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September 1966

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THE TRA SAFEGUARD COMMITTEE

R. J. Nertney

RELEASED FOR ANNOUNCEMENT
IN NUCLEAR SCIENCE ABSTRACTS

IDAHO NUCLEAR CORPORATION
NATIONAL REACTOR TESTING STATION
IDAHO FALLS, IDAHO

U. S. ATOMIC ENERGY COMMISSION

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IDAHO NUCLEAR CORPORATION

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GENERAL CHEMICAL
CORPORATION CORPORATION

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THE TRA SAFEGUARD COMMITTEE

by

R. J. Nertney

A B S T R A C T

This document constitutes the working charter of the TRA Safeguard Committee. It describes the duties and functions of the TRA Safeguard Committee; documents certain existing procedures regarding reactor and experimental safety at the MTR, ETR and ATR; indicates those activities which require TRA Safeguard Committee approval, describes the procedures for obtaining such approval and relates the activities of the TRA Safeguard Committee to the functions and responsibilities of Idaho Nuclear Corporation line supervision.

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THE TRA SAFEGUARD COMMITTEE

A. Introduction

The purpose of this document is basically four-fold.

1. To describe the duties and functions of the TRA Safeguard Committee.
2. To document certain existing procedures regarding reactor and experimental safety at the MTR, ETR and ATR.
3. To indicate those activities at MTR, ETR and ATR which require TRA Safeguard Committee approval and to describe the procedures for obtaining such approval.
4. To relate the activities of the TRA Safeguard Committee to the functions and responsibilities of Idaho Nuclear Corporation line supervision.

Historically, a Reactor Safeguard Committee has been in existence since the beginning of the NRTS Test Reactor Operations in 1952. This committee was earlier identified as the "MTR Safeguard Committee" the "Phillips Reactor Safeguard Committee" and was composed of various combinations and numbers of members and a part-time chairman. The committee Chairmanship was made a full-time function in 1959. This committee had, however, at all times been composed of senior members of the Phillips organization and had at all times exercised the final decision regarding safe operation of the MTR, later the ETR, and these reactors' experimental programs. A brief history and summary of operating practices of the MTR Safeguard Committee was published in 1956*. The present committee known as the "TRA Safeguard Committee" was organized on April 14, 1965, and it is this committee which we shall discuss here.

B. Committee Membership

The committee members and their alternates are selected by the Manager, Idaho Nuclear Corporation. Functionally, the committee is presently composed as follows:

1. Chairman, full-time, PhD Engineering Physics
2. Sr. Plant Engineer, BS Engineering
3. Section Head, Operational Surveillance, BS Physics
4. Director, Health Physics, BA Physics - BS Mathematics
5. Operations Coordinator, MTR (MTR only), BS Engineering
6. Operations Coordinator, ETR (ETR only), BS Engineering
7. Operations Coordinator, ATR (ATR only), BS Engineering

All of the members have had many years' experience in the test reactor field.

* deBoisblanc, D. R., "History and Operating Practices of the MTR Reactor Safeguard Committee", IDO-16284 (1956)

With the exception of the chairman of the committee, who serves in a staff capacity to the Idaho Nuclear Corporation Operations Division Manager, the members serve on the committee on a part-time basis.

An alternate, of approximately similar background and qualifications, has been appointed for each member. Except by specific directive from the Idaho Nuclear Corporation Manager, the alternate may represent the member only when the member himself is not available for attendance by reason of being away from the Reactor Testing Station.

In addition to the regular membership, the committee frequently makes use of the services of specialists within the Idaho Nuclear Corporation in the various nuclear speciality fields.

C. Responsibilities

The functions of the committee are three-fold:

1. To establish and maintain an acceptable risk level with regard to operation of the MTR, ETR, ATR and their experimental programs.
2. To review and prevent recurrence of incidents which directly or indirectly involve radiation hazards at the two reactors. This includes operational and design aspects of both the experiments and the reactors.
3. To establish and maintain in Idaho Nuclear and experiment sponsor personnel a high degree of consciousness of the nuclear hazards involved in the operation of the MTR, ETR, ATR and the experimental programs.

Objective one is achieved by careful technical study of all equipment and experimental samples prior to insertion in the reactors, periodic review of all experimental systems, technical study of proposed reactor modifications, and periodic review of reactor and experimental operating procedures.

The second objective is achieved by the combination of a compulsory reporting procedure and careful study by the committee of the facts involved in incidents involving radiation hazards.

The final objective is automatically achieved in properly attaining the first two. If the personnel responsible for liaison and design of the experiments are aware, through experience, that their systems are to be very carefully scrutinized prior to approval, the safety aspects of such design are given greater emphasis. A similar situation exists with regard to the operational aspects of the experiments and reactors. An important factor is, of course, the support received by the committee from management in its decisions. The TRA committee has never lacked firm management support.

Specifically, the following classes of activities require Safeguard Committee approval:

1. Insertion and modification of all experimental equipment. This includes approval of all operating conditions and reactor safety circuit setpoints.
2. Any change in experiment operating conditions and/or safety circuit setpoints.
3. Continued operation of an experiment after any deviation from approved operating conditions which might conceivably affect the safety of the system.
4. Continued operation of an experiment during unexplained deviation in monitored experimental parameters from expected values even though these deviations are not sufficient to initiate or are incapable of initiating a reactor power reduction.
5. Any experimental repair or adjustment which involves the disabling of all or portions of any experiment's reactor power reduction circuits with the reactor in operation.
6. Any change in reactor operating modus which might conceivably affect reactor or experimental safety.
7. Any physical modification of the reactors or change in reactor safety circuit setpoints.

In addition to the activities indicated above, the committee indicates, from time to time, areas in which it feels the existing procedures are not properly defined. In this case, it is the responsibility of the appropriate line supervisors to see that the situation is remedied and/or explained to the Safeguard Committee.

It would be proper at this time to mention a few aspects of the TRA operation for which the Safeguard Committee is not responsible.

The committee is not responsible for safe operation of the ETRC, The RMF, the ARMF or any of the experimental work performed in these low power auxiliary reactors.

The committee is not responsible for criticality hazards other than those directly associated with operational aspects of the MTR, ETR, ATR and the experimental programs.

The committee is not responsible for reactor down time or radiation doses received under controlled conditions during cleanup of contaminated experimental systems. The committee does, however, point out in its minutes that such cleanup problems may exist.

The committee is not responsible for handling of radioactive materials in the reactor canals and hot cell or for proper packaging of materials for shipment.

D. Relationship with Other Groups

In the establishment of "approved" procedures and systems, it has been necessary to consider all groups which have participated in approving experimental design and operating procedures. The following order of precedence evolves in defining "approved" procedures:

1. Approvals currently required from surveillance groups outside the Idaho Nuclear Corporation organization.
2. TRA Safeguard Committee approvals if not in conflict with 1.
3. Existing practices if not in conflict with 1 or 2.

If a conflict exists, it must be cleared by obtaining the necessary approvals. It is the responsibility of Idaho Nuclear Corporation line organization to detect such conflicts and obtain the approvals.

It should be noted that, whereas approvals from without the Idaho Nuclear Corporation organization may be necessary for certain aspects of the TRA operation, these approvals are not sufficient to permit operation in those areas under the jurisdiction of the TRA Safeguard Committee.

With regard to the Idaho Nuclear Corporation organization, TRA Safeguard Committee approval is independent of any surveillance performed by such groups as the Idaho Nuclear Corporation Health and Safety Branch and the Nuclear and Chemical Technology Division. Any approvals required from Idaho Nuclear Corporation line organization groups are independent of Safeguard Committee approval.

It is the responsibility of Idaho Nuclear Corporation line supervision to determine when their actions require Safeguard Committee approval and to insure that operations performed under their supervision conform to existing Safeguard Committee approvals. It is, however, the responsibility of each Safeguard Committee member to report any deviation from approved procedures of which he is aware.

E. Committee Action

Committee action is achieved in three ways viz. regular scheduled committee meetings, emergency committee meetings and telephone conferences.

Regular scheduled committee meetings are held for MTR, ETR and ATR business. As many meetings are held as are required to transact the weeks business. An agenda is issued prior to each meeting to advise the committee of the items of business to be transacted. The full MTR, ETR or ATR committee is assembled for these meetings, or if the business is of such a nature that it applies to two or three

reactors, an appropriate committee membership meets. It will be remembered that the MTR Operations Coordinator need be present only when MTR business is to be discussed and a similar situation exists with regard to the ETR and ATR Operations Coordinators. The Operations Coordinator present defines the committee as the MTR Subcommittee (Committee) the ETR Subcommittee (Committee) or the ATR Subcommittee (Committee).

Emergency meetings are held on demand and may include the full committee or an appropriate group of members selected by the chairman. These meetings are ordinarily held during the regular working day in connection with items for which time consideration will not permit regular scheduling. No agenda is prepared for these meetings.

The final method of action by the committee is by telephone contact. In this case, the chairman is in contact with the committee or an appropriate sub-group of members and decisions are arrived at in this manner. This mode of operation is ordinarily used only outside of working hours when it is not practical to assemble the committee and applies usually to changes in experiment operating conditions.

Requests for Safeguard Committee approval take several forms. The complex engineered experiments are ordinarily described in a formal hazard analysis report. These reports, in form and content, are very similar to the familiar reactor hazard analyses. The reports are accompanied by a verbal presentation by the responsible Idaho Nuclear Corporation Reactor Project Engineer.

The insertion requests for less complicated experiments, requests for mechanical or operational reactor changes and requests for test specimen changes in the loop systems are made by letter from the responsible Idaho Nuclear Corporation personnel. These requests are also accompanied by a verbal presentation.

In cases where time does not permit processing the necessary paper work, requests are made by direct verbal presentation or by telephone. In all cases of verbal presentation, it is the responsibility of the requester to follow up his verbal request with a written confirmation at his earliest opportunity.

Incident reports are submitted verbally. Verbal reports must be submitted to the committee within one week of the incident in cases involving release of significant quantities of radioactive gases or particulate matter into occupied areas.

The various aspects of experimental hazard analysis considered by the committee are discussed in IDO-16466*. The analyses in connection with the reactors themselves follow conventional lines and will not be discussed in detail here. In connection with hazard analysis in general,

* Nertney, R. J., "A Standard Practices Guide for Hazard Analysis of Experimental Systems", IDO-16466 (1958)

we have determined that the greatest accident potential lies in off-normal operation and procedures and increased emphasis has been placed on this aspect of our study. That is to say, the "What would you do if-----" type question is augmenting the "What are the normal operating conditions" type question in study of the experimental and reactor systems.

Committee action takes five forms and is recorded in a letter to the Idaho Nuclear Corporation Manager, Operations:

1. Approval of a request
2. Report that a request was studied
3. Recommendation that some action be taken
4. Report of a deviation from the approved conditions of operation.
5. Written confirmation of a verbal approval

It will be noted that no "conditional approvals" are granted. The only action taken by the committee is outright approval or noting that a proposal was "studied" but not approved.

A proposal may be "studied" but not approved for one or more of three reasons:

- (a) Insufficient information to evaluate the risk level
- (b) The proposal, as presented, constitutes an unacceptable risk
- (c) Further liaison between the initiator of the request and other Idaho Nuclear Corporation groups or individuals is necessary

"Recommendations for action" referred to above are items noted by the committee which are hazardous and should be corrected. They may or may not be associated with a proposal submitted by line organization.

F. Correspondence and Records

Committee outgoing correspondence consists of the following:

1. Meeting agendas
2. Meeting minutes
3. Confirmation of verbal approvals
4. General administrative correspondence

All committee correspondence except the meeting agenda is written by the committee chairman. All committee correspondence is signed by the committee chairman.

Files and records maintained by the committee include:

1. Minutes
2. Requests for approval
3. Incident reports
4. Safety circuit setpoint lists
5. General technical information of interest to the committee
6. Safeguard administrative information

G. Safeguard Committee Educational Program

In order for the committee to properly perform its duties, a certain amount of specialized knowledge, which is not acquired in the normal course of the members' experience, is required. For this reason, certain meetings or portions of meetings are devoted to special discussions. These discussions are conducted as round table affairs or consist of formal lectures by Idaho Nuclear Corporation or experiment sponsor specialists followed by a question and answer period. Some of the subjects discussed are:

1. General safeguard philosophy
2. Mechanisms of sample failure (predicted and indicated by post-irradiation examination)
3. Special technical subjects such as burnout and metal-water reactions.
4. General resumes of experimental design considerations

The "specialist" discussions, in particular, have been extremely helpful in enabling the committee members to do a realistic job of hazard analysis.

H. Step-by-step Procedures

As has been stated earlier, there are several kinds of activities which require action by the committee and also several ways of obtaining this action. The latter depend principally on the time urgency.

All requests for approval of initial insertion, modification, change in operating conditions or any other operational aspects of the experimental program are initiated by the responsible Idaho Nuclear Corporation Engineer, his alternate or his line supervisors. This includes Idaho Nuclear Corporation sponsored experimental work as well as that sponsored by other organizations.

All requests for modification of the reactor plant, reactor safety circuitry, changes in operating conditions etc. which might conceivably affect the safety of operation of the reactor or the experiments are initiated by the Idaho Nuclear Corporation line organization responsible for making the change.

All requests are directed to the Chairman, TRA Safeguard Committee. Letter requests are handled as follows:

1. The letter request for approval, prepared by the originator, is transmitted along with necessary supporting technical information to the Chairman, TRA Safeguard Committee with carbon copies to the committee members. This must be done with sufficient lead time to permit study of the proposal by committee members. "Sufficient" lead time will depend on the nature of the request and cannot be rigidly defined here.

2. The originator must make arrangements with the secretary of the chairman regarding the meeting date when he wishes to have his proposal placed on the committee agenda.
3. The secretary to the chairman will place the proposal on the agenda and will distribute the agenda (which is signed by the chairman) to the members of the committee.
4. On the scheduled meeting day, the originator or his designated representative will appear at the meeting, along with any special consultants whom he may require to present the proposal to the committee.
5. The committee will consider the proposal and will arrive at a decision in the presence of the originator (or his representative).
6. The minutes of the committee and the committee log book will indicate the action taken.

Verbal (emergency) requests are handled as follows:

1. The originator makes verbal contact with the Chairman of the Safeguard Committee.
2. The chairman contacts other members of the committee as necessary to insure proper review of the proposal and the appropriate action is taken.
3. The originator confirms his verbal request with a written resume' containing the essential details of his proposal.
4. The Chairman of the Safeguard Committee confirms all verbal approvals with a written resume' of committee action.

I. Internal Performance Audit

It is obvious that the TRA Safeguard Committee must be cognizant of organizational personnel performance in order to effectively perform its task of risk level evaluation.

This is achieved in several ways:

1. Through the regular assigned jobs of the committee members in line organization. All members of the committee are in a position to be particularly aware of personnel capabilities and limitations both on a steady state and transient basis.

2. Through multiple committee and staff appointments. All committee appointments are studied carefully in this regard. One or more Safeguard Committee members or alternates also hold membership on all other closely related committees and functions in the Idaho Nuclear Corporation organization. For example, two TRA Safeguard Committee members and one alternate are members of the Safeguard Review Committee, one member and one alternate member of the TRA Safeguard Committee are members of the Accident Review Committee, etc.
3. Through participation of the TRA Safeguard Committee Chairman in the Test Reactor's internal performance audit programs. The committee chairman participates in establishing the criteria for these programs and receives data regarding these programs on a continuing basis.

The TRA Safeguard Committee does not supply audit data to management on a continuing basis. The committee does however:

1. Take performance data into account in determining acceptable risk.
2. Report to management any deviations from Safeguard approved procedures.
3. Report to management any situations which appear to constitute an unacceptable plant operating risk. This relates to those things observed by the individual committee members in the course of their normal duties and does not relate to formal plant reviews or a "search out" function. Formal annual reviews at TRA are conducted by the Idaho Nuclear Corporation Safeguard Review Committee.