

FEB 23 1961

Dear Dr. Thompson:

At the Commission meeting on January 31, 1961, to consider proposed reactor site criteria, you asked about the status of studies to establish the feasibility of developing reactor safety criteria and of research relating thereto recommended by the ACRS in its letter of November 16, 1959.

As indicated in our letter of January 7, 1960, the Commission has devoted considerable time and effort to the Committee's suggestions and has given serious study to the extent and direction of efforts which the Commission should exert on the definition of criteria and standards for reactor safety and how handling of matters closely related to this topic might be arranged to best advantage.

In December 1959 the General Manager appointed an Ad Hoc Committee to consider these matters further and recommend steps that should be taken. Committee membership included persons from the AEC, from nuclear industrial concerns and from the ACRS. The Ad Hoc Committee study was completed in September 1960 and copies of its report dated September 29, 1960 have been forwarded to the ACRS.

We believe the recommendations of this Committee constitute reasonable steps in the direction of achieving the objectives expressed by the Advisory Committee, although the Commission has not depended solely for guidance in these matters on the Ad Hoc Committee. Implementation of these Ad Hoc Committee recommendations has been initiated as shown in some detail in the attached staff report.

I suggest that the Advisory Committee on Reactor Safeguards appoint a small subcommittee to consult with the Division of Licensing and Regulation and the Office of Technical Information on the selection, scope, authors and priority scheduling of the monographs and review articles discussed under Item 6 of the attached staff report.

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Dr. T. J. Thompson

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You may be aware that the Commission's Reactor Safety Research program as contained in next year's budget will be expanded. Not only have the projects (SPERT, TREAT, fuel meltdown, fission product release, containment concepts, water-metal reactions, etc.) supported by this year's \$11 million budget been continued and in some cases expanded, but the budget support has been increased to \$13 million to accommodate extension of laboratory experiments in certain of the areas of investigation to large-scale field experiments. Controlled explosions in large scale containers for missile studies, and release, containment, "washdown" and clean-up of larger scale fission products releases are among those visualized. Planning discussions are also under way for systematic meteorology studies in special areas such as California.

Sincerely yours,

John S. Gashorn
Acting Chairman

Dr. T. J. Thompson, Chairman
Advisory Committee on Reactor Safeguards
U. S. Atomic Energy Commission

Enclosure:
Staff Report with Annex I

bcc: Chairman (2)
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AGMRS
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CKBeck, I&R
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OTI <i>DiNunno</i>
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February 13, 1961

STAFF REPORT
ON
IMPLEMENTATION OF RECOMMENDATIONS OF
AD HOC COMMITTEE
RELATING TO REACTOR SAFETY CRITERIA

The recommendations of the Ad Hoc Committee are listed below along with a discussion of measures that have been taken to implement those recommendations:

(1) Recommendations

"We recommend that there be established rules, which may of necessity involve some degree of arbitrariness, by which sites that would be considered acceptable for locations of reactors can be selected."

The AEC staff has, with the assistance of the ACUS, recently completed a set of proposed guides to be used in considering the acceptability of sites for power and test reactors. The Commission has approved publication of these guides in the Federal Register for public comment. It is intended that these guides will receive continued attention with the view to updating them as the technology advances.

(2) Recommendations

"We recommend that the AEC does not at this time attempt to standardize the technical design and construction specifications and procedures for reactors or for the various components of reactors."

In making this recommendation the Committee explained this conclusion on the basis that at the present time, standard patterns of general practice in types and general characteristics of reactors, or in the design arrangements and construction plans for reactor components have not emerged. It appeared to the Committee that in this transitional developmental stage of reactors it was too early to bind designers to fixed design standards so long as safety was not being compromised. Rather, concern was expressed that issuance of standard design and construction specifications might discourage incorporation of alternate arrangements which further experience might reveal to offer greater safety than that achieved by the best now known.

The Commission staff agrees with this recommendation against pressing the advancing technology at this time through issuance of standardized technical design specifications. There is a need, however,

to develop criteria or guides, which, while not attempting to tell applicants specifically how to design, will inform them as to what is acceptable as we see, in practice that have been found acceptable and on the factors the AEC will consider in reviewing their design proposals. This is discussed further below.

(3) Recommendations:

"We recommend that there be initiated a continuing effort within the AEC on the collection and organization of safety guides, or state-of-the-art practices on reactors and reactor components and on a systematic tabulation of safety performance objectives for reactors and reactor components and that these be made available as guides to the nuclear community, but not at this time as regulations."

Work along these lines began many months ago. Performance objectives on such subjects as containment, control rods, monitoring systems, waste disposal systems and organization and operating procedures were developed in preliminary form. Copies of these were furnished the AECs for information and comment. The AEC staff has reviewed and expanded its efforts on these guides and expects in the near future to have considerably revised and expanded versions prepared.

(4) Recommendations:

"We recommend that, to inform the general public and to assist applicants in the preparation of information required in support of license applications, there be prepared an explanation of the AEC licensing procedures and a guide or set of instructions, with appropriate illustrations and examples, on the preparation of licensee summary reports, which, to some extent, should follow a standard pattern."

Work on a revision of formal instructions on licensee summary reports (10 CFR 50) containing sections which would amplify and clarify the procedures and requirements relating to licensee summary reports has been initiated. It is intended that this effort will also result in formulation of additional guidance to applicants in the areas of change procedures and technical specifications.

(5) Recommendations:

"We recommend that the safety research projects of the AEC scattered among many administrative units, be brought under the surveillance and co-ordination of one appropriately located person having sufficient authority and staff to achieve appropriate scope and coherence in the program."

It is recognized that in the pursuit of the objectives of the many programs of the AEC, there is generated much technical

information of value to those charged with the safety analysis of specific projects. Added emphasis is to be given to the study of existing data and programs with the view of comparing what already is known with the needs and gaps as they appear in the course of hazards evaluations, after which specific steps to augment existing safety research programs can be recommended. Steps have been taken to supplement the staff of the Division of Licensing and Regulation with specific assignment to this task. Insofar as this recommendation of the Ad Hoc Committee relates to administrative responsibilities, the implementation will have to await the results of the Commission's study on organization.

(6) Recommendations

We recommend that the Nuclear Safety Journal receive full time direction, and support from some appropriate person on the staff of the Commission, that it be increased in frequency to at least six issues per year and that it be expanded to include in each issue authoritative monographs or review articles on pertinent reactor safety topics prepared by experts in the field."

This recommendation related to the need expressed in the ACES letter for a study of the available information on reactor safety. The Ad Hoc Committee agreed on the desirability of a series of monographs on pertinent reactor safety topics. The majority visualized that such effort should constitute a continuing program by which the AEC would provide the nuclear community with a comprehensive flow of information from research projects and experience gained in reactor operation. Expansion of the coverage of the Nuclear Safety Journal was suggested. This recommendation is being considered along with other possible means to achieve the same objective.

The AEC has in the past sponsored the publication of books and review-type reports on subjects directly relating to safety analysis and currently has an active program along similar lines. A summary of such projects currently in progress is attached hereto. These efforts are to be expanded.

One method of extending this review, collection and evaluation work is through appropriate contractual arrangements with selected professional technical societies through monographs and review articles on specified topics will be prepared. Contracts have been or are now being negotiated with the American Society of Metals, the American Nuclear Society, and the American Institute of Biological Sciences. The role visualized for the societies would be one of arranging for specialists in the various fields to act as a committee to advise on the over-all project, recommend titles with specific scope outlines, recommend authors and reviewers for monographs and articles and render advice based on its own review of manuscripts. A number of the society would be expected to act as a project supervisor. Titles, authors and texts in all cases would be worked out in discussions between the society and the AEC. By attempting to utilize the familiarity society personnel have with the ability of men within their own fields and the problem areas peculiar to these fields that relate to nuclear safety, this approach should result in a broad attack on the problem. The Division of Licensing and Regulation is working with the Office of Technical Information in establishing titles of subjects that are in most urgent need for monograph type coverage.

In addition, the Division of Licensing and Regulation and Office of Technical Information are setting up a list of topics for comprehensive review articles which are to be covered in forthcoming issues of the Nuclear Safety Journal. Such articles are intended to be on more narrow technical areas and hence will be less extensive in scope than the monograph series.

The Advisory Committee on Reactor Safeguards should be asked to appoint a small subcommittee to consult with the staff on the selection, scope, authors and priority scheduling of both the monographs and the review articles.

Meanwhile, as the steps described above are taken to gather and publish information pertinent to better understanding of problems of nuclear safety, AEC efforts will continue also to encourage the interchange of new knowledge in these areas through conferences and symposia by the technical experts, professional societies and the nuclear industry. Oral discussion among the expert participants and publication of the proceedings of such conferences are both recognized as important contributions to efforts for making new information readily accessible. The AEC, for example, has in the past fifteen months either organized or participated in numerous conferences devoted to the interchange of ideas and information on matters relating to nuclear safety.

(7) Recommendation:

"We recommend that means be found for making widely available the discussions of the Commission and its Hearing Examiners and the AEC staff analyses and evaluations of safety aspects of projects considered in the regulatory process, and that consideration be given to making more accessible the hazards summary reports."

The applicants' Records Summary Reports, the Division of Licensing and Regulation staff analyses (testimony in the hearing cases) and the decisions of the Hearing Examiner and the Commission have always been available. The bulk of material involved is formidable but copies can be obtained (1) for the first listed, from the applicant or from the Public Document Room reproduction services and (2) transcripts of hearings, including the detailed AEC staff analyses, from the Alderson Reporting Service, and (3) decisions of Hearing Examiners and the Commission, from the Office of the Secretary. There has been no interest indicated by any technical or trade journal in reproducing these documents, no doubt because of their bulk. Usually the documents listed are cited or extracted by commercial news letters and trade journals so that their existence is broadcast. To insure that their availability as described above is known, appropriate notices will be distributed to that effect.

ANNEX I

BOOK AND REVIEW-TYPE REPORTS ALREADY IN PRESS OR IN PREPARATION

1. On Reactor Site and Environment

- a) Reactor Handbook (2nd Ed.) Vol II, Fuel Processing, Interactions (500 p)
- b) Chapter 12 of Reactor Handbook (2nd Ed.) Vol IV, Engineering, Interactions
- c) Treatment and Disposal of Low Level Radioactive Wastes, Strub. (300 p)

2. On Meteorology

- a) AECU 3044, Meteorology and Atomic Energy is being revised (under the direction of the Weather Bureau)

3. On Containment

- a) Chapter 11 of Reactor Handbook (2nd Ed) Vol IV, Engineering, Interactions

4. On Reactor Design

- a) Reactor Handbook (2nd Ed) Vol III, Physics and Shielding, Interactions (300 p)
- b) Chapters 1, 2, 4, 5, 6 & 9 of Reactor Handbook (2nd Ed) Vol IV, Engineering, Interactions
- c) Fast Reactor Handbook, Amrosi, Vol II on theory and core design (450 p)
- d) Principles of Nuclear Reactor Engineering (2nd Ed) Glasstone, Van Nostrand (300 p)
- e) Nuclear Reactor Design Manual, Palladino, Fanger, and Mandil. NRC sponsorship.

5. On Metallurgy and Materials Radiation Effects

- a) Properties of Uranium Dioxide, Belle, NRC sponsorship
- b) Effects of Radiation on Organic Materials, Bolt and Carroll, (500 p)
- c) Radiation Damage to Reactor Fuels, Howe (500 p)

- d) **Plutonium Handbook, Wick (300 p)**
- e) **Metallid Hydrides, Miller and Blackledge**
- f) **Nuclear Graphite, Nightengale**
- g) **Irradiation Testing and Hot Laboratory Techniques, Wroughton, Glascoe, and Reef. NHB sponsorship**
- 6. **On Instrumentation and Control**
 - a) **Theory and Design of Nuclear Reactor Control Systems, Harter**
 - b) **Chapter 8 of Reactor Handbook (2nd Ed) Vol IV, Engineering, Inter-science**
 - c) **Neutron Absorber Materials for Reactor Control, Anderson and Thellacher. NHB sponsorship**
- 7. **On Chemical Reactions**
 - a) **Reactor Handbook (2nd Ed) Vol II, Fuel Reprocessing, Inter-science (600 p)**
 - b) **Analysis of Essential Reactor Materials, Rodden (700 p)**
- 8. **On Reactor Operation**
 - a) **Chapters 10 and 13 of Reactor Handbook, (2nd Ed) Vol IV, Engineering, Inter-science**
- 9. **On Mechanical Systems**
 - a) **Thermal stresses in Reactor Design, Franklin Institute, (750 p)**
 - b) **Reactor Heat Transfer and Fluid Flow, Zarbo. NHB sponsorship**
 - c) **Piping Handbook for Pressurized Water Nuclear Power Plants, Shaw. NHB sponsorship**

