

Task A-34

INSTRUMENTS FOR MONITORING RADIATION AND PROCESS
VARIABLES DURING ACCIDENTS

Lead NRR Organization: Division of Site Safety and
Environmental Analysis (DSE)

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Applicability: All Reactor Types

Projected Completion Date: November 1978

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APPENDIX B

1. DESCRIPTION OF PROBLEM

To develop criteria and guidelines to be used by applicants, licensees and staff reviewers to support implementation of Regulatory Guide 1.97, Revision 1 (Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant Conditions During and Following an Accident).

Such criteria and guidelines would provide specific guidance on functional and operational capabilities required of the various classes of instruments, including inplant and explant instruments. Where such guidance cannot be provided, the rationale to be applied to derive requirements for specific situations will be provided.

2. PLAN FOR PROBLEM RESOLUTION

- A. Detailed guidance and acceptance criteria concerning implementation of Regulatory Guide 1.97 has not yet been developed. Therefore, the members of this Task Group will answer questions that arise before and during the development of the required proposals for implementation of Regulatory Guide 1.97 for the lead plants described below. In this way, the Task Group will develop the necessary guidance as it is needed by the lead plant applicants. The Task Group will also be responsible for the review of submittals made by the lead plant applicants.
- B. There are two aspects of the implementation of Regulatory Guide 1.97, Revision 1 (Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant Conditions During and Following an Accident) that must be considered.
- (1) Position C.3 of RG 1.97 requires the installation of specific instrumentation to follow the course of an accident (IFCA). The staff has determined that this requirement should be satisfied in as timely a manner as possible. The Task Group established by this Task Action Plan will identify lead plants (at least one BWR and one PWR) for implementation of Position C.3, will answer questions raised by the lead plant applicants, and will assume responsibility for the review of the proposals for implementation of Position C.3 that are submitted. Based on the experience gained during this review, the Task Group will prepare uniform review procedures and acceptance criteria to be used by the staff for the review of subsequent implementation proposals.

- (2); Full implementation of RG 1.97 requires the applicant/licensee to prepare a Safety Analysis which is reviewed by the staff. Lead plants (at least one BWR and one PWR) for full implementation of RG 1.97 will be designated. The Task Group established by this Task Action Plan will assist the lead plant applicants in the development of the required Safety Analyses by answering questions from the applicants. The Task Group will review the Safety Analyses when they are submitted. Based on the experience gained during the development and review of the Safety Analyses for the lead plants, the Task Group will prepare guidance to assist other applicants/licenseses in the development of the required Safety Analysis and acceptance criteria to be used by the staff to review the Safety Analyses submitted.

C. Description of the End Product of Task Group

- (1) A letter to all applicants and licensees containing guidance to facilitate the preparation of Safety Analyses required by RG 1.97.
- (2) Revision of various Standard Review Plans to provide for the uniform review of required Safety Analyses and Proposals for Implementation of Position C.3.
- (3) Recommendation for revision of RG 1.70, Standard Format and Content of SAR's for Nuclear Power Plants.
- (4) Recommendations for confirmatory research as required.
- (5) Recommendations for revisions to RG 1.97.

3. BASIS FOR CONTINUED PLANT OPERATION AND LICENSING PENDING COMPLETION OF TASK

As described in Sections 1 and 2, the issue addressed by this task is the timely development of criteria and guidelines to support full implementation of Reg. Guide 1.97, Revision 1 for CP's, OL's and Operating Reactors. Full implementation of Reg. Guide 1.97, Revision 1 requires the applicant/licensee to prepare a Safety Analysis (of instruments to follow the course of an accident which are part of this task as opposed to instruments to prevent an accident which are not) which is to be reviewed by the staff. This task will provide guidance to applicants for preparation of the Safety Analysis report and criteria and analyses by which the staff will review the report.

The current staff review process assures that the likelihood of serious accidents is extremely low. Implementation of the defense-in-depth concept and the single failure criterion assure that there is no undue risk to the health and safety to the public. There

is, however, a residuum of risk from accidents which are more severe than those evaluated in the applicant's Safety Analysis Report and reported on in the staff's Safety Evaluation Report. This residuum of risk is small when compared to other risks in society and as such, specific designs to accommodate accident conditions contributing to these risks is not required. The staff has, however, determined that it is prudent to provide additional capability for plant operators to identify accident conditions which could lead to significant consequences. Full implementation of the provisions of Regulatory Guide 1.97, Revision 1 will provide additional assurance that the operator will be able to identify the need for and execute accident mitigation procedures for design basis accidents and be able to identify and act to rectify accident conditions which have been degraded beyond the design basis. The low level of the residual risk for current designs presents no undue risk to the health and safety of the public.

3. NRR TECHNICAL ORGANIZATIONS INVOLVED

These branches will carry out their responsibilities through participation on the Task Group.

- A. Accident Analysis Branch (DSE) - review the Safety Analyses required by RG 1.97 for the lead plants to ensure that variations in plant variables are adequately defined, from a consequences viewpoint, for the Design Basis Accidents analyzed. This review will also include evaluation of operator interaction (e.g., procedures, actions, timing) for utilizing instrumentation to follow the course of an accident (IFCA) to assess and minimize risk. Develop guidance for applicants/licensees and uniform review procedures for the staff to support the implementation of RG 1.97 on other plants. Review the plans for implementation of Position C.3 for lead plants and develop uniform review procedures for the staff to use to review implementation proposals for other plants. (Manpower Requirements: 1 reviewer, 2MM per reviewer.)
- B. Reactor Systems Branch (DSS), Containment Systems Branch (DSS), Auxiliary Systems Branch (DSS), Power Systems Branch (DSS)

Review the Safety Analyses for the lead plants to ensure that significant process variables required to monitor the course of Design Basis Accidents, from a systems performance viewpoint, are identified. This review will also include evaluation of operator interactions (e.g., procedures, actions, timings) for

- utilizing IFCA to optimize system performance. Develop guidance for applicants/licensees and uniform review procedures for the staff to use to implement RG 1.97 on other plants. (Manpower requirements: 1 reviewer per branch, 3MM per reviewer in RSB, 1MM per reviewer in CSB, and PSB.)
- C. Radiological Assessment Branch (DSE) and Effluent Treatment Systems Branch (DSE) - develop criteria for application of inplant and explant radioactivity monitoring systems to follow the course of an accident during various accident situations and accident scenarios. Review the Safety Analyses for the lead plants to ensure that plant radiation sources are adequately defined and that radiation monitoring is adequate from the viewpoint of protection of the health and safety of utility staff personnel, of emergency program personnel and of the public outside the immediate plant environs. (Manpower requirements: 1 reviewer, 2 MM per reviewer for RAB and 1 reviewer, 1 MM per reviewer for ETSB).
- D. Instrumentation and Control Systems Branch (DSS) - review the Safety Analyses for the lead plants to ensure that IFCA is appropriately designed, will remain operable as required, and will accurately represent the information required by the operator. This review will include consideration of maintenance and testing of instrumentation. Develop guidance for applicants/licensees and review procedures for the staff to use to implement RG 1.97 on other plants. Review the plans for implementation of Position C.3 for lead plants and develop uniform review procedures for the staff to support the review of implementation proposals for other plants. (Manpower Requirements: 1 reviewer, 2MM per reviewer.)
- E. Operator Licensing Branch (DPM) - assist in evaluating operator interactions and expected operator responses to identify the instrumentation required and the procedures to be followed to deal with Design Basis Accidents. Develop guidance for applicants/licensees and uniform review procedures for the staff to support implementation of RG 1.97 on other plants. (Manpower Requirements: 1 reviewer, 1MM per reviewer.)
- F. Emergency Planning Branch (DPM) - review the Safety Analyses for lead plants and the applicant's Emergency Plan to ensure that the operator will be supplied with the information needed to permit him to provide authorities responsible for implementation of Emergency Plan with accurate and timely recommendations concerning implementation of all or part of the plan. Develop guidance for applicants/licensees and uniform review procedures for the staff to support implementation of RG 1.97 on other

plants. Review the plan of Position C.3 for lead plants and develop uniform review procedures for the staff to support the review of implementation proposals for other plants. (Manpower Requirements: 1 reviewer, 1MM per reviewer.)

- G. Environmental Projects Branch 1 (DSE) - Provide a Task Manager to serve in the principal management function for the project. (Manpower Requirements: 1 project manager, 3MM manager.)
- H. Operating Technology (DOR) - Review and comment on materials developed by the Task Group. Adapt the criteria and guidance developed by the Task Group for use by reviewers and licensees of operating reactors. [Manpower Requirements: 1 reviewer per branch (4 branches), 1 MM per reviewer.]
- I. Other Branches in NRR may be called upon to provide technical support to the Task Group as needed on a consultation basis. (Manpower Requirements: Total 1 MM.)

5. TECHNICAL ASSISTANCE FUNDS AND CONFIRMATORY RESEARCH FUNDING REQUIRED

It is not presently anticipated that technical assistance funding or confirmatory research funding will be required to directly support this Task Group. Two projects (described below) may produce data that will support the activities of this Task Group.

- A. DOR has an existing technical assistance contract with BNL to evaluate certain operating plants to determine the capability of existing effluent radiation monitors to measure radioactivity releases through anticipated release paths from postulated accidents. The funding level for this program is \$25K for FY 1977 and FY 1978.
- B. DSE has an existing technical assistance contract with Allied Chemical Company (INEL) to develop bases for the specification of gaseous effluent accident monitoring instrumentation. The funding level for this program is \$40K for FY 1977.

6. INTERACTION WITH OUTSIDE ORGANIZATIONS

The Task Group will maintain close contact with applicants for the lead plants.

7. ASSISTANCE REQUIREMENTS FROM OTHER NRC OFFICES

Office of Standards Development - Assist in the development of subsequent revisions of RG 1.97 and other Regulatory Guides based on experience gained during the review of the lead plants.

6. POTENTIAL PROBLEMS

Based on preliminary studies, as exemplified in BNWL-1635, it is anticipated that many plant evaluations, particularly those for operating plants, will show the need for monitoring equipment not commercially available and, therefore, a lead time of six months to two years may be necessary for development, procurement, and installation of monitoring equipment.

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