
Research in the Regulatory Context

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BACKGROUND

The International nuclear community has been concerned for some time about the ability of countries to sustain an adequate level of safety research.

In recent years both government and industry funding of research has decreased in many countries. Governments often believe that nuclear is a mature technology and therefore that increased reliance should be placed on the industry to fund the necessary research. Industry, in turn, has often reduced its involvement in funding safety research because there is little commitment to building new plants and because there is a belief that the research needed to operate existing plants and to prevent and manage possible accidents is largely complete. Furthermore, electricity market competition has tended to focus the industry's attention on short-term profitability, sometimes at the expense of long-term research.

Excessive reduction in safety research, leads to loss of continuing safety knowledge, to the consequent loss of research facilities and expertise, and the to loss of academic interest in safety research. This in turn may affect the safe operation of existing nuclear power plants in the medium and long term, the ability of regulatory bodies to meet their obligation in a competent and independent manner and, ultimately, the ability to design and build new plants.

In general there is recognition that reduction in safety research may have gone too far. Action is or has been taken to deal with the situation. Several countries conducted or are conducting studies to assess the research capability needed and are making arrangements to ensure that essential capability is available.

At the international level, the Nuclear Energy Agency (NEA) of the OECD through the Committee on the Safety of Nuclear Installations (CSNI) and the Committee on Nuclear Regulatory Activities (CNRA) has been active since the early 1990's in looking into specific issues and promoting international co-operation to deal with the problem of maintaining adequate research capability.

PURPOSE OF THE PAPER

The purpose of this paper is to summarise the actions taken by the OECD/NEA to help its Member countries deal with the problem of maintaining adequate safety research programmes to ensure effective regulation and operation of nuclear power plants.

In particular the paper will summarise the conclusions of a major workshop held in June 2001 in which top regulators, heads of industry and research organisations discussed in broad terms what is needed to ensure adequate research capability.

ACTIVITIES OF THE NEA/CSNI

Within the Nuclear Energy Agency (NEA) of the OECD, the Committee on the Safety of Nuclear Installations (CSNI) and the Committee on Nuclear Regulatory Activities (CNRA) have the key role in providing OECD Member countries with authoritative advice on matters relating to the safety and regulation of nuclear facilities.

The CSNI concentrates on the technological and research aspects of nuclear safety while the CNRA concentrates on the regulatory and policy aspects. The maintenance of essential research capabilities and facilities has been of concern to the CSNI since the early 1990's. A programme of work was started with the essential aim of gathering information, analysing it and developing a strategy for the efficient management of essential nuclear safety research.

Starting in 1992, a Senior Group of Experts on Safety Research (SESAR) was established. This group brought together senior research managers from OECD Member countries with major research programmes.

The first task of this Group was to review the status of research being carried out and draw conclusions on future requirements and priorities [1]. The Group then went on to identify areas of agreement, areas where further action was required and the need for increased collaboration [2]. An important outcome of these studies was to raise a concern on the loss of critical research facilities and competence, which could lead to undermining the ability to adequately regulate and support the safe operation of nuclear facilities [3].

This concern led the CSNI to request that the Group focus more specifically on research capabilities and facilities likely to be at risk and to put forward proposals for international programmes that could help secure an adequate research infrastructure [4].

In its work, the Group started by summarising the main drivers of research for the medium and long term. These drivers are :

- Plant life management, including ageing of components, systems and structures (hardware), ageing of analytical tools and documentation (paperware), application of modern standards to older plants, life extension and backfitting.
- Optimisation of operating margins, including power uprating, higher fuel burn-up, more extensive use of PSA, etc.
- Severe accidents including the need to further develop practical accident management procedures and design solutions for future plants.

Then, the discussion within the group concentrated on determining the areas in which research facilities and programmes are essential and on determining where internationally co-ordinated action is necessary. In essence, the work of the group consisted in correlating the technical areas that need to be monitored with the research facilities which are needed to provide the relevant data and which may be at risk in the short and medium term.

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Since the report was written, interest for new reactor concepts has further increased. Regulatory authorities need to have the proper competencies and experimental facilities to evaluate the safety performance of such concepts.

The technical areas considered are all those relevant to nuclear safety namely:

- thermal-hydraulics;
- fuel and reactor physics;
- severe accidents;
- human factors;
- plant control and monitoring;
- integrity of plants and structures;
- seismic analysis;
- risk assessment;
- fire risk assessment.

To judge the suitability of a particular facility, a set of criteria was developed. The two overriding criteria were whether the facility can provide knowledge to address a safety issue which was considered open based on earlier work of the group, and whether the relevant capability or facility is under threat.

Other criteria used are:

- *Uniqueness to the nuclear industry:* resources should be focused on capabilities and facilities where there are no other front line industrial or research interests. Examples of uniqueness are: core melt progression experiments, specific thermal-hydraulic test rigs, test reactors and critical facilities and hot cells. Examples on non-uniqueness are: instrumentation, heat transfer, basic Computational Fluid Dynamics (CFD) developments and some aspects of human factors.
- *Applicability to a broad range of conditions:* capabilities and facilities need to be flexible and able to accommodate different users needs. It should also be relevant to scaling criteria, if the technical demands of the subject area require it.
- *Responsibility:* the ownership of the capability (either Government or Industry) must be clearly established and there should ideally be clear commitment from the owner to support any future international programme in their facility. However, for specific and important facilities and programmes, the group raised the possibility of an international action even if the host country is not initially supportive.
- *Credibility:* the management provisions must be acceptable against modern standards, e.g., including proper financial, quality and technical control.
- *Size:* in order to limit the number of possible projects, an initial cut off point of US\$1 million or more was used.

Using these criteria the group examined a very large number of facilities and identified a number of long-term actions which are required to address the needs of an adequate programme. Obviously, the needs vary from country to country depending upon the nuclear technology in use and the national arrangements in place for funding and conducting safety research. However a number of collective needs for the OECD countries can be identified.

This work concluded with a large number of recommendations, some of strategic nature and some dealing with specific facilities and programmes. Some of the key recommendations are:

- *Thermal-hydraulics*: maintain one major facility per reactor type because of the need to perform confirmatory tests, to support code development and provide educational opportunities.
- *Severe accident*: address the need for a Centre of Excellence in Fuel-Coolant Interaction and fission product behaviour.
- *Fuel reactor physics and integrity of structures*: maintain status of hot cells and research reactors.
- *Human factors and plant control and monitoring*: maintain the Halden project as a Centre of Excellence.
- *Seismic*: monitor availability of large shaking tables.
- *Fire safety*: establish international database, consider possible additional research.

CURRENT FOLLOW-UP

The work of the SESAR Group is being followed up in various ways. The CSNI has created a Programme Review Group which has among its tasks that of monitoring development in the research infrastructure of the OECD countries and update periodically the list of facilities and programmes at risk given in Ref. 3. The specialist knowledge of the CSNI Working Groups is being used for this purpose.

In addition, the NEA has considerably expanded the establishment of internationally funded research projects based on the conclusions of the CSNI/SESAR study and detailed discussion at the technical level. Table 1 shows the current status of the NEA Sponsored Research Projects.

OECD/NEA Projets - Status

Name	Period	Technical area	Status
HALDEN	2000-2002	Fuel/Human factors	On-going
RASPLAV	1997-2000	Severe accidents	Completed
MASCA	2000-2002	Severe accidents	On-going
CABRI-WLP	1999-2007	Fuel	On-going
SANDIA-LHF	1998-2001	Severe accidents	On-going
SETH	2001-2005	Thermal Hydraulics	On-going
MCCI	2002-2005	Severe accidents	Being established
ICDE	2000-2002	Operating data	On-going
PLASMA	1999-2000	Human factors	Completed
OPDE	2002-2005	Piping reliability	Being established
FIRE	2002-2005	Fire safety	Being established

A number of other recommendations are being followed up at the level of the CSNI Working Group. For example an action plan in the area of fuel/coolant interaction involving several countries is being put in place.

THE CNRA/CSNI WORKSHOP

To complement the work of the CSNI on safety research, it was felt important to hold a senior level workshop with the following two objectives:

- a) To exchange views among the three major players, that is regulators, researchers and industry executives on the needs and vision for research in the regulatory context,
- b) To identify commonalities and differences and define additional activities at the international level that may be needed.

The workshop was held in June 2001 and saw the participation of approximately 100 senior experts. It was structured in three sessions. The first dealing with the vision and needs of regulators, the second with the vision and needs of researchers and industry, while the third one was used to identify ways to move the discussion forward.

RESULTS OF THE QUESTIONNAIRE

Prior to the workshop a survey was conducted among NEA Member countries to gather basic information on the needs, adequacy of current programmes, trends in programmes and funding levels and action being taken to overcome some of the problems.

Some of the major aspects of regulatory related research highlighted by the results are:

- A research programme in support of the safe operation of NPPs is deemed necessary in essentially all OECD Member countries.
- All countries participate in international research projects, though to quite widely varying degrees; typically smaller/medium countries devote 20 to 30 percent of their budget to international projects, while major nuclear countries dedicate approximately 10 percent.
- No clear trend can be seen regarding past, current and future funding of safety research although there appears to be a trend toward maintaining or increasing funding in the next five years.
- The sources of funding in Member countries tend to reflect the extent to which the government or the nuclear industry are regarded as having the prime responsibility for resolving nuclear safety issues. As an example in countries like Japan, Germany and Spain, a very high proportion of the funding comes from governments while in countries such as the U.S., Sweden and the U.K. a very large proportion comes from the industry.
- Essentially all countries share concern about the need to maintain research facilities. A number of countries have undertaken a strategic review of their capabilities and needs.

THE WORKSHOP DISCUSSION

In the first session heads of regulatory organisations addressed questions such as why research should be supported, what types of research should be funded and the role of the international organisation in setting up and funding research. A common conclusion is that a strong research programme is a central feature of a sound regulatory system.

Research is needed by the regulator to provide independent judgement, to determine areas in which improvements might be necessary, to anticipate potential problems and in general to improve the effectiveness of the regulatory system and ensure that the regulatory requirements are adequate and practical.

It was recognised that one of the key challenges for regulators is to maintain the proper balance between confirmatory research such as that conducted to validate methods, and anticipatory research such as that conducted to anticipate potential problems and improve knowledge. Clearly with a decreasing budget it is always easier to justify the need for confirmatory research at the expense of anticipatory research.

International co-operation is important for several reasons. One reason is simply to be able to leverage budgets and avoid duplication of programmes. Other reasons include the benefits deriving from “magnification of intellectual firepower” coming from interaction among researchers; to make it possible to involve countries with limited resources, and in the end to contribute to harmonisation of safety requirements by achieving common technical positions. It can also help by stimulating and motivating young scientists to work in the nuclear field.

In the second session issues discussed included ways to increase co-operation between industry and regulators in research while at the same time maintaining the independence of the regulatory decisions and the freedom to choose the research subjects.

Industry representatives emphasised that they should be allowed to choose the method to demonstrate the safety of nuclear installations. Studies, calculations, design modifications, etc. are in many cases an acceptable alternative to further research. They also emphasised the need to establish achievable closure criteria for safety and to improve the alignment between industry and regulatory research, particularly with respect to best estimate analyses and determination of margins.

WORKSHOP CONCLUSIONS

The basic conclusions of the workshop are documented in a “Collective Statement” by the CNRA and the CSNI which is reproduced in appendix.

The document outlines areas of commonalities between the three parties involved in safety research, areas where differences exist, the consensus achieved as well as a number of recommendations. In response to these recommendations the CSNI is setting up a group to identify and review issues which hinder closer co-operation on research between regulators and industry, and to propose possible ways for resolving such issues. The group is expected to discuss issues such as:

- Resource and sources of funding;
- Public availability and utilisation of results;
- Independent decision-making;
- Research on very low probability events.

In addition existing groups of the CSNI will discuss possible types of criteria that can be used by individual countries for “closing-out” specific research activities and issues.

CONCLUSIONS

This paper has tried to summarise the various actions taken by the OECD/NEA to help its Member countries deal with the problem of maintaining adequate safety research capability. Strongly linked to this problem is the problem of attracting and retraining a young generation of scientists in nuclear research.

Although the solutions to these problems must primarily come at the national level, improved co-operation between the industry and the regulators and improved international co-ordination and co-operation, can provide a very important contribution. The NEA through the CSNI and the CNRA in particular will continue to be actively engaged in these efforts.

REFERENCES

- [1] Nuclear Safety Research in OECD Countries, OECD, 1994.
- [2] Nuclear Safety Research in OECD Countries: Areas of Agreement, Areas for Further Action, Increasing Need for Collaboration, OECD, 1996.
- [3] Nuclear Safety Research in OECD Countries, Capabilities and Facilities, OECD, 2001.
- [4] Nuclear Safety Research in OECD Countries, Major Facilities and Programmes at Risk, OECD, 2001.

APPENDIX

**Collective Statement on the Role of Research in a Nuclear Regulatory Context
Committee on the Safety of Nuclear Installations (CSNI) and Committee on
Nuclear Regulatory Activities (CNRA)**

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

Pursuant to Article 1 of the Convention signed in Paris on 14th December 1960, and which came into force on 30th September 1961, the Organisation for Economic Co-operation and Development (OECD) shall promote policies designed:

- to achieve the highest sustainable economic growth and employment and a rising standard of living in Member countries, while maintaining financial stability, and thus to contribute to the development of the world economy;
- to contribute to sound economic expansion in Member as well as non-member countries in the process of economic development;
- to contribute to the expansion of world trade on a multilateral, non-discriminatory basis in accordance with international obligations.

The original Member countries of the OECD are Austria, Belgium, Canada, Denmark, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The following countries became Members subsequently through accession at the dates indicated hereafter: Japan (28th April 1964), Finland (28th January 1969), Australia (7th June 1971), New Zealand (29th May 1973), Mexico (18th May 1994), the Czech Republic (21st December 1995), Hungary (7th May 1996), Poland (22nd November 1996); Korea (12th December 1996) and the Slovak Republic (14th December 2000). The Commission of the European Communities takes part in the work of the OECD (Article 13 of the OECD Convention).

NUCLEAR ENERGY AGENCY

The OECD Nuclear Energy Agency (NEA) was established on 1st February 1958 under the name of the OEEC European Nuclear Energy Agency. It received its present designation on 20th April 1972, when Japan became its first non-European full Member. NEA membership today consists of 27 OECD Member countries: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Luxembourg, Mexico, the Netherlands, Norway, Portugal, Republic of Korea, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The Commission of the European Communities also takes part in the work of the Agency.

The mission of the NEA is:

- to assist its Member countries in maintaining and further developing, through international cooperation, the scientific, technological and legal bases required for a safe, environmentally friendly and economical use of nuclear energy for peaceful purposes, as well as
- to provide authoritative assessments and to forge common understandings on key issues, as input to government decisions on nuclear energy policy and to broader OECD policy analyses in areas such as energy and sustainable development.

Specific areas of competence of the NEA include safety and regulation of nuclear activities, radioactive waste management, radiological protection, nuclear science, economic and technical analyses of the nuclear fuel cycle, nuclear law and liability, and public information. The NEA Data Bank provides nuclear data and computer program services for participating countries.

In these and related tasks, the NEA works in close collaboration with the International Atomic Energy Agency in Vienna, with which it has a Co-operation Agreement, as well as with other international organisations in the nuclear field.

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FOREWORD

In the present context of deregulation and privatisation of the nuclear industry, maintaining an adequate level of nuclear safety research is a primary concern for nuclear regulators, researchers and nuclear power plant licensees, as well as for government officials and the public. While these different stakeholders may have common concerns and interests, there may also be differences. At the international level, it is important to understand that divisions exist both within and among countries, not only in national cultures but also in the way regulators, researchers and licensees view the role of research.

An international gathering under the auspices of the OECD Nuclear Energy Agency (NEA) took place in June 2001, bringing together heads of nuclear regulatory bodies of NEA Member countries, senior regulators, senior executives of research organisations and leaders from the nuclear industry to discuss their perceptions of the role of research in a nuclear regulatory context.

This collective statement represents an international consensus on a rationale for regulatory research for currently operating nuclear reactors and for future reactors, and sets forth specific recommendations to NEA standing technical committees and Member countries. The intended audience is primarily nuclear safety regulators, senior researchers and industry leaders. Government authorities, nuclear power plant operators and the general public may also be interested.

COLLECTIVE STATEMENT ON THE ROLE OF RESEARCH IN A NUCLEAR REGULATORY CONTEXT

Committee on the Safety of Nuclear Installations (CSNI) and Committee on Nuclear Regulatory Activities (CNRA).

The definition of the role of research in a nuclear regulatory context needs to take account of the perspectives of all interested parties. The three main parties, the regulator, the researcher and the licensee face a number of common challenges in maintaining an adequate capability in regulatory research. Other parties such as government officials and the public have other interests and need to be apprised of the issues in an open and free environment. While the challenges may be common, their resolution is sometimes seen in very different ways by different parties. The workshop organised by the Nuclear Energy Agency in June 2001 brought together the three main parties in an effort to identify the commonalities and differences that exist between them. Approximately 100 participants, including the heads of the nuclear regulatory bodies of most NEA Member countries, senior regulators, senior executives of research organisations and leaders from the nuclear industry, attended and openly discussed their perceptions of the role of research in a nuclear regulatory context.

The workshop took place in an atmosphere of openness and candour among both the panellists and the participants, with the result that the discussions were pitched at an appropriately high level and avoided too much detail. This was important as a key element of the workshop was to determine where commonalities and differences exist and what can be done to further the agreements and to bridge the gaps.

In characterising the commonalities and differences it is important to understand that divisions exist both within and among countries not only in national cultures but in the exact way regulators, researchers and licensees view the role of research. Therefore, the significance of the differences and commonalities may depend on the specific viewpoints and the regulatory environment in which they are discussed.

All participants recognised that the three major parties have to resolve the scientific/technical challenges in the research arena. It is also very important that the information and work coming from research is openly provided to the stakeholders and their needs and input taken into account when formulating future research plans. There was also general agreement among parties that it is important to have a “constantly inquiring mind”. However, this has to be balanced with individual country criteria for the sun-setting of research programmes.

Prior to the workshop a survey was conducted to establish the current situation in NEA Member countries. The survey responses identified several major aspects of regulatory-related research such as:

- No clear trend can be seen regarding past, current or future funding of government-sponsored research, although there appears to be a slight overall trend towards maintaining or slightly increasing funding in the next five years. The sources of funding in Member countries tend to reflect the extent to which the government or the nuclear industry is regarded as having the prime responsibility for resolving nuclear safety issues and reducing associated uncertainties. There is no clear picture regarding future governmental funding either in relation to future levels or needs.
- The responses on specific national priorities in research provide a good overview of where Member countries are concentrating their efforts. Issues such as nuclear safety in general, ageing and riskinformed regulation are noted frequently.
- The main consequences of losing adequate research capability is generally considered to be the degradation of the scientific knowledge base that could lead to a loss of technical safety competence and potentially missing important safety issues, thus contributing to reduced public confidence. Concern is expressed by almost all countries about the problems in maintaining adequate research facilities.

- The need to maintain an independent source of regulatory research is highlighted by most Member countries.

Some of the areas of commonality that were identified during the workshop include:

- The capability of the regulator to supervise or commission independent confirmatory research is an important element in an effective regulatory programme.
- Increased international co-operation through joint research is seen as a key element in achieving better efficiency and consensus on technical issues.
- Each country should try to establish an understanding of adequate research capability.
- There is a need to identify the type of criteria to be used for “closeout” of specific research activities and issues.
- There is a need to clearly articulate the value of nuclear safety research for the development (or revision) of regulation, for example, how regulators utilise the results of research to update their regulatory requirements and measure the impact of such updated requirements.
- Joint research projects, with participation by both regulators and licensees, can provide efficiency and cost sharing. However, the need to maintain regulatory independence, especially in the eyes of the public, can create potential “inhibitors” to such co-operative efforts.

Some of the areas where differences exist include:

- To clear up differences in how the parties view confirmatory research there is a need for criteria to determine when independent confirmatory research gives us the flexibility to say that licensing decisions can proceed while confirmatory research is under way.
- Differences exist between regulators, researchers and industry on what constitutes “needed or required” safety research and this extends to decisions about where the proper balance between confirmatory and anticipatory research lies.
- There are differences in views about which party should be responsible for the cost of research.
- There is a division among the parties about the extent to which the researcher should be a specific problem solver.

It is clear from the discussions that the subject requires further consideration. The challenges presented cannot be answered from these discussions alone. However, the foundation for advancing the issues and responding to the unanswered questions has been secured.

Consensus was achieved by the participants in several key areas including:

- It is essential to maintain an adequate infrastructure including people, facilities and analytical tools, and it would also be beneficial for Member countries to attain a better understanding and definition of what constitutes adequate research capability.

- Based on the survey and further inputs it would be beneficial to analyse the commonalities and differences between Member countries and determine what are the main priorities in research over both the short and long term; this is a continuing role of the CSNI.
- The realisation by most countries that they cannot afford to do everything themselves means that there is a need for increased international co-operation.

The following specific recommendations are made:

1. Individual NEA Member countries need to ensure that adequate research capability is maintained.
2. A high-level group of experts should be formed under the sponsorship of the CSNI/CNRA to identify and review issues which hinder closer co-operation on research between regulators and industry, and to propose ways for resolving such issues while maintaining regulatory independence in decision making.
3. The CSNI should examine the need to identify the types of criteria that can be used by individual NEA Member countries for “closeout” of specific research activities and issues.
4. CSNI/CNRA groups working on improving regulations should ensure that sufficient technical information is developed to make realistic regulatory decisions. The value of such information should be articulated for the development (or revision) of any regulation.
5. Member countries should recognise the important role that research plays in enhancing educational opportunities and should intensify efforts to allow young professionals to cross borders so as to gain experience and achieve advancement in the nuclear environment. A corollary to this is that all parties should strive to maintain adequate knowledge and to increase the number of professionals entering into the nuclear field.
6. The NEA should continue to explore ideas for increasing international co-operation through joint research projects.
7. The role of the stakeholders should be recognised by the NEA and its Member countries. Research information should be made available to all stakeholders and the incorporation of their viewpoints into strategic thinking should be encouraged.
8. The NEA and its Member countries should enhance the knowledge base in technical and scientific areas by increasing the exchange of information with other industries and governmental organisations.
9. Research on major safety issues should be properly “peer reviewed”. One way of achieving this is to develop suitable state-of-the-art reports within the CSNI structure.
10. A follow-up workshop should be considered by the CSNI and the CNRA in two to three years to review progress and to provide an opportunity for further discussions.

Déclaration collective sur le rôle de la recherche dans un contexte de réglementation nucléaire
Comité sur la sûreté des installations nucléaires (CSIN) et Comité sur les activités nucléaires réglementaires (CANR)

ORGANISATION DE COOPÉRATION ET DE DÉVELOPPEMENT ÉCONOMIQUES

En vertu de l'article 1er de la Convention signée le 14 décembre 1960, à Paris, et entrée en vigueur le 30 septembre 1961, l'Organisation de coopération et de développement économiques (OCDE) a pour objectif de promouvoir des politiques visant :

- à réaliser la plus forte expansion de l'économie et de l'emploi et une progression du niveau de vie dans les pays Membres, tout en maintenant la stabilité financière, et à contribuer ainsi au développement de l'économie mondiale ;
- à contribuer à une saine expansion économique dans les pays Membres, ainsi que les pays non membres, en voie de développement économique ;
- à contribuer à l'expansion du commerce mondial sur une base multilatérale et non discriminatoire conformément aux obligations internationales.

Les pays Membres originaires de l'OCDE sont : l'Allemagne, l'Autriche, la Belgique, le Canada, le Danemark, l'Espagne, les États-Unis, la France, la Grèce, l'Irlande, l'Islande, l'Italie, le Luxembourg, la Norvège, les Pays-Bas, le Portugal, le Royaume-Uni, la Suède, la Suisse et la Turquie. Les pays suivants sont ultérieurement devenus Membres par adhésion aux dates indiquées ci-après : le Japon (28 avril 1964), la Finlande (28 janvier 1969), l'Australie (7 juin 1971), la Nouvelle-Zélande (29 mai 1973), le Mexique (18 mai 1994), la République tchèque (21 décembre 1995), la Hongrie (7 mai 1996), la Pologne (22 novembre 1996), la Corée (12 décembre 1996) et la République slovaque (14 décembre 2000). La Commission des Communautés européennes participe aux travaux de l'OCDE (article 13 de la Convention de l'OCDE).

L'AGENCE DE L'OCDE POUR L'ÉNERGIE NUCLÉAIRE

L'Agence de l'OCDE pour l'énergie nucléaire (AEN) a été créée le 1er février 1958 sous le nom d'Agence européenne pour l'énergie nucléaire de l'OECE. Elle a pris sa dénomination actuelle le 20 avril 1972, lorsque le Japon est devenu son premier pays Membre de plein exercice non européen. L'Agence compte actuellement 27 pays Membres de l'OCDE : l'Allemagne, l'Australie, l'Autriche, la Belgique, le Canada, le Danemark, l'Espagne, les États-Unis, la Finlande, la France, la Grèce, la Hongrie, l'Irlande, l'Islande, l'Italie, le Japon, le Luxembourg, le Mexique, la Norvège, les Pays-Bas, le Portugal, la République de Corée, la République tchèque, le Royaume-Uni, la Suède, la Suisse et la Turquie. La Commission des Communautés européennes participe également à ses travaux.

La mission de l'AEN est :

- d'aider ses pays Membres à maintenir et à approfondir, par l'intermédiaire de la coopération internationale, les bases scientifiques, technologiques et juridiques indispensables à une utilisation sûre, respectueuse de l'environnement et économique de l'énergie nucléaire à des fins pacifiques ; et
- de fournir des évaluations faisant autorité et de dégager des convergences de vues sur des questions importantes qui serviront aux gouvernements à définir leur politique nucléaire, et contribueront aux analyses plus générales des politiques réalisées par l'OCDE concernant des aspects tels que l'énergie et le développement durable.

Les domaines de compétence de l'AEN comprennent la sûreté nucléaire et le régime des autorisations, la gestion des déchets radioactifs, la radioprotection, les sciences nucléaires, les aspects économiques et technologiques du cycle du combustible, le droit et la responsabilité nucléaires et l'information du public. La Banque de données de l'AEN procure aux pays participants des services scientifiques concernant les données nucléaires et les programmes de calcul.

Pour ces activités, ainsi que pour d'autres travaux connexes, l'AEN collabore étroitement avec l'Agence internationale de l'énergie atomique à Vienne, avec laquelle un Accord de coopération est en vigueur, ainsi qu'avec d'autres organisations internationales opérant dans le domaine de l'énergie nucléaire.

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AVANT-PROPOS

Dans le contexte actuel de la déréglementation et de la privatisation de l'industrie nucléaire, réussir à maintenir un niveau adéquat de recherche sur la sûreté nucléaire est un sujet de préoccupation essentiel pour les responsables des autorités de sûreté, les chercheurs et les exploitants des centrales nucléaires ainsi que pour les décideurs politiques et le public. Ces différents acteurs peuvent avoir des craintes et des intérêts communs mais aussi des divergences. Au niveau international, il importe de comprendre que des désaccords existent entre les pays comme dans les pays tant au niveau des cultures nationales que de l'idée exacte que se font les autorités de sûreté, les chercheurs et les exploitants du rôle de la recherche.

Une réunion internationale organisée sous les auspices de l'Agence de l'OCDE pour l'énergie nucléaire (AEN) a rassemblé en juin 2001 des directeurs et des cadres dirigeants des autorités de sûreté des pays Membres de l'AEN, des responsables des organismes de recherche et des dirigeants de l'industrie nucléaire qui ont ainsi pu confronter leurs points de vue sur l'adéquation entre recherche et réglementation.

Cette déclaration collective exprime un consensus international sur la justification de la recherche et son adéquation à la réglementation pour les réacteurs nucléaires actuellement en exploitation et aux réacteurs futurs. Elle propose des recommandations aux pays Membres et aux comités techniques permanents de l'AEN. Elle s'adresse avant tout aux responsables des autorités de sûreté nucléaire, des établissements de recherche et de l'industrie mais peut également intéresser les pouvoirs publics, les exploitants de centrales nucléaires et la population dans son ensemble.

Déclaration collective sur le rôle de la recherche dans un contexte de réglementation nucléaire

Comité sur la sûreté des installations nucléaires (CSIN) et Comité sur les activités nucléaires réglementaires (CANR)

Pour définir le rôle de la recherche à finalité réglementaire, il faut tenir compte des points de vue de toutes les parties intéressées. Les trois principales parties, à savoir les autorités de sûreté, les chercheurs et les exploitants sont confrontés à un certain nombre de problèmes communs concernant la préservation des capacités de recherche adéquates pour les autorités de sûreté.

D'autres parties comme les hauts fonctionnaires et le public ont des intérêts différents et doivent être informés des problèmes qui se posent dans un esprit de transparence et d'ouverture. Même si elles sont confrontées aux mêmes problèmes, les différentes parties ne s'accordent pas toujours sur les solutions à y apporter.

Le séminaire organisé par l'Agence pour l'énergie nucléaire en juin 2001 a rassemblé ces trois principales parties pour qu'elles s'efforcent de trouver les points de convergence et de divergence. Une centaine de participants, dont les directeurs et les cadres des autorités de sûreté nucléaire de la plupart des pays Membres de l'AEN, des responsables des organismes de recherche et des dirigeants de l'industrie nucléaire ont participé à ce séminaire où ils ont librement débattu du rôle de la recherche à finalité réglementaire.

Ce séminaire s'est déroulé dans un esprit d'ouverture et de franchise qui a permis aux intervenants et aux participants de débattre à un niveau élevé en évitant de se perdre dans trop de détails. Ces conditions étaient capitales car il s'agissait avant tout de déterminer les points d'entente et les divergences et ce qu'il convenait de faire pour consolider les uns et atténuer les autres.

En caractérisant ces points de convergence et de divergence, il importe de comprendre que des désaccords existent entre les pays comme dans les pays non seulement au niveau des cultures nationales mais aussi de l'idée exacte que se font les autorités de sûreté, les chercheurs et les exploitants du rôle de la recherche. C'est pourquoi l'importance de ces divergences et de ces points communs dépendra des points de vue et du contexte réglementaire considérés.

Tous les participants ont reconnu la nécessité pour les trois principales parties de trouver des solutions aux problèmes scientifiques et techniques qui se posent dans le domaine de la recherche. Il est également primordial que les informations et les résultats issus de la recherche soient librement diffusés aux parties prenantes et que leurs besoins et leurs contributions soient pris en compte lors de la formulation des plans de recherche futurs. Les parties s'accordent toutes, en outre, sur l'importance de conserver en permanence un « appétit de connaissances ». Néanmoins celui-ci doit être contrebalancé par les critères définis par chaque pays pour la phase finale des programmes de recherche.

Avant le séminaire une enquête a été réalisée afin de brosser la situation actuelle dans les pays Membres de l'AEN. Les réponses fournies à cette enquête permettent de dégager plusieurs caractéristiques importantes de la recherche à finalité réglementaire, à savoir :

- On ne distingue aucune tendance bien définie dans le financement passé, actuel et futur des recherches soutenues par l'État ; néanmoins il semblerait que, globalement, ce financement s'est maintenu ou a légèrement progressé dans les cinq dernières années. Les sources de financement dans les pays Membres révèlent que des pouvoirs publics ou de l'industrie nucléaire porte essentiellement la responsabilité fondamentale de résoudre les problèmes de sûreté nucléaire et de réduire les incertitudes associées. Il est difficile d'établir clairement quelle sera dans l'avenir la part de l'État par rapport aux besoins et aux niveaux de financement futurs.
- Les réponses fournies sur les priorités nationales permettent de se faire une idée des domaines dans lesquels les pays Membres ont décidé de concentrer leurs efforts. La sûreté nucléaire en général, le vieillissement des installations et la réglementation en fonction des risques sont fréquemment cités.
- On estime en règle générale que la principale conséquence de la perte des capacités de recherche nécessaires est la dégradation de la base de connaissances scientifiques qui peut aboutir à une perte des compétences techniques en matière de sûreté et au risque de ne pas détecter des problèmes de sûreté importants avec, pour corollaire, la diminution de la confiance du public. Pour ainsi dire tous les pays s'inquiètent des difficultés qu'ils rencontrent à préserver des moyens de recherche adéquats.
- La plupart des pays soulignent la nécessité de préserver une source indépendante de recherche à finalité réglementaire.

Les participants au séminaire s'accordent sur les points suivants :

- L'aptitude des autorités de sûreté à superviser ou faire réaliser des recherches indépendantes de confirmation est une composante essentielle d'un programme réglementaire efficace.
- Le renforcement de la coopération internationale par le biais de projets de recherche communs est jugé indispensable pour arriver à un consensus sur des problèmes techniques et les traiter plus efficacement.
- Chaque pays doit s'employer à déterminer ce qu'il entend par des moyens de recherche adéquats.
- Il est indispensable de déterminer quels types de critères seront utilisés pour mettre un terme à des activités de recherche spécifiques et mettre fin à certains débats.
- Il est nécessaire de justifier clairement la valeur des recherches sur la sûreté nucléaire pour l'élaboration (ou la révision) de la réglementation. Ainsi, il est bon de savoir comment les autorités de sûreté utilisent les résultats des recherches pour mettre à jour leurs prescriptions réglementaires et déterminer les répercussions de celles-ci.
- La réalisation de projets de recherche communs auxquels participent les autorités de sûreté et les exploitants peut contribuer à améliorer l'efficacité et à partager les coûts de recherche. Néanmoins, la nécessité de préserver l'indépendance des autorités de sûreté surtout aux yeux du public peut être un frein à ce type d'effort de coopération.

Des divergences existent dans certains domaines :

- Pour éliminer les divergences d'opinion des parties sur les recherches de confirmation, il est indispensable de disposer de critères permettant de décider à quel moment ces recherches indépendantes de confirmation donnent la latitude de poursuivre la procédure d'autorisation alors que les recherches sont en cours.
- Les autorités de sûreté, les chercheurs et l'industrie diffèrent sur ce qui peut être considéré comme des recherches sur la sûreté « indispensables ou requises » et notamment sur les décisions relatives aux proportions respectives des recherches de confirmation et des recherches exploratoires.
- Les parties ne s'entendent pas sur qui devrait assumer la responsabilité financière des recherches.
- Jusqu'à quel point le chercheur doit résoudre des problèmes spécifiques est une question sur laquelle les parties ne sont pas parvenues à s'accorder.

Il ressort clairement des débats qu'un complément de réflexion est indispensable. Le débat ne suffit pas à résoudre les problèmes posés. Néanmoins les bases ont été jetées pour faire progresser la réflexion et commencer à trouver un élément de réponse aux questions qui n'ont pas encore trouvé de solution.

Les participants ont réussi à s'entendre sur un certain nombre de questions cruciales :

- Il est indispensable de préserver une infrastructure adéquate, en l'occurrence des hommes, des équipements et des outils d'analyse, et il serait également bon pour les pays Membres de parvenir à mieux cerner et définir un niveau des moyens de recherche qui peut être jugé approprié.
- Sur la base de l'enquête réalisée et d'autres contributions, il serait utile d'analyser les points communs et les différences entre les pays Membres et de définir les principales priorités pour la recherche à court et à long terme ; c'est au CSIN qu'incombe cette tâche.
- À présent que la plupart des pays sont conscients qu'ils n'ont pas les moyens de tout faire eux-mêmes, la nécessité d'une intensification de la coopération internationale est évidente.

Les actions suivantes sont donc recommandées :

1. Chaque pays Membre de l'AEN doit s'assurer que des capacités de recherche adéquates sont préservées.
2. Un Groupe d'experts à haut niveau devra être constitué sous le parrainage du CSIN/CANR pour déterminer et analyser les obstacles à une coopération plus étroite dans le domaine de la recherche entre les autorités de sûreté et l'industrie et proposer des moyens permettant de résoudre ces problèmes tout en préservant la liberté de décision des autorités de sûreté.
3. Le CSIN devra réfléchir à la nécessité de définir les critères qui devraient être utilisés par chacun des pays Membres de l'AEN pour mettre un terme à des activités de recherche spécifiques et mettre fin à certains débats.

4. Les groupes du CSIN/CANR travaillant à l'amélioration des réglementations devront s'assurer que les données techniques rassemblées sont suffisantes pour prendre des décisions réglementaires réalistes. Il conviendra d'expliquer la valeur de ces informations pour l'élaboration (ou la révision) de la réglementation.
5. Les pays Membres devront être conscients du rôle déterminant de la recherche pour l'amélioration des possibilités d'enseignement et devront intensifier leurs efforts pour permettre à de jeunes experts d'aller à l'étranger pour acquérir de l'expérience et progresser dans le domaine nucléaire. En corollaire il est indispensable que toutes les parties s'efforcent de préserver les connaissances et d'augmenter le nombre de spécialistes qui s'engagent dans le domaine nucléaire.
6. L'AEN doit continuer de réfléchir à des moyens d'accroître la coopération internationale par le biais de projets de recherche communs.
7. Le rôle des parties prenantes doit être reconnu par l'AEN et ses pays Membres. Les informations sur la recherche doivent être diffusées à toutes les parties prenantes, et il convient d'encourager la prise en considération de leurs opinions dans les réflexions stratégiques.
8. L'AEN et ses pays Membres doivent enrichir la base des connaissances techniques et scientifiques en intensifiant les échanges d'informations avec d'autres industries ou organismes publics.
9. Les recherches sur les principales questions de sûreté doivent être soumises à l'examen critique d'autres experts. Pour ce faire une des solutions envisagées est de préparer, au sein du CSIN, des rapports sur l'état des connaissances.
10. Le CSIN et le CANR devraient envisager d'organiser un atelier d'ici deux à trois ans afin d'examiner les progrès réalisés et de poursuivre le débat.