to plant staff.

a. Description: Each licensee will review its administrative procedures to assure that operating experience from within and outside its organization is provided to operators and other operations personnel and is incorporated in training programs in accordance with NRC instructions.

b. Implementation: Operating reactors will complete by January 1, 1981. Operating license applicants will complete prior to fuel loading.

c. Resources: 0.5 my per plant.

6. Procedures for verification of correct performance of operating activities.

a. Description: Each licensee will review and revise procedures as necessary to assure that an effective system of verifying the correct performance of operating activities is in place. This action will be accomplished in two phases - one before and one after installation of automatic status monitoring equipment.

b. Implementation: Operating reactors are to complete the first phase by January 1, 1981 and the second phase six months after completion of installation of automatic status monitoring equipment, if required (see Item I.D.3). Operating license applicants are to complete these tasks on the same schedule as operating reactors or prior to fuel loading, whichever is later.

c. Resources: 0.5 my per reactor for procedure review and 3.0 my per reactor for implementation.

7. NSSS vendor review of procedures.

a. Description: Operating license applicants are required to obtain reactor vendor review of their low-power, power-ascension and emergency procedures as a further verification of the adequacy of the procedures.

b. Implementation: This requirement is not applicable to operating reactors. Applicants for near-term operating licenses must complete vendor review of emergency and power-ascension test procedures prior to full-power operation and low-power test procedures before fuel loading.

c. Resources: \$200,000 per plant (cost includes 2 my per plant engineering effort).

8. Pilot monitoring of selected emergency procedures for near-term operating license applicants.

a. Description: Licensees will be required to correct any deficiencies identified before full-power operation.

b. Implementation: See "Description" above.

c. Resources: \$50,000 per near-term operating license applicant.

9. Long-term plan for upgrading procedures.

a. Description: Significant industry efforts will be required in the area of plant procedures upgrading. This may be best accomplished through owner's group participation or through INPO and or NSAC. In either case, an industry study of the analytical bases for procedures, as well as studies of human engineering and crisis management, will be required. Studies of operator training and training improvements will also be required. In addition, NRC

will require industry cooperation in developing a pilot program to implement the upgraded procedures on a lead plant.

b. Implementation: This effort will parallel the NRC actions in this area and will be addressed in the NRC plan to be developed by July 1981.

c. Resources (industry total): Costs will be discussed in NRC plan.

D. OTHER ACTIONS: None.

E. REFERENCES

President's Commission Report: Items A.4.c(i), A.5, B.1.b, B.5, C.3.b, C.3.c, D.4, D.4a, D.7

Other: NUREG-0578, Recommendations 2.1.3b, 2.1.9, 2.2.1a, 2.2.1c, and 2.2.2a  
NUREG-0585, Recommendations 4, 5, and 6.2

NUREG-0616, Recommendation 2.2.4.1

NUREG/CR-1250, Vol. I, p. 146; Vol. II, Part 1, pp. 105, 185, Part 2, pp. 203, 205, 211, 388; Part 3, pp. 66, 67, 95. The page numbers given here for Vol. II are draft page numbers.

Letter from Chairman, ACRS, to Chairman, NRC, dated May 16, 1979,  
Subject: "Interim Report No. 3 on the Three Mile Island Nuclear Station, Unit 2"

Letter from Chairman, ACRS, to Chairman, NRC, dated August 14, 1979,  
Subject: "Studies to Improve Reactor Safety"

Letter from Chairman ACRS, to Chairman, NRC, dated December 13, 1979,  
Subject: "Report of TMI-2 Lessons Learned Task Force Final Report"

Letter from Chairman, ACRS, to Chairman, NRC, dated March 11, 1980,  
Subject: "ACRS Report on NTOL Items from Draft 3 of NUREG-0660, NRC Action Plans Developed as a Result of the TMI-2 Accident"

**ENCLOSURE 3**

**MEASURES TO MITIGATE SMALL BREAK  
LOSS-OF-COOLANT ACCIDENTS AND  
LOSS OF FEEDWATER ACCIDENTS**

**PART 1: Staff Requirements (30 Subparts)**

**II.K.3.1; 2; 3; 5; 9; 10; 12; 13; 14;  
15; 16; 17; 18; 19; 20; 21; 22; 24; 25;  
27; 28; 29; 30; 31; 32; 33; 45; 46; 47;  
58**

**PART 2: Copy of Section II.K to NRC Task Action Plan**

INSTALLATION AND TESTING OF AUTOMATIC PORV  
ISOLATION SYSTEM (II.K.3.1)

POSITION

- (a) All PWR licensees should provide a system which uses the PORV block valve to protect against a small break LOCA. This system will automatically cause the block valve to close when the reactor coolant system pressure decays after the PORV has opened, to relieve excess pressure. An override feature should be incorporated. Justification should be provided to assure that failure of this system would not decrease overall safety by intensifying plant transients and accidents.
- (b) Each licensee should perform a confirmatory test of the automatic block valve closure system installed in response to (a) above.

CLARIFICATION

Implementation of this action item has been modified in the forthcoming May 1980 version of NUREG-0660. The change delays implementation of this action item until after the studies specified in Action Item II.K.3.2 have been completed, if such studies confirm that the subject system is necessary.

DISCUSSION

NUREG-0565 (2.1.2.a)  
NUREG-0611 (3.2.4.e, 3.2.4.f)  
NUREG-0635 (3.2.4.a, 3.2.4.b)

SCHEDULE

Design - July 1, 1981  
Test - First refueling cycle

**ACTION: (Class III)**

- (1) Licensee to document proposed changes for staff approval prior to implementation. Documentation to be submitted by scheduled date.
- (2) Licensee to implement modifications and perform confirmatory test at the next refueling outage following staff approval of the design unless this outage is scheduled within six months of the approval date. In this event modifications will be completed during the following refueling outage.



PWR VENDOR REPORT ON PORV FAILURE  
REDUCTION (II.K.3.2)

POSITION

- (a) Each PWR vendor should submit a report for staff review documenting the various actions which have been taken to decrease the probability of a small break LOCA caused by a stuck-open PORV and show how they constitute sufficient improvements in reactor safety. This report should be submitted for staff review.
- (b) Safety valve failure rate based on past history of the vendor designed operating plants should be included in the report submitted in response to (a) above.

CLARIFICATION

In addition to modifications already implemented on PORVs, the report specified above should include consideration of the automatic PORV isolation system identified in Action Item II.K.3.1. This item is applicable to PWRs.

DISCUSSION

NUREG-0565 (2.1.2.d)  
NUREG-0611 (3.2.4.g, 3.2.4.i)  
NUREG-0635 (3.2.4.c)

SCHEDULE

January 1, 1981

ACTION: (Class I)

Licensee to provide the report to the staff by scheduled date.

REPORTING SAFETY AND RELIEF VALVE  
FAILURES AND CHALLENGES (II.K.3.3)

POSITION

- (a) Future failures of a relief valve to close should be reported promptly to the NRC.
- (b) Future challenges to the relief valves should be documented in the annual report.
- (c) Future failures of a safety valve to close should be reported promptly to the NRC.
- (d) Future challenges to the safety valves should be documented in the annual report.

CLARIFICATION

This action item is applicable to all LWRs. Safety valve failure rate based on historical data is addressed in Action Item II.K.3.2.

DISCUSSION

NUREG-0565 (2.1.2.c, 2.1.2.e)  
NUREG-0611 (3.2.4.h, 3.2.4.j)  
NUREG-0626 (F-2.5, F-3.5)  
NUREG-0635 (3.2.4.d)

SCHEDULE

April 1, 1980

ACTION: (Class I)

Licensee to provide annual report on SRV and RV failures and challenges as of April 1, 1980.

AUTOMATIC TRIP OF REACTOR COOLANT PUMPS  
DURING LOCA (II.K.3.5)

POSITION

Tripping of the reactor coolant pumps in case of a LOCA is not an ideal solution. The licensees should consider other solutions to the small break LOCA problem (for example, an increase in safety injection flow rate). In the meantime, until a better solution is found, the reactor coolant pumps should be tripped automatically in case of a small break LOCA. The signals designated to initiate the pump trip should be carefully selected in order to differentiate between a small break LOCA and other events which do not require reactor coolant pump trip as discussed in NUREG-0623.

CLARIFICATION

Application to PWRs only. This action item has been revised in the May 1980 version of NUREG-0660 to provide for continued study of criteria for early reactor coolant system pump trip. Implementation, if any is required, will be delayed accordingly.

DISCUSSION

NUREG-0565 (2.3.2.a)  
NUREG-0611 (3.2.2.a)  
NUREG-0635 (3.2.2.a)  
NUREG-0623 (7.3)

SCHEDULE

Study: January 1, 1981

Modify: January 1, 1982

ACTION: (Class I)

Licensee to provide results of evaluation of alternate solution to reactor coolant pump trips to staff by scheduled date.

PROPORTIONAL INTEGRAL DERIVATIVE (PID)  
CONTROLLER MODIFICATION (II.K.3.9)

POSITION

The Westinghouse-recommended modification to the Proportional Integral Derivative (PID) controller should be implemented by affected licensees.

CLARIFICATION

This action item is applicable only to Westinghouse-designed PWRs.

DISCUSSION

NUREG-0611 (3.2.4.a)

SCHEDULE

July 1, 1980

ACTION: (Class II)

Licensee to implement actions and submit documentation of the method for staff review by scheduled date.

## PROPOSED ANTICIPATORY TRIP MODIFICATION (II.K.3.10)

### POSITION

The anticipatory trip modification proposed by some licensees to confine the range of use to high power levels should not be made until it has been shown on a plant-by-plant basis that the small break LOCA probability resulting from a stuck-open power-operated relief valve (PORV) is little affected by the modification.

### CLARIFICATION

This action item is applicable only to Westinghouse-designed PWRs.

### DISCUSSION

NUREG-0611 (3.2.4.c)

### SCHEDULE

Plant by plant

### ACTION: (Class III)

- 1) Licensee to document proposed change for staff approval prior to implementation. Documentation to be submitted as proposed by the licensee.
- 2) Licensee to implement modifications at the next refueling outage following staff approval of the design unless this outage is scheduled within six months of the approval date. In this event modifications will be completed during the following refueling outage.

CONFIRM EXISTENCE OF ANTICIPATORY  
TRIP UPON TURBINE TRIP (II.K.3.12)

POSITION

Licensees with W-designed operating plants should confirm that their plants have an anticipatory reactor trip on turbine trip. The licensee of any plant where this trip is not present should provide a conceptual design and evaluation for the installation of this trip.

CLARIFICATION

This item is applicable to Westinghouse PWRs.

DISCUSSION

NUREG-0611 (3.2.4.a)

SCHEDULE

July 1, 1980

ACTION: (Class III)

- (1) Licensee to document proposed changes for staff approval prior to implementation. Documentation to be submitted by scheduled date.
- (2) Licensee to implement modifications at the next refueling outage following staff approval of the design unless this outage is scheduled within six months of the approval date. In this event modifications will be completed during the following refueling outage.

SEPARATION OF HPCI AND RCIC SYSTEM INITIATION LEVELS -  
ANALYSIS AND IMPLEMENTATION (II.K.3.13)

POSITION:

Currently, the reactor core isolation cooling (RCIC) system and the high pressure coolant injection (HPCI) system both initiate on the same low water level signal and both isolate on the same high water level signal. The HPCI system will restart on low water level but the RCIC system will not. The RCIC system is a low-flow system when compared to the HPCI system. The initiation levels of the HPCI and RCIC system should be separated so that the RCIC system initiates at a higher water level than the HPCI system. Further, the RCIC system initiation logic should be modified so that the RCIC system will restart on low water level. These changes have the potential to reduce the number of challenges to the HPCI system and could result in less stress on the vessel from cold water injection. Analyses should be performed to evaluate these changes. The analyses should be submitted to staff and changes should be implemented if justified by the analyses.

CLARIFICATION

This item is applicable to BWRs with RCIC and HPCI systems.

DISCUSSION

NUREG-0526, Section A-2.3

SCHEDULE

Analysis: October 1, 1980

Implementation: April 1, 1981

ACTION: (Class II)

- (1) Licensee to provide results of evaluation to staff by scheduled date.
- (2) If justified by analysis licensee to implement actions by scheduled dates and submit documentation of the method for staff review.

## ISOLATION OF ISOLATION CONDENSERS ON HIGH RADIATION (II.K.3.14)

### POSITION

Isolation condensers have radiation monitors on their vents. These monitors provide alarms in the control room but do not isolate the isolation condenser. The isolation condensers are currently isolated on a high radiation signal in the steam line leading to the isolation condensers. The design should be modified such that the isolation condensers are automatically isolated upon receipt of a high radiation signal at the vent rather than at the steam line. The purpose of the change is to increase the availability of the isolation condensers as heat sinks.

### CLARIFICATION

This item is applicable to BWRs which have isolation condensers.

### DISCUSSION

NUREG-0626, Section A-2.4

### SCHEDULE

January 1, 1981

### ACTION: (Class II)

- (1) Licensee to implement actions and submit documentation of the method for staff review by scheduled dates.



MODIFY BREAK DETECTION LOGIC TO PREVENT SPURIOUS ISOLATION  
OF HPCI AND RCIC SYSTEMS (II.K.3.15)

POSITION

The HPCI and RCIC systems use differential pressure sensors on elbow taps in the steam lines to their turbine drives to detect and isolate pipe breaks in the systems. The pipe break detection circuitry has resulted in spurious isolation of the HPCI and RCIC systems due to the pressure spike which accompanies startup of the systems. The pipe break detection circuitry should be modified so that pressure spikes resulting from HPCI and RCIC system initiation will not cause inadvertent system isolation.

CLARIFICATION

This item is applicable to BWRs with HPCI and RCIC systems.

DISCUSSION

NUREG-0626, Sections A-2.3, A-2.5, and F-2.3

SCHEDULE

January 1, 1981

ACTION : (Class II)

- (1) Licensee to implement actions and submit documentation of the method for staff review by scheduled dates.

## REDUCTION OF CHALLENGES AND FAILURES OF RELIEF VALVES - FEASIBILITY

### STUDY AND SYSTEM MODIFICATION - (II.K.3.16)

#### POSITION

The record of relief valve failures to close for all BWRs in the past three years of plant operation is approximately 30 in 73 reactor years (0.41 failures/reactor year). This has demonstrated that the failure of a relief valve to close would be the most likely cause of a small-break LOCA. The high failure rate is the result of a high relief valve challenge rate and a relatively high failure rate per challenge (0.16 failures/challenge). Typically, five valves are challenged in each event. This results in an equivalent failure rate per challenge of 0.03. The challenge and failure rates can be reduced in the following ways:

- (1) Additional anticipatory scram on loss of feedwater,
- (2) Revised relief valve actuation setpoints,
- (3) Increased emergency core cooling (ECC) flow,
- (4) Lower operating pressures,
- (5) Earlier initiation of ECC systems,
- (6) Heat removal through emergency condensers,
- (7) Offset valve setpoints to open fewer valves per challenge,
- (8) Installation of additional relief valves with a block or isolation valve feature to eliminate opening of the safety/relief valves (SRVs), consistent with the ASME Code,
- (9) Increasing the high steam line flow setpoint for main steam line isolation valve (MSIV) closure,
- (10) Lowering the pressure setpoint for MSIV closure,
- (11) Reducing the testing frequency of the MSIVs,
- (12) More stringent valve leakage criteria, and
- (13) Early removal of leaking valves.

An investigation of the feasibility and contraindications of reducing challenges to the relief valves by use of the aforementioned methods should be conducted. Other methods should also be included in the feasibility study. Those changes which are shown to reduce relief valve challenges without compromising the performance of the relief valves or other systems should be implemented. Challenges to the relief valves should be reduced substantially (by an order of magnitude).

REDUCTION OF CHALLENGES AND FAILURES OF RELIEF VALVES - FEASIBILITY

STUDY AND SYSTEM MODIFICATION - (II.K.3.16) - Continued

CLARIFICATION

This item is applicable to BWRs.

DISCUSSION

NUREG-0626, Sections A-2.8 and F-3.4

SCHEDULE

Feasibility Study - January 1, 1981

Proposed System Modification - January 1, 1982

Modification - Refueling

ACTION: (Class III)

- (1) Licensee to provide results of evaluation to staff by scheduled date.
- (2) Licensee to document proposed changes for staff approval prior to implementation. Documentation to be submitted by scheduled date.
- (3) Licensee to implement modifications at the next refueling outage following staff approval of the design unless this outage is scheduled within six months of the approval date. In this event modifications will be completed during the following refueling outage.

REPORT ON OUTAGE OF ECC SYSTEMS - LICENSEE REPORT AND PROPOSED

TECHNICAL SPECIFICATION CHANGES (II.K.3.17)

POSITION:

Several components of the ECC systems are permitted by Technical Specifications to have substantial outage times (e.g., 72 hours for one diesel-generator; 14 days for the HPCI system). In addition, there are no cumulative outage time limitations for ECC systems. Licensees should submit a report detailing outage dates and lengths of outages for all ECC systems for the last five years of operation. The report should also include the causes of the outages (e.g., controller failure, spurious isolation).

CLARIFICATION

This item is applicable to all LWRs.

DISCUSSION

NUREG-0626, Section F-3.5

SCHEDULE

January 1, 1981

ACTION: (Class I)

(1) Licensee to provide results of evaluation to staff by scheduled date.

## MODIFICATION OF ADS LOGIC - FEASIBILITY STUDY AND MODIFICATIONS

### FOR INCREASED DIVERSITY FOR SOME EVENT SEQUENCES (II.K.3.18)

#### POSITION:

The ADS actuation logic should be modified to eliminate the need for manual actuation to assure adequate core cooling. A feasibility and risk assessment study is required to determine the optimum approach. One possible scheme which should be considered is ADS actuation on low reactor vessel water level provided no HPCI or HPCS system flow exists and a low pressure ECC system is running. This logic would complement, not replace, the existing ADS actuation logic.

#### CLARIFICATION

This item is applicable to BWRs.

#### DISCUSSION:

NUREG-0626, Sections A-2.9 and F-2.3

#### SCHEDULE

Feasibility Study - January 1, 1981

Proposed Modifications - January 1, 1982

Modifications - Refueling

#### ACTION: (Class III)

- (1) Licensee to provide results of evaluation to staff by scheduled date.
- (2) Licensee to document proposed changes for staff approval prior to implementation. Documentation to be submitted by scheduled date.
- (3) Licensee to implement modifications at the next refueling outage following staff approval of the design unless this outage is scheduled within six months of the approval date. In this event modifications will be completed during the following refueling outage.

## INTERLOCK ON RECIRCULATION PUMP LOOPS (II.K.3.19)

### POSITION

Interlocks should be installed on non-jet pump plants (other than Humboldt Bay) to assure that at least two recirculation loops are open for recirculation flow for modes other than cold shutdown. This is to assure that the level measurements in the downcomer region are representative of the level in the core region.

### CLARIFICATION

This item is applicable to non-jet pump BWRs except Humboldt Bay.

### DISCUSSION

NUREG-0526, Section A-2.17

### SCHEDULE

January 1, 1981

### ACTION: (Class II)

- (1) Licensee to implement actions and submit documentation of the method for staff review by scheduled dates.

LOSS OF SERVICE WATER FOR BIG ROCK POINT (II.K.3.20)

POSITION

The service water system for Big Rock Point has only one cooling train and is powered from normal alternating current power. The Big Rock Point licensee should verify the acceptability of the consequences of a loss of service water supply to the essential plant components in the event of a loss of offsite power.

CLARIFICATION

This item is applicable only to Big Rock Point.

DISCUSSION

NUREG-0626, Section A-2.13

SCHEDULE

January 1, 1981

ACTION: (Class I)

(1) Licensee to provide results of evaluation to staff by scheduled date.

## RESTART OF CORE SPRAY AND LPCI SYSTEMS ON LOW LEVEL - DESIGN

### AND MODIFICATION (II.K.3.21)

#### POSITION

The core spray and LPCI system flow may be stopped by the operator. These systems will not restart automatically on loss of water level if an initiation signal is still present. The core spray and LPCI system logic should be modified so that these systems will restart if required to assure adequate core cooling. Because this design modification affects several core cooling modes under accident conditions, a preliminary design should be submitted for staff review and approval prior to making the actual modification.

#### CLARIFICATION

This item is applicable to BWRs.

#### DISCUSSION

NUREG-0626, Section A-2.7

#### SCHEDULE

Design - 1/1/81

Modifications - Refueling

#### ACTION: (Class III)

- (1) Licensee to document proposed changes for staff approval prior to implementation. Documentation to be submitted by scheduled date.
- (2) Licensee to implement modifications at the next refueling outage following staff approval of the design unless this outage is scheduled within six months of the approval date. In this event modifications will be completed during the following refueling outage.



## AUTOMATIC SWITCHOVER OF RCIC SYSTEM SUCTION - VERIFY PROCEDURES

### AND MODIFY DESIGN - (II.K.3.22)

#### POSITION

The RCIC system takes suction from the condensate storage tank with manual switchover to the suppression pool when the condensate storage tank level is low. This switchover should be made automatic. Until the automatic switchover is implemented, licensees should verify that clear and cogent procedures exist for the manual switchover of the RCIC system suction from the condensate storage tank to the suppression pool.

#### CLARIFICATION

This item is applicable to BWRs with RCIC system.

#### DISCUSSION

NUREG-0626, Section A-2.3

#### SCHEDULE

Verify procedures - January 1, 1981

Modify design - January 1, 1982

#### ACTION: (Class II)

- (1) Licensee to implement actions and submit documentation of the method for staff review by scheduled dates.

CONFIRM ADEQUACY OF SPACE COOLING FOR HPCI AND RCIC SYSTEMS - (II.K.3.24)

POSITION

Long-term operation of the RCIC and HPCI systems may require space cooling to maintain the pump room temperatures within allowable limits. The licensees should verify for each plant the acceptability of the consequences of a complete loss of alternating current power. The RCIC and HPCI systems should be designed to withstand a complete loss of alternating current power to their support systems, including coolers, for at least two hours.

CLARIFICATION

This item is applicable to BWRs with RCIC and HPCI systems.

DISCUSSION

NUREG-0626, Section A-2.13

SCHEDULE

January 1, 1982

ACTION: (Class II)

- (1) Licensee to implement actions and submit documentation of the method for staff review by scheduled dates.

EFFECT OF LOSS OF AC POWER ON PUMP SEALS (II.K.3.25)

POSITION

The licensees should determine by analysis or experiment, on a plant-specific basis, the consequences of a loss of cooling water to the reactor recirculation pump seal coolers. The pump seals should be designed to withstand a complete loss of alternating current power for at least two hours. Adequacy of the seal design should be demonstrated.

CLARIFICATION

This item is applicable to PWRs.

DISCUSSION

NUREG-0626, Section A-2.14

SCHEDULE

January 1, 1982

ACTION: (Class I)

Licensee to provide results of evaluation to staff by scheduled date.

PROVIDE COMMON REFERENCE LEVEL FOR VESSEL LEVEL INSTRUMENTATION

(II.K.3.27)

POSITION

Different reference points of the various reactor vessel water level instruments may cause operator confusion. Therefore, all level instruments should be referenced to the same point. Either the bottom of the vessel or the top of the active fuel are reasonable reference points.

CLARIFICATION

This item is applicable to BWRs.

DISCUSSION

NUREG-0626, Section A-2.17

SCHEDULE

October 1, 1980

ACTION: (Class II)

(1) Licensee to implement actions and submit documentation of the method for staff review by scheduled dates.

STUDY AND VERIFY QUALIFICATION OF ACCUMULATORS ON ADS VALVES

(II.K.3.28)

POSITION

Safety analysis reports claim that air or nitrogen accumulators for the ADS valves are provided with sufficient capacity to cycle the valves open five times at design pressures. GE has also stated that ECC systems are designed to withstand a hostile environment and still perform their function 100 days after an accident. Licensee should verify that the accumulators on the ADS valves meet these requirements, even considering normal leakage. If this cannot be demonstrated, show that the accumulator design is still acceptable.

CLARIFICATION

This item is applicable to BWRs.

DISCUSSION

NUREG-0626, Section A-2.15

SCHEDULE

January 1, 1982

ACTION: (Class II)

(1) Licensee to provide results of evaluation to staff by scheduled date.

STUDY TO DEMONSTRATE PERFORMANCE OF ISCLATION CONDENSERS

WITH NON-CONDENSIBLES (II.K.3.29)

POSITION

If natural circulation plays an important role in depressurizing the system (e.g., in the use of isolation condensers), then the various modes of two-phase flow natural circulation, including non-condensibles, which may play a significant role in plant response following a small-break LOCA should be demonstrated.

CLARIFICATION

This item is applicable to all LWRs.

DISCUSSION

NUREG-0626, Section F-4.5

SCHEDULE

April 1, 1981

ACTION: (Class I)

(1) Licensee to provide results of evaluation to staff by scheduled date.

REVISED SMALL-BREAK LOCA METHODS TO SHOW  
COMPLIANCE WITH 10 CFR 50, APPENDIX K (II.K.3.30)

POSITION

The analysis methods used by NSSS vendors and/or fuel suppliers for small break LOCA analysis for compliance with Appendix K to 10 CFR Part 50 should be revised, documented, and submitted for NRC approval. The revisions should account for comparisons with experimental data, including data from the LOFT and Semiscale facilities.

CLARIFICATION

Clarifying information regarding the implementation of this action item will be provided in the forthcoming Draft 4 of NUREG-0560. This item is applicable to LWRs.

DISCUSSION

NUREG-0565 (2.2.2.a)  
NUREG-0611 (3.2.1.a)  
NUREG-0526 (F-4.0)  
NUREG-0535 (3.2.1.a, 3.2.5.a)

SCHEDULE

January 1, 1982

ACTION: (Class I)

(1) Licensee to submit analysis model for staff approval by scheduled date.

PLANT SPECIFIC CALCULATIONS TO SHOW  
COMPLIANCE WITH 10 CFR 50.46 (II.K.3.31)

POSITION

Plant-specific calculations using NRC-approved models for small break LOCAs as described in II.K.3.31 above, to show compliance with 10 CFR 50.46 should be submitted for NRC approval by all licensees.

CLARIFICATION

Clarifying information regarding the implementation of this action item will be provided in the forthcoming Draft 4 of NUREG-0660. This item is applicable to LWRs.

DISCUSSION

NUREG-0565 (2.2.2.b)  
NUREG-0611 (3.2.1.b)  
NUREG-0626 (F-4.0)  
NUREG-0635 (3.2.1.b)

SCHEDULE

January 1, 1983 or one year after staff approval of LOCA analysis model.

ACTION: (Class I)

- (1) Licensee to provide results of evaluation to staff in accordance with the schedule as indicated above.



EVALUATION OF ANTICIPATED TRANSIENTS WITH SINGLE FAILURE

TO VERIFY NO FUEL FAILURE (11.K.3.44)

POSITION

For anticipated transients combined with the worst single failure and assuming proper operator actions, licensees should demonstrate that the core remains covered or provide analysis to show that no significant fuel damage results from core uncover. Transients which result in a stuck-open relief valve should be included in this category.

CLARIFICATION

This item is applicable to LWRs.

DISCUSSION

NUREG-0626, Section F-4.3

SCHEDULE

1/1/81

ACTION: (Class I)

(1) Licensee to provide results of evaluation to staff by scheduled date.

EVALUATION OF DEPRESSURIZATION WITH OTHER THAN ADS (II.K.3.45)

POSITION

Analyses to support depressurization modes other than full actuation of the ADS (e.g., early blowdown with one or two SRVs) should be provided. Slower depressurization would reduce the possibility of exceeding vessel integrity limits by rapid cooldown.

CLARIFICATION

This item is applicable to BWRs.

DISCUSSION

NUREG-0626, Section F-4.3

SCHEDULE

1/1/81

ACTION: (Class I)

(1) Licensee to provide results of evaluation to staff by scheduled date.

RESPONSE TO LIST OF CONCERNS FROM ACRS CONSULTANT (II.K.3.46)

POSITION

GE should provide a response to the Michelson concerns as they relate to BWRs.

CLARIFICATION

GE provided a response to the Michelson concerns as they relate to BWRs by letter dated February 21, 1980. Licensees should assess applicability and adequacy of this response to their plants. This item is applicable to BWRs.

DISCUSSION

NUREG-0626, Section F-4.6

SCHEDULE

7/1/80

ACTION: (Class I)

(1) Licensee to provide results of evaluation to staff by scheduled date.

IDENTIFY WATER SOURCES PRIOR TO MANUAL ACTIVATION OF ADS (II.K.3.57)

POSITION:

Emergency procedures should include verification that a source of cooling water, such as the core spray, LPCI, or condensate systems, is available prior to manual actuation of the automatic depressurization system (ADS). Alternate water sources should be identified in the procedures and reference should be made to procedures for start-up and operation of systems that provide these sources. This is being implemented through the guidelines being developed to assure adequate core cooling.

CLARIFICATION

This item is applicable to BWRs.

DISCUSSION:

NUREG-0626, Section A-2.9

SCHEDULE

10/1/80

ACTION: (Class I)

- (1) Licensee should verify by the scheduled date that Emergency Procedures have been appropriately revised.

The following pages are from the May 1980 version of the TMI Action Plan, Section II.K. This section is provided for background information only and note that the subject being discussed with respect to our positions on the II.K.3 matters is a subpart. Appendix C to 0660 is included.

**TASK II.K MEASURES TO MITIGATE SMALL-BREAK LOSS-OF-COOLANT ACCIDENTS AND  
LOSS OF FEEDWATER ACCIDENTS**

A. OBJECTIVE: To perform systems reliability analyses and to effect changes in emergency operating procedures and operator training to improve the capability of plants to mitigate the consequences of the small-break loss-of-coolant accidents (LOCA) and loss-of-feedwater events.

B. NRC ACTIONS

1. IE Bulletins.

a. Description: Between April 1, 1979 and July 26, 1979 the Office of Inspection and Enforcement (IE) issued nine bulletins to various operating plant licensees, depending on the design of the reactor, and reviews of licensee responses were conducted by the NRR Bulletins and Orders Task Force. The responses were determined to be acceptable, and separate evaluation reports have been prepared and issued to some licensees. The effort to complete these reports for all operating plant licensees is continuing.

NRR will require all operating license applicants to evaluate their plants against the requirements specified in applicable IE Bulletins and not otherwise addressed in this Action Plan, and to take corrective actions as necessary prior to fuel loading. Ultimately, these requirements will be codified by NRR and SD, as appropriate, and required of all plants as preconditions for receipt of an operating license.

A comparison of the composite requirements from the nine bulletins with the action items in this plan is provided in Appendix C. The Bulletin requirements not covered by action items are listed below:

(1) Review all safety-related valve positions and positioning requirements and positive controls, as well as all related test and maintenance procedures, to assure proper ESF functioning, if required (see Appendix C, Table C.1, Item 5).

(2) Review and modify (as required) procedures for removing safety-related systems from service (and restoring them to service) to assure that operability status is known (see Appendix C, Table C.1, Item 10).

(3) Provide a trip for the pressurizer low-level bistable so that the pressurizer low-pressure signal alone (rather than the low-level/low-pressure coincidence) will trip the reactor. For testing, provide for resetting the pressurizer low-level bistable (see Appendix C, Table C.1, Item 17).

(4) Provide procedures and training to operators for prompt manual reactor trip for LOFW, TT, MSIV Closure, LOOP, LOSG level, and PZR Low Level (see Appendix C, Table C.1, Item 20).

(5) Provide automatic safety-grade anticipatory reactor trip for LOFW, TT, or significant decrease in SG level (see Appendix C, Table C.1, Item 21).

(6) Describe automatic and manual actions for proper functioning of auxiliary heat removal systems when main feedwater system is not operable (see Appendix C, Table C.1, Item 22).

(7) Describe uses and types of RV level indication for automatic and manual initiation of safety systems. Also describe alternative instrumentation and methods (see Appendix C, Table C.1, Item 23).

b. Schedule: NRR will complete the Bulletin evaluation reports for operating plants by March 31, 1980. NRR will issue requirements to all pending operating license applicants and all plants under construction by July 1, 1980.

c. Resources: NRR FY80 - 1.0 my, FY81 - 0.8 my.

## 2. Commission Orders on Babcock and Wilcox plants.

a. Description: In April 1979, a task group was established in NRR to perform a generic assessment of feedwater transients in B&W-designed operating plants in light of the accident at TMI-2. The study concluded that the staff

did not have reasonable assurance that the B&W plants could continue to operate without undue risk to the health and safety of the public and that the plants should be shut down until certain actions were completed to the satisfaction of the staff. The B&W licensees committed to perform these actions and confirmatory Orders were issued to formalize the agreements reached with the licensees.

The Orders included both short-term and long-term actions. The NRR Bulletins and Orders Task Force reviewed the licensee responses to the short-term actions in the Orders and issued safety evaluation reports lifting the Orders in the period between May 18, 1979, and July 6, 1979. (These are Items 1 through 12 in Appendix C, Table C.2.) Additional items were identified in the review that required further work by the licensees. These items are numbered 13 through 21 in Appendix C, Table C.2; all 21 items are to be implemented by operating B&W reactors. However, because some were suspended by actions elsewhere in this plan, only seven of these actions apply to operating license applicants with B&W reactors (see Table C.2, Appendix C). License applicants with B&W plants will be required by NRR to demonstrate conformance with these seven requirements prior to operating license issuance.

b. Schedule: NRR will complete the evaluation of operating plant licensee implementation of residual actions originating from short-term actions and the implementation of long-term actions of the confirmatory Orders by January 1, 1981. NRR will issue these seven unique requirements, described above, to B&W designed plants now under construction by July 1, 1980.

c. Resources: NRR FY80 - 1.5 my, FY81 - 2 my; IE FY80 - 0.5 my, FY81 - 0.5 my.

### 3. Final recommendations of B&O Task Force.

a. Description: The Bulletins and Orders Task Force has conducted generic reviews of the loss-of-feedwater (LOFW) and small-break loss-of-coolant events on operating PWRs designed by B&W, Westinghouse (W), and Combustion Engineering (CE), and on operating BWRs. These reviews consisted of



an evaluation of systems reliability analyses, guidelines for emergency procedures, and operator training related to these events. From these reviews, a number of recommendations for improvements were developed and issued in reports NUREG-0565 (B&W), NUREG-0611 (W), NUREG-0626 (GE), NUREG-0635 (CE), and NUREG-0623.

Upon approval of these recommendations (shown in Table C.3, Appendix C), NRR will notify licensees of the actions to be taken with respect to system modifications, additional analyses, improved emergency procedures, and improved operator training related to the loss of feedwater and small-break LOCA events. The ACRS will advise NRR in early 1980, after which NRR will review and evaluate licensee commitments and/or actions required.

On a case-by-case basis, NRR will propose the schedule on which these generic requirements must be met by near-term operating license applicants during calendar year 1980 (i.e., before fuel loading, before full-power operation, or later). Ultimately, these generic requirements will be codified by NRR and SD and will be applied to all plants as preconditions for receipt of an operating license.

b. Schedule: NRR will issue requirements to operating plant licensees in early 1980 and will review the responses on a schedule to be completed in 1983. Near-term operating license applicants are being advised of the specific requirements in this area on a case-by-case basis.

c. Resources: NRR FY80 - 7.7 my, FY81 - 11.2 my, FY82 - 4.5 my, FY83 - 4.0 my.

## C. LICENSEE ACTIONS

### 1. IE bulletins.

a. Description: All applicants must respond to the NRC requirements to be issued) and describe how the actions required by the IE Bulletins are to be implemented.

b. Implementation: Near-term operating license applicants will be required to implement the requirements prior to fuel loading.

c. Resources: 0.2 my per application.

2. Commission Orders on Babcock and Wilcox plants.

a. Description: Licensees must complete residual actions originating from short-term actions in the confirmatory Orders and long-term actions in the confirmatory Orders. All applicants must respond to the NRC requirements (to be issued) and describe how the actions required by the confirmatory Orders are (or will be) implemented.

b. Implementation: B&W operating reactors must complete actions by January 1, 1981. Operating license applicants must complete actions on the schedules specified in Table C.2 of Appendix C.

c. Resources: 1 my per plant.

3. Final recommendations of B&O Task Force.

a. Description: Licensees must complete actions originating from the generic reviews of the small-break loss-of-coolant accident and loss of feed-water events by the dates set forth in NRC requirements (to be issued). All applicants for plants and designs must resolve all applicable actions specified in NRC requirements (to be issued) and describe how the required actions are (or will be) implemented.

b. Implementation: Operating reactors must complete actions by January 1, 1981. Operating license applicants must complete actions on the schedules specified in Table C.3 of Appendix C.

c. Resources: 2 my per plant.

D. OTHER ACTIONS: None.

E. REFERENCES

President's Commission Report: D.4.a

Other: NUREG-0565, NUREG-0611, NUREG-0626, NUREG-0635, and NUREG-0645.

NUREG/CR-1250, Vol. II, Part 2, pp. 187, 193, 197, 205, 211. The page numbers given here for Vol. II are draft page numbers.

Inspection and Enforcement Bulletins 79-05, 79-05A, 79-05B, 79-05C, 79-06, 79-06A, 79-06A (Revision 1), 79-06B, 79-06C, and 79-08.

Commission Orders to Duke Power Company dated 5/07/79, Sacramento Municipal Utility District dated 5/07/79, Florida Power Corporation dated 5/16/79, Toledo Edison Company dated 5/16/79, and Arkansas Power & Light Company dated 5/17/79.

Letters lifting Orders to Duke Power Company dated 5/18/79, Arkansas Power & Light Company dated 5/31/79, Sacramento Municipal Utility District dated 6/27/79, Florida Power Corporation, dated 7/06/79, and Toledo Edison Company dated 7/06/79.

Letter from Chairman, ACRS, to Chairman, NRC, dated March 11, 1980, Subject: "ACRS Report on NTOL Items from Draft 3 of NUREG-0660, NRC Action Plans Developed as a Result of the TMI-2 Accident"

**APPENDIX C**

**RECOMMENDATIONS AND REQUIREMENTS BASED ON  
IE BULLETINS AND ORDERS AND COMMISSION ORDERS**

TABLE C.1 OFFICE OF INSPECTION AND ENFORCEMENT BULLETINS

Requirement	Source for Operating Reactors	Applicability	Operating Reactor Implementation	Operating License Implementation
1. Review TMI-2 PNs and detailed chronology of the TMI-2 accident.	79-05&05A (Item 1) 79-06&06A (Item 1) 79-06&06B (Item 1) 79-08 (Item 1)	BWR and PWR	3/31/80	I.A.2.2 I.A.3.1
2. Review transients similar to TMI-2 that have occurred at other facilities and NRC evaluation of Davis-Besse transient.	79-05&05A (Item 2)	B&W	3/31/80	I.A.2.2 I.A.3.1
3. Review operating procedures for recognizing, preventing, and mitigating void formation in transients and accidents.	79-05&05A (Item 3) 79-06&06A (Item 2) 79-06&06B (Item 2)	PWR	3/31/80	I.C.1
4. Review operating procedures and training instructions to ensure that:	79-05&05A (Item 4.a) 79-05B (Item 2) 79-06A (Item 7.a) 79-06B (Item 6.a) 79-08 (Item 5.a)	PWR and BWR	3/31/80	I.C.1 I.C.7 I.G.1 I.C.8
a. Operators to not override ESF actions unless continued operation is unsafe;				
b. HPI system operation	NUREG-0645 (App. G) NUREG-0565 (Rec. 104) 69-110 6002-00 (11/1/79) 69-110 6003-00 (11/20/79) 69-110 6001-00 (11/1/79)	W, CE B&W  ANO-1  Davis-Besse 1  Oconee 1, 2 & 3 Crystal River 3 Rancho Seco 1	3/31/80	I.C.1

TABLE C.1 (continued)

Requirement	Source for Operating Reactors	Applicability	Operating Reactor Implementation	Operating License Implementation
c. RCP operation	NUREG-0623	PWR	Complete	I.C.1 I.A.1.3
d. Operators are instructed not to rely on level indication alone in evaluating plant conditions.	79-05A (Item 4.d) 79-06A (Item 7.d) 79-06B (Item 6.d) 79-08 (Item 5.b)	PWR and BWR	Complete	I.C.1 I.A.3.1 II.F.2
5. Safety-related valve position.	79-05&05A (Item 5)	PWR and BWR	3/31/80	NTOL: Same as ORs, before FL OL: I.C.2 & I.C.6
a. Review all valve positions and positioning requirements and positive controls and all related test and maintenance procedures to assure proper ESF functioning, if required.	79-06A (Item 8) 79-06B (Item 7) 79-008 (Item 6)			
b. Verify that AFW valves are in open position. See Requirement 8 below.	79-05A (Item 5)	B&W	3/31/80	I.C.2 I.C.6
6. Review containment isolation initiation design and procedures. Assure isolation of all lines that do not degrade safety features or cooling capability upon automatic initiation of SI.	79/05A (Item 6) 79-06A (Item 4) 79-06B (Item 3) 79-08 (Item 2)	PWR and BWR	3/31/80	II.E.4.2
7. Implement positive position controls on valves that could compromise or defeat AFW flow.	79-05A (Item 7)	B&W	3/31/80	II.E.1.1

TABLE C.1 (continued)

Requirement	Source for Operating Reactors	Applicability	Operating Reactor Implementation	Operating License Implementation
8. Immediately implement procedures that assure two independent 100% AFW flow paths, or specify explicitly LCO with reduced AFW capacity.	79-05A (Item 8)	B&W	3/31/80	II.E.1.1
9. Review procedures to assure that radioactive liquids and gases are not transferred out of containment inadvertently especially upon ESF reset). List all applicable systems and interlocks.	79-05A (Item 9) 79-06A (Item 9) 79-06B (Item 8) 79-08 (Item 7)	PWR and BWR	3/31/80	II.E.4.2
10. Review and modify (as required) procedures for removing safety-related systems from service (and restoring to service) to assure operability status is known.	79-05A (Item 10) 79-06A (Item 10) 79-06B (Item 9) 79-08 (Item 8)	PWR and BWR	3/31/80	NTOL: Same as ORs & I.C.2, before FL OL: I.C.2 & I.C.6
11. Make all operating and maintenance personnel aware of the seriousness and consequences of the erroneous actions taken leading up to, and in early phases of, the TMI-2 accident.	79-05A (Item 11) 79-06A (Item 1.a) 79-06B (Item 1.a) 79-08 (Item 1.a)	PWR and BWR	3/31/80	I.A.3.1 I.A.2.2
12. One hour notification requirement, and continuous communications channel.	79-05B (Item 6) 79-06A (Item 11) 79-06B (Item 10) 79-08 (Item 9)	PWR and BWR	Complete	I.E.6 III.A.3.3

TABLE C.1 (continued)

Requirement	Source for Operating Reactors	Applicability	Operating Reactor Implementation	Operating License Implementation
13. Propose Technical Specification changes reflecting implementation of all Bulletin items, as required.	79-05B (Item 7) 79-06A & Rev. 1 (Item 13) 79-06B (Item 12) 79-08 (Item 11)	PWR and BWR	1/1/81	Normal work on all new OLS
14. Review operating modes and procedures to deal with significant amounts of hydrogen.	79-06A (Item 12) 79-06B (Item 11) 79-08 (Item 11)	W, CE GE	3/31/80	II.B.4 II.B.7 II.E.4.1 II.F.1
15. For facilities with non-automatic AFW initiation, provide dedicated operator in continuous communication with CR to operate AFW.	79-06A (Item 5) 79-06B (Item 4)	W & CE	Complete	II.E.1.2
16. Implement (immediately) procedures that identify PRZ PORV "Open" indications and that direct operator to close manually at "RESET" setpoint.	79-06A (Item 6) 79-06B (Item 5)	W & CE	Complete	I.C.1 II.D.3
17. Trip PZR Level Bistable so that PZR Lo Press. (rather than PZR Lo Press. and PZR Lo Level coincidence) will initiate safety injection. For test, reset Lo Level bistable.	79-06A & Rev. 1 (Item 3)	W	Complete	Same as ORs, before FL
18. Develop procedures and train operators on methods of establishing and maintaining natural circulation.	79-05B (Item 1)	B&W	Complete	I.C.1 I.G.1



TABLE C.1 (continued)

Requirement	Source for Operating Reactors	Applicability	Operating Reactor Implementation	Operating License Implementation
19. Describe design and procedure modifications (based on analysis) to reduce likelihood of automatic PZR PORV actuation in transients.	79-05B (Item J)	B&W	3/31/80	II.E.5
20. Provide procedures and training to operators for prompt manual reactor trip for LOFW, TT, MSIV closure, LOOP, LOSG Level, & Lo PZR Level.	79-05B (Item 4)	B&W	3/31/80	Same as ORs, before FL
21. Provide automatic safety-grade anticipatory reactor trip for LOFW, TT, or significant decrease in SG level.	79-05B (Item 5)	B&W	3/31/80	Same as ORs, before FL
22. Describe automatic and manual actions for proper functioning of auxiliary heat removal systems when FW system not operable.	79-08 (Item 3)	BWR	3/31/80	Same as ORs, before FL
23. Describe uses and types of RV level indication for automatic and manual initiation safety systems. Also, describe alternative instrumentation.	79-08 (Item 4)	BWR	3/31/80	Same as ORs and II.F.2, before FL
24. Perform LOCA analyses for a range of small-break sizes and a range of time lapses between reactor trip and RCP trip.	79-05C (short-term Item 2) 79-06C (short-term Item 2)	PWR	Complete	I.C.1

TABLE C.1 (continued)

Requirement	Source for Operating Reactors	Applicability	Operating Reactor Implementation	Operating License Implementation
25. Develop operator action guidelines (based on analyses in Requirement 24 above).	79-05C (short-term Item 3) 79-06C (short-term Item 3)	PWR	Complete	I.C.1
26. Revise emergency procedures and train RO's and SRO's based on guidelines developed in Requirement 25 above.	79-05C (short-term Item 4) 79-06C (short-term Item 4)	PWR	Complete	I.C.1 I.A.3.1 I.G.1
27. Provide analyses and develop guidelines and procedures for inadequate core cooling conditions. Also, define RCP restart criteria.	79-05C (short-term Item 5) 79-06C (short-term Item 5)	PWR	Complete	I.C.1 II.F.2
28. Provide design that will assure automatic RCP trip for all circumstances where required.	NUREG-0623	PWR	1/1/81	See Table C.3, item 5

TABLE C.2 REQUIREMENTS FOR NEW B&W PLANTS DERIVED FROM COMMISSION ORDERS ON OPERATING B&W PLANTS

Requirement	Source	Applicability	Operating Reactor Implementation	Operating License Implementation
1. Upgrade timeliness and reliability of AFW system.	Commission Order	B&W	Complete	II.E.1
2. Procedures and training to initiate and control AFW independent of integrated control system.	Commission Order	B&W	Complete	II.K.2
3. Hard-wired control-grade anticipatory reactor trips.	Commission Order	B&W	Complete	None-see Requirement 10 below
4. Small-break LOCA analysis, procedures, and operator training.	Commission Order	B&W	Complete	I.A.3.1 I.C.1
5. Complete TMI-2 simulator training for all operators.	Commission Order	B&W	Complete	I.A.2.6
6. Reevaluate analysis for dual-level setpoint control.	Commission Order	Davis-Besse 1	Complete	NA
7. Reevaluate transient of September 24, 1977.	Commission Order	Davis-Besse 1	Complete	NA
8. Continued upgrading of AFW system.	Commission Order	B&W	1/1/81	II.E.1

TABLE C.2 (continued)

Requirement	Source	Applicability	Operating Reactor Implementation	Operating License Implementation
9. Analysis and upgrading of integrated control system.	Commission Order	B&W	1/1/81	Same as ORs, before OL
10. Hard-wired safety-grade anticipatory reactor trips.	Commission Order	B&W	1/1/81	Same as ORs, before OL
11. Operator training and drilling.	Commission Order	B&W	1/1/81	I.A.3.1 I.A.2.2 I.A.2.5 I.G.1
12. Transient analysis and procedures for management of small breaks.	Commission Order	B&W	I.C.1	I.C.1
13. Thermal-mechanical report -- effect of HPI on vessel integrity for small-break LOCA with no AFW.	Letter, D. Ross to B&W operating plants, 8/21/79	B&W	1/1/81	Same as ORs, before OL
14. Demonstrate that predicted lift frequency of PORVs and SVs is acceptable.	Letter, D. Ross to B&W operating plants, 8/21/79	B&W	1/1/81	Same as ORs, before OL
15. Analysis of effects of slug flow on once-through steam generator tubes after primary system voiding.	Letter, D. Ross to B&W operating-plants, 8/21/79	B&W	6/1/80	Same as ORs, before OL

TABLE C.2 (continued)

Requirement	Source	Applicability	Operating Reactor Implementation	Operating License Implementation
16. Impact of RCP seal damage following small-break LOCA with loss of offsite power.	Letter, D. Ross to B&W operating plants, 8/21/79	B&W	6/1/80	Same as ORs, before OL
17. Analysis of potential voiding in RCS during anticipated transients.	Letter, R. Reid to all B&W operating plants 1/9/80	All B&W	1/1/81	I.C.1
18. Analysis of loss of feedwater and other anticipated transients.	Letter, D. Ross to B&W operating plants, 8/21/79	All B&W	I.C.1	I.C.1
19. Benchmark analysis of sequential AFW flow to once-through steam generator.	Letter, D. Ross to B&W operating plants, 8/21/79	All B&W	1/1/81	I.C.1
20. Analysis of system response to small-break LOCA that causes system pressure to exceed PORV setpoint.	Letter, D. Ross to B&W operating plants 8/21/79	All B&W	1/1/81	I.C.1
21. LOFT 3-1 predictions.	Letter, D. Ross to B&W operating plants, 8/21/79	All B&W	Complete	None

TABLE C.3 FINAL RECOMMENDATIONS OF BULLETINS AND ORDERS TASK FORCE

Requirement	Source	Applicability	Operating Reactor Implementation	Operating License Implementation	Near-Term Operating License Requirements
1. Install automatic PORV isolation system and perform operational test.	NUREG-0565(2.1.2.a) NUREG-0611(3.2.4.e 3.2.4.f) NUREG-0635(3.2.4.a (3.2.4.b)	PWR	7/1/81 and first refueling and depending on results of item 2, below.	Same as OR	NA
2. Report on overall safety effect of PORV isolation system.	NUREG-0565 (2.1.2.d) NUREG-0611(3.2.4.g, 3.2.4.i) NUREG-0635(3.2.4.c)	PWRs	1/1/81	Same as OR	NA
3. Report safety and relief valve failures promptly and challenges annually.	NUREG-0565(2.1.2.c, 2.1.2.e) NUREG-0611(3.2.4.h, 3.2.4.j) NUREG-0626(B.14) NUREG-0635(3.2.4.d)	All	4/1/80	Same as OR	FP
4. Review and upgrade reliability and redundancy of non-safety equipment for small-break LOCA mitigation.	NUREG-0565(2.3.2.b) NUREG-0611(3.2.2.b) NUREG-0626 (B.12, NUREG-0635(3.2.2.b)	All	None	II.C.1 II.C.2 II.C.3	NA
5. Continue to study need for C.1.4.c and need for automatic trip of RCPs, then modify procedures or designs as appropriate.	NUREG-0565(2.3.2.a) NUREG-0611(3.2.2.a) NUREG-0635(3.2.2.a) NUREG-0623	PWR	Study - 1/1/81 Modify - 1/1/82	Same as OR	NA

TABLE C.3 (continued)

Requirement	Source	Applicability	Operating Reactor Implementation	Operating License Implementation	Near-Term Operating License Requirements
6. Instrumentation to verify natural circulation.	NUREG-0565(2.6.2.b) NUREG-0611(3.2.3.b) NUREG-0635(3.2.3.b)	PWR	I.C.1 II.F.2 II.F.3	I.C.1 II.F.2 II.F.3	NA
7. Evaluation of PORV opening probability during overpressure transient.	NUREG-0565(2.1.2.b)	B&W	See Table C.2, item 14	See Table C.2, item 14	NA
8. Further staff consideration of need for diverse decay heat removal method independent of SG's	NUREG-0565(2.5.2.a) NUREG-0635 (4.2.5., App. VIII) NUREG-0611 (4.2.5., App. VIII)	PWR	II.C.1  II.E.3.3	II.C.1  II.E.3.3	NA
9. Pressure Integral Derivative controller modification.	NUREG-0611(3.2.4.b)	W	7/1/80	Same as OR	FL
10. Anticipatory trip modification proposed by some licensees to confine range of use to high power levels.	NUREG-0611(3.2.4.c)	W	Plant by plant	Same as OR	FL
11. Control use of PORV supplied by Control Components Inc. until further review complete.	NUREG-0611(3.2.4.d)	All	Case by case	Same as OR	FL
12. Confirm existence of anticipatory trip upon turbine trip.	NUREG-0611(3.2.4.a)	W	7/1/80	Same as OR	FL

TABLE C.3 (continued)

Requirement	Source	Applicability	Operating Reactor Implementation	Operating License Implementation	Near-Term Operating License Requirements
13. Separation of HPCI and RCIC system initiation levels. Analysis and implementation.	NUREG-0626(A.1)	GE	Analyses - 10/1/80 Implement - 4/1/81	Same as OR	NA
14. Isolation of isolation condensers on high radiation.	NUREG-0626(A.2)	GE plants with isolation condenser	1/1/81	NA	NA
15. Modify break detection logic to prevent spurious isolation of HPCI and RCIC systems.	NUREG-0626(A.3)	GE	1/1/81	Same as OR	NA
16. Reduction of challenges and failures of relief valves - feasibility study and system modification.	NUREG-0626(A.4)	GE	Study - 1/1/81 Modify - 1/1/82	Same as OR	NA
17. Report on outage of ECC systems - licensee report and proposed technical specification changes.	NUREG-0626(A.6)	GE	1/1/81	Same as OR	NA
18. Modification of ADS logic - feasibility study and modification for increased diversity for some event sequences.	NUREG-0626(A.7)	GE	Study - 1/1/81 Modify - 1/1/82	Same as OR	NA



TABLE C.3 (continued)

Requirement	Source	Applicability	Operating Reactor Implementation	Operating License Implementation	Near-Term Operating License Requirements
19. Interlock on recirculation pump loops.	NUREG-0626(A.8)	GE Non-Jet Pump ORs	1/1/81	NA	NA
20. Loss of service water for Big Rock Point.	NUREG-0626(A.9)	Big Rock Point	1/1/81	NA	NA
21. Restart of core spray and LPCI systems on low level - design and modification.	NUREG-0626(A.10)	GE	Design - 1/1/81 Modify - 1/1/82	Same as OR	NA
22. Automatic switchover of RCIC system suction - verify procedures and modify design.	NUREG-0626(B.1)	GE	Verify - 1/1/81 Modify - 1/1/82	Same as OR	NA
23. Central water level recording.	NUREG-0626(B.2)	GE	I.D.2 III.A.1.2 III.A.3.4	I.D.2 III.A.1.2 III.A.3.4	NA
24. Confirm adequacy of space cooling for HPCI and RCIC systems.	NUREG-0626(B.3)	GE	1/1/82	Same as OR	NA
25. Effect of loss of AC power on pump seals.	NUREG-0626(B.4)	GE	1/1/82	Same as OR	NA

TABLE C.3 (continued)

Requirement	Source	Applicability	Operating Reactor Implementation	Operating License Implementation	Near-Term Operating License Requirements
26. Study effect on RHR reliability of its use for fuel pool cooling.	NUREG-0626(B.5)	GE	II.E.2.1	II.E.2.1	NA
27. Provide common reference level for vessel level instrumentation.	NUREG-0626(B.6)	GE	10/1/80	Same as OR	NA
28. Study and verify qualification of accumulators on ADS valves.	NUREG-0626(B.7)	GE	1/1/82	Same as OR	NA
29. Study to demonstrate performance of isolation condensers with non-condensibles.	NUREG-0626(B.13)	GE Isolation Condenser ORs	4/1/81	NA	NA
30. Revised small-break LOCA methods to show compliance with 10 CFR 50, Appendix K.	NUREG-0565(2.2.2.a) NUREG-0611(3.2.1.a) NUREG-0626(A.12) NUREG-0635(3.2.1.a) (3.2.5.a)	All	Beyond 1982	Same as OR	NA
31. Plant-specific calculations to show compliance with 10 CFR 50.46.	NUREG-0565(2.2.2.b) NUREG-0611(3.2.1.b) NUREG-0626(A.13, B.10) NUREG-0635(3.2.1.b)	All	Beyond 1982	Same as OR	NA

TABLE C.3 (continued)

Requirement	Source	Applicability	Operating Reactor Implementation	Operating License Implementation	Near-Term Operating License Requirements
32. Provide experimental verification of two-phase natural circulation models.	NUREG-0565(2.6.2.a) NUREG-0611(3.2.3.a) NUREG-0635(3.2.3.a)	PWR (Matter under consideration for Semiscale/LOFT - see II.E.2.2 and for a PWR startup)	NA	NA	NA
33. Evaluate elimination of PORV function.	NUREG-0565(3.5) NUREG-0611(3.2.4.k) NUREG-0635(3.2.4.e)	PWR	II.C.1	II.C.1	NA
34. RELAP-4 model development.	NUREG-0611(3.2.5) NUREG-0635(3.2.5)	PWR	NA (II.E.2.2 covers this staff action)	NA	NA
35. Evaluation of effects of core flood tank injection on small-break LOCAs.	NUREG-0565(2.2.2.c)	B&W	I.C.1	I.C.1	NA
36. Additional staff audit calculations of B&W small-break LOCA analyses.	NUREG-0565(2.4.2.a)	B&W	NA (I.C.1 covers this staff action)	NA	NA
37. Analysis of B&W plant response to isolated small-break LOCA.	NUREG-0565(2.6.2.c)	B&W	I.C.1	I.C.1	NA
38. Analysis of plant response to a small-break LOCA in the pressurizer spray line.	NUREG-0565(2.6.2.d)	B&W	I.C.1	I.C.1	NA

TABLE C.3 (continued)

Requirement	Source	Applicability	Operating Reactor Implementation	Operating License Implementation	Near-Term Operating License Requirements
39. Evaluation of effects of water slugs in piping caused by HPI and CFT flows.	NUREG-0565(2.6.2.e)	B&W	I.C.1	I.C.1	NA
40. Evaluation of RCP seal damage and leakage during a small-break LOCA.	NUREG-0565(2.6.2.f)	B&W	See Table C-2, item 16	See Table C.2, item 16	NA
41. Submit predictions for LOFT Test L3-6 with RCPs running.	NUREG-0565(2.6.2.g)	B&W	I.C.1	I.C.1	NA
42. Submit requested information on the effects of non-condensable gases.	NUREG-0565(2.6.2.h)	B&W	I.C.1	I.C.1	NA
43. Evaluation of mechanical effects of slug flow on steam generator tubes.	NUREG-0565(2.6.2.i)	B&W	See Table C-2, item 15	See Table C.2, item 15	NA
44. Evaluation of anticipated transients with single failure to verify no significant fuel failure.	NUREG-0626(A.14)	GE	1/1/81	Same as OR	NA
45. Evaluate depressurization with other than full ADS.	NUREG-0626(A.15)	GE	1/1/81	Same as OR	NA

TABLE C.3 (continued)

Requirement	Source	Applicability	Operating Reactor Implementation	Operating License Implementation	Near-Term Operating License Requirements
46. Response to list of concerns from ACRS consultant.	NUREG-0626(A.17)	GE	7/1/80	Same as OR	NA
47. Test program for small-break LOCA model verification pretest prediction, test program and model verification.	NUREG-0626(B.9)	GE	I.C.1 II.E.2.2	I.C.1 II.E.2.2	NA
48. Assess change in safety reliability as result of implementing B&OTF recommendations.	NUREG-0626(B.15)	GE	II.C.1 II.C.2	II.C.1 II.C.2	NA
49. Review of procedures (NRC).	NUREG-0611(3.4.1) NUREG-0635(3.4.1)	W, CE	I.C.9	I.C.8 I.C.9	NA
50. Review of procedures (NSSS vendors)	NUREG-0611(3.4.2) NUREG-0635(3.4.2)	W, CE	I.C.9	I.C.7 I.C.9	NA
51. Symptom-based emergency procedures.	NUREG-0611(3.4.3) NUREG-0626(B.8) NUREG-0635(3.4.3)	W, CE GE	I.C.9	I.C.9	NA
52. Operator awareness of revised emergency procedures.	NUREG-0626(A.11)	GE	I.B.1 I.C.2 I.C.5	I.B.1 I.C.2 I.C.5	NA

TABLE C.3 (continued)

Requirement	Source	Applicability	Operating Reactor Implementation	Operating License Implementation	Near-Term Operating License Requirements
53. Two operators in control room.	NUREG-0626(A.16)	GE	I.A.1.3	I.A.1.3	NA
54. Simulator upgrade for small-break LOCAs.	NUREG-0565(2.3.2.c) NUREG-0611(3.3.1.b) NUREG-0626(B.11) NUREG-0635(3.3.1.b)	All	I.A.4.1	I.A.4.1	NA
55. Operator monitoring of control board.	NUREG-0611(3.5.1) NUREG-0635(3.5.1)	W, CE	I.C.1 I.D.2 I.D.3	I.C.1 I.D.2 I.D.3	NA
56. Simulator training requirements.	NUREG-0611(3.3.1.a) NUREG-0635(3.3.1.a)	W, CE	I.A.3.1 I.A.2.6	I.A.3.1 I.A.2.6	NA
57. Identify water sources prior to manual activation of ADS	NUREG-0626(A.5)	GE	10/1/80	I.C.1	NA

**ENCLOSURE 4**

**WORKER RADIATION PROTECTION IMPROVEMENTS**

**PART 1: Staff Requirements III.D.3.4**

**PART 2: Copy of Section III.D.3 to NRC Task Action Plan**

The following nine pages are the May 1980 version of the TMI Action Plan, Section III.D.3. This section is provided for background information only and note that the subject being discussed with respect to our positions on the Control Room Habitability Requirements is a subpart.



## Control Room Habitability Requirements

### Position

In accordance with action item III.D.3.4, Control Room Habitability, licensees shall assure that control room operators will be adequately protected against the effects of accidental release of toxic and radioactive gases and that the nuclear power plant can be safely operated or shut down under design basis accident conditions (Criterion 19, "Control Room," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50).

### Clarification

All facilities that have not been reviewed for conformance with the following sections of the Standard Review Plan:

- 2.2.1-2.2.2 Identification of Potential Hazards in Site Vicinity;
- 2.2.3 Evaluation of Potential Accidents;
- 6.4 Habitability Systems;

shall perform the necessary evaluations and recommend appropriate modifications to meet control room habitability requirements. The following documents may be used for guidance in performing the required evaluations:

1. Regulatory Guide 1.78, "Assumptions of Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release."
2. Regulatory Guide 1.95, "Protection of Nuclear Power Plant Control Room Operators Against an Accidental Chlorine Release."
3. K. G. Murphy and K. M. Campe, "Nuclear Power Plant Control Room Ventilation System Design for Meeting General Design Criterion 19," 13th AEC Air Cleaning Conference, August, 1974.

The licensee's submittal shall include the results of the analyses of control room concentrations from postulated accidental release of toxic gases and

control room operator radiation exposures from airborne radioactive material and direct radiation resulting from design basis accidents. The toxic gas accident analysis should be performed for all potential hazardous chemical releases occurring either on the site or within five miles of plant site boundary. Regulatory Guide 1.78 lists the chemicals most commonly encountered in the evaluation of control room habitability but is not all-inclusive.

The DBA radiation source term should be for the LOCA containment leakage and ESF leakage contribution outside containment as described in Appendix A and B of Standard Review Plan Chapter 15.6.5. In addition, BWR facility evaluations should add any leakage from the main steam isolation valves (e.g., valve stem leakage, valve seat leakage, main steam isolation valve leakage control system release) to the containment leakage and ESF leakage following a LOCA. Other DBA's should be reviewed to determine whether they might constitute a more severe control room hazard than the LOCA.

In addition to the accident analysis results which should either identify the possible need for control room modifications or provide assurance that the habitability systems will operate under all postulated conditions to permit the control room operators to remain in the control room to take appropriate actions as required by General Design Criteria 19, the licensee should submit sufficient information needed for an independent evaluation of the adequacy of the habitability systems. Attachment 1 lists the information that should be provided along with the licensee's evaluation.

**ACTION: (Class II)**

Licensees should submit their responses to this request on or before January 1, 1981. Modifications needed for compliance with the control room habitability requirements specified in this letter should be identified and a schedule for completion of the modifications should be provided. Implementation of such modifications should be started without awaiting for the results of the staff's review. Additional needed modifications, if any, identified by the staff during its review will be specified to licensees by July 1981. All modifications must be scheduled for completion by January 1, 1983.

## ATTACHMENT 1

### Information Required for Control Room Habitability Evaluation.

1. Control Room Mode of Operation, i.e., pressurization and filter recirculation for radiological accident isolation or chlorine release
2. Control Room Characteristics
  - a. air volume of control room
  - b. control room emergency zone (control room, critical files, kitchen, washroom, computer room, etc.)
  - c. control room ventilation system schematic with normal and emergency air flow rates
  - d. infiltration leakage rate
  - e. HEPA filter and charcoal adsorber efficiencies
  - f. closest distance between containment and air intake
  - g. layout of control room, air intakes, containment building, and chlorine or other chemical storage facility with dimensions
  - h. control room shielding including radiation streaming from penetrations, doors, ducts, stairways, etc.
  - i. automatic isolation capability-damper closing time, damper leakage and area
  - j. chlorine detectors or toxic gas (local or remote)
  - k. self-contained breathing apparatus availability (number)
  - l. bottled air supply (hours supply)
  - m. emergency food and potable water supply (how many days and how many people)
  - n. control room personnel capacity (normal and emergency)
  - o. potassium iodide drug supply
3. On-site storage of chlorine and other hazardous chemicals
  - a. total amount and size of container
  - b. closest distance from control room air intake
4. Off-site manufacturing, storage or transportation facilities of hazardous chemicals
  - a. identify facilities within a five-mile radius
  - b. distance from control room
  - c. quantity of hazardous chemicals in one container
  - d. frequency of hazardous chemical transportation traffic (truck, rail, and barge)

5. Technical Specifications (refer to standard technical specifications)

- a. chlorine detection system
- b. control room emergency filtration system including gross leakage determination by control room pressurization at 1.8 inch water gage, verification of isolation by test signals and damper closure times and filter testing requirements.

TASK III.D.3 WORKER RADIATION PROTECTION IMPROVEMENT

A. OBJECTIVE: Improve nuclear power plant worker radiation protection to allow workers to take effective action to control the course and consequences of an accident, as well as to keep exposures as low as reasonably achievable (ALARA) during normal operation and accidents, by improving radiation protection plans, health physics, inplant radiation monitoring, control room habitability, and radiation worker exposure data base.

B. NRC ACTIONS

1. Radiation protection plans.

a. Description: NRC will require all licensees to prepare and implement radiation protection plans (RPP) that will incorporate commitments to criteria in existing Regulatory Guides, including Regulatory Guide 8.8, and Standard Review Plan Chapter 12, as well as criteria to be developed from analysis of the EE appraisal of health physics programs at all operating sites. The RPP will be integrated into the emergency plan to assure worker protection without unduly restricting accident mitigation and recovery.

The results of the following task action items will be incorporated into the RPP; Item I.A.1, "Operating Personnel and Staffing," to determine the necessary number and types of radiation protection personnel for each shift and to investigate the desirability of separation of the radiation protection and chemistry functions; Item I.A.2, "Training and Qualifications of Operating Personnel," to review the training program for radiation protection personnel and develop new regulations or guides for such personnel; Item I.A.3, "Licensing and Requalifications of Operating Personnel," to study the need for licensing radiation protection personnel; and Item I.B.1, "Organization and Management Criteria," to determine the organization and qualifications of the radiation protection staff.

(1) NRR will, in cooperation with IE and SD, prepare a draft Guide for the preparation of an RPP that will include an existing draft Guide on "Implementation of ALARA at Operating Plants."

(2) NRR will develop acceptance criteria using existing regulatory guides, the Standard Review Plan, and information to be developed on the basis of feedback from ongoing IE comprehensive appraisals at all operating reactors to assess the adequacy of existing radiation protection programs.

(3) NRR will publish for review and action by licensees the draft RPP Guide (see item 1 above), which will specify format, content, and acceptance criteria, including guidance on implementing ALARA at operating plants and will send an information notice to licensees providing clarification that all health physics personnel, including temporary contractor personnel, must meet the technical specification training and qualifications requirements.

(4) NRR will hold regional meetings to discuss implementation of RPPs and to receive comments on improvements in the draft Guide.

(5) NRR will revise the draft Guide based on the feedback obtained at the regional meetings and from IE.

(6) NRR will require licensees to provide RPPs and request amendment of technical specifications, including a commitment to implement the RPP.

(7) NRR will review the RPPs and, for reference, the amended technical specifications.

(8) NRR will revise Standard Review Plan Section 12.5, "Health Physics Program," to include the RPP Guide in the acceptance criteria.

(9) SD will revise Regulatory Guide 1.70, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants."

b. Schedule: Initiate NRC work in FY82, or later.

c. Resources: NRR first FY - 2 my, second FY - 0.1 my per site for 40% of sites, third FY - 0.1 my per site for 60% of sites; SD first FY - 0.7 my, third FY - 0.2 my; IE first FY - 0.55 my; ADM first FY - 0.1 my and \$10,000, second FY - 0.2 my and \$20,000.

2. Health physics improvements.

a. Description: The accuracy of health physics measurements for both routine and emergency conditions is to be improved. Accurate high dose rate warning devices and radioiodine respiratory protection are needed.

(1) SD will amend 10 CFR 20 to require that personnel dosimetry processing be done only by nationally certified processors who meet specific performance criteria (utilities could themselves become certified if they desire).

(2) SD will issue a regulatory guide containing specifications for audible alarm dosimeters and criteria for their use.

(3) SD, in cooperation with the American National Standards Institute (ANSI), will develop standard performance criteria for radiation survey and monitoring instruments. SD will contract for performance testing of on-the-shelf instruments to determine feasibility of the standards. NRC will adopt a final standard and require that only instruments meeting the standard be used at licensed facilities.

(4) Under contract with RES, the Los Alamos Scientific Laboratory will develop a method for testing and certifying air-purifying respirators for use against radioiodines. The method and equipment will be transferred to NIOSH, and NIOSH will be requested to amend 30 CFR 11 to incorporate the method into respirator test and certification schedules. NRR will evaluate the need to specify the quantity and types of respirators necessary for normal and emergency use.

b. Schedule: This is a Decision Group D item. Therefore, schedules and resources are to be developed in connection with routine agency budgetary processes.

c. Resources: See "Schedule" above.

3. Inplant radiation monitoring.

a. Description: Licensees are to improve systems for monitoring inplant radiation and airborne radioactivity with instruments appropriate for a broad range of routine and emergency conditions and to provide calibration methods for such instruments.

(1) NRR has issued a letter requiring improved radioiodine sampling instrumentation (NUREG-0578, 2.1.8.c).

(2) NRR will set criteria requiring licensees to evaluate in their plants the need for additional survey equipment and radiation monitors in vital areas and requiring, as necessary, installation of area monitors with remote readout. NRR will evaluate the need to specify the minimum types and quantities of portable monitoring instrumentation, including very high dose rate survey instruments. Operating reactors will be reviewed for conformance with Standard Review Plan Section 12.3.4, "Area Radiation and Airborne Radioactivity Monitoring Instrumentation." NRR will revise Standard Review Plan Sections 12.5 and 12.3.4 to incorporate additional monitor requirement criteria. IE will inspect implementation.

(3) SD will issue a rule change providing acceptable methods for calibration of radiation-monitoring instruments.

(4) SD will issue a Regulatory Guide providing acceptable methods for calibration of air-sampling instruments.



b. Schedule: NRR issued requirements regarding radioiodine monitoring by letter to operating plant licensees on October 30, 1979; NRC work on requirements regarding area monitors and portable instrumentation will be initiated in FY82, or later. Items (3) and (4) above are Decision Group D items; schedules and resources are to be developed in connection with routine agency budgetary processes.

c. Resources: NRR FY 80- 0.3 my and \$60,000 for contract, FY81 0.1 my and \$120,000 for contract; IE FY80 - 0.1 my, FY81 - 0.2 my; ADM FY 80 - 0.1 and \$5,000, FY81 - 0.1 my and \$5,000.

#### 4. Control room habitability.

a. Description: NRR will follow a two-step approach to assure that workers are adequately protected from radioactivity, radiation, and other hazards, and that the control room can be used in the event of an emergency. First, NRR will require all facilities that have not been reviewed for conformance to Regulatory Guides 1.78 and 1.95 and Standard Review Plan Sections 2.2.1, 2.2.2, 2.2.3, and 6.4 to do the evaluations and establish a schedule for necessary modifications. This will be a condition of full-power operation for near-term operating license facilities. Then, NRR will, in conjunction with the rulemaking proposed in Item II.B.8, examine and evaluate other sources and pathways of radioactivity and radiation that may lead to control room habitability problems, and will, if necessary, make changes in the requirements of the Regulatory Guides and the Standard Review Plan. Such potential internal (to the plant) pathways for potential control room contamination were flagged by the TMI-2 accident. Review and quantification of potential control room operator doses due to such airborne radioactivity ingress and radiation penetration from pathways internal to plant structures will be the basis for such changes.

b. Schedule: NRR will issue the requirements for operating reactors by May 1980, regarding the existing criteria listed above. NRR will complete evaluation of licensee responses and notify licensees of acceptance by July 1981. IE will complete inspections on a case-by-case basis for conformance by no later than July 1983. Longer term changes in criteria will be dependent on the results of the rulemaking proceeding on degraded cores.

c. Resources: NRR FY80 - 0.7 my, \$110,000, FY81 - 1.2 my, \$90,000; IE FY80 - 0.1 my, FY81 - 0.7 my; ADM FY80 - 0.1 my, FY81 - 0.2 my.

5. Radiation worker exposure data base.

a. Description: NRC will continue its efforts to improve and expand the data base on industry employees to facilitate possible future epidemiological studies on worker health.

(1) The NRC staff has been actively engaged in this and similar efforts for some time. Examples are our participation in the working groups of the Interagency Task Force on the Health Effects of Ionizing Radiation (the so-called Libassi Committee), the Fredrickson Committee on Federal Research on the Biological Effects of Ionizing Radiation Research (NIH), and the Upton Subcommittee on TMI Followup Studies (NIH).

More recently, NRC and NIOSH have been cooperating to establish a worker registry at TMI to facilitate possible future health studies. We also have been in contact with EPRI to investigate expansion of our efforts to the entire U.S. nuclear utility industry. In addition, SD has funded an epidemiology feasibility and planning study which, among other things, will provide information on how to improve the worker's health and exposure data base.

SD will develop a format for data to be collected by utilities regarding total radiation exposures to workers, as well as other data pertinent to eventual epidemiological studies. These data will include both external and internal doses, medical radiation exposures, health data, and exposure to nonradioactive carcinogens (both within and outside of the workplace).

(2) NRC will investigate methods of obtaining employee health data by nonlegislative means until such time as legislation is passed allowing routine collection of these data by NRC.

(3) SD will, following appropriate legislative action to permit such regulatory requirement, revise 10 CFR 20 to require licensees to collect worker data.

b. Schedule: This is a Decision Group D item. Therefore, schedules and resources are to be developed in connection with routine agency budgetary processes.

c. Resources: See "Schedule" above.

C. LICENSEE ACTIONS

1. Radiation protection plans.

a. Description: Operating reactor licensees will develop an RPP based on NRC guidance and propose a technical specification change. Following NRC review, the licensees will take corrective actions, as necessary, based on inspection findings.

b. Implementation: Operating reactors will complete by 15 months after issuance of requirement by NRC; operating license applicants will complete before fuel loading or by 15 months after issuance of requirement by NRC, whichever is later.

c. Resources: .1.0 my per reactor; \$5,000 for printing RPP and related procedures.

2. Health physics improvements: This is a Decision Group D item.

3. Inplant radiation monitoring.

a. Description: Licensees must evaluate locations and ranges of radioiodine monitors, provide results to NRC, and install new monitors as required. They must also comply with the rule on radiation monitoring instruments and the Regulatory Guide on air-sampling instruments.

b. Implementation: Operating reactors and near-term operating license applicants must have radioiodine detection capability by January 1, 1980 or before fuel loading and must add area monitors and a low-background area for

iodine analysis by June 1982; other operating license applicants and construction permit holders must comply by June 1982 or prior to licensing for operation, whichever is later.

c. Resources: Evaluation of radioiodine detection capability will require 0.2 my per reactor, and the addition of monitors will require 0.2 my and \$50,000 per monitor.

4. Control room habitability.

a. Description: Licensees must review control room habitability against specified guidance and make necessary modifications.

b. Implementation: For operating reactors, reviews must be complete by January 1981, and modifications must be complete by January 1983; operating license applicants must schedule necessary modifications to achieve compliance before full-power operation; construction permit holders must comply before an operating license is issued.

c. Resources: 2.0 my and \$500,000 per reactor for operating reactors. Estimate one-tenth of this for NTOLs that are likely to be substantially in compliance with existing guidance.

5. Radiation worker exposure data base: This is a a Decision Group D item.

D. OTHER ACTIONS: None.

E. REFERENCES

President's Commission Report: Items A.4.c.3iii, A.5, B.3, E.1.c, E.4

President's Response, dated December 7, 1979

Other: NUREG-0578, Recommendation 2.1.8.c  
NUREG-0600, Recommendations 26, 27, and 28  
NUREG-0616, Recommendations 2.5.5, 2.6.1.5  
NUREG/CR-1250, Vol. I, p. 155; Vol. II, Part 2, pp 39, 135, 141,  
143, 147, 157, 158, 161, 172. The page numbers given here for Vol. II  
are draft page numbers.  
NUS-3364, "Generic Review of the Health Physics Program at the Three  
Mile Island Nuclear Station," March 20, 1979  
Letter from Chairman, ACRS, to Chairman, NRC, dated March 11,  
1980; Subject: "ACRS Report on NTOL Items from Draft 3 of  
NUREG-0660, NRC Action Plans Developed as a Result of the TMI-2  
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Docket No. 50-261

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Trojan Plant

Docket No. 50-344

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# Docket File

## ALL POWER REACTOR LICENSEES

020248#3

May 7-1980

Docket No. 50-348  
Farley Unit 1

Docket No. 50-313  
Arkansas Unit 1

Docket No. 50-368  
Arkansas Unit 2

Docket No. 50-317  
Calvert Cliffs Unit 1

Docket No. 50-318  
Calvert Cliffs Unit 2

Docket No. 50-293  
Pilgrim Unit 1

Docket No. 50-325  
Brunswick Unit 1

Docket No. 50-324  
Brunswick Unit 2

Docket No. 50-261  
H. B. Robinson Unit 2

Docket No. 50-10  
Dresden Unit 1

Docket No. 50-237  
Dresden Unit 2

Docket No. 50-249  
Dresden Unit 3

Docket No. 50-254  
Quad-Cities Unit 1

Docket No. 50-265  
Quad-Cities Unit 2

Docket No. 50-295  
Zion Unit 1

Docket No. 50-304  
Zion Unit 2

Docket No. 50-213  
Connecticut Yankee (Haddam Neck)

Docket No. 50-3  
Indian Point Unit 1

Docket No. 50-247  
Indian Point Unit 2

Docket 50-286  
Indian Point Unit 3

Docket No. 50-155  
Big Rock Point

Docket No. 50-255  
Palisades

Docket No. 50-409  
Lacrosse

Docket No. 50-269  
Oconee Unit 1

Docket No. 50-270  
Oconee Unit 2

Docket No. 50-287  
Oconee Unit 3

Docket No. 50-334  
Beaver Valley Unit 1

Docket No. 50-302  
Crystal River 3

Docket No. 50-335  
St. Lucie Unit 1

Docket No. 50-250  
Turkey Point Unit 3

Docket No. 50-251  
Turkey Point Unit 4

Docket No. 50-321  
Edwin I. Hatch Unit 1

Docket No. 50-366  
Edwin I. Hatch Unit 2

Docket No. 50-315  
D. C. Cook Unit 1

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Docket No. 50-316  
D. C. Cook Unit 2

Docket No. 50-331  
Duane Arnold

Docket No. 50-219  
Oyster Creek Unit 1

Docket No. 50-309  
Maine Yankee

Docket No. 50-289  
Three Mile Island Unit 1

Docket No. 50-320  
Three Mile Island Unit 2

Docket No. 50-298  
Cooper Station

Docket No. 50-220  
Nine Mile Point Unit 1

Docket No. 50-245  
Millstone Unit 1

Docket No. 50-336  
Millstone Unit 2

Docket No. 50-263  
Monticello

Docket No. 50-282  
Prairie Island Unit 1

Docket No. 50-306  
Prairie Island Unit 2

Docket No. 50-285  
Ft. Calhoun

Docket No. 50-133  
Humboldt Bay

Docket No. 50-277  
Peach Bottom 2

Docket No. 50-278  
Peach Bottom 3

Docket No. 50-344  
Trojan

Docket No. 50-333  
FitzPatrick

Docket No. 50-267  
Ft. St. Vrain

Docket No. 50-272  
Salem Unit 1

Docket No. 50-244  
R. E. Ginna 1

Docket No. 50-312  
Rancho Seco

Docket No. 50-206  
San Onofre 1

Docket No. 50-259  
Browns Ferry Unit 1

Docket No. 50-260  
Browns Ferry Unit 2

Docket No. 50-296  
Browns Ferry Unit 3

Docket No. 50-346  
Davis-Besse 1

Docket No. 50-271  
Vermont Yankee

Docket No. 50-338  
North Anna 1

Docket No. 50-280  
Surry Unit 1

Docket No. 50-281  
Surry Unit 2

Docket No. 50-266  
Point Beach Unit 1

Docket No. 50-301  
Point Beach Unit 2

Docket No. 50-305  
Kewaunee

Docket No. 50-29  
Yankee-Rowe

Docket No. 50-267  
Ft. St. Vrain

Docket No. 50-311  
Salem 2

Docket No. 50-327  
Sequoyah 1

Docket No. 50-339  
North Anna 2