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## Trends Analysis of Technical Support - Objectives And Activities

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### INTRODUCTION

The annual Eurosafe forum has been created five years ago. Its aim was and is to give the opportunity to all those involved in the technical aspects of Nuclear Safety to meet, discuss, exchange and develop professional relations beyond the meeting.

The history of this conference is, in a way, emblematic of the evolutions of the Technical Safety Organisations (TSO). Indeed, at the beginning was the so-called "Fachgesprach" organised by GRS as an internal meeting.

Then, at the end of the eighties, when GRS and IRSN decided to cooperate more closely on such topics as safety assessment, code developments, nuclear safety in Eastern European countries, it became a common meeting, renamed after some time to "Eurosafe" with the objective to contribute to the convergence of safety technical practices in Europe.

It appeared immediately necessary to share the objectives and the organisation of this meeting with other Technical Safety Organisations and expertise bodies, to broaden the topics to radioprotection, security and to extend the collaboration to the creation of a review called "Tribune Eurosafe" and a website.

The factors motivating these evolutions, recent ones, since they happened in the last decade, are still existing. The purpose of this speech is to present them and to explain their influences on the Technical Safety Organisations and expertise bodies.

**What are those Technical Safety Organisations and expertise bodies?**

It has been internationally recognized and even formalised in the international convention on nuclear safety ratified up to now by more than fifty countries that nuclear safety relies on several fundamental principles such as the existence of a legislative and regulatory framework, the responsibility of the licence holder, the existence of a comprehensive and systematic assessment and verification of safety.

The efficiency of the regulation and control of nuclear facilities relies, then, for a large part, on the technical capabilities of both the operators and the Regulatory Bodies.

More precisely, operators, which are primarily responsible for safety, perform and justify to the Regulatory Bodies their technical choices. The Regulatory Bodies evaluate and assess the justifications given by the operators.

To perform this task, the national organisations are various. Indeed, history, administration culture and the importance of nuclear energy play a major role in the national organisations set-up to perform the control of nuclear safety.

Nevertheless, the national organisations can mainly be divided into two broad categories, as recognised in the requirements on “legal and governmental infrastructure for nuclear safety radiation, waste and transport safety” provided by the International Atomic Energy Agency.

In the first category, the technical expertise body is integrated in the safety authorities. In Europe, this is the case of the Health and Safety Executive, Nuclear Safety Directorate (HSE/NSD) in the United Kingdom, the SKI in Sweden, CSN in Spain and last but not least KFD in the Netherlands.

In the second category, the Safety authorities rely on the technical expertise of a Technical Safety Organisation.

For example, in Germany the Regulatory Bodies, the Federal Ministry of the Environment, Nature Conservation and Reactor Safety (BMU) and authorities of the Federal State ("Laender") according to the situation, rely on separate expert institutions, namely GRS or the TÜV. In France, the two Regulatory Bodies, one for civil purposes, the other for defence purposes, rely on IRSN.

Anyhow, in each of the two categories mentioned, the safety authorities can complete or diversify the technical expertise they need by turning to the appropriate structure.

The organisation of technical support for nuclear safety in countries joining the European Union on the 1<sup>st</sup> of may 2004 are various and can be close to one category or the other.

Whatever the national organisation, a national Safety Authority should have available the expertise resources internally, or externally in the appropriate technical safety organisation, to assess the quality of the safety demonstration presented by the operator, especially by investigating the lacks or misses of the demonstration.

A peer-to-peer technical dialogue between the operator and the expertise body acting for the Safety Authority is an imperative condition for achieving a high safety level.

Necessary conditions for the technical dialogue to be efficient are the following:

- On both sides, experts are well trained and skilled and are perfectly aware of the state of the art and knowledge in their domain. It should be noticed that the assessment required by the Safety authorities is a global one. Indeed, it implies to combine, hierarchy, according to the level of risk, the conclusions of the technical dialogue for each domain like criticality, thermohydraulics, fire and so on.
- The expert body has the appropriate access to information in due time.
- The expert body is independent in its technical judgment.

In Europe, there is a wide variety of technical safety organisations and expertise bodies, depending on :

- the size which can vary from less than one hundred to more than one thousand experts or researchers,
- the administrative structure, most of them being public organisations,
- the domain of competence which can cover safety, radioprotection or security.
- the domain of intervention (nuclear facilities, transport, medical or industrial facilities using radioactive materials, etc.).

Besides these differences, these organisations all are involved in research.

They can carry out the research activities themselves. However, the activities can also be conducted by external researchers, such as consultant companies, universities, institutes of technology and research, etc. .

Strong relationships between expertise and research are necessary for at least three reasons :

- Questions are raised by expertise, in some cases answering those questions arising from research. The behavior of highly irradiated fuel in accident situations provides a good example
- Researchers can, on their own, raise safety issues being not anticipated,
- Experts are in close contact with the most recent developments in the field of research. As mentioned above, it is necessary for the expert to be well trained, highly skilled and aware of the actual state of the art and knowledge.

### **What are the main evolutions of the environment of the technical support organisations ?**

The European technical support organisations are acting in an evolving environment due to at least the following factors :

- the liberalisation of the electricity market,
- the internationalisation and the growing importance of European institutions,
- the need of the society for more transparency and understanding of the choices

The liberalisation of the electricity market coupled with the reduction of international barriers to trade increases the economical competition between operators and results in a pressure on cost. For expertise bodies, this has several implications. First of all, the operators intend to increase the electricity production rate of the NPPs and/or to reduce the costs. To achieve these objectives, the operator may increase the operation domain of the reactor, for example by up rating the nominal power of the reactor, reduce the duration of outages, increase the burn up of fuel, reduce staff. Then, it must be shown by the operator by means of safety files that this extension of the domain remains acceptable from the view point of safety.

Usually, the operator relies on new methodologies, more efficient calculation codes, for example going from 2D to 3D thermo hydraulic codes and on experimental data, for example on the behaviour of irradiated fuel.

It is then obvious that the expertise bodies must be in a position to assess and to evaluate these elements and, consequently have the appropriate information, knowledge and competence regarding these new elements.

Acquiring new knowledge and competences may require anticipated actions from the expertise bodies for example, in the management of human resources by recruiting experts in developing field or displaying the resources from one expert field to another.

This can lead to the identification and the realisation of dedicated training programs. It can also result in expertise bodies being involved in the definition of research programs relevant to the issues.

In any case, the sooner the expertise bodies is aware of the major technical evolutions envisaged by the operator, the more efficient the assessment process is. Another consequence of the liberalisation of the electricity market is that operators may be more reluctant to give access to the relevant information to the expertise bodies, either from industrial or from research origin.

Last but not least, the funding of research programs and the associated facilities decreases leading also to a loss of competence in the research teams and to the closure of facilities. A lot of research activities have been performed in many fields relevant to nuclear safety for several decades now. Nevertheless, nuclear safety is a continuously evolving matter and new issues need to be dealt, with according to the evolution in the operation of NPPs, the use of new technologies (for example digital I & C), the national and international experience feedback, the development of knowledge and the aging of NPPs.

#### Internationalisation and growing importance of the European Institutions

In close connection to the preceding item concerning liberalisation, internationalisation also raises specific issues for expertise bodies.

The use of nuclear energy raises international issues :

- On one hand, a significant event or accident occurring at a nuclear installation in one country has the potential to affect its neighbouring countries.
- On the other hand, the industry is acting on a worldwide basis. The nuclear facilities built in one part of the world may have been designed in another part, with components supplied from many countries.

Although the industry is global in nature, the way it is regulated is not. Each country has its own regulatory procedures and has significant differences in the way the regulation is performed. Indeed, the national political environment with regard to the use of nuclear energy, the legislative and regulatory framework, the administrative organisation widely vary among those countries.

Moreover, the primary responsibility for regulation of nuclear safety remains a national one and the responsibilities related to nuclear safety of international or supranational organisations remain limited. From the technical point of view, the activities of international organisations are mainly related to cooperative research projects, developing standards, reaching technical consensus and understanding.

More and more frequently the industrial projects are submitted to different regulators for licensing in different countries.

It may happen and it did happen, that an industrial project is licensed in some country and still assessed or considered to be not completely justified in another. It is indeed an uneasy situation for the TSO being considered, facing this situation according to the case, to be too much or not enough demanding.

With the enlargement of the European Union from 15 to 25 countries intended on the 1<sup>st</sup> of May 2004, regulatory bodies and TSO from Eastern countries will participate in the European Union actions in the field of Nuclear Safety. This will be the case either on the regulation (e.g. the elaboration of directives) in technical working groups or in the research activities by joining the Common Program on Research and Development.

Finally, concerning the international evolutions, in July 2002 the European Commission has elaborated the so-called nuclear package containing a directive on nuclear safety. This directive initiated a debate inside the European Union about what could be the responsibilities of the European Commission in this field and its relations with the national organisations.

## The need of the society for more transparency and understanding of the choices.

Since a number of years, an increase in public criticism with regard to the conventional mechanisms applied for preparing regulatory decisions is observed. This widely affects the industrial sector but it takes a special importance when nuclear questions are involved.

### **What strategy for the TSO regarding evolution of their environment ?**

This strategy could be threefold :

- strengthening the technical convergence and harmonisation between TSO
- intensifying international cooperation in research to ensure the availability of pertinent research capabilities and to obtain consensus on safety related questions,
- getting more involved in the societal debate on nuclear safety,

With respect to specific safety concerns, GRS and IRSN started comparative safety studies on subjects of joint interest (thermal fatigue, comparison of databases, etc.) several years ago in order to highlight the points of convergence and to identify and then explain the discrepancies met in safety approaches. They also performed assessment for each other or worked together on the EPR reactor or in eastern countries. This cooperation, aimed at a progress in nuclear safety in Europe, was meanwhile extended to AVN.

In this respect, all three organizations initiated, one year ago, a comparative analysis of the safety assessment methods they apply and the main aspects to be considered when analysing the safety problems met, in order to facilitate knowledge sharing, conduct of joint or complementary work, and comparison of the results thus obtained. This should result in a common reference document.

It is obvious that such approaches, that may then be applied by field of expertise or by type of facility, represent a key factor in the convergence of safety approaches and in the consistency of assessments performed by GRS, AVN and IRSN. This type of approach could be extended to the European Organizations that may wish to be associated. It is, indeed, a first but necessary step if expertise bodies intend to mutualise in some way their competences.

The construction of such an expertise bodies network based on a shared approach and methodology for safety assessment is consistent and complementary with the regulators network WENRA .

Moreover, this organisation according to networks, i.e. the regulators network and the expertise bodies network organisation would favour the harmonisation and convergence on nuclear safety in Europe.

In any case, if directives were to exist on nuclear safety in European Union, it would be valuable that they point out the utmost importance to master the technical aspects of safety to achieve a high level for it, the necessity of a skilled professional and collective expertise, informed by research, the interest of sharing and comparing experiences between national experts inside the European Union.

It is essential for countries equipped with nuclear facilities to conduct a high quality research with regard to nuclear and radiological safety. Thus, an intensified international cooperation to ensure the availability of pertinent research capabilities and to obtain a consensus on safety related questions is necessity.

From this point of view, the ambition declared by the European Council in Lisbon in March 2000, for promoting the creation of a European research space, and the innovating orientations proposed by the European Commission and adopted for the 6<sup>th</sup> Research and Development Master Program are now essential.

Gathering infrastructures, human resources and analysis tools within the European excellence networks is certainly a powerful mean to preserve the research capabilities and to ensure a skill level that is essential for maintaining a high safety level in Europe. It is therefore essential, for the TSOs, to join and manage such networks.

In this respect, the creation of the SARNET excellence network dedicated to severe accidents is clearly illustrating the will of about fifty European Organizations, among them TSOs like GRS or IRSN, to link their action to the integration policy decided by the European Union with a long term objective.

The SARNET network should play a major role in the identification of most pertinent research subjects and in the coordination of works conducted in Europe, whether they concern experimental or theoretical projects. It will therefore contribute in maintaining the appropriate research skills and capabilities in Europe, ASTEC, providing an

environment conducive to knowledge sharing. This excellence network will be presented in the research workshop tomorrow.

Beyond such actions, TSOs should continue their reflections on how to achieve the availability of pertinent research capabilities.

Beyond a strengthened public communication and observance of the right for information, which will be extended by the implementation of the Aarhus Convention, the society wants to be more involved in the decision process concerning industrial projects presenting hazards. This is, in particular, the case for nuclear industry. Technical Safety Organisations do neither represent the interest of the operator, nor do they take the final regulatory decision. In that sense, TSOs are in the position to answer the questions of the stakeholders from a technical point of view and to enlighten the various issues to them to feed pluralist approach to expertise.

Moreover, the question of involving the public on the local community level is now essential in the research for a renewed decision making process. In that spirit, since 2002, IRSN has a convention with the French ANCLI “local information committees National association” to provide the committees with information on nuclear safety issues or to deliver information to their members on some topics. The objective is that those members be able to gather the relevant technical informations from various origins to make up their own opinion on this subject.

## **CONCLUSION**

To conclude, technical safety organisations are facing many changes in their environment. These changes must motivate the TSOs and expertise bodies to develop a network between them, either from the view point of expertise or research. Moreover, they could contribute to the debate inevitably associated with nuclear energy by explaining the issues associated.