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*The OECD Secretary General  
Angel Gurría (2006-)  
and the NEA Director-General  
Luis Echávarri (1997-)*

NEA  
50  
Anniversary



1958  
2008





*Headquarters of the OECD Nuclear Energy Agency (1958-1992)*

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*Signature of the diplomatic instruments establishing  
the European Nuclear Energy Agency  
20 December 1957*

# Events leading to the creation of the OECD/NEA



1947	5 June	US announcement of Marshall Plan
1948	16 April	Organisation of European Economic Co-operation (OEEC) is established
1953	8 December	“Atoms for Peace” speech by US President Dwight D. Eisenhower to the United Nations General Assembly
1953	14 December	Secretary-General submits report to OEEC Council on energy supply difficulties
1955	24 May	Report by Louis Armand citing potential of nuclear energy and need for European co-operation
1955	10 June	Working Party on Nuclear Energy set up
1955	15 December	Working Party submits its report
1956	29 February	OEEC Council establishes Special Committee on Nuclear Energy; four working parties develop proposals
1956	18 July	OEEC Council responds to working parties’ proposals with a series of actions, including the establishment of a Steering Committee for Nuclear Energy
1957	25 March	European Atomic Energy Community (Euratom) established
1957	29 July	International Atomic Energy Agency (IAEA) established
1957	20 December	European Nuclear Energy Agency (ENEA) established by the OEEC Council – precursor to the NEA
1958	1 February	ENEA Statute enters into force
1960	14 December	OEEC becomes the Organisation for Economic Co-operation and Development (OECD)
1972	20 April	ENEA becomes the OECD Nuclear Energy Agency (NEA) with membership expanded beyond Europe

# Foreword by the Director-General

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© photo : Marthe Lemelle

*The year 2008 marks the fiftieth anniversary of the OECD Nuclear Energy Agency. Five decades ago, the members of the Council of the then Organisation for European Economic Co-operation, the predecessor of OECD, decided to consider nuclear energy as a promising source capable of reinforcing Europe's energy supply capacity in the face of its pressing needs for reconstruction after World War II. This co-operative effort started with the creation of the Nuclear Energy Agency, and was the beginning of a long story.*

*The Agency was conceived from the outset as a flexible tool of international co-operation, capable of adjusting to changing political, economic, social and of course energy contexts, and hence to the needs of its members.*

*Early on, this flexibility and responsiveness allowed the Agency to organise the co-operation among its members around a limited number of objectives aimed not only at supporting the scientific and technical development of promising nuclear reactor and fuel cycle technologies, but also at favouring a safe, environmentally friendly and economical use of nuclear energy.*

*A continuing objective of NEA in this respect has been the framing of common understandings on national practices in such areas as reactor safety, protection against radiation, and radioactive waste management as well as nuclear law and regulatory applications.*

*Although these objectives still represent a large part of its “raison d’être”, the Agency has evolved in many ways over the years. Its current membership of 28 OECD countries across the world demonstrates the present value they each draw from sharing confidently the experience collected among them, and benefiting, for example, from international joint projects and co-operative validations through “peer reviews”.*

*Thanks to the high competence of its standing technical committees, and their methods to arrive at consensus, the NEA has regularly produced and published “collective opinions” pointing in a large range of areas, the results achieved, the knowledge acquired, deficiencies to remedy and desirable follow ups.*

*From the beginning of the 1970s, the Steering Committee for Nuclear Energy resolved to give the Agency’s work a more determined policy orientation. This orientation was reiterated at the end of the 1990s by the High Level Advisory Group of the OECD on the Future Role of the NEA. This invitation to involve itself in broader debates by means of its policy statements allowed the Agency to enter the wider policy discussions at OECD level encompassing sustainable development, global warming, and the evaluation of the nuclear energy option in a socio-economic context.*

*Interest worldwide in nuclear energy is growing and there is a clear commitment to increase generating capacity in many*

*countries in the years to come in order to achieve security of energy supplies, taking into account global warming and ever rising fossil fuel prices. The will and the tools are available to ensure that the next generation of nuclear power plants will be even safer, more cost effective and even more environmentally friendly. The NEA has demonstrated throughout its history, and particularly in recent years as Technical Secretariat to the Generation IV International Forum (GIF) and the Multinational Design Evaluation Programme (MDEP), that it possesses the competence and the managerial skills needed to pool and maintain expertise and co-ordinate multinational nuclear projects.*

*At the dawn of this new century the Agency appears well prepared to continue its role in sustaining international co-operation in the use of nuclear energy for peaceful purposes for the benefit of its member countries. These co-operative efforts will continue to include other countries with a view to possible membership or other modes of partnership.*

*I hope that the following succinct overview, for which we have to thank Jacques de la Ferté who was the Secretary of the Steering Committee for Nuclear Energy over a large part of the Agency’s history, will provide a faithful illustration of the value of the tasks accomplished, their relevance to the needs of our member countries, and the competence and dedication of the Secretariat throughout these fifty years.*

Luis Echávarri  
Director-General

The origins:

Why and how the European Nuclear Energy Agency (ENEA) was created?



*Inauguration of the Halden Reactor  
by King Olav V of Norway on 10 October 1959*

Among the issues facing European countries, as they took up the challenges of national economic reconstruction during the immediate post-World War II period, were those of energy availability and cost. This concern was taken into account as a priority as early as December 1953 by the Organisation for European Economic Co-operation (OEEC) when its Secretary-General, Robert Marjolin, presented a memorandum to the Council expressing his concern about “the problem of the rising cost of energy in Europe and the possible dangers of such a trend to the economic development of member countries”. As a first step, the Council decided to commission Louis Armand, one of the “wise men” who would later assist in the creation of the European Atomic Energy Community (Euratom), to make proposals on how to solve Europe’s energy problems.

The Armand report, delivered in May 1955, stressed the importance of tackling energy issues through a mainly qualitative rather than quantitative approach, in which nuclear energy, as an emerging revolutionary technology, was to be given a place. Armand anticipated that nuclear energy would rapidly become economically competitive and emphasized the major importance for Europe to pool resources to allow its development. Indeed, most of the scientific manpower resources required to give momentum to a European nuclear industry had migrated to the United States during World War II and the bulk of the technological and economic resources of the West was also to be found there. The time was indeed ripe for international co-operation. The “Atoms for Peace” programme was launched by President Eisenhower in 1953 and the first UN Geneva Conference was held in 1955. The International Atomic Energy Agency (IAEA) was created in 1957, and the Treaty of Rome established the Euratom on 25 March 1957.

Meanwhile, on the basis of the recommendations of the Armand report, a special working group of the OEEC Council was tasked to study the potential for economic and financial co-operation in the field of nuclear energy. After in-depth consultations with member countries, a report was submitted to the Council in December 1955, analysing a broad range of “possibilities of action in the field of nuclear energy” which could be addressed, using flexible and pragmatic methods, under the supervision of a Steering Committee

for Nuclear Energy reporting to the Council. The Steering Committee would be competent to set up specialised structures for launching projects with the participation of interested countries. Under a Special Committee of the Council on Nuclear Energy Questions, involving all OEEC members and Associated countries, negotiations among the European governments were initiated and concrete objectives, taking due account of work undertaken by other international organisations, were presented to the Council. These proposed objectives were used as a basis for the decisions that the Council adopted on 18 July 1956 on “joint action by member countries in the field of nuclear energy”, one of which was to formally set up the “Steering Committee for Nuclear Energy”.

Agreed objectives involved projects for joint undertakings intended to develop nuclear fuel cycle plants, experimental reactors and prototypes, a security control on the use of fissile materials by these plants, training of nuclear engineers, and initial work on nuclear third party liability and insurance as well as public health and radiological protection. After one year’s work, the Steering Committee was able to submit concrete proposals to launch all these activities.

The culmination of this preparatory phase was the creation of the European Nuclear Energy Agency (ENEA) by a decision of the Council on 17 December 1957, and the entry into force of its Statute on 1 February 1958.

As defined by the Statute, the purpose of the Agency is “... taking due account of the public interest and mindful of the need to prevent the proliferation of nuclear explosive devices, to further the development of the production and uses of nuclear energy, including applications of ionising radiations, for peaceful purposes by the participating countries, through co-operation between those countries and a harmonisation of measures taken at the national level.”

While the co-operation in the field of nuclear energy within OEEC began with pragmatic arrangements, the Agency, from the outset, was conceived as a flexible tool of international co-operation, capable of adjusting to changing needs of its members. Developments since its inception have confirmed the value of this approach.

# The NEA membership:

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## evolution and international relations

### The membership

The original ENEA membership included all 17 OEEC European member countries<sup>1</sup> as well as the United States as an associate member. By the early 1970s, the membership began to change. Japan was the first non European country to join the Agency in 1972. This opening of its membership led the Agency to change its name from ENEA to “OECD Nuclear Energy Agency” (NEA)<sup>2</sup>.

The new scope of its membership conferred upon the NEA a unique position between the then limited membership of the European Communities, and that of the International Atomic Energy Agency (IAEA), an autonomous Agency in the United Nations family. Subsequently, and in step with the expansion of OECD membership, the NEA welcomed new member countries from North America, the Asia-Pacific region and, after the collapse of the USSR, from Central Europe<sup>3</sup>. NEA membership today totals 28 members, i.e. almost all OECD member countries.

Given the pace of applications to NEA membership, the OECD High Level Advisory Group on the Future of the NEA set up by the OECD Secretary General by the mid-1990s endorsed the Steering Committee’s view that caution should be exercised with respect to accepting new members. An aim of the NEA was to maintain and strengthen itself as an international centre of nuclear competence. Therefore, only applicant countries with demonstrated capacity to contribute substantially to this objective would qualify for membership. These principles were henceforth applied in the evaluation of all applicant countries.

### Outreach and relations with non-member countries

In addition to enlarging its membership in recent years, the NEA has gradually developed a policy of extending links with some non-member countries which are themselves involved in nuclear energy development and use, on a basis of co-operation and mutual benefit. Representatives of such countries have been invited to take part, on an ad hoc or regular basis, in selected NEA activities.

The Russian Federation, with which earlier informal contacts and collaboration had opened the way to an observer position in NEA safety committees, received observer status in 2007 in all Agency technical committees. The same year, the NEA and the Russian Federation signed a joint declaration on co-operation with a

number of goals, such as facilitating scientific research in the nuclear field, assessing innovative technology development, advancing national and international legal frameworks, and performing economic analyses essential to the safe, ecological and economical use of nuclear energy for peaceful purposes.

Among other examples, Slovenia became an observer in all NEA standing technical committees in 2002. Bulgaria; Hong Kong, China; Lithuania; Romania and Ukraine are ad hoc observers in the NEA Nuclear Law Committee.

For several years, informal contacts between the Chinese authorities and the Agency have highlighted mutual interest to enter into some form of co-operation such as the participation of Chinese experts in the work of the Agency in order to progressively enhance mutually profitable collaboration prospects.

### Relations with multilateral organisations or institutions

Very early on, in addition to the Commission of the European Communities, which statutorily takes part in the work of the Agency, the Agency undertook to develop relations and working links with international organisations or institutions active or interested in peaceful nuclear energy, and more specifically those working on broad areas which are part of its programme of work, such as the IAEA (with which a co-operation agreement was concluded as early as 1960), the World Health Organization (WHO), the International Commission on Radiological Protection (ICRP), the International Radiation Protection Association (IRPA), and the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR). Within OECD, in view of obvious convergence of interests, robust co-operative relations were established between the NEA and the International Energy Agency, with mutual representation in respective governing bodies and technical committees as appropriate. Working relations are also established with the OECD Environment Directorate.

1. Founding members of the Agency: Austria, Belgium, Denmark, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Sweden, Switzerland, Turkey, United Kingdom. Spain became a full member of the OEEC on 20 July 1959.

2. The OEEC became the OECD (Organisation for Economic Co-operation and Development) in 1961.

3. Accession of new members since 1972: Japan (1972), Australia (1973), Canada (1975), Finland (1976), United States (1976), Republic of Korea (1993), Mexico (1994), Czech Republic (1996), Hungary (1996), Slovak Republic (2002).

# Salient milestones and evolution in NEA history since its creation

As early as its creation in 1958, the programme of the Agency focused on a selection of co-operation themes, compatible with its limited human and financial resources, and which would not attempt to spread over the full range of nuclear energy issues. Furthermore, most of the research and development projects launched were funded separately by interested member countries, as a voluntary co-operation outside the regular budget, a concept which has continued to be used regularly until now.



*The NEA Senior Staff in 1963*

# 1958-1970

The early years:  
forging the tools of nuclear technology  
and its regulation



*Inauguration of the Eurochemic Company  
by King Baudouin I of Belgium in 1966*

Echoing the optimism expressed at the United Nations Geneva Conference of 1955 on the peaceful uses of nuclear energy, the beginning of this decade was marked by the momentum created among governments of industrialised countries for joining efforts to develop nuclear fission as a major energy production process, cheap and abundant, to sustain the economic restart of Europe.

### *Launching of the first OECD international joint undertakings*

The birth of the ENEA came as a means of launching as soon as possible the scientific and technical foundation of a nuclear energy industry among European countries. The establishment under the Agency of three joint undertakings with ambitious objectives, requiring heavy funding, came as a first demonstration of the potential created through intergovernmental co-operation.

The European Company for the Chemical Processing of Irradiated Fuels: the Eurochemic Company, the first NEA joint undertaking, was established in July 1959 in Belgium by 13 member countries as an international shareholding company. Its purpose was to build and operate a plant and a laboratory for the reprocessing of spent nuclear fuel in view of developing this technique, and training specialists of member countries in this field. Its small pilot plant was able to process a large variety of fuel types, but it stopped operation in 1975 following decisions by several of its shareholders to launch their own reprocessing industries. In parallel, Eurochemic contributed substantially to providing Europe with state-of-the-art knowledge and experience as well as qualified human resources in the field of nuclear chemistry. It should be noted that the United States provided assistance to the company throughout this period.

In its second phase, Eurochemic launched a comprehensive radioactive waste management programme for the treatment, solidification and storage of the large volumes of high- and medium-level waste generated during its operation. To complement this work, an agreement was concluded in 1978 with the Belgian government to gradually transfer the ownership of the Mol site and its installations, as well as a large part of its staff, to the Belgian State which had accepted responsibility for the dismantling of the plant and the disposal of the waste. The company was liquidated in 1990.

The Halden Reactor Project was created in June 1958 by an agreement with the then Norwegian Atomic Energy Institute (now the Institute for Energy Technology) for the joint operation of an experimental boiling heavy water reactor built in Halden, Norway, initially with the participation of seven member countries. The work of the Project was originally focused on the physics and chemistry of the reactor system. Although this research work was carried out on a system using heavy water as both moderator and coolant, most of the results were equally applicable to the light water reactor systems which form an important part of many current nuclear power programmes. This fifty year-old project evolved gradually under successive three-year programmes into an important international technical network supported by some hundred organisations in twenty countries to perform research and development programmes in the areas of nuclear safety, including fuel reliability, integrity of reactor internals, online computer control and monitoring, and human factors. The current three-year programme is set to end in 2008 and preparations are being made for its continuation in the longer term.

*Pierre Huet  
Director-General  
1958-1964*



The OECD Dragon Project aimed at the joint construction and operation of a 20 MW(Th) experimental high-temperature, gas-cooled reactor in the United Kingdom, under an April 1959 agreement between twelve countries. The reactor went critical in 1964 and work began on the development of a power reactor based on this concept and its industrial operation. For some years the work concentrated on testing fuels and fuel elements' behaviour under high-temperature. A number of alternative designs for high-temperature power reactor fuel elements, developed by national and commercial organisations supporting the project, made use of the testing facilities afforded by the Dragon reactor. The project also provided consultancy services to a number of design teams engaged in the commercial development of high-temperature reactors. Studies were carried out as well on longer-term applications of these reactors, such as in direct-cycle gas turbine generators or for industrial process heat production. The primary objective of developing a scientific R&D collaboration around the high-temperature reactor concept having been successfully fulfilled, the project signatories decided to bring it to an end in 1976.



*Einar Saeland  
Director-General  
1964-1977*

### *Nuclear legislation and nuclear third party liability; framing of the Paris Convention*

As early as 1957, the Council anticipated that civil liability for damage that could result from the peaceful uses of nuclear energy, as well as the difficulty of obtaining insurance to cover that liability, were likely to become serious issues in the years to come. Consequently, the OEEC Special Committee on Nuclear Energy (later to become the Steering Committee for Nuclear Energy) established a working group in charge of developing proposals for harmonising legislation in the nuclear liability and insurance fields.

That working group was subsequently transformed into the Group of Governmental Experts on Third Party Liability in the Field of Nuclear Energy. This group was comprised of lawyers, insurers, and technical specialists who were assigned the task of drafting an international convention on nuclear third party liability, compensation and insurance, which would set out the basic principles underlying subsequent national legislation in this field. These included the strict and exclusive liability of nuclear installation operators, limitations upon the amount of that liability and the time within which claims may be instituted, and the requirement that operators financially secure their liability.

The group's work was carried out in close consultation with the United States, Euratom, the IAEA, the European Insurance Committee, the International Union of Producers and Distributors of Electrical Energy (now EURELECTRIC) and other relevant international bodies in the field of electricity transmission.

The resulting Paris Convention was adopted by the Council in July 1960. Throughout the ensuing decade, the Group of Experts devoted its work to harmonising that convention with the Vienna Convention on Civil Liability adopted under the auspices of the IAEA in 1963, primarily by means of an Additional Protocol to the Paris Convention adopted in 1964. Both the Paris Convention and its additional protocol entered in force in April 1968. Another convention under the auspices of the Agency was adopted as well in 1963: the Brussels Supplementary Convention aimed at supplementing the measures set up by the Paris Convention.

### *First steps in the shaping of international radiation protection and public health norms and principles*

As early as 1957, issues related to protection against ionising radiation and related needs for regulation in this field appeared prominently in the future work programme of the Agency. Indeed, public health and safety have been a high priority for governments from the very beginning of commercial nuclear power industry. In the first instance, a Working Party on Public Health and Safety was established to contribute to the development of radiation protection policies and regulations for workers and the public. Basic norms for the protection of workers and the public were adopted by the Council in 1959 and revised in 1962 to take into account recent work and recommendations developed by the International Commission on Radiological Protection (ICRP). Since then, the NEA has routinely provided authoritative guidance and advice to member countries on the interpretation of the recommendations issued by the ICRP in this domain, and has taken steps to assure that the needs and concerns of radiological protection policy makers, regulators and practitioners are appropriately addressed in ICRP recommendations.

### *First international nuclear science co-operative efforts*

In the course of this decade, scientific co-operation under the aegis of the Agency began to emerge. A European-American Nuclear Data Committee was formed in 1959 to examine ways of extending scientific activities, and to reinforce research co-operation in the area of nuclear data through task-sharing among national research centres. The European-American Committee on Reactor Physics was set up in 1962 to review the state of knowledge, for example in the areas of thermal and fast breeder reactor physics and radiation shielding, to identify issues for international collaboration and to co-ordinate research in these fields. The work of both committees was complemented by the organisation of a series of scientific international conferences.

### *A first reappraisal of the Agency's programme*

The Steering Committee decided in 1963 to perform a first review of the Agency's programme and priorities in the light of the prevailing situation of members' national nuclear programmes.

Toward the middle of this decade, and contrary to the forecasts of a rapid expansion of installed nuclear capacity in Europe, nuclear energy still represented only a very modest percentage of the total electric capacity. The absence of shortage in the supply of conventional energy, technical difficulties encountered by the nuclear industry, and investment costs higher than anticipated had slowed down the expansion prospects of national nuclear programmes.

At the end of 1962, the determination of member countries participating in the Agency's joint undertakings to pursue their co-operation and to maintain their financial support was largely confirmed. However, the interest of creating additional such projects of this nature was subject to doubt, given that the national industries were starting to relay the initial impulse of governments in the development of nuclear technology.

### *Establishing international centres of reference for nuclear data and computer programs*

This prevailing political and economic context led the Agency to reinforce its scientific activities and to encourage national nuclear research centres to rely more on international co-operation. National governments were found to be reducing nuclear research investments to the benefit of more general scientific policies. To this end, the ENEA established two specific scientific services in 1964: the Computer Program Library and the Neutron Data Compilation Centre (amalgamated in 1978 into the NEA Data Bank). These provided essential mechanisms for collecting, testing and disseminating the basic tools used in the analysis, control and prediction of phenomena in nuclear technology.

# 1970-1980

Broader membership and structure; addressing the consequences of the 1973 energy crisis



*Twentieth Anniversary of the Nuclear Energy Agency*

The beginning of this decade saw two main factors likely to impact the NEA programme. The “energy crisis” which culminated in 1973 began to have a concrete meaning throughout industrial, commercial, and domestic life in the OECD area. The competitiveness of nuclear energy with other thermal power sources ceased to be in doubt. A logical consequence was that the nuclear energy option gained renewed attraction in many countries. A second factor was that adjustments in the programme and priorities of the NEA, resulting from a detailed review carried out in 1972 by the Steering Committee and incorporating the new energy situation, were brought into effect the following year. These changes involved a more determined “policy orientation” in the Agency’s work, taking account of both government and public attitudes toward nuclear energy, which were beginning to be influenced by environmental and safety concerns. Increasing attention would be paid to such matters as radiological protection, safety of nuclear installations, radioactive waste management, and the necessary basic legal and administrative framework for regulating these activities. In addition, preliminary work would begin toward improved public understanding of the nuclear energy option.

### *The 1973 crisis: a new challenge for the NEA*

The impact of the oil crisis on energy supply had as a consequence to highlight nuclear energy’s competitiveness with other thermal power sources (the cost of base-load nuclear-generated electricity calculated as half that of electricity from fossil fuels). Many countries were tempted to reorient their energy programmes toward the nuclear energy option, although the lowering of energy demand forecasts resulting from the general adoption of energy conservation measures and capital-intensive financing constraints had to be taken into account.

The basis for any forward planning for nuclear power must be confidence in the availability of fuel supplies. The NEA, which had established in 1965 a Study Group on the Long-term Role of Nuclear Energy in Western Europe, set up a working party to compile world-wide uranium and thorium resources estimates. This became later a joint activity between the NEA and the IAEA, and since then the well known “Red Book” on *Uranium Resources Production and Demand* has been produced regularly.

The forecasting work of NEA during this period was therefore geared toward addressing uncertainties in the availability of fuel cycle services, in particular, reprocessing, uranium and plutonium recycling, and giving greater consideration to the need for renewed uranium prospecting, both in preparation for a steep rise in demand expected in the 1980s, and for assuring availability in the longer term.

### *Extending NEA competence in the safety, regulatory and radioactive waste management areas*

In 1973, NEA work in the nuclear safety and regulatory areas under the former Committee on Reactor Safety Technology (CREST) was assigned to a new committee, with wider responsibilities, notably in the regulatory and licensing areas: the Committee on the Safety of Nuclear Installations (CSNI). Attention was given to safety questions related to light water reactors, sodium fast reactors, and certain gas-cooled reactors. Comparative studies were undertaken on licensing authority structures and systems in member countries, and of standards and codes of practice for the siting, design, construction, and inspection and continuing safety of nuclear installations.

The Programme for the Inspection of Steel Components (PISC) was launched in 1974. The PISC was a major international initiative to assess and improve non-destructive testing methods of steel

components of nuclear power plants, in order to detect and size possible defects, and thus contribute to improving plant safety and reliability. The programme ended in 1993.

The growing importance of NEA work on radioactive waste management, particularly on its technological aspects, led to the creation of a new specialist committee to take over direction of the Agency's activities in this field in 1975. The mandate of this new Radioactive Waste Management Committee (RWMC) included development of an international waste management R&D programme within the OECD framework. Soon after, a revision of this mandate included all aspects of the objectives, concepts and strategies for waste management in OECD countries, and the inter-relationship between radiation protection, safety, and waste management.

### *Expanding radiation protection and public health co-operation to radioactive waste management*

Early in 1973, the Committee on Radiation Protection and Public Health (CRPPH) was created to succeed the initial Health and Safety Sub-committee. In 1981 a new research programme began: the Co-ordinated Research and Environmental Surveillance Programme relating to the disposal of radioactive waste at sea (CRESP), aimed at the study of the processes regulating the transfer of radionuclides in the marine environment, with a view to increase the knowledge of processes controlling the transfer of radionuclides in the marine environment, so that safety assessments could be based on more accurate and comprehensive scientific data. This programme was carried out under a decision of the OECD Council establishing a

Multilateral Consultation and Surveillance Mechanism for Sea Dumping of Radioactive Waste. The co-ordination, within CRESP, of national research programmes of participating countries rapidly became an important international programme. All experience and data acquired by the NEA from the Atlantic disposal operations were made available to the IAEA, which was developing recommendations concerning the application to radioactive waste disposal of the 1972 London Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter. This programme continued until 1995, when the contracting parties to the Convention voted for a total ban on the dumping at sea of radioactive waste.

### *Tackling environmental considerations and public information*

Changes in public attitudes toward environmental aspects of nuclear energy, and signs of public opposition during this decade challenged nuclear regulatory authorities to take initiatives in order to inform the public and foster a better understanding of the pros and cons of nuclear energy. At the request of member countries, the Agency launched a series of actions to supplement and help national "public understanding" campaigns. Under the aegis of the NEA, experts in various fields, notably public health, reactor safety, public information, and industry gathered during 1973, with representatives of national atomic energy authorities, ministries of industry, and electricity producers, as well as chairmen of relevant NEA technical committees, to develop lines of action. These were the collection and circulation of information, exchange of experience in public understanding activities, consultations on critical problems, and harmonisation of standards and regulations.

*Contributing further to the efficiency of the nuclear third party liability regime*

Apart from the entry into force in 1974 of the Brussels Supplementary Convention and its Additional Protocol, providing for supplementary compensation to be made available through state intervention where amounts called for under the Paris Convention are insufficient, a number of other achievements were attained: The Agency was one of the co-founders of the Convention on Civil Liability for Maritime Carriage of Nuclear Material adopted in 1971 and the mandate of the Group of Governmental experts was expanded in 1974 to include the resolution of problems arising from the interpretation of not only the Paris Convention, but also all other nuclear liability conventions as well.

*Ian Williams  
Director-General  
1977-1982*



# 1980-1990

Nuclear accidents:  
hard lessons and review of nuclear energy  
potential and deployment



*Steering Committee at the OECD Headquarters,  
Château de la Muette in 1982*

This decade was seriously marked by the accidents which occurred in the nuclear power plants at Three Mile Island in March 1979 and at Chernobyl in April 1986. Both accidents triggered cancellations of existing or new reactor orders in a number of countries and emphasised the need to refine approaches to safety and regulatory aspects of nuclear power. Furthermore, these events emphasised the indispensable contribution that international co-operation must make to prevent or remedy such events.

Nevertheless, at a high-level workshop held in 1982, the NEA together with the International Energy Agency examined the prospects for nuclear power growth and their influencing factors. It was confirmed on this occasion that there were no constraints on substantial further deployment of nuclear energy from technical, economic, and industrial viewpoints, nor from an uranium availability perspective. Public acceptance however was an important factor for the future prospects of nuclear energy, as public opposition to this energy source was now found to have the strongest impact on national plans for nuclear programmes. The debate at national and international levels turned to issues connected with nuclear fuel cycle including plutonium recycling, radioactive waste management, and, to some extent, the proliferation of nuclear weapons.

Taking these evolving concerns into account, the Agency's programme of work was reviewed and the decision made to devote special efforts to the evaluation of economic and technical problems constraining the nuclear fuel cycle as well as to the preparation of co-operative solutions in the key area of radioactive waste management.

### *The NEA addresses the consequences of the accidents at Three Mile Island and Chernobyl*

The first international step toward understanding the accident at the Three Mile Island nuclear plant and discussing the lessons learnt, was the organisation within OECD of an analysis by the Committee on the Safety of Nuclear Installations (CSNI) of available information on the causes and consequences of the accident. The NEA Incident Reporting System (IRS) created in 1980, and adopted

in 1984 by the IAEA, proved to be a precious resource providing member countries with information on relevant facts and actions undertaken. Through IRS, information is collected from around the world on unusual events in nuclear power plants that may be important for safety or accident prevention and remedial actions. The information is then assessed, analysed and fed back to operators to prevent similar occurrences at other plants. IRS provides a systematic approach to the feedback of lessons learned from operating experience, which is a key element of the "defence-in-depth" approach applied in the nuclear power industry. A similar system was developed later on for the notification and analysis of incidents in the nuclear fuel cycle (FINAS). Several other specific programmes in this area were launched, such as compiling the findings of national safety research efforts made in response to TMI and international participation in the examination of damaged fuel from the reactor.

Other follow up initiatives taken by the CSNI touched upon emergency core cooling and fuel behaviour in water reactors, quantification and improvement of reliability of human actions in the testing and inspection of nuclear installation, and technical issues in the area of reactor containment safety.

The CRPPH, for its part, focused on the analysis of the findings of the investigations initiated by the US authorities and a critical review of the technical problems encountered in the measurement of radiation and radioactivity in the environment, in dosimetric and health effects assessments, and in the implementation of emergency counter measures by the various public authorities. Somewhat related to the range of remedial initiatives taken after the accident is the NEA study on Implications of Nuclear Safety Requirements for the protection of Workers in Nuclear facilities, which led, in 1989, to laying the foundations of the Information System on Occupational Exposure (ISOE) which was officially established in 1992. Indeed, new safety requirements, in particular post-TMI, would increase in an unbalanced way the risks to workers in nuclear power plants resulting from in-service inspections, plant maintenance, or back-fitting. The main value of ISOE was to give access to first-hand information on high-dose jobs and newly developed reduction techniques, as well as

information on total collective doses. More broadly, ISOE facilitated permanent exchanges of information on the radiation exposure of workers in nuclear power plants.

The Radioactive Waste Management Committee (RWMC) contributed a study on the state of the art of monitoring airborne releases from nuclear facilities under accident conditions, which appeared particularly relevant in relation to the TMI accident releases from the plant.

The activities of the NEA in 1986 were inevitably affected by the accident on 26 April at the Chernobyl reactor in the then Soviet Union. Although it was specific to a particular type of soviet reactor, and primarily affected soviet citizens, it had a pronounced effect on public opinion throughout the world and also caused repercussions in nuclear power programmes of some countries.

A strong consensus emerged urging international organisations to act promptly to help prevent repetition of such a severe accident in the future and initiate improved collaboration in some specific areas, such as international research work on severe accidents, a formalised system for the rapid exchange of information and mutual assistance in emergency situations, improved techniques for monitoring and assessing radioactivity levels in all countries, harmonised intervention levels and the associated emergency countermeasures, strengthening of the existing third party liability and insurance and compensation system, and improved dissemination of information to the public. Soon after the Chernobyl accident the Steering Committee for Nuclear Energy and the OECD Council developed, in close liaison with other relevant international organisations, an additional programme of work addressing these priority issues.

In the area of nuclear safety, the main focus was put on research on reactor containments and their ability to withstand severe accidental stress, testing of the capability of computer codes to predict the consequences of accidents, safety principles and practices in nuclear power plants in OECD countries, the role of human factors, particularly in the area of simulators and operator training programmes, and a review of R&D programmes in NEA countries, with the expansion of international joint projects. The report *Chernobyl and the Safety of Nuclear Reactors in OECD Countries* concluded that the accident did not bring to light any

previously unknown phenomena or safety issues that are not resolved or otherwise covered by current reactor safety programmes in OECD countries.

In the field of radiation protection, the CRPPH initiated an international review of the impact of the accident in OECD member countries and a critical appraisal of the emergency countermeasures adopted by the various countries. The report *The Radiological Impact of the Chernobyl Accident in OECD Countries* concluded that, although the radiological consequences of the accident had been serious in the region of Chernobyl, only in some OECD countries did the levels of radioactive contamination warrant special action to protect public health. On the whole, the contamination levels of the accident did not raise any major concern for the health of the population in the OECD countries. However, the economic impact of the accident was significant in some member countries, due to the relatively high cost of the countermeasures adopted, particularly the restrictions of the sale and import of food. In this respect, the committee called for better harmonisation of the scientific basis for countermeasures and more effective co-ordination of steps to protect the public. Accident scenarios and emergency planning were identified among areas deserving renewed emphasis. The CRPPH went on to publish several reports on the post-Chernobyl consequences and remedies, among which: *Chernobyl Ten Years On: Radiological and Health Impact*; and *Stakeholders and Radiological Protection: Lessons from Chernobyl 20 Years After*.

Chernobyl was also at the root of a new programme: the International Nuclear Emergency Exercises (INEX) for the organisation of exercises on the management of off-site emergencies following a severe nuclear accident. The main purpose was to detect and avoid unnecessary differences in approach, and establish better communication protocols between countries with common borders. Three different types of INEX exercises have been carried out so far.

The Chernobyl accident also drew attention to the deficiencies of the existing legal regimes governing liability and compensation of victims suffering damage as a result of nuclear accidents, particularly extensive transboundary damage, which was one of the more unexpected consequences of that tragic occurrence. The Steering

Committee, at its session in September 1986, took stock of the issues raised in this field and decided to reinforce the Agency's work on civil liability for nuclear damage. The Group of Governmental Experts was instructed to reorient its work to address the gaps in the nuclear liability regimes revealed by the accident. Work began in earnest on developing a Joint Protocol establishing a link between the two existing international nuclear liability conventions, namely the Paris Convention and the Vienna Convention.

This Joint Protocol relating to the Application of the Vienna Convention and Paris Convention was adopted in September 1988 and entered into force in 1992. Under its terms, rights of compensation granted to victims in States Party to the Joint Protocol and one of those two conventions, will be the same as the rights granted to victims in states party to the Joint Protocol and the other of the two conventions, thus effectively extending the geographic scope of application of each convention to cover victims in states party to the other. At the same time, the Joint Protocol ensures that only one of the two conventions will apply to any one nuclear accident.

A major decision was taken in the mid-eighties by the Steering Committee to extend the technical scope of application of the Paris Convention to installations being decommissioned and to nuclear waste disposal facilities.

*Radioactive waste management:  
a major objective for the NEA*

The Radioactive Waste Management Committee (RWMC) was created in 1975, after the CRPPH had already undertaken several studies on the management of radioactive waste, particularly the necessary very long-term radiological protection objectives needed to develop suitable technical solutions. In 1977, the two committees jointly published an authoritative report: *Objectives, Concepts and Strategies for the Management of Radioactive Waste Arising from Nuclear Power Programmes*, which provided a solid foundation for the future programme of this new committee.

The beginning of the 1980s was largely devoted to the development of this wide-ranging programme intended to pave the way for an international co-operative effort, with emphasis on high-level,

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Director-General  
1982-1988*



long-lived waste. Already significant progress had been noticed in a number of OECD countries in the setting up of suitable institutional and financial mechanisms for their long term management, and the Agency itself had published a comprehensive report on the *Legal, Administrative, and Financial Aspects of Long-term Management of Radioactive Waste*.

With this in mind, the RWMC organised several workshops to help frame a common understanding in member countries of radioactive waste management strategies and long-term objectives, and to take stock of progress notably in research and development and technical aspects of waste conditioning, storage and disposal. In 1986, the programme focused on the assessment of the long-term performance of radioactive waste disposal systems, notably in relation to high-level waste in deep geologic formations, based on predictive modelling techniques.

Several international R&D projects were set up under the aegis of the Agency, for example the Stripa Project in Sweden focusing on research into the disposal of high level waste in geological formations such as crystalline rock, or the International Sorption Information Retrieval Project (ISIRS), an international computer-based system for the storage and retrieval of sorption data useful for the assessment of the migration of radioactive materials in the geosphere. Work in this field continues today as the Thermochemical Data Base Project (TDB), which aims at meeting the specialised modelling requirements for safety assessments of radioactive waste disposal sites.

In this context, it is relevant to mention the specific services which the NEA has been performing over the years, and continues to provide to interested member countries, by co-ordinating independent international “peer reviews” of national studies and projects in key waste management areas, for example on the safety assessment and feasibility of a repository in a specific geologic

formation, or a methodology for assessing the long-term safety of a deep geologic repository. Belgium, France, Hungary, Japan, Sweden and the United States are among those member countries which have made use of these services.

An important achievement was the completion of a study on the implications for waste management of applying the principles recommended by the ICRP, and the development of a set of radiation protection objectives for the long-term disposal aspects of high-level, long-lived waste.

The technical and scientific information derived from the NEA programme at that stage was assembled into a global appraisal of the current situation, published as a collective opinion by the RWMC, which concluded that “... from a technical stand-point, specialists agree that, while specific research is still needed to optimise the disposal systems at actual sites, there is no fundamental obstacle to the safe disposal of radioactive waste, even with currently available technology”.

### *A wide-ranging evaluation of nuclear fuel cycle perspectives*

Assessing the technical and economic implications of the contribution of nuclear power to the overall energy supply is a major commitment of the NEA. A high-level workshop sponsored jointly in 1986 by the International Energy Agency and the NEA performed a wide-ranging review of the prospects of nuclear energy to 2000 and beyond. Two reports were published by the NEA on the growth of nuclear power and related fuel cycle supply and demand situations: *Electricity, Nuclear Power and Fuel Cycle in OECD Countries, Main Data, and Nuclear Energy and its Fuel Cycle: Prospects to 2025*. The Agency co-ordinated the preparation with the IAEA of the next edition of the “Red Book”: *Uranium: Resources, Production and Demand*. Also, a report on The Economics of the Nuclear Fuel Cycle

was published in 1985, and an updated report on *Projected Costs of Generating Electricity from Nuclear and Coal-fired Power Station for Commissioning in 1995* provided a firm basis for estimating nuclear fuel cycle costs in the total power generation cost. Spent fuel management and decommissioning of nuclear facilities also continued to be actively addressed by the NEA. In the latter area, the NEA set up in 1985 a Co-operative Programme on Nuclear Installations Decommissioning Projects, which covers the various safety, technical and economic issues involved in decommissioning operations.

The NEA has been involved in the topic of partitioning and transmutation (P&T) since 1989. Although it had been pointed out, from the outset, that successful application of P&T would not replace the need for geological disposal of high-level waste, this option has attracted the interest of a number of member countries. P&T technologies offer the potential for a significant minimisation of radioactive waste volumes and heat load for deep geological storage as well as a reduction of the radiotoxicity in the repository. Information exchange meetings have therefore been held and will continue among interested countries under the auspices of the NEA.

On the basis of these reports and evaluations of other facets of the fuel cycle development, the NEA view, at the end of the decade, was that nuclear energy was a proven technology with assured supplies, deployed widely throughout the industrialised countries. Nuclear electric power generation was showing increasing efficiency and steady improvements in plant reliability and performance. Nuclear energy was routinely found to be competitive with other sources of electricity in regard to cost, safety, reliability and environmental impact. Thus, the outlook for nuclear power, considered increasingly as a major option to meet electricity demand, continued to be encouraging.

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Director-General  
1988-1995*



# 1990-2000

Confirming the nuclear energy option:  
progress through co-operation on increasing  
attention to societal and environmental  
requirements



*The Republic of Korea  
joins the NEA in 1993*



*Mexico becomes  
the twenty-fifth member of the NEA  
in 1994*

The last decade of the 20<sup>th</sup> century was characterised by a more acute perception, by decision-makers and an increasingly large section of the public, of the environmental imperatives to reduce CO<sub>2</sub> and other harmful gas emissions in order to limit global warming worldwide, and to turn, for baseload energy supply, to environmentally sound solutions. That was the clear message of the UN Rio de Janeiro Conference of June 1992 and the objective of the ensuing Framework Convention on Climate Change.

This novel vision drew attention to the growing interdependence between countries in the energy field, as well as to the concerns about the impact of greenhouse gas emissions on the environment, and the question of the sustainability of different energy sources. The NEA was involved at an early stage in this issue, notably through the work of its Committee for Technical and Economic Studies on Nuclear Energy Development and the Fuel Cycle which had pointed early to the advantages of carbon-free sources, notably nuclear energy, for electricity or heat generation, and in terms of security of supplies. As a contribution to the OECD horizontal project on sustainable development led by the Environment Directorate of the Organisation, and with the co-operation of the International Energy Agency, the NEA Secretariat published in 2000 a study *Nuclear Energy in a Sustainable Development Perspective* intended to assist governments in evaluating the main impacts of nuclear energy and in identifying the factors that should be considered in assessing the contribution that nuclear energy can make to sustainability goals.

Another striking factor during this period was the acknowledgement, by governments and industry leaders, of the indispensable role for stakeholders in decisions to be taken for the siting and operation of new nuclear facilities. This new attitude was at the root of considerable improvements in terms of reciprocal understanding between nuclear actors and the public.

### *Initiating contacts with emerging economies*

In line with the OECD, an important move was made by the Agency toward developing contacts and possible co-operation with non-member countries, notably European economies in transition. As early as 1990, an information seminar was held by the NEA gathering senior nuclear experts from four countries of Central and Eastern Europe, the USSR and Yugoslavia. Possible forms of co-operation in the areas of nuclear safety and regulation, international civil liability and public information were considered. One year later, a similar initiative was undertaken for NEA contacts with dynamic Asian economies, whose nuclear power programmes had been moving forward in response to the growth of their energy demand.

### *Maintaining the nuclear energy option: nuclear development and the fuel cycle*

Against this background, the NEA continued to provide member governments with objective data to help them make sound decisions about nuclear power, and with information on policy alternatives and their relations with macroeconomic issues. Areas included assessments on technological, economic and environmental aspects of nuclear power likely to affect the acceptability and viability of the nuclear energy option, supply and demand questions that could affect these policies, new technologies that could influence them and microeconomic aspects of the choices made.

A report on *Projected Costs of Generating Electricity from Power Stations for Commissioning in the Period 1995-2000*, prepared jointly by the NEA and the IEA in close association with the IAEA was published and followed by a study on the *Broad Economic Impacts of Nuclear Power*. Another report addressed advanced water-cooled reactor technologies, including classification of

concepts, timing, design, and safety improvements. A study of spin-off technologies developed through nuclear activities should also be mentioned.

Conscious of the growing concern in OECD countries about a possible shortage of qualified manpower in the nuclear-related field in the coming years, the NEA conducted a survey in 1993 in 12 OECD countries, which confirmed that continued demand for plant operation and decommissioning likely would put pressure on the existing workforce. Close monitoring of this situation as well as actions to support nuclear R&D and the education sector were needed. The proceedings of a meeting on this subject were published under the title *Qualified Manpower for the Nuclear Industry: An Assessment of Demand and Supply*.

### *Nuclear safety and regulation as continued major priorities in the NEA programme*

Current nuclear safety and the improvement of the safe operation of technical systems continued to be a programme focus. Areas of study included operating experience and human factors, structural and components integrity, prevention and management of accidents, and regulatory co-operation.

The various components of the NEA programme have traditionally relied upon autonomous R&D projects or joint undertakings grouping interested member countries and when appropriate, non-members. This was the case of the RASPLAV project set up in 1994 to study the behaviour of molten corium in the lower head of a reactor pressure vessel during a hypothetical accident. The project, which initially gathered 14 OECD countries, was the first OECD-sponsored nuclear safety project to be carried out in a non-member country, namely the Russian Federation, which also participated in the project. It was designed to ensure that the results generated would be relevant to the reactors operating in NEA member countries as well as to the Russian-designed pressurised water reactors (VVER) and considered both current and future designs. Related co-operative activities with Central and Eastern European Countries and Newly Independent States of the former Soviet Union were set up in the field of accident prevention and

management, fostering significant participation of experts from these countries in meetings and studies.

The NEA nuclear safety area has often benefited from such co-operative projects and continues to do so. By the end of the century, the NEA safety programme counted no less than 14 projects covering, for example, safety issues in fuel and material, thermal-hydraulics and severe accidents, human factors, or data bases on system events or fire propagation.

In the early part of the decade, funding levels of government safety research programmes had been reduced in several member countries. Care was necessary to ensure that this reduction would not have an adverse impact on the ability of government agencies to fulfil their safety responsibilities. The CSNI thus established mid-decade a Senior Group of Experts on Nuclear Safety (SESAR), which pointed to the need for continuing research work to provide better support for the safe operation of nuclear power plants.

A new Committee on Nuclear Regulatory Activities (CNRA), previously a sub-committee of the CSNI, was set up in 1989 to promote exchange of information and experience among the nuclear regulatory bodies in OECD countries, and for the review of developments which could affect regulatory requirements. One of its first actions was to start developing analyses on human factors in operational safety. The CNRA started to organise in the middle of the decade “nuclear regulatory fora”, where top regulators from NEA countries would address specific regulatory issues and provide guidance for NEA safety activities.

### *Building consensus views on geological waste disposal and its environmental and ethical bases*

During the nineties, a large part of the Agency's activities was devoted to the long-term safety aspects of radioactive waste disposal, and to the evaluation of the geological, hydro-geological and geochemical characteristics of potential sites. Following a major international symposium on methods for the safety assessment of radioactive waste repositories, held in 1989, the Radioactive Waste Management Committee jointly with the IAEA

and the European Commission (EC) published, in 1991, an international collective opinion. Written for a broad audience, this was intended to put the issue of long-term safety in perspective, and to indicate the extent to which the development of safety assessment tools had reached a stage where they could be used in the licensing of specific repositories.

Against this background, the committee decided to address another aspect of radioactive waste management, which proved to be an important contribution: the philosophical and ethical basis of radioactive waste disposal. A special meeting on Environmental and Ethical Aspects of Long-lived Radioactive Waste Disposal was held in 1994, with the participation of ethicists and specialists of environmental protection and hazardous waste management outside the nuclear field. Concepts of inter- and intra-generational equity were covered extensively. The results of this meeting led the RWMC to develop a new collective opinion addressing the *Environmental and Ethical Basis of Geological Disposal of Long-lived Radioactive Waste*, published in 1995.

The main message of the committee was that the geological disposal concept can be designed and implemented in a manner that is sensitive and responsive to fundamental ethical and environmental considerations. Moreover, it is justified, both environmentally and ethically, to continue development of geological repositories for those long-lived wastes which should be isolated from the biosphere for more than a few hundred years. Stepwise implementation of plans for geological disposal leaves open the possibility of adaptation, in the light of scientific progress and social acceptability, over several decades, and does not exclude the possibility that other options could be developed at a later stage.

### *Radiation protection and its interfaces with other components of the NEA programme*

The scope of interfaces of the Committee on Radiation Protection and Public Health domain with other sectors of the NEA programme continued to grow, in line with the extension of areas related to public health, nuclear workers protection, but also

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Acting Director-General  
1995-1997*



nuclear accident prevention and mitigation, and public information. At the same time interfaces grew with other international regulatory bodies in charge of developing norms and guides affecting nuclear activities.

Following the completion of the new recommendations of the International Commission on Radiological Protection (ICRP Publication 60), experts from nuclear safety and radiation protection communities met to review the implications of these recommendations on nuclear safety and regulatory policies, as well as to discuss issues of interface between their respective disciplines. In the course of this decade the NEA, the EC, CMEA<sup>4</sup>, FAO<sup>5</sup>, IAEA, ILO<sup>6</sup>, UNSCEAR and the WHO co-operated to revise the joint Basic Safety Standards for Protection Against Ionising Radiation and for the Safety of Radiation Sources (BSS).

More coherent and effective criteria and provisions for the radiological protection of the public in the event of a nuclear accident were developed.

Stakeholders and the larger public need quick and accurate information in case of events at nuclear facilities involving possible radioactive releases with health and safety consequences. A substantial contribution of the Agency was the development, in 1989, of an international nuclear event scale of safety significance. Subsequently, in 1989, the Agency joined the IAEA in a common effort to develop such a scale. As of 1990 the International Nuclear Event Scale (INES) provided a standard instrument to characterise and report nuclear incidents or accidents and communicate with the public.

### *Supporting the role of science in nuclear technology*

A new Nuclear Science Committee (NSC) was set up in 1991, to carry out the Agency's scientific programme and take over the responsibilities of three previously separate committees. The NSC constitutes a forum for the exchange of information and experience, for co-ordination of scientific activities in member countries, and for the promotion of appropriate studies and projects, both for the current and advanced nuclear systems. The

initial programme of work covered, for example, basic and evaluated nuclear data, advanced computing for nuclear applications, radiation shielding, criticality studies, fuel cycle studies, advanced fission reactors, and partitioning and transmutation of actinides and fission products.

The Data Bank continues to be an international reference centre by providing nuclear data and computer program services for scientists in member countries. The Data Bank forms part of a worldwide network of nuclear data centres including sites in the United States and Russia and at the IAEA, which disseminate neutron cross-section data. The co-ordination and assembly of the Joint Evaluated File (JEF) of evaluated neutron cross section data is also part of the work, as is the collection, verification and distribution of computer programs. Several projects in support of other NEA programmes are carried out by the Data Bank, for example the Thermochemical Database (TDB) Project whose management is shared with the NEA Radioactive Waste Management Committee. Similarly, new data sets continue to be incorporated in the Code Validation Matrix in co-operation with the CSNI.

### *Harmonising and extending nuclear liability coverage; supporting nuclear law education and training*

Following the modernisation of the Vienna Convention, and the adoption of a new global Convention on Supplementary Compensation for Nuclear Damage by the IAEA in the late 1990s, the NEA immediately began work to revise both the Paris Convention and its accompanying Brussels Supplementary Convention. As in the case of the IAEA, the NEA's objective was to prepare for its member countries instruments that in case of accident would make money available to more victims in more countries, for a broader range of nuclear damage suffered. The result was the adoption in 2004 of two protocols amending both the Paris and Brussels Supplementary Conventions accordingly.

By the year 2000, it was recognised that the Group of Governmental Experts could benefit from a broadened mandate which would include aspects of nuclear law other than liability and compensation. Its mandate was accordingly revised and its name changed to the Nuclear Law Committee.

4. Council for Mutual Economic Assistance.

5. Food and Agriculture Organization.

6. International Labour Organization.

The events of 11 September 2001 in the United States represented a new challenge for the NEA Nuclear Law Committee, with international circles focusing on questions related to security. To address these concerns, the committee carried out a study on insurance coverage of damage resulting from a nuclear accident caused by a terrorist act, as well as on the need to establish a special regime covering the use (and potential abuse) of radioactive sources.

The recognition of the increasing importance of public participation in the decision-making process for nuclear energy projects also encouraged the committee to carry out a study of the potential impact of a series of new international conventions in the environmental assessment and public participation fields.

Finally, the marked decrease in young qualified professionals in the field of nuclear law led to the establishment of the International School of Nuclear Law at the University of Montpellier 1 (France) – a co-operative effort between the NEA and the University – which aims to provide an intensive, high-quality educational programme in international nuclear law sanctioned by a university diploma.

### *Exchanging experience on information and communication with stakeholders and the public*

An important objective of the NEA is to provide those concerned with decisions and policies related to nuclear energy with information on the Agency's findings, and to promote the exchange of experience and information between specialists in communication programmes in OECD countries.

The NEA continued to develop its series of international meetings where information specialists can review information and communication needs and experience, and evaluate future challenges. Several international workshops and seminars during this decade aimed at improving the methods for communication with stakeholders and the wider public. Among these were: Public Participation in Nuclear Energy Decision Making; Information to the Medical Profession on Ionising Radiation; Teachers and Nuclear Energy; Informing Parliamentarians on Nuclear Energy Issues; Informing the Public about Radioactive Waste Management.

# 2000-2008

Entering the 21<sup>st</sup> Century:  
a new role for the NEA; analysing nuclear policy  
issues relevant to decision making



*Signing of the Protocols to amend  
the Paris and Brussels Conventions, 2004*

**K**ey trends that affected nuclear development at the beginning of the new century included the continued deregulation of electricity markets, privatisation of the power sector and increasing awareness of environmental issues, especially the risk of global warming. These factors would necessarily influence nuclear energy programmes in the OECD area, notably as a result of the implementation of sustainable development policies integrating economic, environmental and social goals. From this perspective, a renewed interest appeared for advanced reactors, that would be even safer, more cost-competitive, and better secured against weapons proliferation threat. The re-activation in the United States of research and development on future reactor systems gave a strong signal at national and international levels of the confidence in the future of nuclear energy.

### *Adapting to a changing nuclear energy context*

The first decade of the 21<sup>st</sup> century, which led the NEA to its fiftieth year of existence was indeed a period particularly significant for the Agency. Echoes were heard of the wide-ranging debate of the 1980s and 1990s as to what extent nuclear energy would be relied upon for providing electricity in the future, and what role international co-operation could play in assisting governments and industry to adjust to the new parameters of the energy market.

Following the recommendations from the comprehensive review of the future role of the Agency by a High-Level Advisory Group convened by the Secretary-General of the OECD in 1997, the Agency developed a strategic plan, detailing a mission, objectives and priorities based on its traditional strengths and optimum use of its resources. Specifically, the Agency's role was defined as that of a forum for exchanging information and experience, a centre of nuclear competence, and a contributor of nuclear policy analyses and authoritative assessments, with a view to forging common understanding on key issues.

Thus, international co-operation through the NEA could continue to contribute substantially to keeping the nuclear energy option open in a sustainable development perspective, for example by helping preserve and develop scientific and technical know-how, maintaining adequate human resources in both quantity and quality, contributing to greater cost-effectiveness of nuclear operations, and improving stakeholder confidence in radioactive waste management solutions.

Interestingly, during this decade, activities to define and develop of future nuclear reactor designs in OECD countries and a number of other industrialised countries recalled methods which had successfully prevailed in the 1950s and 1960s, notably in the Agency: the selection of innovative designs and the organisation of multilateral co-operation on the basis of joint undertakings with independent budgets. A typical example is the Generation IV International Forum (GIF) launched in 2000 by the US Department of Energy and formally chartered in 2001. The GIF Technology Roadmap for Generation IV Nuclear Energy Systems evaluated over 100 system concepts, selecting six with the greatest promise and setting out the R&D necessary to bring them to commercialisation within the 2030 time frame. For each of the six concepts selected, a system steering committee was set up to manage the R&D collaboration. The NEA was selected to serve as Technical Secretariat of the GIF. Another example is the Global Nuclear Energy Partnership (GNEP) launched by the United States in 2006, adding to the current momentum building in favour of nuclear energy contribution to solving energy supply problems.

A Multinational Design Evaluation Programme (MDEP) was launched in 2005 by the US Nuclear Regulatory Commission, with the later participation of ten countries to share the resources and knowledge accumulated by national nuclear regulatory authorities in the course of their assessment of new reactor designs, with the aim of improving both the efficiency and the effectiveness of the assessment process. The NEA provides the Technical Secretariat functions of this project. Ultimately, the MDEP is expected to lead

to a convergence of codes, standards, and safety goals in the participating countries. The overall objective is to identify common regulatory practices and regulations that enhance the safety of new nuclear reactor designs.

In a period of nuclear technology renaissance where government and industry need to refine their strategies to meet present and long-term energy supply security, while reducing the risk of global warming and pursuing sustainable development, the NEA has put priority on developing studies and analyses of nuclear policy issues relevant to decision making. The NEA publication *Nuclear Energy Today* covers the scientific, technical, economic and social issues related to peaceful applications of nuclear energy. A report on *Government and Nuclear Energy* examines the role played over the last decades by governments in the development of nuclear energy and their challenging responsibilities in the context of electricity market deregulation, stressing too the advantages governments have found in international co-operation and intergovernmental agencies such as the NEA. A report on *Nuclear Competence Building* surveys initiatives launched during recent years in the area of nuclear education and training. A new edition of the joint IEA/NEA study on *Projected Costs of Generating Electricity* was also published. Finally, since 2001 the CNRA “Green Booklets” have summarised the status of key regulatory matters, such as regulatory effectiveness, decision making or the goal of assuring nuclear safety.

Toward the end of 2007, the Steering Committee for Nuclear Energy issued a statement about the pressing need for qualified human resources in the nuclear field. Indeed, many NEA member countries have been experiencing difficulties in recruiting qualified specialists, as a consequence of declines of enrolment in various degree or training programmes in the nuclear field. An NEA report issued in 2000 *Nuclear Education and Training: Cause for Concern?* had already drawn attention to this decline. The statement by the Steering Committee calls governments to carry out regular assessments of both requirements for and availability of nuclear expertise, and to join forces with universities, industry and research institutions to enhance nuclear education and expertise, by means notably of financial support to universities and scholarships to students.

### *Addressing nuclear energy and civil society: a key objective*

Renewing momentum of nuclear energy today and for the future faces a number of continuing challenges. Scientific and technical arguments alone have generally been found insufficient to gain wide public confidence in – and support for – this energy source. Despite good nuclear safety records in OECD countries and confidence expressed by the experts that solutions exist to deal safely with radioactive waste, much work remains necessary for countries to gain broad societal support for peaceful uses of nuclear energy. It appears that greater public participation in nuclear energy decision making can contribute to improving mutual understanding among the various groups concerned – industry, government, and civil society. The NEA has taken the lead to help facilitate exchanges of information and experience in this field.

Regarding stakeholder participation in radioactive waste management, the NEA set up in 2000 a Forum on Stakeholder Confidence (FSC) to facilitate the sharing of member country experience in addressing the societal dimension of radioactive waste management. A series of successful international workshops have been held under the FSC in Belgium, Canada, Finland, Germany, Hungary and Spain, bringing an international community in direct contact with national and local stakeholders to review and reflect on their waste management programmes.

The FSC released in 2004 a report on *Learning and Adapting to Societal Requirements for Radioactive Waste Management*, offering a synthesis of the results of its regular meetings and three of its workshops. The report emphasises the need to conduct decision making through iterative processes, retaining flexibility to adapt to contextual changes. Public involvement in stepwise decision-making processes should be facilitated by promoting constructive and high-quality communication between individuals with different knowledge, beliefs, interests, values and worldviews. More recently, the FSC released three major studies. *Fostering a Durable Relationship Between a Waste Management Facility and its Host Community* notes that the societal sustainability of an agreed solution is essential to the success of any long-term waste management project, and can be achieved by improving prospects for quality of life across generations. Another study, *Stakeholder Involvement in Decommissioning Nuclear Facilities*, emphasises the

importance of developing dialogue and co-operation among regulators, implementers, and local stakeholders as early as practicable. Finally, a survey of *Cultural and Structural Changes in Radioactive Waste Management Organisations: Lessons Learnt* highlights the ways in which traditional institutions have adapted to the stakeholder-centred ethos.

For several years now, stakeholder involvement in radiological protection has been studied in depth by the Agency. A series of expert group reports and broadly attended workshops have showed that the involvement of stakeholders in decision making can improve the quality and sustainability of decisions, and through stakeholder interaction with radiological protection specialists can improve the relevance of scientific input to the decision at hand. Promotion of stakeholder engagement among radiation protection professionals is now being studied, as are the impacts of stakeholder involvement on organisational structures.

A key example of stakeholder involvement in a concrete application has been the role played by the CRPPH in the development of new ICRP recommendations. Published in 2007, these new general recommendations replace ICRP Publication 60 and will significantly influence national regulations and international standards in radiological protection. The CRPPH participated for almost nine years in discussion of these new recommendations, organising stakeholder workshops and detailed draft reviews. As a result, the new recommendations respond much better to the needs and concerns of radiological protection policy makers, regulators and practitioners.

In respect of nuclear regulation, building and improving public confidence has become a priority for nuclear regulators worldwide. Confidence among stakeholders is a necessary pre-requisite for nuclear regulation. Nuclear regulatory experts met in 2000 to share information, practices and experience in this field during a workshop *Investing in Trust: Nuclear Regulators and the Public*. The CNRA decided after the workshop to establish a new Working Group on Public Communication on Regulatory Matters to use the findings from this meeting and to pursue assistance to its members on related matters of regulatory transparency, a theme which was again the subject of meetings organised in Canada in 2004 and in Japan in 2007.

Luis Echávarri  
Director-General  
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# Preparing for tomorrow

## Contributing to sustainable development efforts

The international recognition of the importance of achieving sustainable development objectives as thoroughly and rapidly as possible implies efficient actions on the part of decision makers on issues such as security of energy supply, global warming reduction and preservation of the environment from detrimental human activities. The Nuclear Energy Agency, with its fifty year experience in international co-operation in the field of peaceful nuclear energy, plays already an important role in this respect, and is well placed to contribute usefully to the global efforts underway, well into the coming decades. The Agency's programme in this field and its regular participation in OECD activities on sustainable development are examples.

On the occasion of its 50<sup>th</sup> Anniversary, the NEA has published a new comprehensive report entitled *Nuclear Energy Outlook (NEO)*. "Outlooks" are a recognised trademark of the OECD, however the NEO will be the first outlook ever produced on nuclear energy. It responds to the changing dynamics and renewed interest in nuclear energy and arrives at a moment when energy security and climate change and the cost of energy have become priorities in both short-term and long-term energy policies.

The strengthening of the co-operation with the IEA will continue to have a constructive effect on the services provided to the member countries. The NEA contributes regularly to selected IEA work by drafting chapters in IEA publications that deal primarily with nuclear aspects. Another example of this collaboration is the provision by the NEA of nuclear experts to participate in the regular energy policy reviews of IEA countries having a nuclear component in their energy mix, and its permanent representation in the regular meetings of the IEA Governing Board, including at Ministerial level.

The forty-eight year-old co-operation between the NEA and the International Atomic Energy Agency under their 1960 co-operation agreement, and the close co-ordination of respective programmes, have largely proved the value of the complementarities of respective agencies. Indeed, their different strength and expertise are, by themselves, a precious asset, for example when a new multinational project launched by one agency can be joined by the other, to the common interest of both, as is the case with the

NEA/IAEA International Nuclear Event Scale (INES), or the Incident Reporting System (IRS). The partnership of the two agencies in the preparation and publication of periodical studies such as the "Red Book", on *Uranium Resources, Production and Demand* is another valuable example. No doubt such long-standing co-operation will continue to be profitable to both organisations.

## Widening contacts with non-member countries

In line with the resolution of the OECD Council to enlarge its membership and enhance engagement with selected non-member countries, the NEA already has an extensive relation with two running nuclear energy programmes, namely the Russian Federation and Slovenia. Both countries are formal observers in all NEA Standing Committees. The Joint Declaration on Co-operation signed with Russia in 2007 is operational and paves the way to fruitful partnership in a large number of areas ranging from scientific research in the nuclear field, to innovative technology development, and economic analyses. As regards China, the possibility of further developing co-operation is an important strategic issue for the future.



*Signature of the Joint Declaration on Co-operation Between the Russian Federation and the Nuclear Energy Agency in the Field of the Peaceful Uses of Nuclear Energy, 21 March 2007*

## **The NEA: a unique framework for co-operation**

Looking into the future, the NEA is now a recognised actor on the intergovernmental nuclear energy co-operation scene, gathering interested OECD countries and non-member countries across the world. Its current initiatives for enlarging co-operation with emerging countries which will need large energy production capacities to feed their economic development, while minimising their impact on the environment, come at a time when nuclear energy is increasingly recognised as an indispensable component, now and for the future, of the world energy mix.

The role of the NEA within the international governmental sphere, as a supporting structure for new multilateral nuclear development projects, such as the Generation IV International Forum, or common approaches to safety and regulation, such as the Multinational Design Evaluation Programme (MDEP), requires an expertise which may easily offer a basis for further similar exercises in the coming years.

Meanwhile, the NEA Strategic Plan will continue to direct its programme of work, offering a large choice of tools ranging from the sharing of information and experience among members, to the pooling and maintenance of the membership's technical expertise, or the provision of nuclear policy analyses. The historic success throughout these past fifty years of the autonomous projects set up by the Agency in the form of joint projects or joint undertakings will no doubt continue to be a useful model of pragmatism and flexibility for the launching of new initiatives among member and non-member countries.

The past half century stands witness to the Nuclear Energy Agency's record in emphasising safety as a key condition for the safe utilisation of nuclear energy, its competence and stamina in conducting its programmes in a constantly evolving political, economic, and social environments, and its capacity to offer new services to a membership desirous to contribute, in a multilateral context, to the development of the next generations of nuclear power plants and related nuclear fuel cycles. This record demonstrates clearly its capabilities and preparedness to meet future challenges in the context of international co-operation in the field of nuclear energy.

# How does the NEA work?

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The OECD Nuclear Energy Agency operates under the general OECD rules, and the provisions of its Strategic Plan, aimed at helping it to meet the evolving needs of its member country governments in the nuclear energy field, including applications of ionising radiation.

## The NEA aims:

- to be a forum for sharing national experience and thus be able to act as a catalyst for developing consensus views;
- to constitute a centre of excellence, through a network, of some 3 000 national experts, capable of pooling and maintaining expertise;
- to offer managerial skills for co-ordinating multinational R&D projects, and to provide the Technical Secretariat of other international initiatives.

## NEA working methods:

The NEA operates under the guidance of the Steering Committee for Nuclear Energy, through a series of specialised standing technical committees, with the NEA providing the secretariat and co-ordination services. At the present time, there are seven such committees covering the six major areas of the Agency's programme: nuclear safety and regulation, radioactive waste management, radiological protection, nuclear law and liability, nuclear development and nuclear science.

The standing committees are composed of experts in the relevant fields, designated by the member governments. While such experts are generally working in institutions under government supervision, some may come from utilities or other private industrial sectors. These committees develop the programme of work in their respective areas, monitor the progress of the projects undertaken and approve the final products.

The standing technical committees set up, as necessary, working parties which are discipline-oriented and report directly to them, or expert groups in charge of specific tasks, reporting either to the working parties or directly to the standing technical committees. The duration of the mandates are five years for the standing committees, three for the working parties and two for the expert groups.

They provide fora within which member countries have in-depth exchanges on technical and programmatic information and experience, develop consensus on technical and policy issues for use by decision-making circles in member countries, identify areas where further work or research is needed, and prepare and publish primary data spanning the whole programme of work.

## Joint undertakings/autonomous projects

The NEA administers autonomous projects, also referred to as joint undertakings or joint projects, which enable interested countries through voluntary co-operation to pool their efforts on particular technical problems and research activities. Participating countries undertake the necessary work among themselves at their own expense under the auspices, and with the support of the NEA.

Such projects, which are unique to the NEA, were the main programme focus of the Agency in its early years. While the role of the NEA was later to act principally as a forum for co-ordination of member country nuclear energy programmes, the initiation and co-ordination of autonomous projects continues to be an important function of the Agency. Task sharing and resource pooling among participating countries have proved to be an efficient, cost-effective method to acquire know-how and experience in a vast range of technical and scientific areas of nuclear energy.



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# Accession dates to the OECD Nuclear Energy Agency

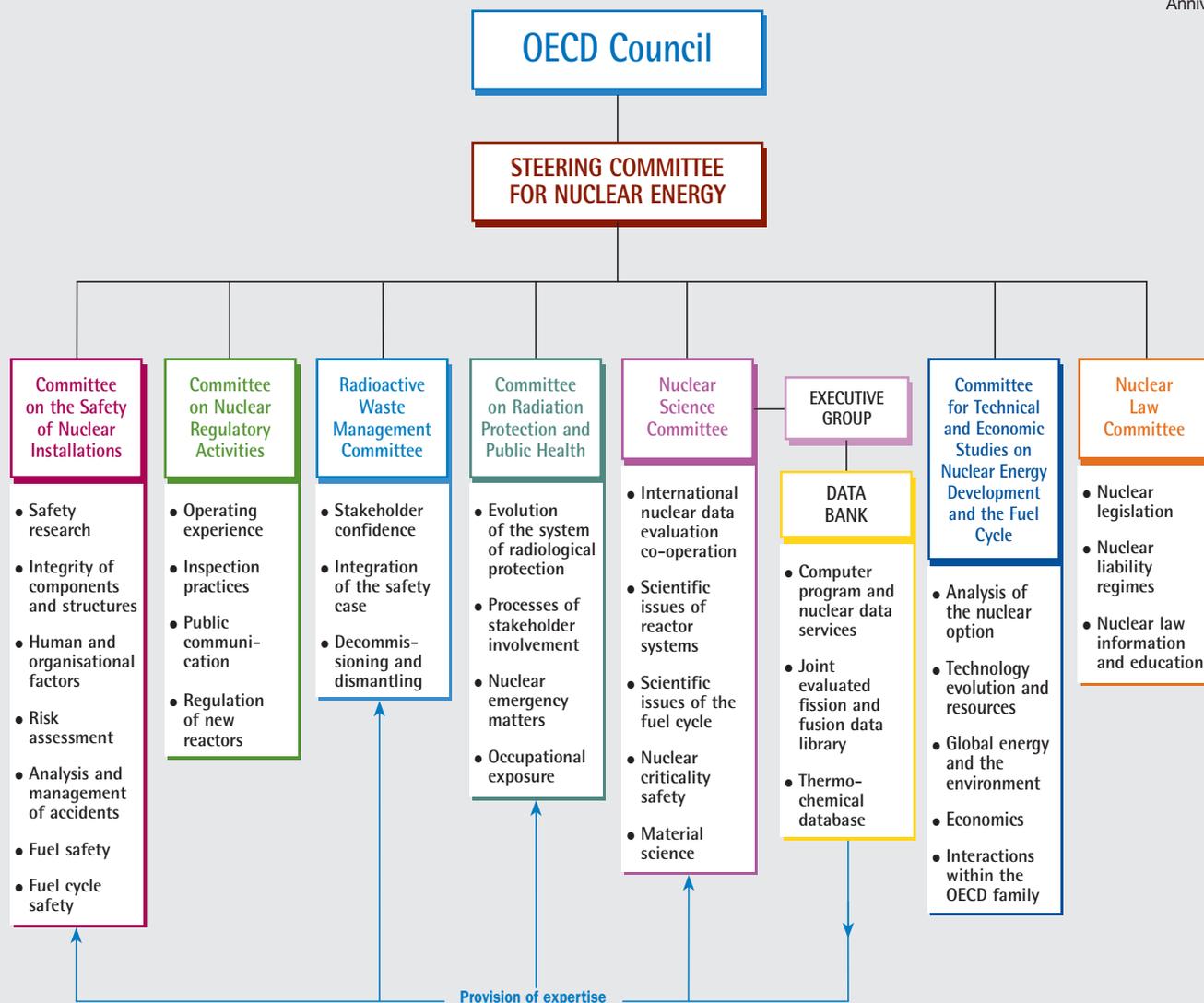
## The Nuclear Energy Agency (NEA)

is a semi-autonomous body of the Organisation for Economic Co-operation and Development.

OECD member countries wishing to participate in the activities of the Agency must make a formal request to join.

Of the 30 OECD member countries, 28 are members of the NEA:

Australia		1973	Japan		1972
Austria		1958	Luxembourg		1958
Belgium		1958	Mexico		1994
Canada		1975	Netherlands		1958
Czech Republic		1996	Norway		1958
Denmark		1958	Portugal		1958
Finland		1976	Republic of Korea		1993
France		1958	Slovak Republic		2002
Germany		1958	Spain		1959
Greece		1958	Sweden		1958
Hungary		1996	Switzerland		1958
Iceland		1958	Turkey		1958
Ireland		1958	United Kingdom		1958
Italy		1958	United States		1976



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***T**he NEA Secretariat  
over the years...*



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*In 2008, the NEA Secretariat is composed of 69 staff members from 19 countries. Professional staff are often specialists from national administrations and research institutes, bringing their experience to the Agency for two to five years on average.*



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