

ENCLOSURE 1

ACTION PLAN TO IMPROVE THE
TECHNICAL CAPABILITY OF LICENSEE PERSONNEL

THIS DOCUMENT CONTAINS
POOR QUALITY PAGES

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ENCLOSURE 1

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PART A

TASK I.A.2 TRAINING AND QUALIFICATIONS OF OPERATING PERSONNEL

A. OBJECTIVE: Improve the capability of operators and supervisors to understand and control complex reactor transients and accidents, and improve the general capability of an operations organization to respond rapidly and effectively to upset conditions. Increase the education, experience, and training requirements for operators, senior operators, supervisors, and other personnel in the operations organization to substantially improve their capability to perform their duties.

B. NRC ACTIONS

1. Immediate upgrading of operator and senior operator training and qualifications.

a. Description: NRR will require all operating plant licensees and all license applicants to provide specific improvements in training and qualifications of senior operators and control room operators. NRR will also require that a level of corporate operations management higher than previously required must certify the fitness of candidates for operator licensing by NRC. The NRR staff will review the contents of revised training programs, and the IE staff will audit the implementation. NRR will indicate that licensees need to make every effort to meet the requirements as soon as possible within the time limits specified below for each change. Long-term upgrading of training and qualifications of operating personnel is discussed in Item I.A.2.6.

(1) Qualifications - Experience.

(a) Senior operators* - Effective May 1, 1980, applicants for senior operator licenses will be required to meet the experience requirements of Recommendation 1 of SECY 79-330E. Effective December 1, 1980, an applicant for a senior operator license will be required to have been a licensed operator for one year (Recommendation 2 of SECY 79-330E as modified by the Commission).

*Precritical applicants will be required to meet unique qualifications designed to accommodate the fact that their facility has not yet been in operation.

(b) Control room operators: There is no immediate change required.

(2) Training.

(a) Senior operators*: Effective August 1, 1980, applicants will be required to have three months of continuous on-the-job training as an extra person on shift (Recommendation 3 of SECY 79-330E).

(b) Control room operators*: Effective August 1, 1980, applicants will be required to have three months' training on shift as an extra person in the control room (Recommendation 3 of SECY 79-330E).

(c) Training programs will be modified, as necessary, to provide: (1) training in heat transfer, fluid flow, and thermodynamics; (2) training in the use of installed plant systems to control or mitigate an accident in which the core is severely damaged (see also Item II.B.4); and (3) increased emphasis on reactor and plant transients.

(3) Facility certification of competence and fitness of applicants for operator and senior operator licenses.

Effective May 1, 1980, certifications completed pursuant to Sections 55.10(a)(6) and 55.33a(4) and (5) of 10 CFR Part 55 will be signed by the highest level of corporate management for plant operation (for example, Vice President for Operations).

b. Schedule: The requirements were issued by NRR on March 28, 1980.

c. Resources: NRR FY80 - 0.6 my; ADM FY80 - 0.1 my and \$8,000, FY81 - 0.1 my and \$3,000; IE FY80 - 1.0 my.

2. Training and qualifications of operations personnel.

a. Description: Each licensee will be required to review its training program for all operations personnel, including maintenance and technical

*Precritical applicants will be required to meet unique qualifications designed to accommodate the fact that their facility has not yet been in operation.

personnel, and to justify the acceptability of training programs on the basis that these programs provide sufficient assurance that safety-related functions will be effectively carried out. Documentation of this review and justification will be retained onsite for inspection, but need not be submitted to the NRC for review. The preferred method of fulfilling this recommendation is a position task analysis, in which the tasks performed by the person in each position are defined, and the training, in conjunction with education and experience, is identified to provide assurance that the tasks can be effectively carried out. The position task analysis will include normal and emergency duties (such as maintenance activities), and place emphasis on the role played by every member of an operations organization that assures safe plant operations. All levels of the operations organization will be included. This task is amenable to a generic approach. INPO could perform a task analysis for those positions generally used throughout industry. Each utility could then evaluate in a similar manner any unique position in its organization not covered in the INPO study. (See also Table C.1, Items 1, 2, 11 and Table C.2, Item 11.)

Licenseses will also be required to upgrade training and qualifications of personnel found to be necessary as a result of the review. The team aspect of the shift operating organization will be emphasized in training, particularly during simulator training and requalification and plant drills.

IE will check to assure that the training evaluation has been performed and personnel are properly qualified. In addition, they will perform evaluation of personnel changes in key plant management positions and changes in organizational structures (see also Item I.B.1.1).

b. Schedule: NRR will issue requirement by October 1, 1980.

c. Resources: NRR FY80 - 0.1 my and \$10,000; IE FY81 - 1.0 my.

3. Administration of training programs.

a. Description: NRR will develop criteria and procedures to be used in auditing training programs, including those provided by reactor vendors, and

increase the amount of auditing. The audit criteria will place emphasis on the instructors' abilities to teach as well as their technical knowledge (NUREG-0585, Recommendation 1.4(6), Recommendation 6 of SECY 79-330E). The audits to be conducted by NRR will assure that training is formalized and structured, including the use of lesson plans, qualified instructors, qualified supervision of instructors, and proper conduct of testing. The audits will eventually be in conformance with training institute accreditation (see Item I.A.2.7). NRR will also conduct all cold certification examinations at simulator training centers (Recommendation 5 of SECY 79-330E as modified by the Commission).

Pending accreditation of training institutions, NRR will require that training center and facility instructors who teach systems, integrated responses, transient, and simulator courses demonstrate their competence to NRC by successful completion of a senior operator examination. These instructors will also be required to successfully participate in requalification programs to retain instructor status, or possess instructor certification from INPO, provided that such a certification program has been examined by NRC and found to be acceptable.

b. Schedule: NRR will initiate procedure development in FY81 and will begin augmented auditing in FY82. NRR issued requirements on March 28, 1980, for certain instructors to demonstrate senior reactor operator (SKO) qualifications and to be enrolled in requalification programs. NRR will conduct certification examinations for some trainees from each simulator training class to audit the training program effectiveness starting October 1, 1980.

c. Resources: NRR FY80 - 0.5 my; FY81 - 1.3 my; ADM FY80 - 0.1 my; FY81 - 0.1 my and \$7,000.

4. NRR participation in inspector training.

a. Description: As part of the established IE inspector training program, operator licensing and human factors personnel in NRR will provide instruction on the role and licensing of reactor operations staff, including the types of

feedback of field observations needed by the NRR staff [NUREG-0585, Recommendation 1.4(1)].

- b. Schedule: The program will be initiated in FY82.
- c. Resources: Annual recurring requirements, NRR - 0.1 my.

5. Plant drills.

a. Description: NRR will require licensees to develop and conduct in-plant drills by shift operating personnel. Normal and off-normal operating maneuvers will be required to be simulated for walk-through drills on a plant-wide basis. Drills will also be required to test the adequacy of reactor and plant operating procedures (NUREG-0585, Recommendation 1.3). See also Table C.2, Item 11.

Over the long term, the staff will give consideration to the need for a standard dealing with in-plant drills to be analogous to the casualty drill manual used in naval reactors. The results of study NRR-80-117 will be considered in the development of long-term recommendations, as will the conduct of drills involving actual maneuvers of the plant and the desirability of initiation of drills by NRC inspectors.

b. Schedule: Short-term requirements will be issued by January 1981. A long-term standard will be developed as a Decision Group D item.

c. Resources: NRR FY80 - 0.1 my, FY81 - 0.1 my.

6. Long-term upgrading of training and qualifications.

a. Description: SD will develop new regulations and regulatory guides for training and qualifications of reactor operators, senior operators, shift supervisors, auxiliary operators, technicians, and possibly other operating personnel.

(1) SD will revise Regulatory Guide 1.8 (ANSI/ANS 3.1) to incorporate the shorter term requirements described above and any other changes resulting from the national standards effort. More explicit guidance regarding exercises to be included in simulator requalification programs will be included in the regulatory guide (Recommendation 8 of SECY 79-330E) as will qualifications of shift supervisors and senior reactor operators [NUREG-0585, Recommendations 1.6(1) and (2)].

(2) Based on staff review of study NRR-80-117, "Requirements for Operator Licensing," SD will make recommendations to the Commission and factor decisions into regulatory guide or regulation changes.

(3) SD will develop revised 10 CFR 55 for action by the Commission to incorporate the applicable short-term changes described above plus requirements based on Commission action on SECY 79-330E for mandatory simulator training for applicants for licenses (Recommendation 4), mandatory simulator training in requalification programs (Recommendation 7), NRC administration of requalification examinations (Recommendation 9 as modified by the Commission), and mandatory operating tests at simulators (Recommendation 11). See also Table C.2, Item 5 and Table C.3, Item 56.

(4) NRR will develop a paper for Commission consideration of and decision on NRC training workshops for licensed personnel [NUREG-0585, Recommendation 1.4(5)].

(5) IE will develop inspection procedures for training programs.

(6) NRR will establish definitive instructional requirements for the basic course in nuclear power fundamentals in licensee training programs [NUREG-0585, Recommendation 1.6(3)].

b. Schedule:

(1) SD will issue revised Regulatory Guide 1.8 for public comment in August 1980.

(2) The staff will complete its review of study NRR-80-117 (planned for completion in September 1980). SD will submit a paper to the Commission by December 1, 1980; revise and reissue for comment Regulatory Guide 1.8 resulting from Commission action on study NRR-80-117 and action on Item I.B.1.1; issue guide for public comment by May 1, 1981; and complete effective guide by February 1, 1982.

The staff has a contract (NRC-03-08-116) with Basic Energy Technology Associates, Inc. (BETA), that includes study of selection, training, and qualifications of maintenance personnel. The results of this study will be considered in the development of requirements in this area.

(3) SD will revise 10 CFR 55 and issue the revision for public comment by October 1, 1980; effective rule will be issued by September 1, 1981.

(4) NRR will make recommendations to Commission by January 1, 1981.

(5) IE will develop procedures by February 1, 1982.

(6) NRR will establish instruction requirements by January 1, 1982.

c. Resources:

(1) SD FY80 - 0.5 my, FY81 - 0.3 my; NRR FY80 - 0.1 my; ADM FY80 - 0.4 my and \$28,000, FY81 - 0.3 my and \$31,000.

(2) SD FY81 - 0.4 my; NRR FY80 - 0.4 my and \$200,000.

(3) SD FY80 - 0.2 my, FY81 - 0.5 my; NRR FY80 - 0.5 my, FY81 - 0.5 my. (NRR manpower figures are associated with publication of rule change. Implementation manpower figures will be considered in FY82 budget.)

(4) NRR FY81 - 0.3 my.

(5) IE FY81 - 1.33 my.

(6) NRR FY80 - 0.3 my. FY81 - 0.1 my

7. Accreditation of training institutions.

a. Description: NRR will complete an ongoing study of procedures and requirements for NRC accreditation. NRR will prepare an information paper concerning accreditation. SD will prepare a Commission paper examining various NRC approaches to accreditation of training institutions. This will be coordinated with INPO to include thorough discussion and assessment of INPO programs.

b. Schedule: NRR will complete study by June 1980. NRR will complete information paper by August 1980. SD will complete a Commission action paper by January 1982.

c. Resources: NRR FY80 - 0.1 my and \$20,000; SD FY80 - 0.1 my, FY81 - 1.0 my; ADM FY80 - 0.1 my and \$7,000, FY81 - 0.2 my and \$7,000.

C. LICENSEE ACTIONS

1. Immediate upgrading of operator and senior operator training and qualifications.

a. Description: All operating license applicants and operating reactor licensees must recruit and train personnel to meet the new requirements.

b. Implementation: Licensed operators must meet the requirements for licensing and relicensing on the schedule as defined in NRC Item I.A.2.1. Operating reactor licensees will modify and submit revised training programs for review by August 1, 1980. Operating license applicants will be required to include specified items in their training programs prior to fuel load or by August 1, 1980, whichever is later.

c. Resources: \$30,000 per year per plant.

2. Training and qualifications of operation personnel.

a. Description: Licensees will review training programs for all operations personnel and upgrade training and qualifications as found to be necessary.

b. Implementation: Operating reactors and applicants for operating licenses must complete analysis and initiate retraining by January 1982 or before operating license is issued, whichever is later.

c. Resources: \$50,000 per year per plant.

3. Administration of training programs.

a. Description: Pending accreditation of training institutions, licensees and applicants for operating licenses will assure that training center and facility instructors who teach systems, integrated responses, transient, and simulator courses demonstrate SRO qualifications and be enrolled in appropriate requalification programs.

b. Implementation: Applications for SRO examinations should be submitted no later than August 1, 1980, for instructors who do not already hold an SRO license. Appropriate requalification programs for instructors should be initiated by May 1, 1980, and programs submitted for NRR for review by August 1, 1980.

c. Resources: \$50,000 per year per plant.

4. NRR participate in IE inspector training: Requires no licensee action.

5. Plant drills.

a. Description: Licensees will establish and execute a program for in-plant safety drills that meets NRC short-term requirements. The long-term program is a Decision Group D item.

b. Implementation: Drills will begin at operating reactors by July 1, 1981. Operating license applicants will begin drills by July 1, 1981, or before operating license issuance, whichever is later. The long-term program is a Decision Group D item.

c. Resources: 1 my per reactor to establish program. \$25,000 and 1/2 my per plant to implement short-term program. The long-term program is a Decision Group D item.

6. Long-term upgrading of training and qualifications.

a. Description: Licensees will recruit or train personnel to comply with revised Regulatory Guide 1.8; make arrangements for simulator training of all operator and senior applicants; make arrangements to have personnel attend the workshop; and revise training to ungrade fundamentals course.

b. Implementation: Both operating reactors and applicants for operating licenses will meet criteria by the date specified in Regulatory Guide 1.8; meet requirements by date specified in revised 10 CFR 55; make arrangements for workshop as specified by NRC at a later date; and provide new training in upgraded fundamentals course by 1 year after issuance of revised criteria.

c. Resources: Up to \$300,000 per year in salaries for training staff and \$6,000,000 in capital expenses for simulator purchase, if required.

7. Accreditation of training institutions: The intent is that all licensees would be required to use accredited training institutions once such a program is in place.

D. OTHER ACTIONS: None.

E. REFERENCES

President's Commission Report: Items A.4.a., A.5, A.8.b, B.1.a, B.4, C.1, C.2, and C.3

President's Response dated December 7, 1979: Proposals C.1.a and D.1.a

Other: NUREG-0585, Recommendations 1.1, 1.2, 1.3, 1.4(1), 1.4(5), 1.4(6),
1.6(1), 1.6(2), and 1.6(3)
NUREG-0616, Recommendations 2.4.2, 3.7.1.4, and 3.13.7.1
SECY-7330E/F Qualifications of Reactor Operators-Recommendations 1,
2, 3, 4, 5, 6, 7, 8, 9, 11
Letter from Chairman, ACRS, to Chairman, NRC, dated May 16, 1979, Subject:
"NRC Interim Report No. 3 on Three Mile Island Nuclear Station Unit 2"
Letter from Chairman, ACRS, to Chairman, NRC, dated February 13, 1980,
Subject: "Qualification of Radioactive Waste System Operating Personnel"
NUREG/CR-1250, Vol. I, pp. 105, 106, and 146; Vol. II, Part 1, p. 130,
Part 2, pp. 419, 423, 458, 612, Part 3, pp. 854, 874, 920
Memorandum from J. M. Allan, NRC Region I, to N. C. Moseley, October 16,
1979, Subject: "Operations Team Recommendations-IE/TMI Unit 2
Investigation" Recommendations B.2.d, C.2.a, C.2.b, C.3.c

TASK I.A.3 LICENSING AND REQUALIFICATION OF OPERATING PERSONNEL

A. OBJECTIVE: Upgrade the requirements and procedures for nuclear power plants operator and supervisor licensing to assure that safe and competent operators and senior operators are in charge of the day-to-day operation of nuclear power plants. Increase the requirements for initial issuance of licenses and for license renewals and provide closer NRC monitoring of licensed activities.

B. NRC ACTIONS

1. Revise scope and criteria for licensing examinations.

a. Description: NRR will notify all operator license holders and applicants of the new scope of examinations and criteria for issuance of reactor operator (RO) and senior reactor operator (SRO) licenses and renewal of licenses based on Commission Action on SECY 79-330E (Recommendations 10, 11, 12, 13). The notification will include a new category on operator and senior operator examinations dealing with thermodynamics and related subjects; establish time limits for applicants to complete the examination; increase the passing grade to 80 percent overall with a minimum grade of 70 percent in each category; require that senior operators take oral examinations; and change requalification programs to reflect new initial requirements for issuance of licenses (Task I.A.2.1). NRR will include simulator examinations as a portion of the license examination. The increased examination requirements will have a substantial resources impact on NRC and a moderate impact on licensees. Applicants for examinations will also be required to grant permission to NRC to inform their facility management regarding the results of the examinations for purposes of enrollment in requalification programs (SECY 79-330E, Recommendation 14). See also Table C.1, Items 1, 2, 4d, 11, 26; Table C.2, Items 4, 11; and Table C.3, Item 56.

b. Schedule: NRR issued requirements on March 28, 1980, and will begin examining to the new criteria by May 1, 1980 for operating reactors. Applicants for operating licenses must prepare employees for new examinations prior to

fuel load. Simulator examinations as a part of the license examination will start by June 1, 1980 at facilities where there is a simulator. Starting FY81, simulator examinations will be conducted for facilities where simulators are not available at the facility, depending on availability and suitability of simulators.

c. Resources: NRR FY80 - 5.5 my, FY81 - 4.3 my

2. Operator licensing program changes.

a. Description: NRC will develop and implement a plan to relocate operator licensing branch (OLB) examiners at Nuclear Power Plant Simulator Training Centers or in IE regions (Recommendation 1.4(7), NUREG-0585) and factor in the results of the study being made under contract NRR-80-117. A study of the staffing of the operator licensing program and the qualifications and training of examiners will be initiated (Recommendation 16, SECY 79-330E). A plan to report operator errors and to act on operator errors with respect to continuation of licensing will be developed and implemented (Recommendation 1.4(2), NUREG-0585).

b. Schedule: Initiate work in FY82 or later except for regional relocation of examiners, which will proceed in the interim on a personnel availability basis.

c. Resources: NRR first year - 1.2 my, second year - 1.5 my, third year - 0.5 my.

3. Requirements for operator fitness.

a. Description: A regulatory approach will be developed for Commission consideration to provide assurance that applicants for operator and senior operator licenses are psychologically fit (stress and malevolence), and to prohibit licensing of persons with histories of drug and alcohol abuse or with histories of criminal backgrounds. Studies, criteria development, public comment, criteria issuance, and implementation are involved. Two studies of interest are already under way in SD: (1) standards for psychological assessment of

plant personnel, and (2) behavioral observation program to assure continued reliability of employees.

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

c. Resources: See "Schedule" above.

4. Licensing of additional operations personnel.

a. Description: NRR will continue to study the question of which plant personnel, other than reactor operators and senior operators, may need to be licensed by NRC. The study submitted to the Commission for review will include consideration of managers, engineers, auxiliary operators, maintenance personnel, technicians, and shift technical advisors. The study will also include consideration of the training, qualification, and certification efforts for such personnel undertaken by the Institute for Nuclear Power Operations. Furthermore, the study will also include consideration of the results of contract NRR-80-117, which is planned for completion in September 1980. The pending petition for rulemaking (PRM 20-13) concerning radiation protection personnel will be held in abeyance until the comprehensive study is completed.

b. Schedule: Work will be initiated in FY82 or later.

c. Resources: NRR first year - 1.0 my; ADM first year - 0.2 my and \$15,000.

5. Establish statement of understanding with INPO and DOE.

a. Description: A statement of understanding between the Institute for Nuclear Power Operations, the Department of Energy, and the NRC will be developed for consideration by the Commission. The statement will address the mutual intent of NRC and INPO concerning the extent, if any, to which NRC should review or rely upon the training, certification, and other activities of the Institute and the general conditions for such reliance in the future.

Consideration will also be given in the development of a statement of understanding that will provide alternative mechanisms for industry to inform NRC of its general progress on needed safety reforms. This will be necessary for NRC to evaluate and accredit those efforts as appropriate.

The staff will report periodically to the Commission on its interactions with INPO.

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

c. Resources: See "Schedule" above.

C. LICENSEE ACTIONS

1. Revise scope and criteria for licensing examinations.

a. Description: Licensees will prepare applicants for new examinations and will develop and implement new examination criteria and lecture schedules for the requalification program. Specific requirements related to new examinations include:

(1) All reactor operator license applicants shall take a written examination with a new category dealing with the principles of heat transfer and fluid mechanics, a time limit of nine hours, and a passing grade of 80 percent overall and 70 percent in each category.

(2) All senior reactor operator license applicants shall take the reactor operator examination, an operating test, and a senior reactor operator written examination with a new category dealing with the theory of fluids and thermodynamics, a time limit of seven hours, and a passing grade of 80 percent overall and 70 percent in each category.

(3) Applicants for operator licenses will be required to grant permission to the NRC to inform their facility management regarding the results of examinations.

(4) Simulator examinations will be included as part of the licensee examination.

Specific requirements related to requalification programs include:

(1) Contents of the licensed operator requalification program shall be modified to include instruction in heat transfer, fluid flow, thermodynamics, and mitigation of accidents involving a degraded core.

(2) The criteria for requiring a licensed individual to participate in accelerated requalification shall be modified to be consistent with the new passing grade for issuance of a license.

(3) Requalification programs shall be modified to require specific reactivity control manipulations. Normal control manipulations, such as plant or reactor startups, must be performed. Control manipulations during abnormal or emergency operations shall be walked through and evaluated by a member of the training staff. An appropriate simulator may be used to satisfy the requirements for control manipulations.

b. Implementation: New examination requirements for operating reactors will be effective May 1, 1980, and for applicants for operating licenses requirements must be satisfied before fuel loading. By May 1, 1980 requalification programs must include instruction in heat transfer, fluid flow, thermodynamics, and mitigation of accidents involving a degraded core. The grading criteria for accelerated requalification shall apply to all annual requalification exams conducted after March 28, 1980. Requalification programs must be modified by August 1, 1980 to require specific reactivity control manipulations. Renewal applications received after November 1, 1980, must reflect compliance with the new requalification program. After May 1, 1980 applicants for operator licenses will be required to grant permission to NRC to inform their facility management regarding results of examinations. The requirement to include simulator examinations as a part of the licensee examination will apply by June 1, 1980 to applicants where a simulator is located at the facility. Starting in FY81, simulator examinations will be conducted as part of the licensee examination for applicants where

simulators are not available at the facility, depending on availability and suitability of simulators.

c. Resources: \$100,000 per plant for initial implementation and \$100,000 per plant per year for recurring costs.

2. Operator licensing program changes: No licensee action is required other than reporting operating performance after requirements are developed.

3. Requirements for operator fitness: This is a Decision Group D item.

4. Licensing of additional operations personnel: Licensee action is to be determined.

5. Establish statement of understanding with INPO and DOE: This is a Decision Group D item.

D. OTHER ACTIONS: None.

E. REFERENCES

President's Commission Report: Items A.4.a, A.5, A.8.b, B.1.a, C.1, C.2, C.3.a and C.3.d

President's Response dated December 7, 1979: Proposal B.1.c, B.1.f, C.1.a and C.1.b

Other: NUREG-0585, Recommendations 1.4(2), 1.4(7), and 1.8

NUREG-0616, Recommendation 2.4.2

NUREG/CR-1250, Vol. I, pp. 105, 110 and 146; Vol. II, Part 2, pp. 423, 424, 458, 612, Part 3, pp. 854

SECY-79-330E, Qualifications of Reactor Operators, Recommendations 8, 10, 11, 12, 13, 14, 16

Memorandum from J. M. Allan, NRC Region I, to N. C. Moseley, October 16, 1979, Subject: "Operations Team Recommendations-IE/TMI Unit 2 Investigation" Recommendations C.2.b, C.2.c, C.3.c, D.3

Memorandum from J. M. Allan, NRC Region I, to J. H. Sniezek, September 28, 1979, Subject: "IE/TMI Radiological Investigation Team Recommendations for "Long-Term" TMI Improvements and/or For Other Power Reactor Sites" Recommendations 2?, 23

TASK I.A.4 SIMULATOR USE AND DEVELOPMENT

A. OBJECTIVE: The objective is to establish and sustain a high level of realism in the training and retraining of operators, including dealing with complex transients involving multiple permutations and combinations of failures and errors. Another overall objective is to improve operators' diagnostic capability and general knowledge of nuclear power plant systems.

B. NRC ACTIONS

1. Initial simulator improvement.

a. Description:

(1) Short-term study of training simulators: NRR and RES will collaborate on a short-term study to collect and develop corrections for the presently identified weaknesses of training simulators. The short-term objective is to establish and sustain a higher level of realism in the training of operators, including dealing with transients, where such gains can be quickly made. In the study, explicit consideration will be given to the programmatic views of Admiral H. G. Rickover in his statement to the Congress on May 24, 1979, and his amplifying remarks in his memorandum to Chairman Ahearne dated December 14, 1979.

(2) Interim changes in training simulators. Based on the results of the short-term study described above, study NRR-80-117, "Requirements for Operator Licensing" (Item I.A.2.6), and the proposed regulatory guide on simulators (Item I.A.4.2), NRR will require that specific weaknesses be corrected in the simulators used to train licensed operators. See also Table C.3, Item 54.

In April 1979, managers of simulator training centers were requested to develop the following capabilities for simulators: modelling saturation conditions, providing multiple failure accident training, including incorrect instrument responses, providing training for both active and passive failure of engineered

safety feature components, and providing training on natural circulation operation under solid water conditions.

b. Schedule:

(1) Short-term study of training simulators: The short-term study will be completed by July 1980.

(2) Interim changes in training simulators: NRR will issue appropriate requirements by December 1980.

c. Resources:

(1) NRR FY80 - 0.5 my and \$90,000; ADM FY80 - 0.2 my and \$15,000.

(2) NRR FY80 - 0.5 my, FY81 - 0.8 my.

2. Long-term training simulator upgrade.

a. Description:

(1) Research on training simulators: Research studies will be performed to improve the use of simulators in training operators, develop guidance on the need for and nature of operator action during accidents, and gather data on operator performance. Tasks include the following:

(a) Simulator capabilities: The accident sequences in WASH-1400 and subsequent risk analyses will be reviewed to identify those combinations of equipment failures and operator errors that will be reproducible by simulators. Advanced codes will be used to calculate the physical response of plant systems during these conditions to assure that the simulators properly represent these responses.

(b) Safety-related operator action: Operating experience will be reviewed to provide data on operator response times during actual and hypothetical accident conditions. The tasks that test an operator's capability to

recognize and cope with an accident situation will be analyzed. Operator training programs will be reviewed with respect to the results of these analyses and training improvements will be recommended. Explicit consideration will be given to operator actuation of controls versus automatic actuation. Recommendations will be developed relative to the degree of automation that should accompany the activation and operation of engineered safety features, as well as the resulting information display. Consideration of loss-of-power supply during a critical transient or accident-mitigation sequence will be included.

(c) Simulator experiments: Experiments will be designed and conducted to determine operator error rates under controlled conditions. This research can yield quantitative results on the effectiveness of proposed changes in information access and display, improved diagnostics, corrective action aids, and improved control room design.

(2) Upgrade training simulator standards: SD has prompted a review and updating of ANSI/ANS 3.5-1979, Nuclear Power Plant Simulators (this effort is currently under way).

(3) Regulatory guide on training simulators: SD will issue a regulatory guide for public comment endorsing ANS 3.5-1979. Based on the results of Item I.A.4.1, public comment, research (item (1) above), and the revised ANS-3.5, SD will revise and issue the regulatory guide for acceptability of nuclear power plant simulators for use in training programs (Recommendation 15, SECY 79-330E/F). SD will include procedures and criteria for testing simulators against the regulatory guide and consideration will be given to the need for full-plant-specific simulators.

(4) Review simulators for conformance to criteria: Simulator owners will be required to submit a report describing their plan for complying with the regulatory guide. Submittals from simulator owners will be reviewed and verified, through testing, to assure that the simulators conform to the regulatory guide or they utilize acceptable alternatives.

b. Schedule:

(1) Research on training simulators: The review of simulator capabilities will be initiated by May 1980, and will provide recommendations for sequences to be simulated as risk analyses and advanced codes become available. Tasks analyzing the capability of an operator to respond to accident conditions will be completed by June 1981, and recommendations will be developed by September 1981. Access to a simulator for experimental use will be obtained by January 1981. Experiments on the simulator will be designed by March 1981, and operator performance will be tested under controlled simulator conditions by December 1981.

(2) Upgrade training simulator standards: The revision of ANSI/ANS Standard 3.5-1979 will be completed by December 1980.

(3) Regulatory guide on training simulators: SD will issue a regulatory guide for comment by August 1980, and will issue the effective guide by September 1981.

(4) Review simulators for conformance to criteria: Verification of simulator conformance will be initiated in FY82 or later.

c. Resources:

(1) RES FY80 - 0.2 my and \$195,000, FY81 - 0.5 my and \$600,000, FY82 - \$900,000.

(2) SD FY80 - 0.1 my.

(3) SD FY80 - 0.2 my, FY81 - 0.5 my; ADM FY80 - 0.2 my and \$12,000, FY81 - 0.2 my and \$12,000.

(4) NRR first yea. - 5.0 my.

3. Feasibility study of procurement of NRC training simulator.

a. Description: In addition to the increased use of industry simulators for training of NRC staff (notably, the work by IE with the TVA training center simulators), a feasibility study of the lease or procurement of one or more simulators to be located in the NRC headquarters area will be performed. These simulators would be used in familiarizing the NRC staff with reactor operations, in assessing the effectiveness of operating and emergency procedures and in gathering data on operator performance. The study will include development of specifications, development of procurement and commissioning schedules, estimation of costs, and comparison with other methods of providing such training for NRC personnel.

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

c. Resources: See "Schedule" above.

4. Feasibility study of NRC engineering computer.

a. Description: The purpose of this study is to fully evaluate the potential value of and, if warranted, propose development of an engineering computer that realistically models PWR and BWR plant behavior for small break LOCA and other non-LOCA accidents and transients that may call for operator actions. Final development of the proposed engineering computer will depend on a number of research efforts. Risk assessment tasks (interim reliability evaluation program, or IREP, for example) to define accident sequences covering severe core damage will also provide the guidelines for the experimental and analytical research programs needed to improve the diagnostics and general knowledge of nuclear power plant systems. The programs will assist the development and testing of fast running computer codes used to predict realistic system behavior for these multiple accident studies. These codes will provide the basic models for use in the improved engineering computer as well as the capability for NRC audit of NSSS analyses.

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

c. Resources: See "Schedule" above.

C. LICENSEE ACTIONS

1. Initial simulator improvement.

a. Description:

(1) Short-term study of training simulators: No action is required, but those licensees who own simulators will be asked to participate.

(2) Interim changes in training simulators: Licensees and others who own and use training simulators will be required to accomplish the short-term improvements.

b. Implementation: All simulators used for training licensed operators shall be upgraded by January 1, 1982.

c. Resources: \$250,000 per existing simulator and \$50,000 for new simulators.

2. Long-term training simulator upgrade.

a. Description:

(1) Research on training simulators: No licensee action is required.

(2) Upgrade training simulator standards: No licensee action is required.

(3) Regulatory guide on training simulators: No licensee action is required.

(4) Review simulators for conformance to criteria: All simulator owners shall improve simulators and report on conformance to new criteria.

b. Implementation: It is not possible to estimate implementation schedules for all simulators. Implementation schedules will be established during course of long-term upgrade study.

c. Resources: It is not possible to estimate accumulated cost at this time, but changes could range from very minimal to a high of about \$6,000,000 per simulator if old simulators had to be replaced.

3. Feasibility study of procurement of NRC training simulator: This is a Decision Group D item.

4. Feasibility study of NRC engineering computer: This is a Decision Group D item.

D. OTHER ACTIONS: None.

E. REFERENCES

President's Commission Report: Items A.4.a, C.3.d, and C.4

President's Response dated December 7, 1979

Other: NUREG-0585, Recommendation 7.4

NUREG/CR-1250, Vol. II, Part 1, p. 130 and Part 2, pp. 463 and 612

SECY 79-330E, Recommendation 15

Memorandum from J. M. Allan, NRC Region I, to N. C. Moseley, October 16, 1979, Subject: "Operations Team Recommendations-IE/TMI Unit 2 Investigation" Recommendation C.2.c

ENCLOSURE 1

PART B

LONG RANGE RESEARCH PLAN

The following research needs are aimed at improving the technical basis for operator licensing requirements:

TASK I OPERATING PERSONNEL AND STAFFING

- A. Objective: Complex transients in nuclear power plants place high demands on the operators in the control room. Conduct research that will help to assure that competent individuals capable of responding to off-normal conditions are on duty at all times.

- B. Research Needs
 - 1. Job Task Analyses
 - a. Description: Analysis of the operator tasks in a nuclear power plant control room is necessary to address personnel qualifications and training, staffing, operating procedures, and improved technology to assist the operator in safety-critical functions. In-depth job task analyses will be conducted to describe the skills and knowledges essential for the tasks performed by control room personnel.
 - b. Schedule: To begin in FY'81. Results due FY'83.
 - c. Resources: NRR 0.1 PSY FY'81

0.4 PSY FY'82

0.2 PSY FY'83

RES 0.1 PSY FY'81

0.4 PSY FY'82

0.2 PSY FY'83

Contract assistance required: 100K FY'81

400K FY'82

200K FY'83

2. Personnel Qualifications

a. Description: Investigate methods to assure that safe and competent operators and senior operators are in charge of the day-to-day operation of nuclear power plants. This will include the validation of present and proposed requirements and procedures for operator selection including use of standardized tests and screening interviews. Evaluation of similar procedures and practices currently used by agencies such as DOD, FAA, etc. in personnel screening may provide guidance for standards.

b. Schedule: 2 years; possible starting date FY'82.

c. Resources: NRR 0.1 PSY

RES/SD 0.2 PSY

RES Outside contracts (\$300K)

3. Effects of Post TMI requirements on Operators.

a. Description: In coordination with INPO, develop a methodology and conduct a comprehensive survey to ascertain

the turnover rate of licensed plant personnel and the associated causative factors. Of particular interest are job stress related factors resulting from post TMI requirements and their impact on job performance and satisfaction of licensed plant personnel.

- b. Schedule: 1 Year; starting in FY'82 - Pending application of post TMI requirements.
- c. Resources: NRR-OLB 0.1 PSY
RES-Contract-INPO (35-50K)

4. Operator Performance

- a. Description: An approach will be developed to provide assurance that candidates for operator and senior operator licenses maintain an appropriate level of performance of duties. Methods and criteria for measuring satisfactory job performance and operator reliability should be determined. If feasible, a non-intrusive method for identifying serious degradation in job performance due to job-related stress will be developed.
- b. Schedule: May await results of job task analysis (See Task II.B.1), due by FY 83 for control room personnel.
- c. Resources: RES Contracts 200K
RES 0.2 PSY

TASK II EDUCATIONAL AND TRAINING REQUIREMENTS

A. Objective: As a result of the TMI-2 accident, increased education, training and experience requirements for operators, senior operators, and supervisors have been proposed to improve the capability of personnel to perform their duties and particularly to respond to off-normal plant operations. There is a need to validate these requirements and to formulate alternative courses of action where appropriate.

B. Research Needs

1. Validation of Present Educational and Training Requirements.

- a. Description: This effort will be focused on performance of job/task analyses to be performed in coordination with INPO to identify performance objectives of the operators' duties. Initially, a generic, job/task analysis will be required for both normal and emergency duties of operators, senior operators, supervisors, and shift technical advisors.
- b. Schedule: INPO task analysis underway (12/1980). Results for licensed, control room personnel due FY 83; for control room support and maintenance personnel FY 84. Funding is from DOE.
- c. Resources: DOE Contracts 500 K FY 81 - 82
500 K FY 83

2. Guidelines for Improved Education and Training Requirements

- a. Description: NRR will develop criteria and objectives to be met by training programs and to justify training curricula. These training objectives will provide assurance that licensed personnel are capable of carrying out safety-related functions effectively. The preferred method of accomplishing this goal is a position task analysis in which tasks performed by each person are defined, and the requisite skills and knowledges for the tasks are identified (See Tasks I.B.1 & II.B.1). Based on this task analysis, a consistent set of training, education, and experience objectives will be developed for positions of reactor operator, senior reactor operator, shift technical advisor and shift supervisor. Education equivalency requirements should be defined where appropriate for other operating personnel.
- b. Schedule: Started in FY 81 current initial effort underway. Completion date dependent on performance of II.B.1. Results for licensed, control room personnel due by FY 83; for control room support and maintenance personnel by FY 84.
- c. Resources: NRR-OLB .5 PSY - FY'82 1.5 PSY FY'83
RES: Outside Contracts-200K
RES: 0.2 PSY

TASK III OPERATOR LICENSING EXAMINATIONS

A. Objective: Increased emphasis on operator candidate qualifications underscores a need for alternative examination methods. The proposed requirement for the NRC to administer requalification examinations on an annual basis would cause an enormous increase in the workload of examiners. There is need to validate the current examination process and to find more efficient examination techniques. Alternatives should be considered in requalification examination requirements.

B. Research Needs

1. Examination validation

a. Description: Critically evaluate the operator license examination process with the objective of validating that the techniques employed meet the educational objectives as determined in Task II.B.2. Conduct controlled studies to establish the correlation of examination with measures of satisfactory job performance as identified in Task I.B.3. Determine the feasibility of alternative methods of written examinations, including use of objective format and scoring criteria. In considering alternative techniques, determine degree of emphasis appropriate for the oral, written, plant walk-through, and simulator portions of both initial and requalification exams.

b. Schedule: Depends on developing criteria for measuring satisfactory job performance (see Task I.B.3), due FY 83. Pilot study in FY 81 - NUREG/CR 1750 out for comment. Anticipated results by FY 84.

c. Resources: NRR .5 PSY - FY'83

RES: Contract Resources \$175K

RES: 0.2 PSY

2. Improved Examination Methodology

a. Description: Determine the feasibility of using standardized format for oral, plant walk-through, and simulator examinations. This could be accomplished by developing an examination checklist or questionnaire protocol which would be amenable to quantitative scoring of applicants knowledge and performance. Improved examination format and methods would foster inter- and intra-examiner reliability and facilitate validation of examination scores with on-the-job performance criteria.

b. Schedule: Depends on Task III.B.1. Anticipated results by start of FY 84.

c. Resources: DHFS .1 PSY - FY'82

.1 PSY - FY'83

RES: Contract assistance 75K FY 83

RES: 0.1 PSY FY 83

TASK IV THE USE OF SIMULATORS IN TRAINING PROGRAMS FOR NUCLEAR POWER PLANT
OPERATORS AND SENIOR OPERATORS

A. Objective: The objective is to achieve and maintain a high degree of realism in the training and retraining of operators, thereby thereby improving their diagnostic skills, as well as their general knowledge of nuclear power plant systems. The use and further development of simulators would be particularly beneficial in training and requalifying applicants to deal with complex transients which involve various constellations of errors and component malfunctions. The TMI accident has revealed a need to upgrade training simulators which has been partially addressed through hardware/software modifications in some sectors of private industry. Draft Regulatory Guide RS 110-5, "Nuclear Power Plant Simulators for Use in Operator Training," provides guidelines for considerable enhancement of simulator capabilities. However, the guide neither confronts the issue of accurately simulating 2 phase flow conditions, nor does it address what capabilities are necessary for effective training. Therefore, the objective of any proposed research program should be to address these specific needs as well. In light of these considerations, such research objectives could probably best be accomplished in 2 stages.

B. Research Needs

1. Stage 1 - Assessing Simulator Capabilities

- a. Description: Research on training simulators, will be performed to systematically establish the degree of simulator capability required to insure adequate training for conditions resulting in or from complex transients, including those events that can be characterized as abnormal 2 phase flow conditions.

Accident sequences and risk analyses will be reviewed to determine which permutations of component malfunctions and operator errors can be accurately simulated. To insure that the simulators effectively reflect these events, advanced codes will be employed to compute the actual physical responses of plant systems during these conditions.

Cooperative work with FAA is envisioned.

- b. Schedule: Work underway in FY 81 - ORNL (with Memphis State, General Physics Corp.) initial assessment of simulator capability and use (NUREG/CR-1482); Plant Status Monitoring Study underway - INEL.
- c. Resources: RES - contracts ORNL, GP 250K
RES: 0.3 PSY

2. Simulator Experiments

- a. Description: Experiments will be designed and implemented that can yield data on operator error rates in controlled settings providing a necessary data base upon which an evaluation of the effectiveness of proposed changes can be made.
- b. Schedule: Initial effort FY 81, NUREG/CR-1278 complete. Research on training simulators. Work underway - ORNL
- c. Resources: NRR 0.2 PSY FY 82
SD/RES 0.4 PSY Contract 300K

3. Stage 2 - Upgrading and Further Development

- a. Advanced Simulator Studies: Due to the technological upgrade of simulators to comply with proposed standards and guidelines, experiments will be designed and implemented to assess the following: 1) prediction of plant response and checkout of emergency procedures; 2) plant and operator response to define non-linearities affecting safety; 3) effectiveness of simulations; 4) alternative simulator concepts.
- b. Schedule: Advanced Simulator Studies: effort to be initiated - FY'82 and completed by end of FY'83.
- c. Resources: RES/SD 0.4 PSY FY 82
0.4 PSY FY 83
NRR 4.0 PSY FY 83
RES contracts - FY'82 250K
FY'83 250K

ENCLOSURE 2

REVIEW OF FOREIGN OPERATOR PRACTICE

REVIEW OF FOREIGN OPERATOR PRACTICE

1. Responsible Organization: OPE
Task Leader: G. Eysymontt and J. Miihoan
End Date: July 15, 1981

2. Statement of Problem Background:

The NRC is considering amending its regulations to improve and strengthen the criteria for issuing a license to reactor operators and senior reactor operators. The amendments will focus on requirements for operator education, training, and experience; requirements for use of simulators in operator training; requirements for maintaining operator proficiency; and NRC conduct of initial operator examinations and requalification examinations. Information on operator practice in other countries could be highly beneficial to NRC's assessment of its own regulations.

3. Plan for problem resolution:

A questionnaire has been prepared for transmittal to other countries. The questionnaire is a means by which the NRC can be specific with regard to the type of information that could be helpful in assessment of NRC regulations. By mid February 1981, the Office of International Programs will transmit the questionnaire to the following countries: Japan, France, Sweden, Switzerland, Spain, UK, FRG, Italy, Korea, the Netherlands, Taiwan, Belgium, Finland, Mexico, Argentina, Canada, and India.

The NRC will request that responses to the questionnaire be completed by April 1, 1981. A collation of information from responses to the questionnaire will be completed by mid July, 1981 and forwarded to the Commission and cognizant staff offices for consideration in developing amendments to 10 CFR Part 55. (The time between receipt of responses and the completion of the collation considers the time to obtain translations and the time to review and collate the supplied information.)

4. Organization involved and manpower estimates:

OPE: 1 person month

IP: 1 person month (this includes manpower estimate to obtain translations of foreign country responses.)

5. Contract assistance: Contract assistance to review the supplied information should not be required. Foreign travel to obtain information is not contemplated.

6. Interaction with outside organizations and the topics for interactions:

a. INPO - Results of the collation of information on foreign practice will be provided to INPO. This information may be useful to INPO programs.

b. International Atomic Energy Agency - Results of the collation of information will be supplied to the IAEA Technical Review Committee on Operations. The collation of information may be useful in revision of IAEA Safety Guide SG-01, "Staffing of Nuclear Power Plants and the Recruitment, Training and Authorization of Operating Personnel.

- c. NEA/INPO/NRC Specialist Meeting on Nuclear Power Plant Operators - Selection, Training and Support During Abnormal Events.

The meeting to be held October 12-14, 1981 will deal with the selection, training and licensing of nuclear power operators from the standpoints of both utilities and regulatory bodies. The results of the collation of information will be made available to INPO and NRC staff participants for their use during this meeting.

- 7. Identification of potential problems that could significantly modify the program or delay its completion:
 - a. Delay in receipt of information from foreign countries.
 - b. Delay in obtaining translation of responses to questionnaires.
 - c. Incomplete responses to questionnaire which may necessitate additional effort to obtain information.

DATE: MARCH 3, 1981

ENCLOSURE 3
THE ACTION PLAN TASKS

STATE ACTION PLAN	SUBMITTED TITLE	LEAD ORG.	OTHER ORG.	FY81	FY82	CONTRACT ASSIST?	CONTRACT FUNDING	CONTRACT REPORT	OFFSHORE ORGS.	STATUS
	TRAINING AND QUALIFICATIONS									
1.A.2.1	Immediate Upgrading of Licensed Personnel	NR-DEFS	N/A	0	0	NO	N/A	N/A	N/A	Complete 03/28/80
1.A.2.2	Train. & Qualifications of Operations Personnel	NR-DEFS				Yes	10,000	C.E.	N/A	NR-80-117 Internal Review underway
1.A.2.3	Admin. of Train. Programs	NR-DEFS	N/A	0	0	NO	N/A	N/A	N/A	Complete 03/28/80
1.A.2.4	NR Participation in Inspector Train.	NR-DEFS	IE	.1	.1	NO	N/A	N/A	N/A	Initiate FY'82
1.A.2.5	Plant Drills	NR-DEFS	N/A	.1	0	NO	N/A	N/A	N/A	
1.A.2.6	Long-term Upgrading of Train. & Qualifications	SD-DEFS	NR-IE-ADM	.6	0	Yes	200,000	OLB	N/A	Study complete NR-80-117 - Out for Comment
1.A.2.7	Accreditation of Train. Institutions	NR-DEFS	SD-IE-ADM	1.3	0	NO	N/A	N/A	IBFO	Commission Paper Due - Jan. 1982

DATE: MARCH 3, 1981

EXHIBIT 3
THE ACTION PLAN TASKS

TASK ACTION PLAN	SUBMITTED TITLE	LEAD ORG.	OTHER ORG.	POWER FY81 FY82	CONTRACT ASSIST	CONTRACT FEEING	CONTRACT METHOD	OUTSIDE ORGS.	STATUS
LICENSING AND REQUALIFICATION OF OPERATING PERSONNEL									
1.A.3.1	Revise Scope & Criteria for Licensing Exams	NRB-DIES	N/A	0	0	N/A	N/A	N/A	Complete
1.A.3.2	Operator Licensing Program Changes	NRB-DIES	N/A	0.1	1.2	N/A	N/A	N/A	Plan to relocate
1.A.3.3	Requirements for Operator Fitness	SD-DIES	N/A	0	0	N/A	N/A	N/A	No Schedule at this time
1.A.3.4	Licensing of Add'l Operations Personnel	NRB-DIES	N/A	0	1.0	X	OLB	N/A	Part of RRR-80-17 Initial requirement in FY82
1.A.3.5	Establish Statement of Understanding with IRO & DEE	NRB-DIE	DIES					DIE IRO	No Schedule as yet

DATE: MARCH 3, 1981

ENCLOSURE 3
THE ACTION PLAN TASKS

TASK ACTION PLAN	SHERIDAN TITLE	LEAD ORG.	OTHER RRC ORG	MANAGER FY81 FY82	CONTRACT ASSIST	CONTRACT FUNDING	CONTRACT MONITOR	OUTSIDE ORGS.	STATUS
SIMULATOR USE AND DEVELOPMENT									
1.A.4.1	Initial Simulator Improvement	HRR-CLE	RES	0.0 .5	Yes	80,000	RES	N/A	Short term study complete-out for comment.
1.A.4.2	Low-term training Simulator Upgrade	SD-DES	RES-HRR	1.0 5.0	Yes	1,795,000	RES	N/A	Studies underway Report due 4/81.
1.A.4.3	Feasibility Study of Procurement of RRC Training Simulator	RES	N/A	0 0	0	0	0	0	No Schedule
1.A.4.4	Feasibility Study Engineering Simulator	RES	N/A	0 0	0	0	0	0	No Schedule

DATE: MARCH 3, 1981

EXHIBIT 3
LOW RANGE RESEARCH PLAN

TRACK ACTION PLAN	SHORT-TITLE	LEAD ORG.	OTHER ORG.	NUMBER FY81 FY82	CONTRACT ASSIST	CONTRACT FUNDING	CONTRACT METHOD	OUTSIDE ORGS.	STATUS
OPERATOR PERSONNEL AND STAFFING									
I.B.1	Job Task Analysis	RES	NRR	RES.1 .4 NRR.1 .4	Yes	100K FY'81 400K FY'82 200K FY'83		To be determined.	To start FY'81 Results due FY'83
I.B.2	Personnel Qualifications	SD	NRR-RES	0.3	Yes	100K	RES	NASA FVA DOD	Completion FY'84
I.B.3	Effects of Post-TMI Requirements	RES	NRR/OLB/ PIRB	0.1	Yes	75K	RES	TRPO	Completion FY'83
I.B.4	Operator Performance	NRR/OLB	RES	0.2 1.5	Yes	200K	RES	DOD	NRRG/CR-1750 Out for comment Completion FY'83

DATE: MARCH 3, 1981

ENCLOSURE 3
 LONG RANGE RESEARCH PLAN

<u>TASK NUMBER</u>	<u>SEARCHED TITLE</u>	<u>LEAD ORG.</u>	<u>OTHER ORG.</u>	<u>NUMBER FY81 FY82</u>	<u>CURRENT ASSESS</u>	<u>CURRENT FUNDING</u>	<u>CURRENT METHOD</u>	<u>OUTSIDE ORGS.</u>	<u>STATUS</u>
<u>EDUCATIONAL AND TRAINING REQUIREMENTS</u>									
I.B.1	Validation of Educational-Training Requirements	RES	NRV/DIFS	0.1 0.5	Yes	500K	DCR	INFO DOE	INFO Study Underway - Pilot Study - NRDG/CR-1759, Completion FY'83 Doe funding
I.B.2	Guidelines for Improved Education & Training	NRV/OEB	NRV/DIFS/RES	0.5 1.5	Yes	200K	RES	DPO	Depends on Tasks I.E.1 and II.B.1. Task Analysis completion FY '84.

DATE: MARCH 3, 1981

ENCLOSURE 3
 LONG RANGE RESEARCH PLAN

<u>OPERATION PLAN</u>	<u>SEARCHED TITLE</u>	<u>LEAD ORG.</u>	<u>OWNER ORG.</u>	<u>NUMBER FY81 FY82</u>	<u>CONTACT ASSISTANT</u>	<u>CONTACT FUNDING</u>	<u>CONTACT METHOD</u>	<u>OUTSIDE ORGS.</u>	<u>STATUS</u>
<u>OPERATOR LICENSING EXAMINATIONS</u>									
III.B.1	Examination Validation	NRV/OIB	NRV/DIRS RES	0.5 0.2	Yes	175K	RES	INFO	NRV/CR-1750 Pilot Study Depends on I.B.3 Completion FY'84
III.B.2	Examination Pathology	NRV/OIB	NRV/DIRS RES	0.1 0.2	Yes	75K	RES	INFO	Depends on III.B.1 Completion FY 84

DATE: MARCH 3, 1981

ENCLOSURE 3
LONG RANGE RESEARCH PLAN

TASK ACTION PLAN	SUBMITTED TITLE	LEAD ORG.	OTHER SRC ORG	MANPOWER FY81 FY82	CONTRACT ASSIST	CONTRACT FUNDING	CONTRACT NUMBER	OUTSIDE ORGS.	STATUS
USE OF SIMULATORS									
IV.B.1	Assessing Simulator Capabilities	RES	NRR/OLB	0.3	0.5	Yes	250K	RES	Underway NUREG/CR-1482 Out for comment Completion FY'82
IV.B.2	Simulator Experiments	RES	NRR/OLB	0.4	0.2	Yes	300K	RES	Initial effort NUREG/CR-1278 Complete
IV.B.3	Upgrading & Development	RES	NRR/OLB	0.8	4.0	Yes	500K	RES	Underway Completion FY'83