

EXCHANGING KNOWLEDGE ON THE SAFETY OF RESEARCH REACTORS IN THE FRAME OF THE ANSN

1. Approach

The concept of the ANSN is based on knowledge exchange among nodes (national centres) and Hubs. Therefore, it requires that nodes and Hubs work together under a common frame to compile and analyze information and ultimately exchange technical knowledge.

The code of conduct being developed on the safety of RR would be a natural basis for structuring the knowledge management and knowledge exchange.

Common issues identified among the research reactor community include:

- Lack of coherent national and institutional approaches to deal with safety matters (perhaps the most important of all issues identified);
- Lack of resources and personnel;
- Loss of corporate memory;
- Isolationism of managers and operating personnel;
- Lack of competency in specific areas within the organizations (and in several cases within the country).

The ANSN can be used as a tool to address some of the issues mentioned above through the establishment of “thematic groups” addressing topics relevant to research reactor operators, engineering supporting groups and regulatory bodies.

To fulfil this objective, the creation of thematic groups composed of specialists from the participating countries is proposed.

A thematic group will be a forum for the exchange of experiences and safety related documentation in a particular topic. Each thematic group should be led by a moderator from one of the Hubs. The moderator is responsible to create and regularly update the group composition, collect information on events and relevant safety knowledge available and make a quality check on the material before it is uploaded to the net. Thematic groups should meet periodically to exchange personal experiences.

A thematic group should contain at least three elements:

- **News:** general information to the group participants
- **IAEA and national documentation:** safety documentation available for consultation
- **Discussion forum:** a forum for discussion on specific subjects and where questions can be addressed to specialists in other participating countries.

2. Examples of thematic group topics in the research reactor field

Examples of topics of potential interest for thematic groups in the research reactor field are presented below:

Safety Analysis

On several occasions the Agency had the opportunity to evaluate the safety analysis of research reactors in Member States. Some of the conclusions from these evaluations are that:

- There is a lack of balance in the accidents discussed in the safety analyses;
- Seismic considerations have not always appeared in the safety analysis;
- Modifications of a facility have not been subjected to safety analysis even though they may constitute an un-reviewed safety question;
- In some reactors it was found that the safety analyses were frequently based on the opinion of outside experts and institutions. In these cases, analyses would not be available locally to support a stated position;
- In some cases there is a lack of appropriate tools to perform the safety analysis;
- Updates in internationally accepted safety standards were not taken into account.

To address some of these issues several expert missions and training activities were conducted under the EBP programme in the last few years. In particular it is worth mentioning the two-year project consisting of four consecutive workshops hosted by Korea Institute of Nuclear Safety on “Safety Analysis Methodology and Computer Code Utilization for Research Reactors”. The main objective of these regional training workshops was to enhance the capability of regulatory bodies and operating organizations to perform safety analysis using computer codes.

A thematic group on Safety Analysis will provide a forum for the exchange of information and documentation among specialists dealing with safety analysis of research reactors. Moreover it can be used as a means to maintain and improve the knowledge acquired during the project on safety analysis methodology and use of computer codes mentioned above.

Quality Assurance (QA) and Safety Documentation

It is recognized that the difficulties of operating organizations to implement QA programmes to comply with the IAEA standards are mainly due to the lack of qualified personnel. One of the main difficulties observed is the application of the “graded approach” to fit the QA programme to the risk associated to each specific facility.

Therefore it is necessary to help reactor managers and other research reactor personnel by providing access to existing safety documentation from similar facilities and fostering the exchange of information among QA specialists and research reactor personnel responsible for the implementation of QA programmes.

Safety documentation should be understood as the set of safety related documents used in the dialogue between an operating organization and a regulatory body. It comprises documents generated by both organizations. The type of documents depends on the life cycle of the facility (design, construction, commissioning, operation or decommissioning) and their format and content may vary from country to country but in general it includes:

- Siting Evaluation;
- Environmental Impact Report;
- Safety Analysis Report;
- Safety Analysis;
- Commissioning Programme;
- Radiation Protection Programme;
- Waste Management Programme;
- Maintenance and Periodic Testing Programme;
- Experiments and Modifications;
- Training and Qualification of Personnel;
- Licence for construction;
- Licence for operation;
- Inspection Programme;
- Reports of peer reviews; etc.

A thematic group on the field of safety documentation will benefit both operating organizations and regulatory bodies from countries following a process of licensing or re-licensing their facilities. Moreover it will provide examples, from other participating countries, on the methodology and documents used in the regulatory process, their content and format and quality assurance.

Operational Limits and Conditions (OLCs)

In several missions to research reactors it was observed that operating organizations have difficulties in establishing an appropriate format and content for their OLCs. In several cases the set of parameters established is incomplete or not justified by the safety analysis and in many cases it is not reviewed or approved by the regulatory body.

A thematic group to share experiences among engineering support groups, research reactor operators and regulators would enhance the safety of research reactors through a better understanding and implementation of OLCs. Existing OLCs for different research reactor types and power, justification by the safety analysis, procedures in case of violations, re-assessments in case of reactor modifications and regulatory reports are some of the topics to be addressed by the thematic group on OLCs.

Emergency Planning

Many research reactors are still operating without an adequate and comprehensive emergency plan. Others have established a plan but do not perform emergency exercises and drills in cooperation with off-site organizations, as appropriate.

A thematic group on the field of emergency plan will benefit the operating personnel of research reactors through the sharing of information on existing programmes, procedures in case of emergencies, emergency classification, preparation of emergency drills and on the lessons learned from exercises and drills.

Regulatory Activities

In some countries, it was found that the development of a legal framework has been lagging for long periods. In others the regulatory body is not entirely independent of the operating organization or have insufficient resources and manpower. In many cases it was observed inadequate training and qualification of the regulatory body personnel.

A thematic group in the regulatory activities field will benefit regulatory bodies to establish their regulatory programmes and to define minimum training requirements for their own personnel. Topics to be addressed by the thematic group on regulatory activities could include:

- Atomic law;
- National regulations and guides;
- Review and assessment;
- Authorization process;
- Methodology to conduct research reactor reviews;
- Training and qualification for regulatory body personnel;
- Relation between the regulatory body and operating organizations.

Safety Culture and Management of Safety

It is realized and accepted that National Cultures are diverse and unique. Since “Safety Culture” (SC) is a sub-set of National Culture, it is logical that SC too will exhibit characteristics of the socio-technical system within which it exists. There are, however, concepts and attributes of healthy SC which are common to all branches of the nuclear industry, regardless of the prevailing local cultural conditions. It is essential that these attributes are integrated with, rather than imposed against, the individual.

In order to provide a framework for the development of safety culture and the management of safety, a thematic group on a Safety Culture Advisors is proposed.

The objective of this initiative is to provide the vehicle by which the regional group members can coordinate the development of their own management of safety and safety culture programmes.

When implemented, the group will provide the vehicle for self-help to member countries to:

- identify common problems related to safety management and safety culture;
- facilitate a forum for development and evaluation of options to improve/resolve those common issues;
- assist each other in the development of integrated SC improvement plans;
- implement those plans; and
- provide technical and cultural support in monitoring and adjusting those local plans on a continuous improvement basis.

The starting point will involve the provision of training in the basic concepts of good management of safety and safety culture to executive and senior representatives of the regional group countries. This will involve running seminars and workshops on the topic using principles and guidelines documented in IAEA Standards. Next a permanent forum of potential safety culture specialists will be established consisting of persons designated from each of the EBP countries. The “education” process will then continue but at a deeper level to ensure that those experts are fully equipped with the necessary skills and knowledge required for them to function effectively as credible advisors to their respective country executives. At the end of this phase the group will be fully constituted.

Having set the stage by introducing a common safety culture “vocabulary”, the Agency would gradually move from the “educator” role to that of “facilitator”, assisting in such activities as developing its Terms of Reference, identifying Mission, Key Results Areas, Goals and Objectives, and Strategic Plans. Thereafter, the Agency will assume a more supportive role in helping implement, evaluate, analyse and monitor the effectiveness of the programme and provide continuing advice on how this can be improved. In the longer term it is expected that the network will become self-motivating. The role of the Agency will fall more and more in line with that of Service Provider to a mature, developed industry, typical to those currently being given to current “developed” Member States.

As relevant the activities of this group will take into consideration those conducted in the frame of the Forum for Nuclear Co-operation in Asia.

3. Implementation

A test of the methodology to be adopted for the implementation of thematic groups is proposed to start in 2003 with the topic Safety Analysis. This topic was considered since it meets the immediate interests of the participants of the three years programme on “Safety Analysis Methodology and Computer Code Utilization for Research Reactors”.

The need to maintain the exchange knowledge among the participants was agreed at the closing of the series of workshops in November 2002 in Korea. Moreover, the Idaho National Engineering and Environmental Laboratory is developing, in co-operation with the IAEA, an Integrated Training and Accident Analysis System which may also be made available.

The implementation of other thematic groups could be initiated in 2004.

The framework for the integration and mutual learning among the various thematic groups as well as the establishment of a Steering Committee should be discussed at the Second Consultation to be hosted in the first quarter of 2003 by Korea.