

# Fifty Years of Radiological Protection

The CRPPH 50<sup>th</sup> Anniversary  
Commemorative Review



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## **The CRPPH 50<sup>th</sup> Anniversary Commemorative Review**

by  
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NUCLEAR ENERGY AGENCY  
ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

## ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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The mission of the NEA is:

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

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

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

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## **PREFACE**

by Luis Echávarri

Director-General

OECD Nuclear Energy Agency

The anniversary of a 50-year career is certainly an event to celebrate. It is thus in a spirit of respect and thanks that this review, a historical chronicle of the work of the NEA Committee on Radiation Protection and Public Health (CRPPH), has been prepared to celebrate the occasion.

The history of the CRPPH began on 21 March 1957, when the Steering Committee for Nuclear Energy established, as early as its third meeting, the Working Party on Public Health and Safety. As shown by this decision, the question of public health and safety has been a top priority among governments from the very beginning of the commercial nuclear power industry. To help ensure the safe development of commercial nuclear power, the CRPPH has throughout its history contributed significantly to the understanding of radiological protection issues, to the development of corresponding principles, policy, regulation and application, to the exchange of national experience in the regulation and application of radiological protection, and to the identification and study of possible emerging challenges in the field. Many of the key accomplishments and most important projects of the Committee are documented herein. In accomplishing its mission, the CRPPH has always strived to work effectively together with other organisations, both national and international. This has of course included the national institutions nominated by governments to participate in the CRPPH, but also many international organisations, in particular the European Commission (EC), the International Atomic Energy Agency (IAEA) and the International Commission on Radiological Protection (ICRP).

The quality of the Committee's work, and its ability to quickly and effectively address the emerging questions facing its members, have forged the Committee's identity as a key forum in radiological protection. It is not as much in terms of developing statutory recommendations or norms as it is in terms of acting as an R&D laboratory for discussing new issues and problems, for developing and testing possible new approaches, and for sharing experience and lessons that the

Committee has excelled. The forward-looking, flexible nature of the CRPPH continues to support its member governments in the important area of radiological protection.

The CRPPH will, at its 50<sup>th</sup> Anniversary Conference on 31 May 2007, briefly summarise its many accomplishments, but will focus as it always has on the future, seeking to hear the views of its key stakeholders, national regulatory authorities and other international organisations, on possible forthcoming challenges. As the CRPPH looks ahead, I would like to congratulate its members for their many successes, to thank them for the quality of their work, and to wish them good luck for the next 50 years of excellence in radiological protection under NEA auspices.

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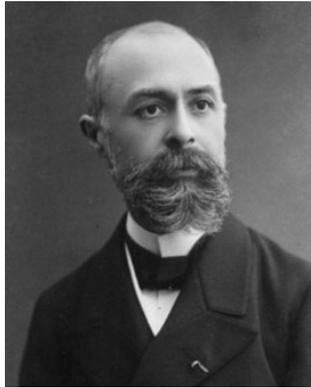
*Memory is intentional.*  
*Boris Cyrulnik*

**T**his book commemorates an anniversary, the anniversary of a wonderful adventure in the service of a noble idea: to develop nuclear energy for the benefit of all mankind while limiting its adverse affects.

In the words of the philosopher Boris Cyrulnik, “Memory is intentional.”, and the following pages draw solely on the official minutes of the Agency, illustrated, where necessary, by personal accounts at our invitation. Possibly, perhaps, definitely, had the vantage point been different, quite a different history could have been written, but freedom is the prerogative of the historian if he follows his own conscience.

The atom is an age-old story; radioactivity is becoming one.

Wilhelm Röntgen, in 1895, followed by Henri Becquerel, in 1896, opened up a new chapter in the history of humanity. The former gave medicine one of its most marvellous tools. More than a century later, we still cannot fully comprehend how much the discovery of X-rays has advanced the wellbeing of our contemporaries. Later, while radioactivity was being put to the service of mankind, given tremendous impetus by the discovery of artificial radioactivity in 1936 by Frédéric Joliot and Irène Curie, the atom took a wrong turning which unfortunately, and to the horror of the entire world, would lead to Hiroshima and Nagasaki.



And the major powers failed to understand that other uses of the atom were possible.

Paradoxically, it was a general, the President of the United States, who, from the tribune of the United Nations on 8 December 1953, launched the moving appeal to reason, *Atoms for Peace*, which would launch a new era. This man was Dwight D. Eisenhower. It was the beginning of a new era. President Eisenhower's idea naturally led to the creation of an international organisation, the International Atomic Energy Agency (IAEA). Yes, indeed, atomic energy could be put to peaceful use and serve mankind.

True, the era of pioneering geniuses such as Roentgen, Becquerel, Curie, Joliot, Einstein, Rutherford, Bohr, Chadwick, Hahn, Fermi, Oppenheimer, Meitner, Seaborg, had passed and we were now entering the era of Martin, Dupont, Smith, Müller, Schmidt, Fernandez, Garcia, Lee, and Kiru.

But our story does not owe quite everything to the atom. Before this revival of peaceful uses, a second character, George C. Marshall, entered the scene and made his name a household word, used today in many situations in which reconstruction has followed natural or man-made disasters. The time was ripe for the emergence of the future CRPPH. The "Marshall Plan" and "Atoms for Peace" could be proud of their brainchild. The goal of the Marshall Plan was more regional: the reconstruction of a Europe devastated by a fratricidal war. Proposed by President Truman's Secretary of State on 5 June 1947 at Harvard



University, this most generous plan in recent history would pave the way for the reconstruction of a new Europe in less than 10 years. There was only one requirement, but it was a big one: "*Put an end to your narrow national views, think continent, think Europe, otherwise no aid*". Stalin was invited to participate, Molotov was his wily old self, but in the end both withdrew. Western Europe, as it would continue to be called for far too many years, would forgive its old enemies. Who could ever have imagined that an era of friendship like this would dawn in Europe?

So it was that, on 16 April 1948, a new organisation, the Organisation for European Economic Co-operation (OEEC), came into being with the participation of 18 European countries<sup>1</sup> (Trieste was a free state at the time). Later that organisation would become the Organisation for Economic Co-operation and Development (OECD). Canada and the United States would of

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1. Austria, Belgium, Denmark, France, Greece, Ireland, Iceland, Italy, Luxembourg, Norway, the Netherlands, Portugal, the United Kingdom, Sweden, Switzerland, Turkey, the free state of Trieste and West Germany.

course be associated with the new adventure. Later still Japan (1964), Finland (1969), Australia (1971), New Zealand (1973), Mexico (1994), the Czech Republic (1995), Hungary (1996), Poland (1996) and Korea (1996) would join this partnership which now spanned the world.

The seed sown by *Mr. Marshall* had prospered.

### **Creation of the European Nuclear Energy Agency (ENEA) and the Health and Safety Sub-Committee (HSC)**

The OEEC, this new organisation for reconstruction would very soon realise that nuclear energy could be a tremendous asset to a programme of economic development and, on 29 February 1956, its Council decided to set up the Steering Committee for Nuclear Energy (SCNE). There was only one requirement, which was that it should actively co-operate with the United States. This was the wish that Dwight D. Eisenhower, president of the United States, had expressed in his declaration of 22 February 1956: a word to the wise suffices.

The objective was clear – the very tightest security to prevent diversion for military purposes, trade regulations governing the use of nuclear energy, education and public health – to be achieved by setting up a new European Nuclear Energy Agency (ENEA) on 20 December 1957, with effect from 1 February 1958. Its members would be Germany, Austria, Belgium, Denmark, Spain, France, Greece, Ireland, Iceland, Italy, Luxembourg, Norway, the Netherlands, Portugal, the United Kingdom, Sweden, Switzerland and Turkey. At the time, the United States was an associate member; it would become a full member in 1976.

In the interval between the establishment of the OEEC and the creation of the ENEA, the free state of Trieste, which had been partitioned between Italy and Yugoslavia, lost its independence and disappeared *de facto* from the ENEA. The Treaty of Osimo in 1975 made partition definitive.

In 1965, Japan became an associate member and would become a full member in 1972, before the United States did, effectively putting an end to the solely European dimension of the Agency which had now become international and was known as the Nuclear Energy Agency (NEA). In 1973, Australia joined the Agency, followed in 1975 by Canada which, like the United States, had been an associate member since the Agency's foundation. Then came Finland in 1976, Korea in 1993, Mexico in 1994, Hungary and the Czech Republic in 1996 and the Slovak Republic in 2002.

Although it had not yet taken its final form in 1957, one could say that the CRPPH as we would know it in the future was launched in those days along with the expression “Public Health”. Paradoxically, it would only re-incorporate the words “Public Health” in its title 15 years later.

For the SCNE, 1957 was a productive year: a significant infrastructure was needed, and the Steering Committee achieved this. It set up Working Parties one after the other, some of them technical (fuel reprocessing, for instance) or regulatory, some looking into safety and some into educating our young people, so that they would want to experience this nuclear adventure. The international dimension would not be forgotten; in fact it would continue to be a permanent feature of this new Agency. Nor would health: the Working Party on Public Health and Safety was set up on 21 March 1957 and on 19 April 1957 a founding document, that was precision itself, was issued under the reference NEA/SAN(57)1.<sup>2</sup> The first programme of work was born. Goodness, they worked fast in those days...

Just what did this founding document propose?

- The adoption of common health standards governing the permissible exposure to external radiation and concentrations of radioactive materials that may be discharged into air and water.
- To see whether an agreement concerning certain general provisions for undertakings producing, dealing with or using radioactive substances would be desirable or whether a set of instructions of some kind could be compiled.
- To see whether there could be agreement on the advance notification of all plans for the disposal of radioactive waste and what the procedure should be for examining such notification.
- To see to what extent there was agreement on establishing an international monitoring body to which states would periodically report legislative and administrative public health and safety regulations in force and their application and the procedure for examining such reports.

The future orientation of the CRPPH can be found in this document.

It should be noted here that the United States played an initiating role in radiological protection regulation. The United States had developed a new

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2. If there is another permanent feature of the Agency 50 years on, it is its document reference system, the logic of which is not immediately apparent to any of its members, apart from the Agency staff.

regulation in July 1955, which took effect as of 28 February 1957. As such, the ENEA Steering Committee for Nuclear Energy requested, in 1957, that the American regulation should serve as a basis for discussion for the development of new European radiological protection standards.

It should also be recognised here that the United States also had an initiating role in the introduction of the precautionary principle. Conscious of the importance of this approach well before it became commonplace, the ENEA Steering Committee for Nuclear Energy required the introduction of the American “precautionary procedures” into its discussions. It cannot be said often enough that this approach, which everyone now wants to lay claim to, had its origins among the pioneers of radiation protection.

Before then, there had been many attempts to warn about the adverse effects of X-rays. As early as 1904 a Boston dentist, William Rollins, had recommended protection standards, perhaps the first. Then, in 1916, it was the turn of Sidney Russ, who requested that the British Röntgen Society also adopt standards. These initiatives had led naturally to the creation of the International Commission on Radiological Protection (ICRP). Nevertheless, the modern system owes its beginnings to the Second World War and it took the massive scale of the Manhattan project before a radiological protection system would replace certain practice-specific standards. From the outset, the precautionary approach prevailed in discussions and would later become second nature. After the Second World War, when the ICRP was revived, it would make this approach a principle.



## 1. THE CRPPH AND THE AGENCY

The story of radiation protection at the NEA truly began on 21 March 1957, with the creation of the Working Party on Public Health and Safety, the predecessor of the CRPPH. It is worth noting that this is almost a year before the creation of the OEEC European Nuclear Energy Agency. The OEEC Steering Committee for Nuclear Energy had asked the Working Party to develop a programme of work in this area, and to establish a mechanism to implement the proposed programme of work. With this, the Working Party completed its assignment and on 21 February 1958, the Health and Safety Sub-committee was created, and began work on the programme created by its founders.

This period marked the beginnings of international co-operation in the nuclear field. Contemporary concerns quite naturally brought the main national public health authorities and specialists in radiation protection together in a standing forum with very broad competencies. Among those concerns were the potential consequences of atmospheric nuclear weapons' tests, the prospects of developing nuclear electricity generation programmes and various applications of radioisotopes, against a backdrop of early awareness of the need to protect people and the biosphere against the effects of radiation.

Among the first activities of the Sub-committee, the following warrant mention.

- The collection and publication of annual reports on “total beta” radioactivity sampling in air, designed to measure the extent of atmospheric contamination due to fallout from nuclear tests. A warning system had been put in place to signal any substantial increase in contamination levels, but it was never put to use, chiefly because atmospheric testing by the two superpowers was halted in 1963.
- Marine radio-ecological studies in the North Sea area, focusing on radioactivity pathways in the marine environment and concentrations in marine food chains. Several scientific seminars were subsequently held on these topics in connection with the management of radioactive effluents and waste.
- Studies on radio-luminescent watches and clocks in co-operation with the IAEA, aimed at limiting the quantities of radioisotopes (Radium 226,

Tritium and Promethium 147) already being used in paints for the clock- and watch-making industry. Other studies followed on radioactive lightning conductors, fire detectors and various consumer products which use radioisotopes, most of which are prohibited today.

These early activities foreshadowed the future development of the Committee's programme within the NEA with its mandate's focus on the safe use of nuclear energy. They gave a first glimpse of the Committee's increasing role in the practical application of the recommendations of the International Commission for Radiological Protection (ICRP) to different situations relating to the protection of man and the environment, such as the protection of workers and the public under normal and accident operating conditions in nuclear power plants and the management of radioactive waste. We shall return to the synergy between the ICRP and the CRPPH in a later chapter.

The work of the CRPPH did not always have the endorsement of the Agency's Steering Committee, which wished to confine its activities to strictly nuclear applications; the CRPPH rebelled against this decision, which it was to describe as a «mistaken policy». Robert Fry mentions this in his commentary.

Somewhat paradoxically, considerable time was spent discussing consumer goods containing radioactive materials and the natural radioactivity of building materials; this was odd because the NEA Steering Committee had determined that such matters, being radiological problems not associated with the nuclear industry, were not within the remit of the CRPPH. Some CRPPH members were of the strong view that this was a mistaken policy.

Robert Fry  
Chairman, 1978-1980

Fortunately, the CRPPH was not diverted from its path and, nowadays, no-one would dream of criticising it for the major initiatives it took in all situations requiring the application of a radiological protection system. Over the course of the 1980s and 1990s, the Committee gradually adopted new positions while fulfilling its mandate. Let us hear what its Secretary Osvaldo Ilari has to say.

This meant to shift its focus from collections of data and studies on radioactive sources of general use and in the environment, towards conceptual aspects of the radiation protection system and practical issues in nuclear energy operations. This resulted in a wider and more interactive approach involving regulators and operators, sometimes in joint ventures.

Osvaldo Ilari

As important as the work of the CRPPH within the Agency was at the time, and still is, it was only one dimension of the activities of the Agency, which was also working on other problems in other committees.

The role of the HSC was accurately summed up at its 18<sup>th</sup> meeting in 1969: “the role of ENEA is (1) to stimulate research in Member countries and (2) to achieve practical results at a regulatory and administrative level in subjects of interest to the Health and Safety Committee, such as the development of radiation protection standards, management of radioactive waste, and practical application at technical, administrative and regulatory levels”.

Within the NEA there have always been other committees. For the successive Directors-General of the Agency, this brought the risk of divergence between the committees. If there is one thing that has not changed over the past 50 years, it is that successive Agency Directors-General have continually stressed the need to work in complete harmony. The same appeal would constantly be made for co-ordination between international agencies.

Now, if successive Directors-General felt the need to keep repeating this, let's face it, it must be because harmony did not always come so easily; such is the lot of any dynamic, multi-faceted organisation.

In July 1972 the Agency's organisation chart included among its technical committees the Radiation Protection Committee (RPC), the Committee on the Safety of Nuclear Installations (CSNI) and the Committee on Reactor Safety Technology (CREST). For wastes, there was only the Working Group on Radiation Waste Management under the RPC. Even at that stage, Bo Lindell, Chairman of the RPC, wanted the scope of activity of the RPC and CREST clarified, since he thought the latter was a little too independent on radiation protection issues. The following year, Jean-Pierre Olivier proposed studying the problem of waste with the CSNI. In 1976, Bo Lindell, again, wanted to meet with the CSNI to make things clear. That same year, the CRPPH was clamouring for the project on the disposal of wastes at sea. In 1979 it was relations with the Radioactive Waste Management Committee (RWMC), which had been set up in the intervening period, which were under strain while relations with the CSNI were hardly more peaceful, what with the Chairmen in 1980 and 1982 complaining pointedly about the CSNI interfering side.

Things changed totally in 1985, when Deputy Director Klaus Stadie officially praised the excellent collaboration between the various committees inside the Agency. In any classic business situation, this is what is known as taking things in hand. Since then, successive Directors-General have stressed the need for collaboration between committees every time they appeared before the CRPPH. Always best to keep things from boiling over.

The role of the Committee Secretary was not always very clear. In 1979, Osvaldo Ilari gave some thought to making the CRPPH more effective and secured greater freedom of operation. The Committee reviewed its role and its missions regularly. It did so most recently (pending the next occasion) at the very beginning of the year 2000.

It just could not begin a new millennium without this sort of review. However, its missions have stood the test of time: the CRPPH was to become a forum for discussion and sharing experience; working alongside the ICRP, it would provide support for national authorities, continue to report on the state of the art in the field of radiological protection and on the potential implications for the system; propose concepts that would be as simple as possible and promote international co-operation activities in the member countries of the Agency.

At the end of the day, 50 years after its inception, the CRPPH remained true to itself within the NEA.

## 2. THE CRPPH AND ITS PEOPLE

An organisation is nothing without its people. Four types of players have been part of this half-century epic: members of the Agency staff, successive HSC/CRPPH Chairmen, representatives of member countries and heads of the working groups set up in the course of the Committee's discussions. The CRPPH owes its success to all of these participants in its history.

### The Secretaries

Reading the minutes of the various sessions of the Committees one can see how very important, in fact crucial, the duties of Secretaries of the HSC and the CRPPH have been. Diplomacy is needed as are great technical skills, and humanity is *a plus that does not come amiss either*. These, according to the testimonials we have gathered, are qualities that all of the Committee Secretaries possessed.

In 50 years, there have not been many Secretaries at all, which has lent the CRPPH the continuity so essential for this type of venture.

When the Working Party on Public Health and Safety was set up by the Steering Committee for Nuclear Energy on 21 March 1957, Reidar Eker of Norway was appointed Chairman and two consultants to the Organisation, C. Van de Berg and J.L. Weinstein, carried out the duties of Secretary. The archives do not go into roles in any great detail, but the Agency seems to have quickly decided to hand these duties over to a member of the Agency staff and so Émile Wallauschek – a principal administrator at the ENEA in 1960 – entered the lists in the post of Secretary as we know it today. In those days, the CRPPH was trying to find its place amid all of the international agencies, particularly in relation to the IAEA, and its Secretary had great ambitions for the NEA.

At that time the scientific secretary of the CRPPH was Émile Wallauschek assisted by the efficient Ms. Zabel Chéghikian. Wallauschek was very ambitious, and Arne Hedgran and I discussed what we saw as a problem, namely that he seemed to wish CRPPH to take up the same problems that other organisations, particularly the IAEA, were already attacking.

Bo Lindell  
Chairman of the CRPPH, 1971-1973  
Chairman of the ICRP, 1977-1984

Émile Wallauschek was Secretary until 1964. He was Head of the Radiation Protection and Waste Management Division until he retired in 1980 and was replaced by Jean-Pierre Olivier. Ms. Zabel Chéghikian acted as Secretary from 1965 to 1975, but according to the minutes, does not seem to have held the post as it was set up to be, or as we know it today, since it was unquestionably Émile Wallauschek who led the discussions at meetings with Zabel Cheghikian's name appearing only in the list of participants as Secretary.

Bertrand Rüeeggler made a brief appearance in the post from 1976 to 1978, still under the orders of Émile Wallauschek. Bertrand was also the Secretary responsible for the CRESP programme (see Section 4.3).

Gilbert Bresson confirms this account; Wallauschek and Olivier together made a formidable pair.

I should like to draw attention to the very capable, steady and friendly support provided throughout those years by the Head of Division Émile Wallauschek and his deputy Jean-Pierre Olivier throughout those years. With the assistance of their efficient colleagues, they ensured that preparations for meetings of the Committee, the Bureau and working groups were excellent and I wish to assure them of all our gratitude.

Gilbert Bresson  
Chairman, 1976-1978

Émile Wallauschek was no longer at the helm. Osvaldo Ilari had taken over in 1980 under the guidance of Jean-Pierre Olivier. A case of the job making the man, perhaps? Here we were again with a strong personality who would be the life and soul of the CRPPH, the glue that held it together. All who knew him will remember how he treated the CRPPH as one of his own, sometimes calling discussants to order and bringing them diplomatically, but firmly, back to the issue at hand. The crucial role of Secretary is summed up unerringly by Antonio Susanna, who was Chairman from 1997 to 1999.

At last let me recall that when I had the feeling that my nomination as Chairman of CRPPH could be possible, I was very certain that everything would be easy, because Osvaldo Ilari was the Secretary (he was a teacher for me and he was my boss before coming to NEA). But when at the end my nomination arrived it coincided with the retirement of Osvaldo. I should confess that at that time I was worried about that. Luckily I soon discovered how quickly Ted had grown up (I met him when he first arrived in Paris, as an assistant to Osvaldo, looking for an accommodation). Everybody knows that a Chairman is in the hands of the Secretary such that if a chairmanship is good, most of the credit must go to the Secretary.

Antonio Susanna  
Chairman of the CRPPH, 1997-1999

Later, we will see how – during a difficult time – Osvaldo Ilari managed to build a climate of trust with Roger Clarke, the future Chairman of the ICRP – who in the interim would also be Chairman of the CRPPH – and to plant a new seed in the radiation protection community which would reach full fruition with the remarkable openness of the dialogue on the revision of ICRP Publication 60. As he had retired by then, he never did see the fruits of his labours, but Roger Clarke remembers.

I wanted to be more open and transparent about ICRP, so in the period when I chaired Committee 4 and CRPPH, I certainly encouraged CRPPH to discuss recent ICRP Publications, but I believe I went further in that I allowed draft Committee 4 reports to be seen at CRPPH. This meant that Osvaldo could speak at Committee 4 meetings with the knowledge that he was reflecting not just his own, but a wide consensus from the profession.

Roger Clarke  
Chairman of the CRPPH, 1987-1992  
Chairman of the ICRP, 1993-2005

Did Osvaldo Ilari know that in this way he would usher in the stakeholder era? If anyone can tell us, it is Abel Gonzalez, the IAEA observer on the CRPPH. While the CRPPH was always a forum for serious debate – admit it – we also went to watch the Abel/Osvaldo match. Not in the same class? Maybe not at weigh-in, but they were in terms of pugnacity!

These few lines from the testimonial by Abel Gonzalez describe the atmosphere, but he concludes that protection regulations grew out of these debates; while they were certainly inspired by the ICRP, they also bear the indelible stamp of the NEA and the IAEA. Abel is right, we would all have liked to see Osvaldo and Abel enter the stakeholder era together, but that is another story, as we will see later.

I certainly enjoyed playing the “contra” – coming from that Viennese Agency which, compared to NEA, appeared to be a Goliath... at least as far as the number of office space available and amount of paper produced are concerned! In this saga, David’s representative was my friend forever, Osvaldo Ilari, who always tried to demonstrate that the minuscule NEA offices in the 16<sup>th</sup> arrondissement of Paris did not make his Agency less important than the Viennese counterpart.

Our Italian ancestors had conveyed to Osvaldo and myself similar genes as far as temperament is concerned.

Whatever the reason, Osvaldo and myself defended our agencies with similar fervour (namely with the vehemence of football’s hooligans) and using analogous tricks like those of a Napolitano trying to sell you a fake watch.

However, the outcome of this peculiar interaction was not so bad: in that period, we were able to achieve a lot of professional excellence for our Agencies, including *inter alia* the still current international radiation protection standards.

But unfortunately, Osvaldo retired... and... well... tragedy usually follows adversity... NEA would embrace its ultimate specialty: “stakeholder involvement”. Unfortunately, Osvaldo could not be an actor of the forthcoming circus: I am convinced that I would have had a lot of fun with him about this strange subject.

Abel Gonzalez  
Representative of the IAEA, 1982-2005

Some missions are just impossible and taking over from characters like Émile Wallauschek and Osvaldo Ilari is one of them. It was Ted Lazo who took up the challenge. One of the mobile phone generation was now joining the CRPPH. Ted had started at the NEA in 1993 under the watchful eyes of Osvaldo Ilari and Jean-Pierre Olivier who would both desert him in 1997. Claudio Pescatore replaced Jean-Pierre Olivier, while Ted took over as Secretary of the CRPPH in June 1997. Then Hans Riotte arrived in September 1998 to head the division. In other words, in a single year the Division, the CRPPH and the RWMC all saw changes at the top and changes in leadership style; a new era was dawning. The successive Chairmanships of Serge Prêtre and Antonio Susanna allowed them to ease calmly into their new roles, which was just as well since another tropical storm was about to hit with the latest revision of the ICRP and the celebrated “stakeholders” .

Abel Gonzalez found himself all on his own. No longer would the rafters echo to the sound of his sparring matches with Osvaldo, There were just no traditions any more.

If we take Christer Viktorsson's word for it – he arrived ahead of Ted at the NEA – it was an easy team to fit in with and would be for Ted Lazo, too.

At this time I arrived at the NEA. I was lucky to be in an enthusiastic team led by Jean-Pierre Olivier and Osvaldo Ilari. These two leaders were able to mobilize significant energy, not only within the Secretariat but also in Member States to do things thought to be impossible for a small international organisation.

Christer Viktorsson  
Staff member of the NEA, 1987-1997

Like Christer a few years before him, Ted was a very fast learner. He very soon took to the international side of his mission: never ask Ted where he is calling from, it might be Issy-les-Moulineaux, but it could just as well be Washington, Tokyo or Tasmania. With him, we at the CRPPH had our ambassador at large. An optimist through and through, he was the complete opposite of the anxious-looking Osvaldo. His invariable reply to “How are you?” , as anyone will tell you, was to hold up his hand, make a circle of his thumb and index finger and say “marvellous”. He was not one to give away any possible failing by the Agency.

He was to become a permanent member of Agency staff, news which everyone were very happy to hear.

A lasting memory will also be working with Ted Lazo. His enthusiasm and untiring dedication to the CRPPH has been an inspiration to us all. Ted has been the glue that has held us all together. He has the unique talent to listen to all the competing interests and voices in the membership of the CRPPH and chart a productive path forward. We owe the success of the CRPPH to Ted Lazo of the Secretariat.

Rick Jones  
Chairman of CRPPH, 2000-2004

He presses people to speak, formulates queries that best sum up people's points of view and rebuilds links between those whom discussions have divided, and is unfailingly constructive.

Annie Sugier  
Former member of CRPPH  
Chairwoman of ICRP Committee 4

We are talking here about the history of the CRPPH and have mentioned its people, but the CRPPH would not have been the CRPPH without the head of the “radiation protection and radioactive waste management division”.

Émile Wallauschek combined both roles, at least in action. Jean-Pierre Olivier and Hans Riotte were more discreet in action, but just as decisive, as we will see later. The Secretary of the CRPPH would be better described as one of a tandem team. Going up hill is easier when there are two of you pedalling.

Émile Wallauschek, a very strong personality, died in 2007 at the age of 91. To the immense regret of all who knew him, he will not see the Committee's half-century celebration.

## **The Chairmen**

In the past 50 years, the Chairmanship of the CRPPH has been held by 12 different countries: Australia (Robert Fry), Belgium (Samuel Halter), Denmark (Eigil Juel Henningsen), the United States (Richard [Dick] Cunningham and Rick Jones), France (Gilbert Bresson and Jacques Lochar), Italy (Antonio Susanna), Ireland (John Cunningham), Norway (Reidar Eker) the first Chairman, the Netherlands (J. Ch. Cornelis), the United Kingdom (Lewis David George Richings and Roger Clarke), Sweden (Bo Lindell) and Switzerland (Serge Prêtre). Some seemed to take a liking to the CRPPH, for instance the Belgian, Samuel Halter, who chaired the Committee for seven years, then Roger Clarke, who stayed six years, just enough to break him in for the Chairmanship of the ICRP. All were elected by their peers, although we really should say they were "co-opted", since one or two representatives of member countries were always designated to invite the delegations to vote for the Agency favourite. But is that anything to complain about?

The Table below lists all of the Chairmen, all with their different styles and origins, another testament to the diversity of the CRPPH.

Each of them left his mark, some more so than others, but all would remain very active on the Committee before or after their Chairmanship as the minutes of those 50 years show. We sought these Chairmen out. Often we managed to locate them and ask them for an account of their time as Chairman of the CRPPH. These commentaries are given in Annex.

|                  |             |                |           |
|------------------|-------------|----------------|-----------|
| R. EKER          | HSC         | Norway         | 1957-1959 |
| S. HALTER        | HSC         | Belgium        | 1960-1965 |
| E.J. HENNINGSSEN | HSC         | Denmark        | 1966-1968 |
| J.Ch. CORNELIS   | HSC         | Netherlands    | 1969-1971 |
| Bo LINDELL       | HSC – CRPPH | Sweden         | 1972-1973 |
| L.D.G RICHINGS   | CRPPH       | United Kingdom | 1974-1976 |
| G. BRESSON       | CRPPH       | France         | 1976-1977 |
| R. FRY           | CRPPH       | Australia      | 1978-1980 |
| J. CUNNINGHAM    | CRPPH       | Ireland        | 1981-1982 |
| R. CUNNINGHAM    | CRPPH       | United States  | 1983-1986 |
| R. CLARKE        | CRPPH       | United Kingdom | 1987-1992 |
| S. PRETRE        | CRPPH       | Switzerland    | 1993-1996 |
| A. SUSANNA       | CRPPH       | Italy          | 1997-1999 |
| R. JONES         | CRPPH       | United States  | 2000-2004 |
| J. LOCHARD       | CRPPH       | France         | 2005-     |

### **Committee members**

While the Secretaries played their role to the full, backed by the authority of the Chairman, a group such as this simply could not exist without the commitment of the representatives of member countries.

For many countries, there seems to have been a degree of continuity, which was fairly representative of radiological protection in the member countries and also of the evolving management of our institutions. The era of the pioneers, who dedicated much and sometimes all of their lives to radiation protection, has given way more recently to a new generation that is more inclined, or may be forced, to change jobs in the course of their professional career. In this respect, the CRPPH is the mirror image of developments in society.

League tables are the order of the day, so it was tempting to announce the select few with a score of over 20 for attendance, bearing in mind that some of the current representatives to the CRPPH are already knocking on the doors of this rather exclusive club.

First prize goes to two members, Alphonse Lafontaine for Belgium and Jean Chanteur for France, who assiduously attended 27 or 28 CRPPH sessions. Henri Jammet, for France, took part in the discussions over a span of 32 years, but his attendance at sessions was sporadic, since he was present at only 17, thus missing out on the gold medal. Next come the old foxes of the CRPPH, John Cunningham (Ireland) with 25 years, Antonio Susanna (Italy) with 23 years, Gilbert Bresson (France) with 22 years and Jan-Olof Snihs (Sweden) with 21. Just missing entry to the club are Lucien Fitoussi (France) with 19 years and Serge Prêtre (Switzerland) with 18 years. Of the current members, only one can lay claim to this purely honorary distinction: keep up the effort for another three years, Mr. Patrick Smeesters (Belgium) and the commemoration of the 100<sup>th</sup> anniversary of the CRPPH will be paying tribute to you. Clearly the CRPPH has not been far from totally dominated by the francophones.

Alphonse Lafontaine, a doctor of medicine in Belgium, played a decisive role in Public Health as Director of the Institute of Health and Epidemiology and more especially as a leader in the Radiation protection field. Belgium had decided to develop a substantial nuclear power programme and therefore had to take responsibility for the associated risks and ensure the safety of the public and workers in the industry. He made a decisive contribution to framing the Royal Decree of 28/02/1963. He lectured in Health and Radiation Protection at the Catholic University of Louvain, and so was instrumental in training many generations of students.

He had a knack of making stage-whispers to his neighbours and his booming asides to his French colleague Henri Jammet are legendary.

From 1956 to 1994, Jean Chanteur, doctor of medicine and professor of medical biophysics was, first, Deputy Director, then, Director, of the Central Service for Protection against Ionizing Radiation (SCPRI). With the responsibilities he held, he made a decisive contribution to the drafting of French regulations on radiation protection. He was involved at international level too, where for more than 25 years he regularly took part in the work of standardising European regulations, primarily as an expert under Article 31 of the Euratom Treaty and at the NEA. His medical training and his legal expertise made him a valuable contributor over the years, who earned the admiration of his colleagues for framing radiation protection regulations that worked and performed so well. Today, following in his wife's footsteps, he has turned definitively to philosophy. Did radiation protection give him a helping hand in that direction?

### **Working group Chairmen on more than one occasion**

Lastly, of the people who made the CRPPH what it is today, mention must be made of the leaders of working groups to whom the Committees gave tasks that

were often difficult. They are too numerous to mention individually, but we will be making the acquaintance of some of them in Chapter 4, where we cover some of the major projects of the CRPPH. With rare exceptions, the work of the working groups often took a long time, sometimes several years. But this seemingly slow pace is the price that has to be paid for quality. Compared with the working groups of other international organisations, those of the CRPPH have nothing to hang their heads about.

These “worker bees” have are the true basis of the Committee’s richness.



### 3. THE CRPPH OVER THE PAST 50 YEARS

The story told here is based on an analysis of the summary records from 50 years of CRPPH meetings. To put the workings of the Committee into perspective, relevant historical events are interspersed in the description of evolving work at the CRPPH.

#### **First years: standards**

Right from 1957, 50 years ago this year, a founding document, NEA/SAN(57)1 laid down the basis for the future work of the CRPPH: the development of recommendations applicable by member countries in their own national legislation. From the very outset, the advice given was to incorporate precautionary procedures into these texts. The ICRP also did so in parallel.

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*29 September 1957: accident at Mayak URSS  
2 October 1957: accident at Windscale  
4 October 1957: launch of the first artificial  
satellite, Sputnik.*

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From the beginning, it was stated that no disposal of radioactive waste should have an impact on public health and for that purpose the Committee proposed a limit equivalent to one-tenth of the levels that the ICRP recommended for workers.

At the same time, the ICRP was already reviewing its first recommendations and the Working Party on Public Health and Safety decided to follow the latter's activities closely before deciding that the Health and Safety Sub-Committee (HSC) that was to be set up in February 1958 should look into the issue. The respective roles of the ICRP and this Committee had not yet been defined. However, wisely, the Steering Committee on Nuclear Energy (SCNE) recommended that this new body co-ordinate its efforts with the various international organisations and co-operate with the ICRP. The situation was by no means straightforward as Euratom was in the process of being formed at the same time, but comprised only six of the 18 member countries of the OEEC. The ICRP was not the only body it co-operated with: in 1960, Henri Jammet reported to the Committee on ILO work on radiation protection and in the same

year, it welcomed IAEA representative, G. Swindell, for the first time, so beginning the exchange of information between the two agencies.

Euratom was preparing to transpose the ICRP recommendations in the form of a Directive which would be binding on its six member countries and requested the ENEA not to adopt different measures as this would inevitably put its members in an awkward position. At the same time, with the United States following Euratom's lead, the Committee saw its role diminish.

The United Kingdom, then Spain voiced concern over the transposition of the ICRP recommendations. The former feared that with a text as specific as the Euratom Treaty, the flexibility of the ICRP recommendations would be lost. Spain, for its part, wanted states to decide for themselves on the transposition of the ICRP recommendations. The sought-after standardisation was not yet to be, but it would come later. In 1961, the revision of the standards was again discussed; the stumbling block this time was the allowance for age. In 1962 although nothing was resolved, agreement was reached on the definition of controlled area and many other points: it was a year of convergence. Only the definition of an accidental dose for groups of special populations gave rise to debate; the ICRP and the IAEA gave the matter their consideration and the Committee deferred its decision on the issue.

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*12 April 1961: Yuri Gagarin becomes the first man in space.*

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In 1962, for planned emergency situations, an annual dose of 12 rems proposed by the IAEA was agreed, but discussions on the thyroid were postponed. In this area, Euratom indulged in semantics: for legal reasons it preferred the expression *unplanned emergency exposure* to *accidental exposure*; back in those days the word "accident" was still taboo.

By the end of 1962, the draft revision of the standards was finally finished and was submitted to the Steering Committee for approval. At the same time, the IAEA Board of Governors approved the agency's draft and, one by one, the six Euratom countries transposed the European Directive. An era of calm began.

### **The 1960s: not just standards, the launch of major projects**

In 1960, at the height of the cold war, the two superpowers were regularly testing increasingly powerful weapons. A decision was taken to monitor ambient radioactivity in the air and milk ( $^{90}\text{Sr}$  and  $^{137}\text{Cs}$ ) and to consider setting up a monitoring and warning system. An effort to standardise sampling methods was also needed. A regular report would be drafted, the first of which was

reviewed as early as 1960. Euratom decided to join forces with the Agency, in order to avoid that its six member countries duplicate this work independently.

In the same period, the Committee launched an activity which would become a regular one for the HSC, then the CRPPH: reciprocal information by member countries on their domestic legislation. The decision was taken to review legislation on a regular basis.

1960 was a great year for the Committee, with the launch of two other activities:

- The organisation of international courses of scientific training in health and safety, which the Committee wanted to be to a very high standard. Three countries, Belgium, France and the United Kingdom, volunteered to take students. The organisation of the courses rapidly descended into chaos and finally they did not happen.
- The Swiss then proposed to set up a European Centre for Radiobiological Research. This project would not meet with success either.

That same year, Norway requested a review of radioactive waste disposal in the North Sea. Four years later, the Committee was still discussing the modalities of the “North Sea” programme, although it did make headway towards a finalised project by the end of 1964. A difficult delivery, to say the least.

Another foretaste of things to come was the HSC’s announcement in 1961 that it would be holding an international colloquium on agriculture and nuclear energy. Similarly with regard to discussions on emergency situations, on which the Committee wished to work closely with the IAEA and the World Meteorological Organization (WMO), despite the reluctance of some.

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*5 August 1963: Treaty of Moscow between the USSR and the United States to prohibit nuclear tests in the atmosphere.*

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With the revision of standards now complete, in 1964 the focus would be on reporting on their implementation. This would again be an on-going activity for the Committee. Reviewing drafts, working on regulatory texts and following up on their implementation would from then on be the Committee’s main activity, one which we shall come back to in the Chapter on the ICRP.

The Committee became highly technical. Starting in 1964, it addressed problems as specific as luminous paint, thickness gauges (beta emitters) and accelerator protection. These were early indications of the Committee’s second

characteristic activity: the provision of advice to member countries on specific problems, for instance, the radioactivity emitted by luminous watches.

In 1965, the international agencies were still vying to assert themselves and, at the 13<sup>th</sup> session of the Committee, tension mounted again between the ENEA and the IAEA over the issue of standards and between the ENEA and Euratom over a symposium on dosimetry. In contrast, the IAEA acknowledged the ENEA role in particle accelerators and neutron generators.

Towards 1970, the ENEA, of which one of the initial missions was to draft standards, ceded that role to Euratom and the IAEA in order to concentrate on other tasks, first and foremost of which was the critical review of those standards.

### **1965–1976: Looking out to sea**

Although Norway had requested a study on the North Sea right at the start of the 1960s, it was not until 1965 that the Committee would come to grips with the subject. At that stage, the Committee requested a study on the experimental disposal of radioactive wastes in the Atlantic Ocean. Germany, France, Italy, the Netherlands and the United Kingdom decided to participate, while the other countries still hesitated. The disposal zone proposed by the Working Group chaired by John Dunster was a site off the coast of Portugal while the first campaign was planned for the spring of 1967 and would be confined to 8 000 curies over two years. Not surprisingly, Portugal issued a reservation in the Committee.

This was to be a major programme for the Agency. Spanning more than 10 years it would involve more than 10 disposal campaigns in the Atlantic. We will come back to this in Section 4.3.

The primary objective of this Agency programme was to promote and supervise the disposal of radioactive wastes under excellent safety conditions. However, from 1972, which would see the signature of the “Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter”, more commonly known as the London Convention, compliance with the relevant provisions of the Convention would be a substantial brake on the disposal programme and would ultimately lead to its abandonment in 1985.

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*1 July 1968: signature of the Treaty  
on Non-Proliferation (TNP)*

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Before that point was reached, in 1967, the CRPPH, still with its eyes to the sea, made preparations for a colloquium on marine radioactivity. It was held in

Cherbourg in 1968, and discussed marine radioecology. In September 1971, a second colloquium was organised in Hamburg. However, saturation point was fast being reached, with the IAEA wanting its own colloquium, which it hosted in Seattle. The NEA threw in the towel and decided to keep to a more specific topic; the behaviour of plutonium and transuranics in the marine environment.

So, the first sea disposal campaign went ahead in 1967. A film of the operation was made and shown to the Committee at its 18th session in February 1969. Disposal at sea continued to be a topic for Committee discussions at subsequent sessions and, in a rather upbeat mood, preparations went ahead for disposal at sea in 1971 and 1972, although another site would have to be found. However, as mentioned previously, the London Convention cooled member countries' enthusiasm somewhat. Only the United Kingdom found it too cautious, considering the safety margins to be adequate. Already the public was voicing some concern about these practices and there were those who wanted to wait and see what could be learned from the previous campaigns before continuing, but the United Kingdom thought that the public's apprehension was unfounded and could therefore be discounted.

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*20 July 1969: Neil Armstrong and Edwin Aldrin  
are the first men to walk on the moon.*

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There were stormy seas ahead in 1973. Norway led the opposition to preparations for another campaign. The United Kingdom, the Netherlands and Belgium pressed on and the United Kingdom made it known that it was prepared to go it alone. Although an incident involving Belgian drums in 1973 demonstrated the need for caution, preparations went ahead for a new campaign in 1974, which contaminated the ship with  $^3\text{H}$ . This did not prevent preparations for the 1975 or 1976 campaigns. Nevertheless, the Committee had to be brought back onto an even keel and, under the Chairmanship of Gilbert Bresson, a special meeting was devoted entirely to disposal at sea when it was finally decided to put a surveillance system in place and a working group was set up.

The influence that stakeholders would have in the management of these issues was something that no one saw coming. How easy it is to see how these concerns built up – with hindsight. In actual fact such concerns went further back. In 1960, you will recall, the Norwegian delegate had already pressed the Committee to look at the technical, biological and administrative aspects of dumping in the North Sea. Several years later, as we also saw above, that project had more or less been shelved and it took the call of the Atlantic to awaken the CRPPH to its maritime mission.

Setting up a study on maritime pollution became very urgent following environmentalist action on sea disposal. In view of the problems reported by countries with strong nuclear associations and their projects to build facilities, joint studies on marine radioecology were conducted by the countries bordering the North Sea and the Channel, in other words, by six NEA member countries. The Agency involved itself directly in the conservation of the international marine environment by the impetus it gave in research, control and prevention.

Throughout all those years, there was one issue underlying all of the discussions and, with the support of all of the members, I attempted to address it. Unfortunately, there was not enough time. The issue was how to approach all of the work from the protection standpoint, the social and economic standpoint and, above all, the international standpoint.

Gilbert Bresson  
Chairman of CRPPH, 1976-1978

### **1957 – 1973: slow pace for some projects**

Since its inception in 1957, one of the objectives that the Committee had set itself was to limit the quantity of radionuclides used in the watch- and clock-making industry. At the time, these were  $^{226}\text{Ra}$ ,  $^3\text{H}$  and  $^{147}\text{Pm}$ . Discussions began again in 1966, when the tragedy of female workers applying luminous paint was still very much to the fore. Sweden still wished to use  $^{226}\text{Ra}$ , Germany did not, and the United Kingdom proposed the use of  $^3\text{H}$  instead. Gradually the latter proposal would win the day. It was not until the first session of the brand-new CRPPH, as it was at the time, chaired by Bo Lindell, that standards for the use of tritium in luminous instruments would finally be adopted.

Other projects dragged on for some time: the accelerator protection project, isotopic energy generators and pacemakers, a unique case, are a few examples.

### **1973: birth of the CRPPH, then the RWMC in 1975**

When Japan joined the Agency in 1972, the ENEA lost its European character and became the NEA. With the integration of Australia, the United States, Canada, etc. the international aspect of the Agency would become irreversible. The same year, the European Union went to nine members.

In the same year, 1973, the ENEA would be renamed the NEA, dropping its European qualifier and becoming irreversibly international. The same year, Europe would have nine member countries, paradoxically giving it a greater presence on the CRPPH. This development, or ambivalence, would inevitably increase with the steady enlargement of Europe.

The CRPPH in its current form was established in 1973: out with the HSC, long live the CRPPH! Bo Lindell would have the honour of being its first Chairman, while the Wallauschek-Olivier two-man team would see that the new “baby” thrived.

The year that the CRPPH was established was also an optimistic one: the Agency announced loud and clear that nuclear energy would account for half of all electric power by the end of the century. Chernobyl was still a long way off...

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*31 July 1973: the European Space Agency is set up.*

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In any case, the point to keep in mind about 1973 was a new idea from Jean-Pierre Olivier, who proposed setting up a specific Working Group to study the problem of waste. Despite a clear position that entrusted waste management issues to the HSC, J.-P. Olivier very astutely proposed that the CSNI take part in it. We all know the outcome, the RWMC would emerge from that working group.

It is now time to move on to the CRPPH and radioactive waste and who better qualified to tell us about it than Jean-Pierre Olivier?

It was under the aegis of the CRPPH that the first of the NEA activities on radioactive waste management began, the mandate and competencies of the Committee ensuring compliance with radiological safety criteria, the priority objective in this field. To begin with, the main focus was the evaluation of the radiological impact of liquid and gaseous effluent discharges in the ambient environment. However, the need to take solid waste into consideration quite soon became apparent, particularly low-level, short-lived solid waste, which certain countries were already, unilaterally, beginning to dump at sea.

So, in the mid-1960s, the NEA was invited to supervise the organisation of the joint disposal of low-level solid waste in deep trenches in the Atlantic Ocean. The CRPPH played a decisive role in evaluating the radiological and environmental safety of this type of operation and in specifying technical criteria and operating procedures that provided appropriate safeguards. Sea dumping operations were thus conducted jointly by several European countries from 1967 to 1982, accompanied by politically controversial and very extensive discussions within the international scientific community. Against this backdrop, the Committee actively participated in the development of a multilateral consultation and surveillance mechanism for disposal at sea, which was formally adopted by the OECD Council in 1977, as well as in setting up a Co-ordinated Research and Environmental Surveillance Programme (CRESP) relevant to sea disposal of radioactive waste. The results of the CRESP programme were published in 1995, showing the substantial database on marine biology and physical oceanography and the absence of significant radiological risk either for man or the marine environment.

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30 November 1974: discovery of *Lucy*,  
an *Australopithecus* over 3 million years old,  
in Ethiopia.

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Later, we have an account from CRESP Chairman (see Section 4.3) Arrigo Cigna but, right now, let us plunge straight into the debate that accompanied the creation of the RWMC.

In parallel with its other activities, the CRPPH was behind several studies on the management of radioactive waste as a whole, particularly on the determination of adequate technical solutions and their industrial application, despite a certain reluctance to address these subjects, which lay well outside the scope of its functions. These studies, particularly the study on the very long-term radiological protection objectives for this type of waste management, nevertheless demonstrated the need for this type of approach within the NEA, and were instrumental in the creation of the Agency's Radioactive Waste Management Committee, the RWMC, in 1975 with a broader and, at the same time, more sharply focused mandate. The co-operation that developed between the two Committees, each respecting the regulatory and operating responsibilities of the other, culminated in the publication of a joint report in 1977. This was a milestone that marked a turning point in the NEA's activities in this field.

The report, *Objectives, Concepts and Strategies for the Management of Radioactive Waste arising from Nuclear Power Programmes*, was drafted by an Expert Group under the Chairmanship of Professor Carlo Polvani, Italy's representative on the CRPPH. On the occasion of the 50<sup>th</sup> anniversary of the Committee, it is worthwhile recalling the main conclusions of that report, which would later be so fundamental to the activities of the NEA and national programmes. They covered:

- The need to proceed with caution before committing to irreversible solutions and the soundness of reasonably long-term intermediate storage for long-lived waste.
- The need to not rely on long-term surveillance to ensure the integrity of repositories.
- The advantages of very long-term containment in stable geological formations and the need for R&D work in this field.
- The necessarily theoretical approach to the long-term safety of repositories and the impossibility of conventional empirical demonstration of their safety.
- The advantages of defining an institutional framework at national level and of sharing responsibility between government authorities and private industry.

- Lastly, the need to provide adequate finance for waste management under the “polluter pays” principle.

Subsequently, co-operation was established between the RWMC and the other standing committees of the NEA on issues such as the dismantling of nuclear facilities and exemption levels for very low-level radioactive materials.

It just could not fail to be a success, given the organisation chart drafted at the outset by Emile Wallauschek, making the Head of the Radiological Protection and Waste Management Division the “top man” for waste, and his Deputy the “top man” for protection. There is nothing to beat good organisation to make a project a success. But would it still have been a success if the initial idea had not been a good one?

Let us note, too, that during the discussions Jean-Pierre Olivier voiced his extreme reservations about the transmutation of long-lived waste. Later, with the Act of 30 December 1991, France would revive transmutation, only to align itself, finally, at the end of the research teams’ 15-year mandate, with the stance that Jean-Pierre Olivier had taken. Ah, how hard it is to be ahead of one’s time, especially in one’s own country.

In the same vein, the CRPPH would have another visionary idea, which would once again show the Committee as a forerunner. In 1977, a decidedly productive year, the Committee took an interest in naturally occurring radioactive materials, the “NORM” of the future. The ICRP and UNSCEAR did not see the relevance, but the CRPPH persisted. Based on a meeting held in Arlington in May 1978, the CRPPH circulated documents on the topic and on building materials in particular. The ICRP took the matter up again in 1979 which immediately put the brakes on the work of the Committee. Incidentally, the problem of radon, which the ENEA had addressed 10 years previously, became a front-burner issue again.

It would be another 10 years and more before ICRP Publication 39 (*Principles for Limiting Exposure of the Public to Natural Sources of Radiation*) drew attention to artificially reinforced natural exposure and included naturally occurring radioactive materials in the radiological protection system. Once again, the CRPPH had indeed given the lead.

However, none of this came easily. The CRPPH and the RWMC held joint discussions in June 1979 on the general approach to waste discharges and the Agency’s Steering Committee produced a document. Only the Environment Committee of the OECD opposed it, judging it to be politically inappropriate because it was overly optimistic. At the same session, the *de minimis* concept

was rejected. The next episode in what would turn out to be a long series – especially as it would be further complicated by exemption – was to be in 1985.

### **1974 – 1977: false note over units**

There were rumblings in the radiological protection community as the new international units arrived on the scene. The Committee reviewed document SEN/SAN(74)14 regarding international-level discussions held by the International Commission on Radiation Units and Measurements (ICRU), with a view to the potential adoption of SI units in the radiological protection field.

Professor Faber of Denmark drew attention to the difficulties that a change in units could raise from the public information standpoint and therefore wanted their introduction to be phased in. The ICRP, through its spokesman Secretary, F.D. Sowby, very prudently announced that it had no position on the issue. The EC representative, Hans Eriskat, proposed, in turn, that the old units should be kept for radiotherapy, essentially for safety purposes. However, the Commission was to take a decision on the curie, rad, rem and roëntgen in 1977. So, we can hardly say that the advent of the sievert was hailed like the coming of the messiah.



Like all the other agencies, the Committee would stick its head in the sand and in 1978 resigned itself to tacking on equivalent values ( $100 \text{ mrem} = 1 \text{ mSv}$ ). Some never could resign themselves to it and continue to use the centigray, never mind the rad, even today. Faber was right; the Chernobyl incident showed 10 years later that the conversion of curies to becquerels had never been digested. Such a pity for the poor generation of Europeans who, later still, would have to give up their national currency for the Euro. So one can scarcely say that 1977 was an unqualified success for the Committee, but in its defence, how many people did welcome the change?

### **1979: Three Mile Island and the painful emergence of the post-accident phase**

The first serious accident since Windscale, or so it was thought at least, as we did not know about Khyshym at the time. The Committee devoted a special session to it, but in an atmosphere of calm, using the term “incident” rather than “accident”.

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*28 March 1979: Accident at Three Mile Island  
in Pennsylvania.*

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In his report in 1980, Osvaldo Ilari reverted to the use of the term “accident”. As emissions of <sup>85</sup>Kr were low (50 000 Ci) and no impact on health was expected, he took this primarily as an opportunity to suggest Committee action on emergency plans and associated protection problems. He pressed for post accident work to be done. The IAEA was interested in it too. The old demons reared their heads again, with some delegates thinking that the NEA was going overboard – the future success of INEX was a long way off at that point. Patience... Osvaldo was a determined man, but it would take a “real accident”, Chernobyl, to start the machinery rolling again, in dramatic fashion. Osvaldo was not alone; as early as 1975, Bo Lindell had wanted to organise a meeting to discuss medical, administrative and policy actions following a nuclear accident. The ground ought to have been ready.

In the same period, another “determined” post-accident advocate, George N. Kelly, then on the CSNI, presented a report on accident consequences and modelling in 1981. The Committee requested the withdrawal of the biological Section on the grounds that it was too open to question. A concession was made on an accident, but health effects were put off until later. Still the same colossal reluctance. No, you were not to know then that this man, in another capacity, would give us COSYMA and RODOS; did he, I wonder?

Before the sky fell in on us with Chernobyl, a COSMOS 1402 satellite fell from orbit onto Canadian soil. In 1983, Canada and the CRPPH were talking satellite, the CSNI was talking reactor: advantage CSNI. The ICRP had only just issued Publication 40 *Protection of the Public in the Event of Major Radiation Accidents: Principles for Planning*, in 1984. Finally, March 1985 brought agreement, seeing the CSNI’s insistence on thinking that the subject ought to be studied. Patience, in a little more than a year, the time for thinking would be over.

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*30 May 1983: French research scientists  
announce the discovery of a new virus, known  
as HIV, which caused AIDS.*

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### **What was on the agenda for April 1986? Drafting the revision of the 2007 recommendations?**

From 8 to 10 April 1986, there was no shortage of subjects to be dealt with. First, quite a time was spent on ICRP Publications 39, 40, 41, 43 and 46. As the CRPPH was still working downstream of the ICRP, it was somewhat limited as to the action it could take.

Speaking of ICRP Publication 40, the rapporteur, Gordon Burley of the United States, pointed out that compared with the individual dose, the collective dose was regarded as less important, that more numerical values were needed to justify action, that the publication was based on current knowledge of the source term and that national emergency plans should be compared in order to gain a better understanding of the rationale for them. ICRP Publication 41 on non-stochastic effects was considered important for the application of ICRP Publication 40.

Beginning of the CRPPH meeting: 18 days to Chernobyl.

In April 1986 a special session was arranged with the CSNI and RWMC to discuss the future revision of the ICRP. The CRPHH once again found itself in the role of prime mover. The CRPPH wished to change from a dose limitation system to a risk limitation system. This was not a view shared by the CSNI, which considered that risk probability studies required further development.

Acceptability criteria were also discussed and even then the spectre of individual susceptibility to stochastic risk was raising its head. Some proposed that differentiated doses should be used for different groups. However, the CRPPH recognised that this was psychologically unacceptable and technically too complicated. Radiation sensitivity testing should be developed: soon, said the radiation biologists. Twenty years later, in 2006, they would still be saying the same thing.

The CRPPH also wanted the ICRP to make an effort to make its recommendations more transparent and, if possible, simpler. It was also observed that it is difficult to calculate the collective dose with a wide range of individual doses. If only the ICRP had listened to the CRPPH in 1986, it would have drafted the 2007 revision right there and then.

Be that as it may, at the same session, reference was made to the foetal dose as well as to a landmark report on the gastro-intestinal transfer of radionuclides.

The session also discussed a report in preparation by the three agencies, the IAEA, the NEA and the WHO on exemption. There was a clash between two different concepts: the advocates of 10  $\mu\text{Sv}/\text{year}$  and the advocates of 1 man-Sv/year. Even at that stage the CRPPH was concerned at the potential misapplication of the collective dose. The report was not approved and discussions were postponed until February 1987...

End of the CRPPH meeting: 16 days to Chernobyl.

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*26 April 1986: Chernobyl accident, Ukraine.*

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## **The storm after the calm: the Chernobyl accident**

Usually we say the “calm after the storm”. But 1986 would shake nuclear energy, radiological protection, our confidence in our leaders and in experts and their institutions to the very foundations. In East European countries, it would be the first big crack that would lead a few years later to the break-up of the Soviet empire.

The event obviously warranted a special session of the CRPPH, which was held on 1 and 2 September that year. From the outset the NEA Director-General, Howard K. Shapar, pointed out that while the IAEA had a mandate to develop co-ordinated international action, he wanted the NEA to conduct an independent review of the situation. He could not have been any clearer.

The meeting went ahead as expected, first with an account by the CSNI of the accident and its implications for existing power plants. It became clear that we needed to know more about other reactors, since it was true we were not very familiar with RBMKs, to put it mildly. This was followed by a commentary on the first big IAEA meeting (25-29 August 1986), which had highlighted the need for international co-operation on:

- Standard intervention levels.
- Information exchange on environmental contamination.
- Decontamination problems.
- Preliminary evaluation of individual doses inside and outside the USSR.
- The future epidemiology of evacuees.
- Effectiveness of treatment for irradiation.
- Potential secondary effects of the distribution of stable iodine.
- Biological dosimetry methods.

The CRPPH responded on the need to:

- Conduct a radiological survey of member countries, stores of caesium and iodine, and individual and collective doses, recommending that they be expressed in terms of natural irradiation.
- Take stock of the protection measures taken by member countries and highlight any disparities in action and differences in intervention levels, particularly since the CEC admitted that it had taken real time action.
- Study the long-term effects of caesium.
- Learn from this accident, collaborating with the IAEA and UNSCEAR on the epidemiological protocols, post-accident protective action, the capacity

of emergency medical services, problems with the distribution of stable iodine, revision of the guides for establishing public emergency plans, criteria for setting limits for foodstuffs, but also on the development of a fast and efficient notification system.

Action by the CRPPH would be constant for many years despite the fact that the extraordinary budget allocated to it by the Agency to address this subject stopped in 1988.

The involvement of the CRPPH in the analysis of the consequences of the Chernobyl accident and the lessons to be drawn from it was such that, as with other major issues, we dealt with it as a separate subject its own right, as detailed in Section 4.5.

### **Post 1986: 1987 – 1990**

Of course, in the years that followed the Chernobyl accident, a great many of the discussions in the CRPPH were reserved for that topic. Those discussions covered the major problem of information exchange between countries, and information on intervention plans – which all had to be adapted to deal with an accident on such a scale. Then there was the problem of public information, which, it has to be said, had at times been chaotic. It had been hard on people living in border areas, who had been able to receive a number of channels from more than one country.

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*September 1987: Goiânia, Brazil, a radiotherapy source abandoned in an old hospital is recovered as scrap, releasing <sup>137</sup>Cs.*

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A workshop on public understanding was held in November 1986 and a proposal for a safety scale that would provide the public with fast and simple information was discussed. Under the aegis of the IAEA and the NEA, this was to become the International Nuclear Event Scale (INES). This was an excellent idea and inevitably many claim to have thought of it first, but Serge Prêtre seems to have launched the debate in the CRPPH when he proposed a scale based solely on the radioactivity released to the environment, while George N. Kelly did the same at European level.

Many other workshops on post-accident ecology, emergency criteria, etc. would be organised before the 1990s.

How are criteria for emergency situations defined? The Committee decided to review national and international activities related to intervention criteria; to

examine specific issues related to intervention criteria, in accordance with instructions from the CRPPH, and to advise the Committee on related matters. The Working Groups performing this work recommended to the CRPPH, in October 1988, to prepare, in addition to a detailed technical report, a less technical booklet aimed at the policy and decision-maker level, summarising in clear terms current guidance for the definition and application of criteria for intervention in case of a nuclear accident.

In addition to this work, while we were discovering that optimisation was a fascinating tool, advances made to the ICRP to discuss future 1990 recommendations were rebuffed by its secretary Hylton Smith. Relations with the ICRP turned frosty over this period, with its Chairman, Dan Beninson, giving stakeholders the cold shoulder and the CRPPH lamenting the loss of the past spirit of co-operation. Very fortunately, that spirit would return with Roger Clarke (see Section 4.1). The CRPPH was aware that work on the future recommendations would be a vast project, and assumed that the implications for society would become increasingly important, which is why it wanted good co-ordination in place between the IAEA, the WHO, the FAO and the NEA. This would be achieved. Quite surprisingly, the word “constraint” already had the members of the CRPPH in a fever.

So, ICRP Publications continued to be reviewed after publication. While this, of course, was a very useful role to have it was one that was frustrating for many members. With ICRP Publication 49 (*Developmental Effects of Irradiation on the Brain of the Embryo and Fetus*) there was even some question as to whether the ICRP was the appropriate forum to even mention abortion. The United States criticised ICRP Publication 50 (*Lung Cancer Risk from Indoor Exposures to Radon Daughters*) in the interests of individual freedom. That was not the end of the debate, far from it.

Another particularly important decision was taken over those years: the development of the Information System on Occupational Exposure (ISOE). Osvaldo Ilari had talked about an occupational exposure study project for nuclear energy in connection with individual, but also collective, doses. It cannot be said that the CRPPH gave the idea an enthusiastic reception and, in the end, the help and conviction of a new, go-ahead recruit, Christer Viktorsson, was needed to get the project on track. It was not until 1989 that document SAN/DOC(89)14 would outline what was to become the ISOE project which would involve eight countries and 90 reactors.

With much assistance from the diminutive CEPN, which took its place alongside the Brookhaven centre and grew in stature, the ISOE programme saw the light of day. It would become an inseparable companion of the CRPPH.

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*9 November 1989: fall of the Berlin wall.*

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The ISOE programme played a major part in reducing the exposure of workers in nuclear power plants. Nothing could beat comparisons between operators in improving the optimisation system being put in place. Nearly 20 years on, the ISOE is still with us and still very active, which is why Christer Viktorsson and Brian Ahier will come back to it in Section 4.4.

### **The 1990s, INEX, collective opinions, 21<sup>st</sup> century**

Of course the spectre of Chernobyl still hung over the 1990s, but the salient feature of the early part of the decade was the work on the Basic Safety Standards (BSS), which involved six international agencies: the FAO, the IAEA, the ILO, the NEA the PAHO and the WHO. Painstaking though it was, in the end the work would be finished relatively quickly with the publication of the Safety Standards in 1994. Europe would take another two years to produce its Directive. The European text is, of course, binding while BSS are not. In 1994 Switzerland would pride itself that it was the first country to adopt ICRP Publication 60: to think that French comedians always make fun of how slow their Swiss neighbours are on the uptake!

The ISOE came in for its first criticism, but the CRPPH received the firm backing of Klaus Stadie, the NEA Deputy Director for Safety and Regulation: anyone who wanted to participate could do so, anyone who did not want to... (it is not too hard to fill in the blanks yourself )... did not have to. The next Director-General, Kunihiro Uematsu, would again give his support in his address to the CRPPH in 1993.

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*6 August 1991: the World Wide Web (www) makes its début, opening the Web up to the public at large.*

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As you know, the CRPPH had put forward a proposal on emergency exercises in the past. This time it was the Swedish delegate, Jan-Olof Snihs, who started the ball rolling again. The end result was the establishment of the International Nuclear Emergency Exercises (INEX), another of the Agency's major accomplishments. In his commentary (Section 4.6), Christer Viktorsson, who appears to have been singularly productive in his time with the CRPPH, again describes the cool reception the idea received from member countries: an exercise was all very well, but "not in my backyard"; the NIMBY syndrome at accident level. So, the exercise would be in Acciland and Neighbourland – and, no, these are not two new republics or two new tax havens, just imaginary countries made

up by a “young lad” called Christer. This was simply the transposition of the NIMBY (Not In My Backyard) syndrome to the level of an accident.

In 1994, countries were pleased with the first exercise, INEX-1, and three follow-up workshops were held to answer the questions it raised. The programme’s success was assured and INEX-2 could go ahead. In Section 4.6, it will be seen that the programme’s success extended far beyond the Agency, since, in one capacity or another, 59 countries all over the world participated in one of the exercises in the series. Later, nuclear power plant managers invited the media for cocktails to show them how happy they were to host an INEX exercise. How quickly times change, when an idea is a good one.

The CRPPH was not immune to fears and fads. In 1992 it was getting ready for the turn of the century and preparing a collective opinion, which would be entitled quite simply *Radiation Protection on the Threshold of the 21<sup>st</sup> Century*. A colloquium, chaired by Gail de Planque, a US NRC commissioner, was organised in 1993. It could have been entitled *Radiation protection over the next 10 years*, but – admit it – that would not have had quite the same ring to it.

The aims of this collective opinion were:

- To give national authorities a general overview of the status of radiation protection at the time in order to assist help them in their initiatives.
- To provide analyses of the emerging problems they would very probably have to deal with.
- To help the CRPPH and the Agency to define its next programmes.

The 1993 Collective Opinion played its role to perfection.

### **End of the 1990s, societal implications**

No one familiar with Serge Prêtre’s personality will be at all surprised to hear that the new issues for society were addressed under his Chairmanship. His partners in crime, Rick Jones and Jacques Lochard, 50<sup>th</sup> anniversary Chairman, followed unflinchingly in his footsteps. As well as the situation posed by chronic contamination at sites affected by the Chernobyl accident, contamination at uranium mining sites in the former East Germany was also addressed in the publication *How society adjusts to deal with abnormality?*

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*30 September 1999: accident at Tokaimura,  
Japan.*

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It was all the rage: 19 member countries were keen to take part in the working group to be set up. Once again, new thinking by the CRPPH would launch a new era. Science, granted, but from that point on, society would join with it as part of the radiological protection system. Villigen was to become the Mecca of this new thinking, but to general dismay, that same working party would introduce the unspeakable – to non-English speakers – word “stakeholders”. A word like that could spell nothing but trouble...

As this initiative would be a lasting one and would extend to the RWMC, it is only right to dedicate a special section to it among the major projects.

Although science may have fears, it must never be afraid. With a number of working groups being set up, requests to participate in them reflect the predilections and fears of members and can be ranked in order. Twenty-six wanted to take part in the working group on science and technology, 19 in the working group on social aspects, 11 in the working group on risk management, nine on work station characterisation and two on work related to the Paris-Oslo Convention (PARCOM). Science was still exerting a fascination, so much the better.

How can one mention the end of the 1990s without saying something about the departure of Osvaldo Ilari at the 55<sup>th</sup> session of the CRPPH in April 1997? The Committee reserved a standing ovation for this man who, in the words of the Chairman, was: “very professional, insightful, and conscientious as well as full of personality, animation and humour”.

However, at the end of the 1990s a storm cloud was looming over the CRPPH. Following the OECD strategy of streamlining, the new Director-General of the Agency, Luis Echávarri, under financial pressure, announced the need to review the Committee structure with the possibility of the amalgamation of the CRPPH and the RWMC and even the disbandment of certain committees. In reaction to this revision process, the Committee actively undertook a review of its mandate and efficiency.

We would see out the century, of course, with a decision to conduct an international neutron dosimetry exercise focusing on the French SILENE reactor, amid complaints that the ISOE was becoming increasingly independent, with Hans Riotte joining the CRPPH and Stefan Mundigl coming on board, discussions on terrorism in INEX and that unspeakable term “stakeholder” making its first appearance in the minutes of the 57<sup>th</sup> session of the CRPPH.

## The 21<sup>st</sup> century

No, nuclear power plants did not stop operating. No, planes did not start falling from the skies, but champagne consumption did hit an all-time high and IT companies, of course, lost no money. We had crossed over into a new century, indeed a new millennium; not a single international organisation managed to keep the rampant verbal inflation under control.

The honour of ushering in the new century fell to Rick Jones. Champagne corks were still popping when the Agency's Director-General announced some reassuring news for the CRPPH, partly as a result of the new Chair having worked to better publicise the Committee's work. Restructuring would still be needed, but it was in fact accomplished painlessly.

The beginning of the 2000s was marked by another excellent piece of news: the new Chairman of the ICRP, Roger Clarke, declared *perestroika*: the Commission would consult the profession in preparing its new recommendations, and the CRPPH would be asked for its input on the recommendations that he was planning for 2005.

Amid the euphoria of the ICRP and the CRPPH being back together again, arrangements were made for a joint workshop on environmental protection, the ICRP's new crusade. The launch of this programme required a magnificent venue and Taormina was chosen. Participants had a rare opportunity to see plumes of smoke escaping from the snowy summit of Etna; discussions proved productive, not explosive. The sudden eruption of Etna a few days after the meeting was probably unrelated. The presentation of the conclusions of the workshop was of course greeted with rumblings from Abel Gonzalez, who thought the CRPPH was stepping on the IAEA's toes. Etna, personified, would you say?

The CRPPH always seemed to be attracted by the sea, that much is clear from its very early history. Rather than steering clear of volcanic islands, it picks them out. The second workshop with the ICRP was held in Lanzarote in 2003. In total contrast to Taormina, Lanzarote's volcanoes may be extinct, but the meeting room was in full eruption. The CRPPH welcomed the ICRP's openness, an opinion not necessarily shared by Roger Clarke, who would say in private that he had been crucified. Ingratitude is the mark of the strong and the CRPPH thus had become very strong indeed.

Consequently, the beginning of the 2000s would be focused essentially on the revision of the recommendations and their societal implications as we finally settled into the stakeholder era.

In 2004, the CRPPH organised a special session on “Science, Policy, Regulation and Implementation and Societal Influences”. The early years of the century would be marked by new, challenging scientific data and universal, or almost universal, recognition of the need for a change in mentality in decision making.

Jacques Lochard succeeded Rick Jones as the CRPPH Chair in 2005. Several working parties would be set up, but “stakeholders” were always the recurrent theme. The CRPPH took an original approach to the 20-year anniversary of Chernobyl. Rather than hypothetical cancer inventories that would be contested to a greater or lesser extent, it focussed on the societal aspects of managing an accident on this scale. The personal implication of the CRPPH Chair in the contaminated territories certainly had an impact on the Committee’s approach. A new working group examined advances in biology and their potential implications for radiation protection, which proved to be a very time-consuming task. Just as we had been 10 years before, we were still on the lookout for biological tests that would allow us to determine individual sensitivity. This proved no more applicable than before and the subject may well crop up again in another 10 years... but in the meantime we are becoming increasingly afraid of lawyers.

Always far-sighted, this time the CRPPH appeared to be unresponsive to the mantras of the then Director-General and remained unmoved by the Generation IV International Forum (GIF) programme. Yet, this new programme called for new research, some of the materials used being totally unknown to radiation toxicologists. Pending the new studies, best prohibit contamination then!

Regulatory authorities, in general, dislike surprises. As such, the CRPPH has maintained its vocation as a visionary organisation, scanning the horizon for emerging issues that could challenge radiation protection policy, regulation or application. In preparation for its 50<sup>th</sup> anniversary, thirteen years after the Committee’s 1994 collective opinion, the CRPPH once more gazed into the future to assess possible issues of concern. This new assessment, like the previous one, will serve the Committee as a road-map as it begins its second half-century of service.

This stroll through the 50 years of the CRPPH ends where it began, in discussions with the ICRP. Relations between the two organisations have been a recurrent theme for the CRPPH. They have seen both sunshine and stormy skies. Happily, we are able to conclude on a sunny note with the summer of 2006. The new Chairman of the ICRP, Lars Erik Holm, accompanied by Jacques Lochard and the Hans Riotte/Ted Lazo team organised a grand summer tour, which took us to Tokyo and Washington, then Prague. Each time, the

Chairman of the ICRP outlined his plan, each time the participants – the famed stakeholders – commented, criticised and proposed adjustments to the draft produced by the ICRP. The calibre of the exchanges at these meetings, in an atmosphere of mutual trust, prompted the ICRP to adjust its recommendations while remaining true to its guiding spirit. This outstanding initiative, conceived by Roger Clarke during a difficult period, then pushed to the limits through the whole-hearted commitment of Lars Erik Holm, was hailed by all.

The CRPPH's proven ability to foresee upcoming issues in radiation protection and to evaluate their impact as soon as they arise, has enabled the Committee to adapt its strategy seamlessly and to instigate major contributions that have led to the improvement of radiation protection in member countries, confirming its role as a leading player in the international arena. So, the CRPPH can celebrate its 50 years by priding itself that it has always been a worthy partner to the states to which it owes its mandate and to international organisations and that, through its outspokenness, it has succeeded in being a think-tank which has seeded many an idea.

Fifty years on, George C. Marshall can be proud of the CRPPH.



## **4. THE MAIN PROJECTS OF THE CRPPH**

During these fifty years, the CRPPH has fully played its role vis-à-vis the authorities of member countries, addressing the full range of radiation protection issues. All of them are important, but some memories are more abiding than others. The first of these is without doubt the close, constant relationship with the ICRP over these 50 years. Throughout that period, the CRPPH initiated and produced many scientific reports which proved extremely useful, but it is its major programmes which raised the CRPPH to the highest level internationally. Examples include CRESP, ISOE, post-Chernobyl, INEX, and the emergence of stakeholders in the radiation protection system. These important projects will be examined further in this fourth chapter.

### **4.1 Relations with the ICRP**

In a framework document published in 1981, the Agency and its Committee formally reiterated the missions of the CRPPH. The 1981 text took account of changes in various international organisations, but the tone did not change: dialogue with the ICRP, interpreting the recommendations for Member countries, and collecting concerns from countries about their application. Although relations between the ENEA, then NEA, and the ICRP took various forms, this was more the result of social attitudes than of the approach adopted by the NEA.

We shall see later that this synergy reached its peak when the 2007 recommendations were being formulated, with a worldwide debate of rare intensity yet characterised by mutual trust. If the NEA/ICRP forums organised in recent years in Taormina, Lanzarote, Tokyo, Washington and Prague were so successful, it was because they were based, as Roger Clarke points out, on his experience as Chairman of the CRPPH. Once again, a seed planted in the CRPPH bore fruit.

As to the relationship between ICRP and CRPPH, well, I followed John Dunster who had chaired Committee 4 in the 4 years up to 1989. Osvaldo Ilari was the Committee 4 observer for NEA and I chaired Committee 4 from 1989 to 1993. This overlapped with my CRPPH chairmanship (1987-1992).

I wanted to be more open and transparent about ICRP, so in the period when I chaired Committee 4 and CRPPH, I certainly encouraged CRPPH to discuss recent ICRP Publications, but I believe I went further in that I allowed draft Committee 4 reports to be seen at CRPPH. This meant that Osvaldo could speak at Committee 4 meetings with the knowledge that he was reflecting not just his own, but a wide consensus from the profession.

I think it was this experience, which was positive, that led me to pursue the policy of distributing draft ICRP reports for comment – initially to groups such as CRPPH where there was a known body of expertise – and then as web access became widely available, we adopted a broader consultation. So, I would say that my very good experiences with CRPPH helped formulate the openness which ICRP now has.

Roger Clarke  
Chairman of CRPPH, 1987-1992  
Chairman of ICRP, 1993-2005

But relations were not always so happy. It can be seen from a study of the two organisations – one representing, at the outset, European countries (ENEA), the other, non governmental – that there was a certain amount of jockeying for position, albeit discreetly done. Very early on, the “inspirational” role of the ICRP was recognised, but was this enough to justify following the lead of this organisation which had not yet fully proved its worth? This question was raised in 1957, but by 1958 the ICRP had struck the first blow by publishing its new “recommendations” (already). And since these were transposable into laws and regulations, there was nothing for the ENEA to do but to resign itself to the role of examiner. This helped to make relations, between the two organisations more relaxed and, perhaps diplomatically, the Committee deemed these relations to be excellent. But could it be otherwise? For already, the stage was becoming crowded, with six European countries, members of ENEA, deciding to join together to form the new European Community and its nuclear arm, Euratom. To make its mark, Euratom quickly adopted the ICRP recommendations and seemed to want to relegate ENEA to a single, advisory, role. There was a rebellion, albeit couched in diplomatic terms, on the part of ENEA countries outside the European Community, and the United Kingdom and Spain objected to an “authoritarian” application of the recommendations, as suggested by Euratom, feeling that they should remain flexible, as desired by the ICRP. It took the entry of the United Kingdom, Denmark and Ireland into the European Community for the power

struggle to abate and relations to calm down. A reading of the minutes of the 15<sup>th</sup> session of the HSC clearly shows the supremacy of the ICRP; the Committee was waiting for the new ICRP texts in order to go to work. But debate about the flexibility or rigidity of ICRP texts was always to remain on the agenda of the future CRPPH, and it still does today.

Another debate, just as interesting, was to take place with regard to the ICRP: the scope of the norms, and the role of the ENEA, and its CRPPH. For most member countries, radiation protection was not a nuclear issue alone. The Agency, timidly sticking to its Statute, wished to comply with its founding document, to ensure that nuclear energy was a positive development. After it became the NEA, this dilemma continued, but the members of the CRPPH paid no attention to this and, step by step, succeeded, sometimes after lively debate, in extending their scope of activity to the effects of ionising radiation, whether of nuclear origin or not, artificial or natural. We shall see that through these sometimes brisk debates, the HSC succeeded in imposing on the Agency a modern and broader vision of radiation protection, and this was perhaps due to the active participation within the HSC of many serving members of the ICRP (Jammet, Lindell, Dunster).

It was radon which proved to be the catalyst for war. How hard it is to reconcile rebellion and diplomacy. The year 1979 was to be a turbulent one. Bo Lindell, Chairman of the ICRP from 1977 to 1981, former Chairman of the CRPPH (1972-1973), recalled in no uncertain terms the supremacy of the ICRP and the scope covered by radiation protection. This was to continue in 1979, the pretext being the Secretariat's workload, and here it was the United States which banged on the table, gaining without difficulty the support of the Committee, and from then on while administrative solutions were found to help the Secretariat, the Committee stuck to its objective: radiation protection did not stop at the borders of the nuclear sector. The experts seemed to have won the day over the diplomats. As pointed out by Bo Lindell, in spite of the grumbling, the CRPPH was "slow but nevertheless early".

In Sweden we were quite worried about the increasing observations of high radiation levels in dwellings. When we sought advice from the committee, the first reaction was that the cause of our problem was our radium-rich building materials, and that this was of no concern for other countries. We replied that “if you measure you will also see the problem”, which turned out to be true. First in 1973 CRPPH began to deal with radiation from building materials, and the first report by an Expert Group, including the Swedish expert Gun Astri Swedjemark, was published in 1979. The full implication of the radon problem was not appreciated until after the 1982 UNSCEAR report and ICRP Publication 39 (1984) on the protection policy. CRPPH was slow but nevertheless early.

Bo Lindell  
Chairman of CRPPH, 1972-1973

Later on, the ICRP was to enter into a glacial phase for which it was much criticised, and still to some extent is, with the publication of the 1990 recommendations (ICRP Publication 60). At this stage, within the CRPPH, appeared the “perestroika” man, Roger Clarke, who, snapping his fingers at the main Commission, proposed a dialogue with the CRPPH based on the documents produced by Committee 4 which he chaired. As indicated previously, this began a new openness of the ICRP through the CRPPH. Thus, a new relationship was born between the two bodies based on mutual trust, and the least that can be said is that it was the CRPPH which this time helped the ICRP to regain a more convivial image.

Seen from the inside, the analysis is the same: the CRPPH has always had a close relationship with the ICRP, concrete form being given to this by the presence of CRPPH Secretaries, Osvaldo Ilari, then Ted Iazo, at all meetings of ICRP Committee 4, even although Osvaldo Ilari limited dealings to the activities of Committee 4, which was altogether understandable given the duties of the CRPPH, namely to interpret ICRP recommendations for the authorities of member countries.

The conceptual contribution of the Committee was expressed primarily through its close and institutionalised relationship with the ICRP, essentially via its Committee 4, and it materialised in various forms: the critical review of ICRP draft documents, the efforts to contribute to the interpretation of the ICRP Recommendations by organising workshops and seminars and creating Expert Groups to develop guidance on interpretation and practical application of specific concepts.

Examples of subjects treated are: concept and uses of “dose constraint” in operational radiation protection, concept and applications of “collective dose” in optimisation of protection, concepts of “trivial dose”, “dose of no regulatory concern”, etc. for the establishment of “exemption levels” for the use and disposal of very small radioactive sources and very small quantities of radioactive wastes, concept and use of “potential exposure”, “intervention levels” for radiation emergencies.

Oswaldo Ilari

In conclusion, the task of the HSC then the CRPPH being first and foremost to draw up recommendations for their members then to ensure a link between the ICRP and member countries, it can be said that relations with the ICRP were the bricks and mortar of the Committee, and it is through such action that from one meeting to the next, the HSC then the CRPPH maintained a credibility which was always recognised. It is also by virtue of these relations that the CRPPH has been able to assert its unique role within international organisations.

#### **4.2 Consulting scientific experts: NEA expert reports**

Since the creation of the CRPPH, its members have come principally from the regulatory bodies in the different Member countries. Often with degrees in the sciences – doctors, biologists, physicists, chemists, etc. – most of them left active scientific work to take up posts of responsibility in radiation protection in their countries. But very rapidly, the CRPPH felt it necessary to maintain links with science and to create expert groups independent from the CRPPH when it was necessary to resolve a scientific issue in order to enhance radiation protection. It was for this reason, in the case of scientific questions that the Committee felt should be addressed to advance radiological protection that the CRPPH created independent expert groups.

Some reports were strictly within the mandate of the CRPPH, and a list of these is given in annex, together with all CRPPH publications, which we shall not discuss here. Here, we shall describe a few documents which have gone somewhat beyond the boundaries of the CRPPH, although this discussion is not exhaustive.

Scientific seminars contributed towards this opening up of the CRPPH. The first seminar on marine radioecology in 1968 brought together a large number of scientists. In this way, the CRPPH was able to increase its knowledge before pronouncing on subjects such as disposal at sea. Always keen to keep its knowledge up to date, the CRPPH organised two other seminars on this topic, the second in 1971 in Hamburg and the third in Tokyo in 1979.

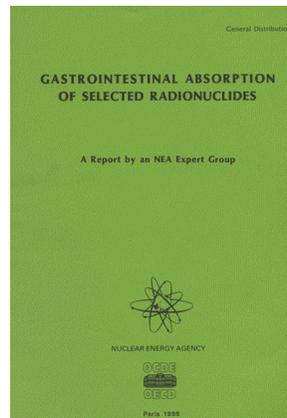
In 1980, the CRPPH asked a group of experts chaired by W.D. Rowe of the United States to examine the *Radiological Significance and Management of Tritium, Carbon-14, Krypton-85 and Iodine-129 arising from the Nuclear Fuel Cycle*. The task was to analyse the potential health risks of four long-lived radionuclides arising from the nuclear fuel cycle. These radionuclides were chosen because they disperse over the entire globe. The report served to inform the CRPPH before it took any decisions on waste management.

In 1981, under the chairmanship of Lucien Fitoussi (France) the *Environmental and Biological Behaviour of Plutonium and some Other Transuranium Elements* was published. The production of transuranic elements, especially plutonium, and the need to dispose of them, had been considered throughout the decade preceding this report as serious drawbacks to the use of nuclear energy. There was talk at the time of breeder reactors, but these were abandoned. Today, transuranium elements continue to be a problem despite industrial solutions such as mixed oxides (MOX). The underlying problem of transuranic elements resurfaced at the Generation IV Forum.

In 1985, again with the purpose of informing the CRPPH before it took any decisions on the issue of radon, a group of experts published a report on the *Dosimetry Aspects of Exposure to Radon and Thoron Daughter Products*. This report was the fruit of the work undertaken by an expert group chaired by F. Steinhäusler from Austria.

1985 was also the year of the Review of the continued suitability of the dumping site for radioactive waste in the North-East Atlantic, chaired by Anneli Salo (Finland). This report was linked to the CRESP project which itself was the subject of important publications under the authority of Arrigo Cigna (see Section 4.3).

But the report which was to have the biggest impact was perhaps *Gastrointestinal absorption of selected radionuclides* under the chairmanship of Hylton Smith (United Kingdom) and the constant, though friendly, urging of Osvaldo Ilari. The little work that the scientific community had done in relation to gastrointestinal transfers of radionuclides had essentially concerned workers, but the Chernobyl accident showed the need to extend such studies to the public. The report was the first analytical work on the subject. The experts of the group formulated a rule for evaluating gastrointestinal absorption by children, and this was adopted by the ICPRP whose publications describing the dose coefficients after ingestion by the public contain the now classic sentence: “This value was recently endorsed by an Expert Group of the OECD/NEA (1988) and is adopted in this report”. There could be no more successful outcome for a report by the CRPPH than to be referenced in ICRP recommendations.



Ten years later, in 1998, the CRPPH asked scientists to describe likely developments in biology and their possible repercussions on the system of radiation protection (Henri Métivier, Chairman). This exercise was undertaken again in 2005 and another group, EGIS (Expert Group on the Implications of radiological protection Science) endeavoured to make new predictions, but this had become even more difficult since biology had turned away, perhaps too much, from the organism as a whole to concentrate on cells and molecules.

These few, non-exhaustive, examples show clearly that while one of the CRPPH primary tasks relates to protection standards, the Committee has always made use of science in order to play a forward-looking role and to warn decision-makers of possible problems the radiation protection system could encounter if certain discoveries were to be confirmed.

### **4.3 The CRESPP Programme**

The Co-ordinated Research and Environmental Surveillance Programme relating to the disposal of radioactive waste at sea (CRESPP) began in 1981. CRESPP was basically a scientific research programme to study the processes regulating the transfer of radionuclides in the marine environment with a view to establishing safety assessments based on detailed and comprehensive scientific parameters. As early as 1986, CRESPP also took an interest in the scientific aspects of coastal dumping, in response to a request from the Paris Commission.

The co-ordination, within the framework of CRESP, of national research programmes of the participant countries gave birth to important international co-operation. The results consolidated knowledge about the radiological impact of radionuclides dumped in deep water.

Under the friendly direction of Arrigo Cigna, tasks were distributed among several experts: François Nyffeler for geochemistry and physical oceanography, Edmond Zuur for modelling, Denis Woodhead and Sabine Charmasson for biology.

In November 1993, the Contracting Parties to the London Convention of 1972 voted for a total ban on the dumping at sea of radioactive waste. In view of this decision but also of the results of the 1985 safety study and the opinion of CRESP that no new scientific discoveries were likely, the NEA decided to stop the Programme in October 1995.

But we should now let Arrigo Cigna, who chaired this Programme, say a few words about CRESP.

“Under the terms of the Decision of the OECD Council establishing a Multilateral Consultation and Surveillance Mechanism for Sea Dumping of Radioactive Waste, the NEA was requested to assess, in consultation with the Environment Committee, the suitability of dumping sites proposed by the national authorities of Participating countries and to keep under review those previously considered suitable.

“Since 1974, radioactive waste sea dumping operations undertaken by Participating countries had been carried out in a single site located in the North-East Atlantic. To fulfil the objectives of the Council Decision, an international group of oceanographic and radiation protection experts was convened by NEA in November 1979 to undertake a review of the continued suitability of the dumping site, taking into account the relevant provisions of the London Dumping Convention and the IAEA Definition and Recommendations for the purposes of the Convention.

“The Steering Committee for Nuclear Energy confirmed in April 1980 that, on the basis of the review, the existing site was suitable for continued dumping of radioactive waste for the next five years, under the conditions specified by the Group of experts in their conclusions and recommendations. At the same time, the Steering Committee for Nuclear Energy agreed on the need for developing a co-ordinated site-specific scientific programme to increase current knowledge of the processes controlling the transfer of radionuclides in the marine environment, so that future assessments can be based on more accurate and comprehensive scientific data.

“The Co-ordinated Research and Environmental Surveillance Programme relevant to sea disposal of radioactive waste (CRESPP) was thus initiated in 1981, with the objective to continue to strengthen the scientific and technical bases of future assessments of the North-East Atlantic dump site, which have to be carried out under Article 2(a)iii of the OECD Council Decision establishing a multilateral consultation and surveillance mechanism for sea dumping of radioactive waste.

“In 1986, in response to a request from the Paris Commission (PARCOM) to advise on the presence of radionuclides within the maritime area covered by the Convention for the Prevention of Marine Pollution from Land-Based Sources, the scope to improve the scientific and technical understanding of the distribution of radioactivity within the Paris Convention area was added.

“CRESPP was directed by an Executive Group with representatives from the following participating member countries and Agencies (the list of active members has changed on several occasions): Belgium, Canada, France, Germany, Ireland, Italy, Japan, Portugal, Spain, Switzerland, United Kingdom, United States, IAEA and IMO. CRESPP has operated through the medium of Task Groups established to deal with topics of the research programme. The Executive Group reported to the CRPPH.

“The first programme-plan for research and environmental surveillance relevant to the Atlantic dump site was published in 1981. Three progress reports were subsequently issued in 1983, 1985, and 1990. Detailed scientific information has also been published in a three volume series entitled *Interim Oceanographic Description of the North-East Atlantic Site for the Disposal of Low-level Radioactive Waste*.

“CRESPP provided the basic scientific information necessary for the second Review of the Continued Suitability of the Dumping Site for Radioactive Waste in the North-East Atlantic carried out in 1985. According to this review, the site was deemed suitable for receipt of packaged low-level radioactive waste, based on model calculations using site-specific data, which showed that the critical group dose resulting from past dumping was  $2.10^{-8}$  sievert/year which corresponds to 0.002% of the dose limit for members of the public of 1 mSv/year recommended by the ICRP.

“The programme was extended for five years after the completion of the 1985 Safety Assessment. Due to the uncertainty of the conclusions of the debate that was on-going within the London Dumping Convention, and the fact that no dumping had taken place since 1982, no site suitability review was undertaken in 1990. Nevertheless, a further 5-year extension of CRESPP was agreed to, in order to strengthen the basis for potential future assessments and maintain surveillance of the North-East Atlantic site.

“In 1995 the CRESP Executive Group concluded that there was a continuing need for an experienced group to provide coordination, and scientific and technical advice, concerning the impact of radioactive material in the marine environment, a role unfulfilled by any other existing international body. It recommended accordingly that the CRPPH establish a standing group within the NEA to undertake these functions and to assume responsibilities of CRESP in respect of coastal releases.

“The Steering Committee, in October 1995, took note of the conclusion of the CRESP Executive Group and the comments of the CRPPH, endorsed the proposal submitted by the CRPPH to terminate CRESP on the understanding that, if and when judged appropriate by the CRPPH an ad hoc group could be set up with a specific mandate to address issues in the areas related to previous CRESP activities. It was also confirmed that any further responsibility related to the previous disposal of radioactive waste in the marine environment under the control of the NEA would rest with the Member countries involved, and that the responsibility of the NEA, through the CRPPH, would be restricted to the proper co-ordination of activities as well as scientific and technical advice in response to any given situation requiring action.

“It must be stressed that the scientific research developed by CRESP achieved a goal beyond its original scope, because it was the first effort as a worldwide study on the behaviour of the radionuclides released by the dumped radioactive waste. Such studies were obviously multidisciplinary and some results achieved were the starting points for other oceanographic programmes.

“As Chaucer wrote in 1287: *Som tyme an ende ther is of every dede* and in 1995 also the CRESP reached its end, as a result of the total ban on the disposal at sea of radioactive wastes.”

#### **4.4 The ISOE Programme**

In 1980, Osvaldo Ilari proposed that the CRPPH should study occupational exposure in the nuclear energy field. At the beginning, admittedly, he spoke about individual doses, but also collective ones. Little by little he succeeded in convincing the operators of nuclear installations to compare experience on radiation protection measures in their installations, and this to the great benefit of workers.

It needed a full-time person with lots of energy to start this project in an irreversible fashion. Today, the ISOE has reached maturity, with its reports awaited at regular intervals. No-one denies that this comparison of performance across actors in the sector has had a beneficial effect on occupational exposures. Better yet, the CRPPH has succeeded in gaining the trust of operators, which was not easy, and is a proof that the project has been useful and well conducted.

So let us allow Christer Viktorsson, a staff member of the NEA Secretariat from 1987 to 1993, to describe to us the beginnings of the ISOE.

“In the middle of the 80s there was great concern within the radiation protection community that new nuclear safety requirements requested by regulators, in particular post-TMI, would increase in an unbalanced way the risks to workers in nuclear power plants. In particular, radiation doses to workers resulting from in-service inspection, plant maintenance and modifications to plant design, so called backfitting, were expected to increase out of proportion at the expense of activities for the protection of public health and safety. For this purpose the OECD Nuclear Energy Agency established an expert group to analyse and recommend actions in this respect. The Group, chaired by Lucien Fitoussi from the then IPSN, produced a report entitled *Implications of Nuclear Safety Requirements for the Protection of Workers in Nuclear Facilities*, OECD Nuclear Energy Agency, 1988. The Group made a number of recommendations including the promotion of the setting up of an enhanced international exchange of information on occupational exposure and practical data on optimisation of protection. They focussed specifically on data related to occupational dose control in specific high dose tasks.

“At this time I arrived at the NEA. I was lucky to be in an enthusiastic team led by Jean-Pierre Olivier and Osvaldo Ilari. These two leaders were able to mobilize significant energy, not only within the Secretariat but also in member countries to do things thought to be impossible for a small international organisation. They put me in contact with a small scientific organisation in France called CEPN led by Mr. Jacques Lochard. This organisation became later one of the main drivers behind the Information System on Occupational Exposure (ISOE) together with the US Brookhaven National Laboratory (BNL). I started to work with CEPN and BNL and rapidly we developed the embryo for the international exchange. As the idea was good and our network of colleagues in member countries responded favourably we were able to make some rapid initial progress. After some difficulties, we could announce the official launching of the ISOE on the occasion of the first meeting of its Steering Group on 18 November 1991 in Paris. The first elected Chairman was Philippe Rollin, EdF, France, who together with his two Vice-Chairmen, Arif Kahn, Ontario Hydro, Canada and Patricio O’Donnell, CSN, Spain, led the ISOE through the first phases of development.

“The fundamental interest in establishing ISOE resided in the possibility of exchanging and getting access to first-hand information on high-dose jobs and newly developed dose reduction techniques. Also, information on total collective doses was asked for. It was clear to us from the beginning that we needed to approach the operators, i.e. the nuclear power plants, in order to be successful. However, we did not exclude the possibility of including also other

targets groups who could benefit from this new system. At the founding meeting, therefore, we had participation from operators mainly, but also from regulatory authorities. The technical operation of the system was delegated by the NEA to technical centres, one in France serving Europe, one in the US serving North America and one in Japan. These centres were in charge of collecting and disseminating information under close supervision by the Steering Group and the NEA. Special computer softwares were developed for this purpose. It should be mentioned that the IAEA and the European Commission were associated to the System from the beginning, and took later active roles in supporting and serving the system.

“The setting up of this system took place at a time when computers entered into office works. Also, this was the time of recovery from the Chernobyl accident creating a favourable climate for international co-operation. The WANO had been created and the international community through the sponsorship of the IAEA had established new Conventions. NEA itself was very active in taking opportunities for increased “visibility”. The International Emergency Exercises, INEX, were born and the International Nuclear Event Scale saw some of its first supporters within the NEA Groups. In light of this, it may be worth recalling some of the challenges we had in the setting up of this system, which by the way has established itself as a major tool for occupational dose control in the world.

“The confidentiality, first. We saw early on that a fruitful exchange of detailed information could only be achieved if we could guarantee confidentiality of the data. This meant that the operators would only be willing to exchange detailed information if the system only disseminated it to their peer operators, and not for open distribution. We could manage this by sophisticated database management and by excellent understanding and support from the major regulatory authorities. Second, the compatibility of database software. The success of the exchange was due to the development of specific computer software which could handle the different types of data and allow an exchange between the technical centres. The two major technical centres had a number of interesting discussions on the pros and cons of different database management tools, and all the diplomacy we could mobilise was needed to find good solutions to this.

“The first steps of ISOE were difficult and often short but steady, and the continuous support that we received from the CRPPH and the NEA management at all levels, guaranteed that we got the time we needed to design, redesign, negotiate and convince. The number of trips we made to member countries to promote the system is significant. I remember that I went from Paris to NUMARK in the US (now NEI), through VGB in Essen in Germany to NUPEC in Japan to talk about the ISOE benefits, and at the end, I believe we managed to establish a system that is good for radiation protection of workers in the nuclear industry worldwide.”

That this project has been a success is confirmed by the participation today of more than 450 nuclear power plants from more than 30 countries, and of regulatory authorities from over 30 countries also.

#### 4.5 The Chernobyl Programme

How peaceful was the CRPPH before 26 April 1986. Even Three Mile Island had not much perturbed the Committee, in that it was a safety problem. The tendency was to joke about probable heart attacks for the Americans in charge rather than discuss the effects on public health of the radionuclides released into the atmosphere.

The safety experts were to have their revenge, however, and what a revenge. Chernobyl did not happen in the West. It was another example of the damage caused by a totalitarian economic system.

For reasons of effectiveness, a consultant, Mary Morrey, was asked to prepare an initial report, *The Radiological Impact of the Chernobyl Accident in OECD Countries*. This report, published fairly quickly, in March 1987, contains information that is still relevant today. There is a description of the assessments of radiation doses received by the populations of member countries as well as a critical analysis of the measures taken to deal with the situation. The comparative tables of the measures taken in member countries after the accident constitutes an irreplaceable database, especially more than 20 years later when the basis for debate has shifted to assertions which are not necessarily proven.

The CRPPH continued to publish independent reports using the services of consultants. The following were published in turn: *Chernobyl. Ten years on. Radiological and Health Impact* by Peter Waight and Henri Métivier; *Chernobyl: Assessment of Radiological and Health Consequences, 2002 Update of Chernobyl. Ten Years On* by Henri Métivier; and since regular commemorations were to be avoided, the CRPPH chose an original option for the 20<sup>th</sup> anniversary of the accident with the report *Stakeholders and Radiation Protection: Lessons from Chernobyl 20 Years After*, written this time under the leadership of Rick Jones. With its reports, which are constantly being downloaded from the NEA Internet site, the CRPPH has demonstrated independence and originality in the information given to experts, decision-makers and also the public.

**The  
radiological impact  
of the  
CHERNOBYL  
ACCIDENT  
IN OECD COUNTRIES**



In conclusion, at a time of great international tension following the accident at Chernobyl, the CRPPH played a very active role, in perfect synergy with the

CSNI and other international bodies, in the international endeavour to evaluate and deal with the consequences of the accident. Special meetings of the Committee and groups of experts made it possible to gather and analyse information about the dispersal of radioactive contamination throughout the northern hemisphere and its radiological impact on the public and the environment.

Chernobyl was also the main source of inspiration for the INEX Programme

#### **4.6 The INEX Programme**

The Chernobyl accident brought to light the obvious; we needed to prepare better for the unexpected. Although severe nuclear accidents are supposed seldom to happen, they do happen. If we are not prepared we can be thrown into a crisis with, often, severe consequences, not only technical, but often also social and political. The Chernobyl accident brought to the attention of the world that we needed to recognise that we were all in the same boat. The consequences of a nuclear accident may not necessarily be restricted to the country of the accident, but also neighbours, and neighbours of neighbours could be concerned. This led the international community to the conclusion that every endeavour needed to be put into nuclear accident prevention and mitigation. Moreover, emergency management also needed more attention. Today it is commonly recognised that a nuclear accident in any country influences, in some way, the entire world.

The NEA Committees realised this early on after Chernobyl. The CRPPH, for example, saw this as a severe problem that needed urgent attention both from national and international viewpoints, and decided to put on the table in a clear way the differences that existed in emergency planning and response practices between OECD countries. One of the studies performed just after the Chernobyl accident highlighted these embarrassing differences in criteria and practices. This, together with the difficulties countries encountered in public communication, contributed significantly to confusion within the public in NEA member countries working to implement countermeasures.

How to improve this situation? Based on an NEA workshop in Brussels on emergency planning, chaired by Serge Prêtre from Switzerland, it was recommended to the CRPPH to organise international emergency exercises on the management of offsite emergencies following a severe nuclear accident. By carrying out exercises, differences in approach could be identified and good practice highlighted. The aim was obviously to improve the situation by removing unnecessary differences and establishing better transboundary connections, in particular between countries with common borders.

However, it did not prove particularly easy to launch this initiative, and for the second time, Christer Viktorsson found himself at the heart of one of the CRPPH very important projects. Let us listen to his description of its, somewhat epic, beginnings.

“The difficulty we ran into when we started to implement the first exercise was who would volunteer to host the accident. We did not get any country willing to simulate the accident country. To overcome this we decided to create fictitious countries. This meant that we needed to create maps simulating societies as realistically as possible. Fortunately, I had good support in the work of colleagues in the European Commission and the OECD publishing office. The key designer of the maps we used was George Fraser. It turned out that in addition to being a very good designer, he had the skills of drawing nicely fictitious societies. The OECD could then print and reproduce the maps of all of the OECD countries. After many very pleasant moments together in the efforts to design the maps and the related infrastructure, we decided to call the main countries on the map Acciland and Neighbourland. These countries had capitals, infrastructure, hills, lakes, agricultural practices, etc. On the day of the exercise the old reactor Nuce 1, at the Boom Nuclear Power Station in Acciland had a severe accident which spread a cloud of radiation also into Neighbourland. To deal with the situation, experts from the NEA member countries simulated what action they would take to cope with the emergency both from the country of the accident and the neighbours. A few weeks later, the experts met in Paris to compare and discuss these responses. Not surprisingly, most of the differences we saw at the time of the Chernobyl accident still remained. What had improved, however, were the early notification to neighbours and the monitoring of radioactive contamination in the environment. But the intervention criteria, for example, were still very different.

“Sometimes, the mind of a child can solve difficult *technopolitical* problems.”

To identify aspects of national emergency response which could benefit from improved international coordination, the first NEA International Nuclear Emergency Exercise (INEX-1) was developed as a series of national table-top exercises using a fictitious location (Acciland and Neighbourland) and scenario. INEX-1 was conducted in 16 participating countries during 1993 by key decision-makers and experts responsible for emergency matters. The purpose was to identify the mechanisms for sounding the alert and communicating with neighbouring countries and the international community, to examine the procedures for protection measures and interventions, to study the measures concerning the import and export of foodstuffs and to see how a request for assistance could be made, if needed, and met.

It rained on Hunsdorf, Resitown was perhaps not the best choice of destination for evacuees, being too close to the contaminated area, and there was hesitation about confining the inhabitants of Oldford to their homes. Since the accident, the inhabitants of these three towns are in fine health; they never existed.

INEX 1 was followed by an international meeting of representatives from these countries to review results and recommend next steps, particularly in the areas of communications, data management, countermeasures and decision making. Three follow-up workshops provided valuable resources for use by national emergency management authorities, one of which was on a subject which at the time was still taboo in some countries: the distribution of iodine pills.

I am sure Christer Viktorsson will have not forgotten that, at the time of INEX-1, he was the first foreigner to gain access to the sacrosanct corridors of French power, thanks to the French *Préfet* who was sponsoring the exercise. And even if he was not the first, the main thing was to believe he was.

The positive experience of INEX-1 led to the launch of a more realistic international exercise. In order to test existing response systems and examine specific issues within national emergency arrangements, INEX-2 was developed as a series of regional, command-post exercises which would involve the simultaneous, real-time participation of many OECD and non OECD member countries. Exercise objectives focused on the real-time exchange of technical information, public information and media interaction, and decision making based on limited data. Between 1996 and 1999, four national-based, large-scale exercises were conducted, each with participation of 30 to 35 countries and 3 to 5 international organisations. INEX moved beyond its initial framework and with great success.

Early in the INEX-2 series, it was recognised that improvements in data management were needed to ensure that emergency decisions and public information are based on appropriate knowledge. An NEA Expert Group, the Working Party on Nuclear Emergency Matters (WPNEM) therefore developed a strategy *Monitoring and Data Management Strategies for Nuclear Emergencies*, 2000 to better identify key emergency data, and improve emergency communication, information management and monitoring approaches; many NEA member countries and international organisations have implemented the strategy detailed in this report. An INEX-2 follow-up workshop identified further lessons for decision-making, information exchange and public/media communications.

Subsequently, the INEX-2000 exercise was developed in response to the INEX-2 findings, and co-organised through the Inter-Agency Committee on the Response

to Nuclear Accidents (IACRNA). Similar to INEX-2, objectives included the testing of new data management and monitoring strategies and the coordination of media information. This exercise saw the participation of the NEA Nuclear Law Committee, and addressed for the first time questions of civil liability following a nuclear emergency. Using the exercise results, a follow-up workshop aimed to test the mechanisms by which potential victims of this simulated accident would be compensated. INEX-2000 represented a further expansion in the scope of emergency management issues, particularly through the examination of the topic of compensation as part of post-accident remediation.

Building on the INEX experience, and recognising the expanded focus of emergency management programmes since 2001, the WPNEM developed INEX-3 as a table-top exercise to explore consequence management, addressing the desire of member countries to better master the later phase response to a nuclear or radiological emergency, loosely defined as the period after the crisis phase has passed and radioactive contamination has been released into the environment.

The INEX-3 exercises conducted by 15 countries in 2005-2006 focused on consequence management issues that would likely arise as a result of a nuclear or radiological emergency that has led to significant contamination of the populated environment. Of particular focus were the decision-making processes in the areas of: agricultural and food countermeasures; other countermeasures such as travel, trade, and tourism; recovery management; and public information. The CRPPH is fond of agriculture, the agricultural aspects of a nuclear or radiological emergency having already been the subject of a meeting after INEX-1.

The WPNEM (Working Party on Nuclear Emergency Matters – INEX is probably a simpler acronym) is now developing a strategy to resolve the key longer-term consequence management issues raised by INEX-3.

One of the most important and lasting outcomes of the INEX exercises has been their contribution towards the establishment of an international exercise and information sharing culture. The routine involvement of a broad range of countries in the preparation and conduct of emergency exercises hosted by various international organisations, as well as nationally arranged bi- and multi-lateral exercises, has advanced the global state of preparedness.

Ultimately, the INEX exercises mobilised 59 countries, many of which are not members of the Agency, and six international organisations. These figures tell us more than any long speech about the success of this project.

## INEX Exercise Participants (including exercise and workshops)

### OECD Countries

|                     | INEX-2<br>CH | INEX-2<br>FI | INEX-2<br>HU | INEX-2<br>CA | INEX-2000/<br>JINEX 1 | INEX-3 |
|---------------------|--------------|--------------|--------------|--------------|-----------------------|--------|
| Australia           |              |              |              |              | ✓                     | ✓      |
| Austria             | ✓            | ✓            | ✓            | ✓            | ✓                     | ✓      |
| Canada              | ✓            |              |              | ✓            | ✓                     | ✓      |
| Czech Republic      | ✓            |              | ✓            |              | ✓                     | ✓      |
| Denmark             | ✓            | ✓            | ✓            | ✓            | ✓                     | ✓      |
| Finland             | ✓            | ✓            | ✓            | ✓            | ✓                     | ✓      |
| France              | ✓            | ✓            | ✓            | ✓            | ✓                     | ✓      |
| Germany             | ✓            | ✓            | ✓            |              | ✓                     | ✓      |
| Greece              |              | ✓            | ✓            | ✓            | ✓                     |        |
| Hungary             | ✓            | ✓            | ✓            | ✓            | ✓                     | ✓      |
| Iceland             |              | ✓            | ✓            | ✓            | ✓                     |        |
| Ireland             | ✓            | ✓            | ✓            | ✓            | ✓                     | ✓      |
| Italy               | ✓            | ✓            |              |              | ✓                     | ✓      |
| Japan               | ✓            | ✓            | ✓            | ✓            | ✓                     | ✓      |
| Korea (Republic of) | ✓            | ✓            | ✓            |              | ✓                     |        |
| Luxembourg          | ✓            |              | ✓            |              | ✓                     | ✓      |
| Mexico              |              |              |              | ✓            | ✓                     | ✓      |
| Netherlands         | ✓            | ✓            | ✓            | ✓            | ✓                     | ✓      |
| Norway              | ✓            | ✓            | ✓            | ✓            | ✓                     | ✓      |
| Poland              |              | ✓            | ✓            | ✓            | ✓                     | ✓      |
| Portugal            | ✓            | ✓            | ✓            |              | ✓                     |        |
| Slovak Republic     | ✓            | ✓            | ✓            | ✓            | ✓                     | ✓      |
| Spain               | ✓            | ✓            | ✓            | ✓            | ✓                     | ✓      |
| Sweden              | ✓            | ✓            | ✓            | ✓            | ✓                     | ✓      |
| Switzerland         | ✓            | ✓            | ✓            | ✓            | ✓                     | ✓      |
| Turkey              |              |              |              |              | ✓                     |        |
| United Kingdom      | ✓            | ✓            |              | ✓            | ✓                     | ✓      |
| United States       | ✓            |              | ✓            | ✓            | ✓                     | ✓      |

### Non OECD Countries

|                | INEX-2<br>CH | INEX-2<br>FI | INEX-2<br>HU | INEX-2<br>CA | INEX-2000/<br>JINEX 1 | INEX-3 |
|----------------|--------------|--------------|--------------|--------------|-----------------------|--------|
| Argentina      |              |              |              |              | ✓                     |        |
| Belarus        | ✓            |              |              | ✓            | ✓                     |        |
| Belgium        | ✓            |              |              |              | ✓                     | ✓      |
| Brazil         |              |              | ✓            | ✓            | ✓                     | ✓      |
| Bulgaria       | ✓            | ✓            | ✓            | ✓            | ✓                     |        |
| Chinese Taipei | ✓            |              |              | ✓            | ✓                     |        |
| Croatia        |              |              |              |              | ✓                     |        |
| Cuba           |              |              |              |              | ✓                     |        |

## INEX Exercise Participants (including exercise and workshops) (Cont'd)

### Non OECD Countries

|                         | INEX-2<br>CH | INEX-2<br>FI | INEX-2<br>HU | INEX-2<br>CA | INEX-2000/<br>JINEX-1 | INEX-3 |
|-------------------------|--------------|--------------|--------------|--------------|-----------------------|--------|
| Egypt                   |              |              | ✓            |              | ✓                     |        |
| El Salvador             |              |              |              |              | ✓                     |        |
| Estonia                 | ✓            | ✓            | ✓            | ✓            | ✓                     |        |
| Georgia                 |              |              |              |              | ✓                     |        |
| India                   |              |              |              |              | ✓                     |        |
| Israel                  |              |              |              |              | ✓                     |        |
| Jordan                  |              |              |              |              | ✓                     |        |
| Kazakhstan              |              |              | ✓            | ✓            | ✓                     |        |
| Kuwait                  |              |              |              |              | ✓                     |        |
| Latvia                  |              | ✓            | ✓            | ✓            | ✓                     |        |
| Liechtenstein           |              |              |              |              | ✓                     |        |
| Lithuania               | ✓            | ✓            | ✓            | ✓            | ✓                     |        |
| Malta                   |              |              |              |              | ✓                     |        |
| Mauritius               |              |              |              |              | ✓                     |        |
| Philippines             |              |              |              |              | ✓                     |        |
| P. R. of China          |              |              | ✓            | ✓            | ✓                     |        |
| Romania                 | ✓            | ✓            | ✓            | ✓            | ✓                     |        |
| Russia                  |              | ✓            |              |              | ✓                     | ✓      |
| Slovenia                | ✓            | ✓            | ✓            | ✓            | ✓                     |        |
| South Africa            |              |              |              |              | ✓                     |        |
| Syrian Arab<br>Republic |              |              |              |              | ✓                     |        |
| Tunisia                 |              |              |              |              | ✓                     |        |
| Ukraine                 |              |              | ✓            |              | ✓                     |        |

### International Organisations

|       | INEX-2<br>CH | INEX-2<br>FI | INEX-2<br>HU | INEX-2<br>CA | INEX-2000/<br>JINEX-1 | INEX-3 |
|-------|--------------|--------------|--------------|--------------|-----------------------|--------|
| NEA   | ✓            | ✓            | ✓            | ✓            | ✓                     | ✓      |
| EC    | ✓            | ✓            | ✓            | ✓            | ✓                     |        |
| IAEA  | ✓            | ✓            | ✓            | ✓            | ✓                     | ✓      |
| WHO   |              | ✓            |              | ✓            | ✓                     |        |
| WMO   | ✓            | ✓            | ✓            | ✓            | ✓                     |        |
| UNDHA |              | ✓            |              |              |                       |        |

Lastly, throughout the history of the WPNEM and INEX programme, important lessons in international and national nuclear emergency preparedness have been identified, and used by countries and international organisations to make substantial improvements in emergency management arrangements. The INEX experience, amongst other national and international post-Chernobyl initiatives,

has provided increased insight into how sound radiation protection aspects fit into a larger integrated emergency management and recovery framework, from planning and preparedness, through the response phase to recovery and rehabilitation.

#### **4.7 Collective opinions**

The CRPPH adopted another conceptual role by preparing conferences and drafting reports of so-called “collective opinions” of the Committee which it then submitted for international discussion.

At the end of the 1980s, many people thought that radiation protection had fully matured and that nearly all problems had been solved. Certain new situations, however, made it necessary to reflect on and refocus the approach adopted. In its collective opinion published in 1994, the CRPPH showed its ability to follow closely trends and forecast future developments in the outside world, so as to be best prepared to respond rapidly to new challenges should they begin to emerge.

Examples include the collective opinion *Radiation Protection Today and Tomorrow* of 1994, *Developments in Radiation Health Science and their Impact on Radiation Protection* of 1998, *A Critical Review of the System of Radiation Protection* of 2000, and *Radiation Protection in Today’s World: Towards Sustainability* of 2007.

In its report of the year 2000, the CRPPH proposed reflection on:

- The clarity and coherence of the radiation protection system.
- The justification and optimisation principles.
- Collective doses.
- Dose limits.
- “Trivial doses”.
- Environmental protection.

By virtue of these reports, the CRPPH once again showed that it was at the origin of the discussions concerning revision of ICRP 60, to be completed in 2007.

With the revision of the ICRP general recommendations in mind, having collaborated significantly with the Commission on their development (see Section 4.1), considering experience in implementing the system of radiological protection since 1990, and taking into account the significant social evolution that has taken place over the past 10 to 15 years (stakeholder involvement aspects in particular, see Section 4.8), the CRPPH began in 2005 to develop a new “collective opinion”. This work (published in 2007) assesses “where we currently are” and “historically how we got here”, in order to better see “what

may pose challenges in the future” for radiation protection policy, regulation and application. These challenges may be new issues that arise, or may be ongoing issues that require a new approach to be taken. This work will once more serve the Committee as a “rudder”, helping to steer the direction of its future work.

These collective opinions confirmed, if confirmation were necessary, the Committee’s forward-looking role, stirring up ideas. A commitment was made to support the ICRP in its move towards greater transparency. The Committee was already on the road to the stakeholder adventure.

#### **4.8 The arrival of “stakeholders”**

Suddenly, in the 1990s, a new expression found its way into radiation protection jargon: “stakeholder involvement”. The limits to managing the situation in the territories contaminated after the Chernobyl accident quickly became apparent, and a European programme ETHOS, conducted by the French group CEPN, opened the way towards the participative management of emergencies. At the same time, the Americans were trying out this approach on the contaminated site of Rocky Flats, and France around the reprocessing plant at La Hague with an all-inclusive group, Nord Cotentin. This showed that a new style of debate was needed. Change can be difficult, and the words of the former Chairman Serge Prêtre show that the arrival of “stakeholders” in the debate was not easy.

“At the beginning, I was irritated. Was it really necessary for radiation protection to address matters which belonged rather to sociology or politics? I have always lived in a country (Switzerland) known for its direct democracy. In Switzerland, “stakeholder involvement” has become part of our culture and we are used to it. Several times a year, we are asked to vote for or against extremely diverse projects such as the construction of a tunnel, the integration of foreigners, health insurance, old-age pensions or accession to the European Union. Such consultations may take place at federal, cantonal or communal level and they are preceded by much public debate and discussion in the media. The “stakeholders” are the actors concerned: political parties, governments, and certain interested associations, as well as every individual who feels concerned and wishes to defend his or her point of view. For me, therefore, “stakeholder involvement” has always formed part of a normal life in society. I could not understand, therefore, why radiation protection took up a subject which seemed trivial to me.

“But I soon realised that democracy was so indirect in most countries that there was little room for “stakeholder involvement”. Although public debates are organised, and everyone can make comments, there is no real process for listening

properly to the concerns of stakeholders. And it would still be unthinkable for stakeholders or the public to be able to vote on the decision to be taken.

“So alright, let’s put “stakeholder involvement” on the agenda of radiation protection. The question which then arose was: do we want to incorporate social aspects in radiation protection decisions, or radiation protection aspects in societal decisions? That which we felt to be a radiation protection problem involving a few social implications was rather a social problem including a few radiation protection aspects. It had to be recognised that a little modesty would be welcome in a world in which radiation protection had become somewhat proud and even arrogant.

“But taking the risk of exposing strictly logical radiation protection arguments to heathen influences was almost a sacrilege. Some of those of the old school involved in radiation protection feared that “stakeholders” would introduce uncertainty, or even stupidity, into a science which prided itself on being exact. Others feared that consulting stakeholders would slow down the decision-making process to an unacceptable degree. It is true that in Switzerland, decisions on major projects take three or four times longer than in neighbouring France and that, at the end of the day, it is not always certain that the slow decision, tempered by stakeholders, is better than a quick one. No doubt it is above all more stable and robust in the long term.

“In my opinion, “stakeholder involvement” is an irreversible development which is very useful in many fields in which stakeholders argue and discuss from an objective point of view. As far as we are concerned, any distortion of the process may be due either to fear or to a hidden political agenda.

“In radiation protection, the old problem of the fear of radiation closely linked to the fear of cancer, influences arguments, discussions and decisions. This ancient fear has to be overcome before any real benefit from stakeholder involvement can emerge. It seems to me necessary, in a first phase of stakeholder involvement, to listen sincerely to the fears of participants and to respect them. This creates a climate of trust which sets the tone for subsequent discussion.

“The other possible distortion is political in nature. Unfortunately, radiation protection is closely related, and in a somewhat perfidious manner, to nuclear energy. Some opponents of nuclear energy see radiation protection as a “free pass” for nuclear energy: the higher the quality of radiation protection, the more nuclear energy is viable. This association of ideas can perturb the stakeholder involvement process to a considerable degree. The second requirement for fruitful discussion consists therefore in verifying at the outset that the participants sincerely share some fundamental values.

“Finally – I confess – there is nothing trivial about “stakeholder involvement”, especially when it is applied to the field of radiation protection.”

Serge Prêtre is right: the participants in this process must share fundamental values, and any ambiguity in involving stakeholders is to be found there, in defining who exactly is a “stakeholder”. This reply is still not very clear. Who can give an exact definition? This definition will determine whether or not such an approach is successful.

But although some issues still remain, this approach adopted by the CRPPH has proved contagious. The RWMC has also undertaken this adventure, which seems only natural since the management of long-lived waste is probably one of the aspects which can no longer be solved by a technical response alone.

But this issue is not perceived by all in the same way. In the following few paragraphs, Abel Gonzalez gives an idea of what the debate within the CRPPH would have been if the Osvaldo/Abel duo had been there to lead the discussion. His account clearly shows the difficulty in understanding and accepting this approach.

“But unfortunately, Osvaldo retired... and... well... tragedy usually follows adversity... NEA would embrace its ultimate specialty: “*stakeholder involvement*”. Unfortunately, Osvaldo could not be an actor of the forthcoming circus: I am convinced that I would have had a lot of fun with him about this strange subject.

“I can’t really remember when I was first exposed to the term “stakeholder” (humans have a rare ability to delete from memory unpleasant experiences!). But I recall precisely my profound aversion to those Anglo-Saxon terms that sound crispy, are untranslatable and usually mean nothing or everything. During my international professional experience, I was exposed to many of these hieroglyphics and nearly always I managed to find a proper (and clearer) Latin or Greek root to replace and convert them into intelligible language. But this was not the case with *stakeholder*! I even failed to ascertain the origin of such a strange term. A Canadian friend (a senior nuclear safety expert) convinced me that its origin could be traced to the gold rush in North America. Dilettante miners, in their saddles, would be given a *stake to hold* and at the sound of a gunshot they will gallop to the place where they planned to mine; these *stakeholders* would on arrival plant there their post in order to claim property. True or not, I failed to find a better historical account.

“Thus, with such a flimsy definition of a concept NEA launched itself on a crusade termed ‘stakeholder involvement’.

“In one of NEA’s most unsound decisions (which, fortunately for the Agency, was never repeated again), it nominated me to chair one of the first meetings on this strange subject. The meeting took place in the peculiar environment of a dot on the Swiss map called Villigen. (I recall that when I went to the well-

equipped Swiss tourist office in Vienna to enquire about Villigen, the place was unknown to them, to their brochures and even to the replete databases in their computers; as this ignorance was unbearable for Swiss public servants, the office turned all Switzerland upside down to find some information about the place and in the end it succeeded: the timetable of the post-bus going to Villigen was produced and given to me!).

“In Villigen’s tranquil atmosphere I found that I was not alone in my doubts about “stakeholders”, but those who shared my reservations were as cowardly as me in expressing our qualms. Our main problem was political correctness: how could anyone be against “stakeholder involvement”? Only some reactionary mind, more suited to the darkest periods of European history than to the new tendencies in full flood after the Treaty of Rome, could express misgivings about such a democratically modern concept. The fact that nobody knew precisely what stakeholder involvement meant and who the stakeholders really were seemed to be irrelevant.

“A new dogma was quickly created and, as the history of religions clearly shows, such dogma was mutating on its way to perfection. One of the highest French officers in the field told a hypnotic audience that in *la France après Robespierre*, stakeholder meant *part concernée ou part intéressée*. My French dictionary was obviously not up-to-date because *concerné* and *intéressé* were not necessarily synonyms.

“I decided to dedicate myself to the discovery of that rare thing termed “stakeholders”. And, after a difficult translation exercise, I asked my aunt María whether she was interested in being a stakeholder for the purpose of radiation protection. Once she confirmed that I was neither drunk nor out of my mind (which took a long while), she wisely gave me her views about stakeholder involvement in radiation protection decisions. For individual cases she would expect radiation protection professionals to take decisions to protect the individual’s health, as a medical doctor is supposed to do, i.e., commensurate with their knowledge and responsibility (and keeping in mind the salaries they were getting). For decisions affecting whole communities, she would expect elected politicians to assume the responsibilities she had voted for them to do, taking into account the professional opinion of the radio-protectionists. The only involvement to which she aspired at that time in her life was improving the cooking of her delicious *dulce de leche* (or *caramelized milk* for the non-initiated).

“Obviously, I concluded, my aunt Maria was not a “stakeholder”. Who were they? It is not easy to find a silent majority but it is relatively simple to identify a vociferous minority of political losers. These people who would not be elected in a free election even by their relatives but who can nevertheless exercise illegal power by pressing for decisions that satisfy only their agenda (and sometimes

their wallets). Would the famous “stakeholders” be these takers-over of the role of cowardly politicians who were not ready to assume their responsibilities?

“As my friend Serge Prêtre recognizes, stakeholder involvement is pretty natural in that conglomerate of Cantons of different nationalities called Switzerland. Swiss people use referenda for everything of federal interest from tunnel constructions to discrimination against foreigners and to potential integration with hated European neighbours. This might be because they accept representative democracy at the Canton level but find it much more difficult to be confident in representation at the federal level where they prefer direct and participative democracy.

“But in the vast majority of countries, for better or for worse, the political system is of representative democracy, i.e. the people govern through elected representatives not by themselves and even less through “stakeholders”.

“Notwithstanding these uncomplicated analyses, I tried to convince myself of the obvious political correctness of stakeholder involvement...it should be right!... but my aunt Maria’s simple and straightforward logic was difficult to defeat. She perhaps wondered what radio-protectionists would do if they needed to make a radiation protection decision to save a human life, let’s say of somebody who was contaminated with Polonium 210 (just to be up-to-date). Say they had to decide whether to use dimercaptopropansulfonate or, conversely, 3,4 dimercaptopropane in order to facilitate excretion. Are they going to engage in a stakeholder consultation in order to make the decision? Or would they just follow the advice of a reliable radiopathologist? In fact, did the London Policy engage in a stakeholder consultation a few months ago? Or rather did they do what they should, namely ask for professional advice from the ex-NRPB?

“At the other end of the spectrum was my aunt Maria’s logic concerning the case of a radiation protection decision that could affect a community. Should the professional advice be subject to the judgments of non-representatives, who in addition are professionally ignorant? Or, as wisely recommended by the ICRP, should it be taken as a provider for decision-aiding recommendations, which in turn can serve as an input to a decision-making process that should necessarily be governed by the people – i.e., by its democratically elected representatives in most countries, or by referenda in countries like Switzerland where for various reasons full representative democracy does not function?

“It seems to me that my aunt Maria was perhaps politically incorrect but basically right: undefined stakeholders do not have any role in any of these extreme situations or in the middle. And this is not a *sacrilège*, as defined by Serge, of those who might be convinced “*de la stupidité dans une science qui se croyait exacte*”. It is simply common sense.

“I have to admit, however, that I failed with my aunt Maria. I found I did not have the energy to battle against the high waves of a strong and chaotic sea. If Osvaldo and his impeccable logic had not retired from the CRPPH, perhaps we could have offered some resistance. But this was not the case and the stakeholder involvement wave continues to flood beach after beach.

“Recently the last cherry was positioned on the cake: in its infinite wisdom, the Board of Governors of the IAEA established international standards requiring “stakeholder involvement” in the management of any source of radiation (i.e., *“nuclear facilities; activities using sources of ionizing radiation; radioactive waste management; the transport of radioactive material; radiation protection activities; any other practices or circumstances in which people may be exposed to radiation from naturally occurring or artificial sources; the regulation of such facilities and activities”* [sic]. According to the new international mandate, management systems shall identify and take account of any requirement formally agreed with interested “stakeholders”. And for the new standards there are no doubts about who the stakeholders are; they include: *“customers, owners, operators, employees, suppliers, partners, trade unions, the regulated industry or professionals; scientific bodies; governmental agencies or regulators (local, regional and national) whose responsibilities may cover nuclear energy; the media; the public (individuals, community groups and interest groups); and other States, especially neighbouring States that have entered into agreements providing for an exchange of information concerning possible transboundary impacts, or States involved in the export or import of certain technologies or materials”* [sic]. While this inexpressible definition was solemnly approved by all States (opposed only by Argentina and Brazil), an officer of the Holy See reminded me *sotto voce* that the Board had forgotten to include in such a complete list nothing less than the *priest* of the village, who in many European countries could be a very important “stakeholder”!

“Throughout its fruitful existence, the CRPPH has done a lot to promote and clarify convoluted and difficult radiation protection concepts. Without the CRPPH radiation protection would be very different today, probably much worse and more illogical. Perhaps the time is ripe to follow this good tradition. I would suggest that now that the stakeholder involvement concept has been internationally standardised, the CRPPH could now contribute to the practical application of the concepts in the real world. All will welcome the CRPPH telling poor mortals how to implement the newly available international standards on stakeholder involvement... for instance, in a modest radiological department in the simplest European hospital.

“Villigen is waiting for a new round!... but, please, bring Osvaldo!”

If stakeholder involvement means international consultation on the revision of the ICRP recommendations begun by Roger Clarke and pushed to its limits by Erik Holm, stakeholder involvement is a real success. This success may also be due to the nature of the CRPPH, the “reference stakeholder” in this case, but also to the judicious choice of other stakeholders by the CRPPH.

History will tell us who is right.



## 5. COMMENTARIES FROM FORMER CHAIRMEN

This Chapter is entirely devoted to testimonials, or “commentaries”, from our former Chairmen. We sought them out, usually found them, and asked them for an account of the years they spent chairing the CRPPH. In this Chapter, you will discover their outstanding memories of these years. Needless to say, these commentaries have not been edited. The style varies from one Chairman to another, fully reflecting the diversity which has so enriched the CRPPH.

### **Bo Lindell, Chairman 1972-1973**

The first Swedish representative to CRPPH was Arne Hedgran from Professor Rolf Sievert’s Institute of Radiophysics, later the National Institute of Radiation Protection (SSI). Soon after Sievert’s death in 1966 Hedgran became head of the Swedish Nuclear Inspectorate (SKI) and I succeeded him as representative to CRPPH. At that time the scientific secretary of the CRPPH was Emile Wallauschek assisted by the efficient Ms. Zabel Chéghikian.

Wallauschek was very ambitious, and Hedgran and I discussed what we saw as a problem, namely that he seemed to wish CRPPH to take up the same problems that other organizations, particularly the IAEA, were already attacking. We were pleased to see a unique OECD initiative, namely recommendations on the handling of radioactive consumer products, published in a report 1970 on the basis of information collected by a consultant, Mr. Richard Cunningham (USA), and prepared by a Group of Experts chaired by E.E. Smith (United Kingdom).

However, Arne reminds me that probably the most important achievement of the CRPPH in its early years was its educational impact. ENEA’s work should be seen in relation to the USA Atoms for Peace policy. Generous offers to Western Europe included research reactors and assistance with radionuclides, actions that required development of safety rules and professional competence. CRPPH and its predecessor consisted of people who needed to develop that competence at the national levels. The work of the committee was important to them. The main task was to provide information on international recommendations and to advise on their application, but the training in participating in international discussions was also of great value.

The meetings of the CRPPH offered also a welcome opportunity for valuable contacts between the Nordic representatives. A small restaurant at Trocadéro was a popular meeting point for dinner with Thorleif Hvinden and Kristian Koren from Norway, Mogens Faber and Per Grande from Denmark, and me from Sweden. The secretariat grew by addition of the amiable Jean-Pierre Olivier and the dynamic Oswaldo Ilari who was also for some years a member of ICRP Committee 4. A later addition, Bertrand Rügger, amused the committee by intervening at a meeting, saying “but this proposal would mean *work* for the secretariat!”

In Sweden we were quite worried about the increasing observations of high radiation levels in dwellings. When we sought advice from the committee, the first reaction was that the cause of our problem was our radium-rich building materials, and that this was of no concern for other countries. We replied that “if you measure you will also see the problem”, which turned out to be true. First in 1973 CRPPH began to deal with radiation from building materials, and the first report by an Expert Group, including the Swedish expert Gun Astri Swedjemark, was published in 1979. The full implication of the radon problem was not appreciated until after the 1982 UNSCEAR report and ICRP Publication 39 (1984) on the protection policy. CRPPH was slow but nevertheless early.

In March 1974 CRPPH had a very animated discussion of a secretariat draft of a report from NEA to OECD about the effect of radiation protection requirements on the pace of development of nuclear power. The Chair at that time, Lewis David George Richings from the United Kingdom, had a tough time to keep the committee in order. The committee permitted me to append two reservations to the revised text. One related to expressions mentioning “public opposition” and “lack of understanding” which I felt underestimated the wisdom of the public. The other related to plutonium as waste, where I felt that the risk from accumulated or recycled plutonium was not sufficiently studied.

Sweden was (and is) negative to dumping waste in the oceans. At home I was criticised for accepting that Sweden participated in sea dumping under the NEA supervision. This was a major exercise for some time, but I defended our participation because I felt that it was better to have full insight once the procedure existed.

In 1979, I was engaged in the “effluent study” operated by Bill Rowe, the American who wrote the pioneering book “The Anatomy of Risk”. Bill was an irritatingly self-assured man (to some degree rightly so). Together with Dan Beninson from Argentina we had long discussions in Parisian restaurants about the right way of dealing with very long-lived radionuclides such as Iodine-129 from the nuclear fuel cycle. The final report from the Expert Group was published in 1980.

In 1982 I was persuaded by Ilari to write a report reviewing the concept “collective dose”. The report was accepted by CRPPH in 1983 and was published as an NEA consultant report in 1985.

After I retired from my position as director of the SSI in 1982, I also left the CRPPH. Although my international engagements were mainly with ICRP and UNSCEAR, I shall always remember my years with the CRPPH with pleasure because of my rewarding contacts with so many memorable individuals on the committee and in its secretariat.

### **Gilbert Bresson, Chairman 1976-1977**

I should first of all like to congratulate you on the initiative taken by you and the members of the CRPPH to celebrate the 50<sup>th</sup> anniversary of the creation of the Committee which you chair.

Please allow me also to wish you every success in your work in 2007 which can only attest to your long and active career.

It is clear that the different successive Chairmen remember some important events which happened during their mandate. But these, together with the results achieved, essentially concern the work of a very restricted team comprising the Chairman, Vice-Chairmen and Secretariat. My participation in such work (apart from my presence as a member of the Committee for several years) was as follows: Vice-Chairman from 1973 to 1975 (Chairman Lewis David George Richings, United Kingdom), Chairman from 1976 to 1978 (Vice-Chairman Mr. Iranzo, Spain), and Vice-Chairman from 1979 to 1981 (Chairperson, Mrs. Anneli Salo, Finland).

I should like to draw attention to the very capable, steady and friendly support provided throughout those years by the Head of Division Emile Wallauschek and his deputy Jean-Pierre Olivier. With the assistance of their efficient colleagues, they ensured that preparations for meetings of the Committee, the Bureau and working groups were excellent, and I wish to assure them of all our gratitude.

During my periods of service, I must point out that the Committee had to integrate the participation of very important new members, in particular Canada, Australia, Japan and Finland. We had to be stricter in our organisation and decentralise programmes and meetings. In similar vein, the broadening of programmes, I was anxious to establish closer relations with those responsible in international bodies: Messrs. Lindell (Chairman of the ICRP), Swindel and Daw (IAEA), Beninson (UNSCEAR), Rowe (USPEA), Polvani (IRPA), Recht and van Hoeck (CEC), Tcherniline (WHO) and Helen (ILO) who were of invaluable help thanks to their active participation.

I cannot forget all the friends in the Committee who helped me during plenary sessions and working group meetings, in particular Messrs. Lafontaine, Chanteur, Coulon, Bonka, Koren, Morley, Faber, Fry, Cornelis, Vaz Careiro, Cunningham, Sataké, Hamel, Breuer and Goskel. They were responsible for preparing many proposals which often informed discussions leading to adjustments at national level, projects for studies within the ENEA, and conclusions adopted by all.

As it is difficult for me to be sure of remembering everything concerning all the years I served on the CRPPH Bureau, which in my time also included problems relating to effluents and waste, I decided to attach a short annex giving a snapshot of our work in certain fields. This document completes the more personal memories I have evoked in the preceding paragraphs.

### **Robert Fry, Chairman 1978-1980**

The late seventies did not see a great change in the activities of the CRPPH but there was perhaps a change in emphasis in the programme. Two major topics addressed during 1978-1980 were the radiological and environmental aspects of uranium mining and the safety assessment and surveillance of the dumping of radioactive wastes in the North-East Atlantic.

Somewhat paradoxically, considerable time was spent discussing consumer goods containing radioactive materials and the natural radioactivity of building materials; this was odd because the NEA Steering Committee had determined that such matters, being radiological problems not associated with the nuclear industry, were not within the remit of CRPPH. Some members of CRPPH were of the strong view that this was a mistaken policy. The 1970 "Green Book" (*Basic approaches for safety analysis and control of products containing radionuclides and available to the general public*) was considered a valuable guide but was in serious need of revision. It had been prepared and published by the ENEA and it was felt that the NEA had a responsibility to produce the update. Similar considerations applied to follow up of some of the matters raised at the NEA/CRPPH Workshop on *Problems Associated with Radiation Protection Principles for Naturally Occurring Radionuclides* (Arlington, USA, May 1978). Naturally occurring radionuclides in building materials and radon in houses were potentially two such matters. The 33<sup>rd</sup> Meeting of CRPPH was my first as Chairman and I was charged to seek clarification from NEA management of its policy on an appropriate balance between radiation protection matters of a general nature and those specifically applying to the nuclear fuel cycle. I spoke with the somewhat formidable Director-General who was sympathetic but adamant that NEA's limited resources could not be made available for non-nuclear related work. He suggested that member countries might be willing to finance such work by special arrangements, provision of

cost free experts, special purpose grants or the like. The CRPPH was not happy with this and there was serious off the record mutinous discussion of abandoning the NEA and seeking some other venue for the discussion of such matters. A submission to the Steering Committee was drafted setting down these views (without the mutinous threats) but the policy was unchanged. In the event the UK offered to co-ordinate the revision of the Green Book and submit it to the CRPPH for recommendation for publication as an NEA document. This incident was important in illustrating the uniqueness of the CRPPH. There was no other international body where representatives of national radiological organisations could gather regularly to exchange information and discuss radiation protection and its regulation, in the presence of senior representatives of ICRP, IAEA, UNSCEAR and the European Community.

A major focus of the Committee during this period was uranium mining and milling, both the assessment of radon exposure in a mining atmosphere and the long-term management of uranium mill tailings. An NEA Specialist Meeting on “Personal Dosimetry and Area Monitoring suitable for Radon and Daughter Products” had been held at Elliot Lake, Canada (October 1976) with a follow up meeting in Paris (November 1978). Questions arose as to the adequacy of area monitoring versus personal monitoring in the assessment of radon daughter exposure, and the adequacy of the Working Level Month as an index of dose; should such factors as aerosol particle size, unattached fraction, equilibrium ratio (known from lung modelling to affect the dose to critical tissues) be monitored routinely to ensure sufficient accuracy in the estimation of dose? A Group of Experts was established to critically review these matters, including different characteristics of mine and domestic atmospheres that might affect the dosimetry of radon daughter exposure in houses. Their report *Dosimetry Aspects of Exposure to Radon and Thoron Daughter Products*, NEA, Paris, 1983 was a most valuable contribution to the literature.

At its March 1979 meeting the CRPPH (jointly with the Radioactive Waste Management Committee) set up a Co-ordinating Group to initiate and supervise a comprehensive programme of studies on the management of uranium mill tailings. The programme arose out of an NEA Seminar on the *Management, Stabilisation and Environmental Impact of Uranium Mill Tailings* (Albuquerque, USA, July 1978). Two further NEA workshops on *Geomorphological Evaluation of the Long-Term Stability of Uranium Mill Tailings Disposal Sites* and *Uranium Ore Processing/Tailings Conditioning for Minimising Long-Term Environmental Problems in Tailings Disposal* (Fort Collins, USA, October 1981) helped the CRPPH further to define the study programme. A major component of the study was to examine the application of the ICRP 26 system of dose limitation to the evaluation of alternative options for tailings management to achieve optimum radiological protection in the long term. The exercise was educative but indicated, I believe, that formal monetised

optimization, based on differences in estimates of collective doses in the long term, is not likely to prove helpful in the engineering design of structures for the long-term retention of mill tailings.

An important role of the CRPPH is to keep radiological aspects of NEA activities under review. A major initiative of the OECD was the establishment, in July 1977, of “A Multilateral Consultation and Surveillance Mechanism for Sea Dumping of Radioactive Waste”. Under this Mechanism the NEA co-ordinated the disposal at sea of the waste of a number of participating countries and ensured the dumping at its North-East Atlantic site was carried out in full accordance with the London Dumping Convention (1972) and the IAEA Definition and Recommendations concerning high-level radioactive wastes unsuitable for dumping at sea formulated for the purposes of that Convention. The NEA established an expert advisory group to keep the suitability of the North-East Atlantic dump site under review. This the group did well but recognized the desirability of more reliable and comprehensive scientific data on the oceanographic and biological characteristics of the specific site to enhance the accuracy and credibility of its assessments. This led to the creation by the NEA, in 1981, of CRESP, the Co-ordinated Research and Environmental Surveillance Programme related to Sea Disposal of Radioactive Waste. The radiological aspects of the excellent reports of the review group and CRESP were reviewed by the CRPPH and its advice transmitted to the Steering Committee of NEA. The experience of the NEA in the control of dumping operations and in the oceanographic and radiological assessment of dumping sites enabled the NEA to make a major contribution to the work of the IAEA, during 1973 to 1985, associated with the formulation of the IAEA Definition and Recommendations in connection with the LDC.

### **Roger Clarke, Chairman 1987-1992**

As to the relationship between ICRP and CRPPH, well, I followed John Dunster who had chaired Committee 4 in the 4 years up to 1989. Osvaldo Ilari was the Committee 4 observer for NEA and I chaired Committee 4 from 1989 to 1993. This overlapped with my CRPPH chairmanship (1987-92).

I wanted to be more open and transparent about ICRP, so in the period when I chaired Committee 4 and CRPPH, I certainly encouraged CRPPH to discuss recent ICRP Publications, but I believe I went further in that I allowed draft Committee 4 reports to be seen at CRPPH. This meant that Osvaldo could speak at Committee 4 meetings with the knowledge that he was reflecting not just his own, but a wide consensus from the profession.

I think it was this experience, which was positive, that led me to pursue the policy of distributing draft ICRP reports for comment – initially to groups such

as CRPPH where there was a known body of expertise – and then as web access became widely available, we adopted a broader consultation.

So, I would say that my very good experiences with CRPPH helped formulate the openness which ICRP now has.

### **Serge Prêtre, Chairman 1993-1996**

#### ***Concerning “Stakeholder involvement”***

Suddenly, in the 1990s, a new expression found its way into radiation protection jargon: “stakeholder involvement”. At the beginning, I was irritated. Was it really necessary for radiation protection to address matters which belonged rather to sociology or politics? I have always lived in a country (Switzerland) known for its direct democracy. In Switzerland, “stakeholder involvement” has become part of our culture and we are used to it. Several times a year, we are asked to vote for or against extremely diverse projects such as the construction of a tunnel, the integration of foreigners, health insurance, old age pensions or accession to the European Union. Such consultations may take place at federal, cantonal or communal level and they are preceded by much public debate and discussion in the media. The “stakeholders” are the actors concerned: political parties, governments and certain interested associations, as well as every individual who feels concerned and wishes to defend his or her point of view. For me, therefore, “stakeholder involvement” has always formed part of a normal life in society. I could not understand, therefore, why radiation protection took up a subject which seemed trivial to me.

But I soon realised that democracy was so indirect in most countries that there was little room for “stakeholder involvement”. Although public debates are organised, and everyone can make comments, there is no real process for listening properly to the concerns of stakeholders. And it would still be unthinkable for stakeholders or the public to be able to vote on the decision to be taken.

So alright, let’s put “stakeholder involvement” on the agenda of radiation protection. The question which then arose was: do we want to incorporate social aspects in decisions about radiation protection or radiation protection aspects in decisions about society? That which we felt to be a radiation protection problem involving a few social implications was rather a social problem including a few radiation protection aspects. It had to be recognised that a little modesty would be welcome in a world in which radiation protection had become somewhat proud and even arrogant.

But taking the risk of exposing strictly logical radiation protection arguments to heathen influences was almost a sacrilege. Some of those of the old school

involved in radiation protection feared that “stakeholders” would introduce uncertainty, or even stupidity, into a science which prided itself on being exact. Others feared that consulting stakeholders would slow down the decision-making process to an unacceptable degree. It is true that in Switzerland, decisions on major projects take three or four times longer than in neighbouring France and that, at the end of the day, it is not always certain that a slow decision, tempered by stakeholders, is better than a quick one. No doubt it is above all more stable and robust in the long term.

In my opinion, “stakeholder involvement” is an irreversible development which is very useful in many fields in which stakeholders argue and discuss from an objective point of view. As far as we are concerned, any distortion of the process may be due either to fear or to a hidden political agenda.

In radiation protection, the old problem of the fear of radiation closely linked to the fear of cancer, influences arguments, discussions and decisions. This ancient fear has to be overcome before any real benefit from stakeholder involvement can emerge. It seems to be necessary, in a first phase of stakeholder involvement, to listen sincerely to the fears of participants and to respect them. This creates a climate of trust which sets the tone for subsequent discussion.

The other possible distortion is political in nature. Unfortunately, radiation protection is closely related, and in a somewhat perfidious manner, to nuclear energy. Some opponents of nuclear energy see radiation protection as a “safe conduct” for nuclear energy: the higher the quality of radiation protection, the more nuclear energy is viable. This association of ideas can perturb the stakeholder involvement process to a considerable degree. The second requirement for fruitful discussion consists therefore in verifying at the outset that the participants sincerely share some fundamental values.

Finally – I confess – there is nothing trivial about “stakeholder involvement”, especially when it is applied to the field of radiation protection which includes the two above-mentioned pitfalls. It was, and still remains, a “Challenge”.

But “Challenge” is a term which reminds me of another story....

### **Antonio Susanna, Chairman 1997-1999**

As a first consideration I would like to recall the discussions that we had in the Committee (that started before my chairmanship) concerning the role of CRPPH that concluded with the abandon of the preparation and consequent publication of norms and recommendations concerning radiation protection in the use of radiation sources, that were very appreciated in the radiation protection community at that time. Some of them, as for instance that on the Recommendations for Ionising Chamber smoke Detectors, to recall only one,

but there are many others as is possible to see in the NEA library, has been considered for many years a must and has been used as a fundamental reference in this field. This decision, although difficult to accept by many members, myself included (personally I started my collaboration in NEA participating in this Working Group), was in the end correct. CRPPH could not compete with other international organizations on similar subjects, even with some risks of not to be in complete harmony each other. Overlapping should always be avoided. The collaboration between international organisations is fundamental and fruitful only with well-established roles and designated responsibilities. Still now, as I can see from the structure of the Conference, this is an important issue that merits to be further focused for the benefit of radiation protection.

The choice to leave to IAEA the responsibility to carry out the recommendations and norms in the field of radiation source left to CRPPH the possibility to better focus its resources on more conceptual problems, as for instance the collective opinion about status or future perspectives that is so helpful for those that are not expert but have responsibilities in taking decisions. The collective opinion can give an idea of where we are and the future expectations, and in some cases this is very useful. This issue seems to continue with success and I believe that it is quite unique in the field of radiation protection.

Another conceptual and even practical subject that was discussed and developed around my chairmanship was the idea to involve stakeholders in the process of taking decisions (I remember the first and even the second Villigen Conference that were very successful). This is in my opinion one of the most important issues that CRPPH started and developed successfully, and if I understand correctly still now is a must. Personally I am convinced that any big project cannot be carried out without the involvement of all interested persons and that many problems can not be solved only by experts. On the contrary the participation of everybody that in some way is involved can help to solve the problems, to avoid misunderstandings and give useful suggestions even to experts.

Last but not least I would like to recall the work done with regard to the ICRP recommendations.

The International Commission on Radiological Protection has the great merit of having established the present conceptual framework of radiation protection that has been adopted all over the world. This is a unique case, compared with other cases of dangerous products. However as often happens, it is difficult to find a general consensus on all the subjects, particularly when there are opinions or single choices. Sometimes there are wide discussions on particular problems and even misunderstandings between experts. In my opinion, NEA/CRPPH, as one of the international agencies with responsibility for developing operational criteria and guidance based on ICRP recommendations, had and I believe still has the merit of collaborating very actively, starting an in-depth discussion of

the ICRP proposals, as soon as ICRP publish the first draft, providing not only criticism but practical solutions in order to be as collaborative as possible for the benefit of radiation protection.

Finally, let me recall that when I had the feeling that my nomination as a Chairman of CRPPH could be possible, I was very certain that everything would be easy, because Osvaldo Ilari was the Secretary (he was a teacher for me and he was my boss before coming to NEA). But when at the end my nomination arrived it coincided with the retirement of Osvaldo. I should confess that at that time I was worried about that. Luckily I soon discovered how quickly Ted had grown up (I met him when he first arrived in Paris, as an assistant to Osvaldo, looking for accommodation). Everybody knows that a Chairman is in the hands of the Secretary such that if a chairmanship is good, most of the credit must go to the Secretary.

### **Rick Jones, Chairman 2000-2005**

On the occasion of the 50<sup>th</sup> Anniversary of the NEA/CRPPH it is my pleasure to provide you with the following input:

#### ***Key Issue***

To assure a sound future for the CRPPH, worked with the Acting Director-General of the Nuclear Energy Agency to restore US Government funding for the CRPPH and established a program, through the publication of the CRPPH Annual Report and other initiatives that demonstrates the valuable contributions of the CRPPH.

#### ***Lasting Inheritance***

Initiated dialogue in the radiation protection profession for the need to integrate the profession and its actions into society and move the radiation protection profession to use open and inclusive decision making with stakeholders.

#### ***Lasting Memories***

It would have to be the friendships and lasting relationships that have enriched both my professional and personal life.

The many memories of lengthy discussions on critical areas of intense interest followed by excellent evenings of fine wine, food and companionship at locations around the world.

The fond memory of the pivotal meeting I held with Roger Clarke, Chairman of the ICRP, at the 2001 US Health Physics Society Meeting where I proposed and he agreed to team with the CRPPH to develop the next set of recommendations

from the ICRP using an open and inclusive process. This led to a series of international meetings (Taormina, Lanzarote, etc) and a number of CRPPH documents where open and inclusive dialogue and exchange of ideas could occur directly with the ICRP for the development of their new recommendations. This action will also result in the more timely and effective implementation of future recommendations. This has irrevocably changed the way the ICRP international principles and recommendations are created in allowing stakeholders to participate in the process and influence the final document.

Another fond memory is working with the CRPPH Secretariat to create a major presence for the CRPPH at the IRPA-11 Congress in Madrid, Spain in 2004. Through the acceptance of papers and presentations at the quadrennial meeting of IPRA in 2004 the CRPPH was able to showcase almost its entire agenda of work activities and products to further demonstrate the valuable contributions the CRPPH is making to enhance the radiation protection profession's contribution to the protection of the public, workers and the environment.

A lasting memory will also be working with Ted Lazo. His enthusiasm and untiring dedication to the CRPPH have been an inspiration to us all. Ted has been the glue that has held us all together. He has the unique talent to listen to all the competing interests and voices in the membership of the CRPPH and chart a productive path forward. We owe the success of the CRPPH to Lazo, of the Secretariat.



**POSTFACE**  
**by Jacques Lochard**  
**CRPPH Chairman 2005-**

What a trail blazed by the CRPPH, since the first efforts of the Working Party on Public Health and Safety at the end of the 1950s to the Committee's most recent accomplishments! This historical portrait by Henri Métivier, who in passing I would like to thank for his significant personal contributions to the Committee's activities, very well illustrates how the CRPPH has accompanied a half-century of nuclear energy development, maintaining the clear objective of assuring the best possible protection for human-kind and its environment.

Created in the almost contradictory context of growing concern during the cold war and an internationally shared political will to develop nuclear energy in the service of peace and economic development, the CRPPH contributed to the elaboration of modern radiological protection, in its own style and sometimes in difficult and controversial areas.

Equally active in the fields of concepts and principles, and in their regulatory and operational application, the Committee has continually accompanied nuclear energy's development, even occasionally anticipating and judiciously acting to confront situations that have been difficult, or even dramatic. I refer here to examples like CRESO and the work that was carried out to manage radioactive waste, and, of course, of the Chernobyl catastrophe that have undeniably influenced the orientations of the Committee.

The worst danger for an organisation is routine, which often brings with it corollary a tendency for self-satisfaction and even for an inward focus. From this viewpoint, the Committee has remained open-minded and listening to its member's preoccupations, and beyond this, to those of many of radiological protection's other stakeholders. The Committee has organised itself to integrate, even to anticipate, scientific, technical and even social, economic and political evolution into its work. As a result, the CRPPH has always been a trail-blazer in many areas of radiological protection, and is increasingly seen as a "ferryman" between authorities, radiological protection professionals and society.

Whether it concerns preparations for emergency response and post-accident recover, the evolution of organisations responsible for radiological protection in the face of social expectations for transparency and participation, or even the implications of the latest discoveries in radiation biology for radiological protection, to cite only three areas where the CRPPH is currently working, the Committee's objective is to establish a dialogue with all the concerned "stakeholders". How can we respond to the needs of those responsible for agriculture and food distribution? How can questions from civil society, relayed through NGOs be taken into account? How can researches be helped to orient their work to best respond to the persistent question of the biological effects of radiation? These are some of the questions that are currently focused on by the Committee's working groups, and can only be answered through open and direct exchanges among all those who are concerned and ready to dialogue.

Throughout its history, the CRPPH has carefully nurtured its close ties to those national and international organisations involved in the development of radiological protection/. In particular, throughout the past decades, and in spite of a few difficult periods discussed in the document, the Committee has become a privileged partner of the International Commission on Radiological Protection. This evolution shows the quality of thinking by the Committee and its sub-groups, but also the capacity of the CRPPH, which has more recently flourished, to mobilise authorities, experts and numerous other radiological protection stakeholders in the NEA member countries to dialogue on the future of radiological protection. I hope that the CRPPH will maintain this partnership role in the future.

What awaits the Committee in the future remains largely unpredictable, and it would be a perilous exercise to imagine its work much beyond the coming decade. However, to watch over the scientific quality of radiological protection's founding principles, to follow, and if possible deepen the opening of these principles to society, and to contribute to maintain a coherent and shared approach to radiological protection at the international level will certainly remain, following the history of the Committee's tradition, the road to travel tomorrow.

To close this brief Post-face, I would like to join the Director-General, Luis Echávarri, in warmly thanking the CRPPH member, both present and past, for their contributions to the Committee's work, and beyond, for their contributions to radiological protection. I also thank the Secretariats and their teams, who have maintained the smooth functioning of the Committee over time, in particular the current team managed by Ted Lazo. All who know Ted through meetings appreciate his good humour, his enthusiasm and his efficiency, and I of course share this appreciation. But Ted is also a professional who masters the

concepts, principles and practical aspects of radiological protection, and their scientific, technical, economic and social stakes, and who has, although less shared, a prospective vision of his evolution. In short, he perfectly incarnates the spirit of the CRPPH!



## *Annex I*

### **CRPPH PUBLICATIONS**

- 1959 Radiation Protection Norms, OECD, Paris.
- 1963 Radiation Protection Norms / *Normes de base pour la protection contre les radiations*, OECD, Paris.
- 1967 Radiation Dose Measurements: their Purpose, Interpretation and Required Accuracy in Radiological Protection / *Mesure des doses d'irradiation : buts, interprétation et précision requise en protection radiologique*, Proceedings of the Stockholm Workshop, 12-16 June 1967, OECD, Paris.
- 1968 Radiation Protection Norms / *Normes de base pour la protection contre les radiations*, OECD, Paris.
- 1968 Seminar on Marine Radioecology in co-operation with the Commissariat à l'énergie atomique / *Colloque sur la radioécologie marine avec le concours du Commissariat à l'énergie atomique*, Cherbourg, 3-6 December 1968, OECD, Paris.
- 1970 Basic Approach for Safety Analysis and Control of Products Containing Radionuclides and Available to the General Public / *Méthodes fondamentales pour l'analyse de sécurité et le contrôle des produits et appareils contenant des radionucléides mis à la disposition du public*, OECD, Paris.
- 1973 Radiation Protection Standards for Gaseous Tritium Light Devices / *Normes de radioprotection applicables aux dispositifs lumineux au tritium gazeux*, OECD, Paris.
- 1974 Monitoring of Radioactive Effluents / *Contrôle des effluents radioactifs*, Proceedings of the Karlsruhe Workshop, OECD, Paris.
- 1974 Radiation Protection Considerations on the Design and Operation of Particle Accelerators. Compilation prepared by B.G. Pettersson / *Considérations relatives à la conception et au fonctionnement des accélérateurs de particules du point de vue de la protection radiologique. Compilation établie par B.G. Pettersson*, OECD, Paris.

- 1974 Interim Radiation Protection Standards for the Design, Construction, Testing and Control of Radioisotopic Cardiac Pacemakers / *Normes provisoires de radioprotection applicables à la conception, à la construction, aux essais et au contrôle des stimulateurs cardiaques radioisotopiques*, OECD, Paris.
- 1976 Estimated Population Exposure from Nuclear Power Production and Other Radiation Sources by Edward E. Pochin / *Estimation de l'exposition de la population aux rayonnements résultant de la production d'énergie nucléaire et provenant d'autres sources par Edward E. Pochin*, OECD, Paris.
- 1977 Personal Dosimetry and Area Monitoring Suitable for Radon and Daughter Products / *La dosimétrie individuelle et la surveillance de l'atmosphère en ce qui concerne le radon et ses produits de filiation*, Proceedings of the NEA Specialist Meeting, Canada, 4-8 October 1976, OECD, Paris.
- 1977 Recommendations for Ionization Chamber Smoke Detectors in Implementation of Radiation Protection Standards / *Recommandations relatives aux détecteurs de fumée à chambre d'ionisation en application des normes de radioprotection*, OECD, Paris.
- 1977 I-129. Proceedings of an NEA Specialist Meeting / *Compte-rendu d'une réunion de spécialistes de l'AEN*, Paris, France, 13-16 June 1977, OECD, Paris.
- 1978 Management, Stabilisation and Environmental Impact of Uranium Mill Tailings / *Gestion, stabilisation et incidence sur l'environnement des résidus de traitement de l'uranium*, Proceedings of the Albuquerque Seminar, USA, OECD, Paris.
- 1979 Guidelines for Sea Dumping Packages of Radioactive Waste / *Recommandations relatives aux procédures d'exécution des opérations d'immersion de déchets radioactifs en mer*, OECD, Paris.
- 1979 Marine Radioecology, Proceedings of the 3<sup>rd</sup> NEA Seminar / *Radioécologie marine, Compte rendu du 3<sup>ème</sup> colloque de l'AEN*, Tokyo, Japan, 1-5 October 1979, OECD, Paris.
- 1979 Exposure to Radiation from the Natural Radioactivity in Building Materials / *Exposition aux rayonnements due à la radioactivité naturelle des matériaux de construction*, OECD, Paris.
- 1979 Radon Monitoring / *Surveillance du radon*, Proceedings, Paris, France, 20-22 November 1978, OECD, Paris.
- 1980 Decommissioning Requirements in the Design of Nuclear Facilities / *Déclassement des installations nucléaires : exigences à prendre en compte au stade de la conception*, Proceedings, Paris, France, 17-19 March 1980, OECD, Paris.
- 1980 CRESP – Review of the Continued Suitability of the Dumping Site for Radioactive Waste in the North-East Atlantic, OECD, Paris.

- 1980 Radiological Significance and Management of Tritium, Carbon-14, Krypton-85, Iodine-129 Arising from the Nuclear Fuel Cycle / *Importance radiologique et gestion des radionucléides Tritium, Carbone 14, Krypton 85, Iode 129 produits au cours du cycle du combustible nucléaire*, OECD, Paris.
- 1980 Borehole and Shaft Plugging / *Colmatage des forages et des puits*, Proceedings, Columbus, USA, 7-9 May 1980, OECD, Paris.
- 1981 The Environmental and Biological Behaviour of Plutonium and Some Other Transuranium Elements / *Comportement mésologique et biologique du plutonium et de certains autres éléments transuraniens*, OECD, Paris.
- 1981 Decontamination Methods as Related to Decommissioning of Nuclear Facilities / *Méthodes de décontamination relatives au déclassement des installations nucléaires*, OECD, Paris.
- 1981 Cutting Techniques as Related to Decommissioning of Nuclear Facilities / *Techniques de découpe utilisées au cours du déclassement d'installations nucléaires*, OECD, Paris.
- 1982 Uranium Mill Tailings Management / *La gestion des résidus du traitement de l'uranium*, Proceedings of two NEA Workshops, 1. Geomorphological Evaluation of the Long-Term Stability of Uranium Mill Tailings Disposal Sites and 2. Uranium Ore Processing/Tailings Conditioning for Minimising Long-Term Environmental Problems in Tailings Disposal, Colorado State University, Fort Collins, USA, 28-30 October 1981, OECD, Paris.
- 1983 CRESP – Interim Oceanographic Description of the North-East Atlantic Site for the Disposal of Low-Level Radioactive Waste / *État des connaissances océanographiques relatives au site d'immersion de déchets radioactifs de faible activité dans l'Atlantique Nord-Est*, OECD, Paris.
- 1983 Dosimetry Aspects of Exposure to Radon and Thoron Daughter Products / *Aspects dosimétriques de l'exposition aux produits de filiation du radon et du thoron*, OECD, Paris.
- 1984 Long-term Radiation Protection Objectives for Radioactive Waste Disposal / *Objectifs de protection radiologique à long terme applicables à l'évacuation des déchets radioactifs*, OECD, Paris.
- 1984 Long-term Radiological Aspects of Management of Wastes from Uranium Mining and Milling / *Aspects radiologiques à long terme de la gestion des déchets résultant de l'extraction et du traitement de l'uranium*, OECD, Paris.
- 1984 Radiation Protection: the NEA Contribution / *Radioprotection : la contribution de l'AEN*, OECD, Paris.
- 1984 CRESP – Progress Report at the End of 1983 / *Avancement des travaux à la fin de 1983*, OECD, Paris.

- 1985 Metrology and Monitoring of Radon, Thoron and their Daughter Products / *Métriologie et surveillance du radon, du thoron et de leurs produits de filiation*, OECD, Paris.
- 1985 Epidemiological Studies of Groups with Occupations Exposure to Radiation by Joan M. Davies / *Études épidémiologiques de groupes de travailleurs exposés aux rayonnements par Joan M. Davies*, OECD, Paris.
- 1985 Storage with Surveillance Versus Immediate Decommissioning for Nuclear Reactors. Proceedings of an NEA Workshop / *Stockage sous surveillance ou déclassement immédiat des réacteurs. Compte rendu d'une réunion de travail*, Paris, France, 22-24 October 1984, OECD, Paris.
- 1985 Interface questions in nuclear health and safety / *Les questions d'interface dans la sécurité nucléaire*, Proceedings of an NEA Seminar, Paris, France, 16-18 April 1985, OECD, Paris.
- 1985 Concepts of Collective Dose in Radiological Protection by Bo Lindell / *Applications du concept de dose collective en protection radiologique par le Prof. Bo Lindell*, OECD, Paris.
- 1985 A Guide for Controlling Consumer Products Containing Radioactive Substances / *Guide pour le contrôle des produits de consommation contenant des substances radioactives*, OECD, Paris.
- 1985 CRESP – Review of the Continued Suitability of the Dumping Site for Radioactive Waste in the North-East Atlantic, OECD, Paris.
- 1986 CRESP – Interim Oceanographic Description of the North-East Atlantic Site for the Disposal of Low-Level Radioactive Waste. Volume 2, OECD, Paris.
- 1986 Assessment and Recording of Radiation Doses to Workers / *Évaluation et enregistrement des doses d'irradiation reçues par les travailleurs*, OECD, Paris.
- 1986 Epidemiological Studies of General Population Groups Exposed to Low-Level Radiation by Joan M. Davies and Hanzel Inskip / *Études épidémiologiques de groupes de travailleurs exposés à des rayonnements de faible niveau*, OECD, Paris.
- 1987 The Radiological Impact of the Chernobyl Accident in OECD Countries / *Les incidences radiologiques de l'accident de Tchernobyl dans les pays de l'OCDE*, OECD, Paris.
- 1988 Epidemiology and Radiation Protection / *Épidémiologie et radioprotection*, Proceedings, Paris, France, 13-15 October 1987, OECD, Paris.
- 1988 Optimisation of Radiation Protection / *Optimisation de la protection radiologique*, OECD, Paris.
- 1988 The Biological Basis for the Control of Prenatal Irradiation, OECD, Paris.

- 1988 Public Understanding of Radiation Protection Concepts, Proceedings of an NEA Workshop / *Faire comprendre les concepts de radioprotection au public. Compte rendu d'une réunion de travail de l'AEN*, Paris, France, 30 November – 2 December 1987, OECD, Paris.
- 1988 Radioactive Materials and Emergencies at Sea by K.B. Shaw, OECD, Paris.
- 1988 Epidemiology and Radiation Protection. Proceedings of an NEA Workshop / *Épidémiologie et radioprotection. Compte-rendu d'une réunion*, Paris, France, 13-15 October 1987, OECD, Paris.
- 1988 Emergency Planning Practices and Criteria after the Chernobyl Accident. A Critical Review by G. Boeri and C. Wiktorsson, OECD, Paris.
- 1988 Gastrointestinal Absorption of Selected Radionuclides. A Report by an NEA Expert Group, OECD, Paris.
- 1988 Implications of Nuclear Safety Requirements for the Protection of Workers in Nuclear Facilities / *Répercussions des exigences de la sûreté nucléaire sur la protection des travailleurs dans les installations nucléaires*, OECD, Paris.
- 1989 Radiation Protection: Survey of Research and Development Activities Initiated after the Chernobyl Accident. Review Report by Werner Burkart, OECD, Paris.
- 1989 Nuclear Accidents: Intervention Levels for Protection of the Public / *Accidents nucléaires : niveaux d'intervention pour la protection du public*, OECD, Paris.
- 1989 The Influence of Seasonal Conditions on the Radiological Consequences of a Nuclear Accident / *L'influence des conditions saisonnières sur les conséquences radiologiques d'un accident nucléaire*, Proceedings, Paris, France, 21-23 September 1988, OECD, Paris.
- 1989 Emergency Planning in Case of Nuclear Accident: Technical Aspects / *La planification d'urgence en cas d'accident nucléaire : aspects techniques*, Proceedings of a joint NEA/CEC Workshop, Brussels, 27-29 June 1989. Japanese translation exists. OECD, Paris.
- 1989 ISOE – Proposal for an International System Information on Occupational Exposure in Nuclear Power Plants, OECD, Paris.
- 1989 CRESO – Interim Oceanographic Description of the North-East Atlantic Site for the Disposal of Low-Level Radioactive Waste. Volume 3, OECD, Paris.
- 1990 Occupational Dose Control in Nuclear Power Plants: An Overview / *Le contrôle des doses d'irradiation professionnelle dans les centrales nucléaires : rapport de synthèse*, OECD, Paris.

- 1990 Protection of the Population in the Event of a Nuclear Accident. A Basis for Intervention / Protection de la population en cas d'accident nucléaire : la conception des interventions, OECD, Paris.
- 1990 Emergency Preparedness for Nuclear-Powered Satellites, Stockholm, Sweden, 24-26 April 1989, OECD, Paris.
- 1990 CRESO – Activity Report 1986-1990. Accompanied by a summary in French, OECD, Paris.
- 1991 Influence of Seasonal and Meteorological Factors on Nuclear Emergency Planning. Report by a Group of Consultants, OECD, Paris.
- 1991 Disposal of High-Level Radioactive Wastes – Radiation Protection and Safety Criteria, Proceedings of an NEA Workshop, Paris, France, 5-7 November 1990, OECD, Paris.
- 1991 The Interface in Nuclear Safety and Public Health / L'interface entre la sûreté nucléaire et la santé publique, Proceedings of the 2<sup>nd</sup> NEA Colloquium, Paris, France, 12-13 September 1990, OECD, Paris.
- 1991 Énergie nucléaire : communiquer avec le public, OECD, Paris.
- 1993 Off-site Nuclear Emergency Exercises / *Exercices d'application hors site des plans d'urgence en cas d'accident nucléaire*, Proceedings of an NEA workshop, The Hague, Netherlands, 12-15 November 1991, OECD, Paris.
- 1993 Radiation Protection on the Threshold of the 21<sup>st</sup> Century / *La radioprotection au seuil du 21<sup>ème</sup> siècle*, Proceedings, 11-13 January, OECD, Paris.
- 1993 Work Management to Reduce Occupational Doses. Proceedings of an NEA Workshop / *Gestion du travail pour réduire la radioexposition professionnelle*, Proceedings, Paris, France, 4-6 February 1992, OECD, Paris.
- 1993 Information to the Medical Profession on Ionising Radiation / *Information du corps médical et rayonnements ionisants*, Seminar, Grenoble, France, 2-4 September 1992, OECD, Paris.
- 1993 ISOE – Occupational Exposures at Nuclear Power Plants in OECD Countries – 1969-1991. First Annual Report of the ISOE Programme, OECD, Paris.
- 1994 Radiation Protection: Today and Tomorrow. A Collective Opinion by the NEA CRPPH / *La radioprotection : aujourd'hui et demain*, OECD, Paris.
- 1994 Probabilistic Accident Consequences Assessment Codes. Second International Comparison. Overview Report. A joint report with the Commission of the European Communities / *Programmes d'évaluation probabiliste des conséquences d'accidents. Deuxième comparaison internationale. Rapport de synthèse*, OECD, Paris.

- 1994 Probabilistic Accident Consequences Assessment Codes. Second International Comparison. Technical Report. A joint report with the Commission of the European Communities, OECD, Paris.
- 1994 ISOE – Occupational Exposures at Nuclear Power Plants in OECD Countries – 1969-1992. Second Annual Report of the ISOE Programme, OECD, Paris.
- 1995 The Implementation of Short-term Countermeasures After a Nuclear Accident. Stable Iodine, Sheltering and Evacuation. Proceedings, Stockholm, 1-3 June 1994, OECD, Paris.
- 1995 INEX 1 – An International Nuclear Emergency Exercise / *Exercice international d'urgence en cas d'accident nucléaire*, OECD, Paris.
- 1995 ISOE – Occupational Exposures at Nuclear Power Plants. 1969-1993. Third Annual Report of the ISOE Programme, OECD, Paris.
- 1995 The Meaning and Application of the Concept of Potential Exposure, OECD, Paris.
- 1996 Chernobyl – Ten Years On: Radiological and Health Impact. An appraisal by the NEA CRPPH / *Tchernobyl – Dix ans déjà : impact radiologique et sanitaire. Évaluation établie par le CRPPH de l'AEN*, November 1995, OECD, Paris.
- 1996 CRESO – Co-ordinated Research and Environmental Surveillance Programme Related to Sea Disposal of Radioactive Waste. CRESO Final Report 1981-1995. Accompanied by a summary in French, OECD, Paris.
- 1996 Radiation Protection: Applications, Risks and Protection / *Le point de vue sur les rayonnements : applications, risques et protection*, OECD, Paris.
- 1996 ISOE – Occupational Exposures at Nuclear Power Plants 1969-1994. Fourth Annual Report of the ISOE Programme, OECD, Paris.
- 1997 Agricultural Aspects of Nuclear and/or Radiological Emergency Situations / *Les aspects agricoles des situations d'urgence nucléaire et/ou radiologique*, Workshop, Fontenay-aux-Roses, France, 12-14 June 1995, OECD, Paris.
- 1997 Work Management in the Nuclear Power Industry, OECD, Paris.
- 1997 CRPPH Sponsored Survey of University Level Education Programmes in Radiation Protection, OECD, Paris.
- 1997 ISOE – Occupational Exposures at Nuclear Power Plants - 1969-1995. Fifth Annual Report of the ISOE Programme, OECD, Paris.
- 1998 Developments in Radiation Health Science and Their Impact on Radiation Protection / *Évolution de radiobiologie et de radiopathologie : répercussions sur la radioprotection*, OECD, Paris.
- 1998 Nuclear Decommissioning. A proposed Standardised List of Items for Costing Purposes: an Interim Technical Document, OECD, Paris.

- 1998 ISOE – Occupational Exposures at Nuclear Power Plants. 6<sup>th</sup> Annual Report of the ISOE Programme – 1986-1996, OECD, Paris.
- 1998 The Societal Aspects of Decision Making in Complex Radiological Situations, Workshop Proceedings, Villigen, Switzerland, 13-15 January 1998, OECD, Paris.
- 1998 Second International Nuclear Emergency Exercise - INEX 2: Final Report of the Swiss Regional INEX 2 Exercise, OECD, Paris.
- 1998 Nuclear Emergency Data Management. Proceedings, Zurich, Switzerland, 13-14 September 1995, OECD, Paris.
- 1999 Joint NEA/IAEA/EC Workshop on the Regulatory Aspects of Decommissioning, OECD, Paris.
- 1999 ISOE – Occupational Exposures at Nuclear Power Plants. 7<sup>th</sup> Annual Report of the ISOE Programme, 1997, OECD, Paris.
- 1999 ISOE – Occupational Exposures at Nuclear Power Plants. 8<sup>th</sup> Annual Report of the ISOE Programme, 1998, OECD, Paris.
- 2000 Radiological Impacts of Spent Nuclear Fuel Management Options: A Comparative Study / *Les incidences radiologiques des options de gestion du combustible nucléaire usé : une étude comparative*, OECD, Paris.
- 2000 A Critical Review of the System of Radiation Protection – First Reflections of the OECD Nuclear Energy Agency's CRPPH / *Analyse critique du système de protection radiologique. Réflexions préliminaires du CRPPH*, OECD, Paris.
- 2000 Monitoring and Data Management Strategies for Nuclear Emergencies / *Stratégies de surveillance et de gestion de données dans les urgences nucléaires*, OECD, Paris.
- 2000 Methodologies for Assessing the Economic Consequences of Nuclear Reactor Accidents / *Méthodes d'évaluation des conséquences économiques des accidents nucléaires*, OECD, Paris.
- 2000 ISOE – Occupational Exposures at Nuclear Power Plants. 9<sup>th</sup> Annual Report of the ISOE Programme, 1999, OECD, Paris.
- 2000 INEX 2 – Second International Nuclear Emergency Exercise. Final Report of the Finnish Regional Exercise / *Deuxième exercice international d'urgence. Rapport final de l'exercice régional finlandais*, OECD, Paris.
- 2001 ISOE – Occupational Exposures at Nuclear Power Plants - 10<sup>th</sup> Annual Report of the ISOE Programme, 2000, OECD, Paris.
- 2001 Policy Issues in Radiological Protection Decision Making / *La prise de décision en radioprotection : domaines d'action des pouvoirs publics*, Summary Report of the 2<sup>nd</sup> Villigen Workshop, Switzerland, OECD, Paris.

- 2001 INEX 2 – Second International Nuclear Emergency Exercise. Final Report of the Hungarian Regional Exercise / *Deuxième exercice international d'urgence. Rapport final sur l'exercice régional hongrois*, OECD, Paris.
- 2001 INEX 2 – Second International Nuclear Emergency Exercise. Final Report of the Canadian Regional Exercise / *Deuxième exercice international d'urgence. Rapport final de l'exercice régional canadien*, OECD, Paris.
- 2001 Experience from International Emergency Exercises. The INEX 2 Series / *Enseignements des exercices internationaux d'urgences nucléaire. Exercices de la série 2*, OECD, Paris.
- 2002 ISOE – Occupational Exposures at Nuclear Power Plants – 11<sup>th</sup> Annual Report (2001), OECD, Paris.
- 2002 Better Integration of the Radiation Protection in Modern Society: Workshop Proceedings, Villigen, Switzerland, 23-25 January 2001, OECD, Paris.
- 2002 ISOE – Information System on Occupational Exposure. Ten years of Experience, OECD, Paris.
- 2002 The Way Forward in Radiological Protection. An Expert Group Report / *Vers un nouveau système de protection radiologique. Rapport d'un groupe d'experts*, OECD, Paris.
- 2002 Chernobyl: Assessment of Radiological and Health Impacts: 2002 Update of Chernobyl: Ten years On / *Tchernobyl : Évaluation des incidences radiologiques et sanitaires. Mise à jour 2002 de Tchernobyl : 10 ans déjà*, OECD, Paris.
- 2003 Possible Implications of Draft ICRP Recommendations, OECD, Paris.
- 2003 Radiological Protection of the Environment: Summary Report of the Issues / *Protection radiologique de l'environnement : rapport de synthèse des questions-clés*, OECD, Paris.
- 2003 Radiological Protection of the Environment: the Path Forward to a New Policy? Proceedings, Taormina, Italy, 12-14 February 2002, OECD, Paris.
- 2003 A New Approach to Authorisation in the Fields of Radiological Protection: The Road Test Report, OECD, Paris.
- 2003 Short-term Countermeasures in Case of a Nuclear or Radiological Emergency / *Contre-mesures à court terme en cas d'urgence nucléaire ou radiologique*, OECD, Paris.
- 2003 Effluent Release Options from Nuclear Installations. Technical Background and Regulatory Aspects / *Options de rejet des effluents des installations nucléaires. Contexte technique et aspects réglementaires*, OECD, Paris.

- 2003 ISOE - Occupational Exposure Management at Nuclear Power Plants. Third ISOE European Workshop, Portoroz, Slovenia. 17-19 April 2002, OECD, Paris.
- 2003 The Future Policy for Radiological Protection, Workshop Proceedings, Lanzarote, Spain, 2-4 April 200, OECD, Paris.
- 2004 ISOE - Occupational Exposures at Nuclear Power Plants – 12<sup>th</sup> Annual Report (2002).
- 2004 The Future Policy for Radiological Protection. A Stakeholder Dialogue on the Implications of the ICRP Proposals / *Politique future en matière de protection radiologique. Dialogue avec les parties prenantes sur les répercussions des propositions de la CIPR*, Summary Report, Lanzarotte, Spain – 2-4 April 2003, OECD, Paris.
- 2004 Evolution of the System of Radiological Protection: Asian Conference, Tokyo, Japan, 24-25 October 2002, OECD, Paris.
- 2004 Stakeholder Participation in Radiological Decision Making: Processes and Implications: 3<sup>rd</sup> Villigen Workshop, Switzerland, 21-23 October 2003, OECD, Paris.
- 2004 Stakeholder Participation in Radiological Decision Making: Processes and Implications: Summary Record of the 3<sup>rd</sup> Villigen Workshop, Switzerland, 21-23 October 2003, OECD, Paris.
- 2005 Occupational Exposure Management at Nuclear Power Plants: Fourth ISOE European Symposium, Lyon (France), 24-26 March 2004, OECD, Paris.
- 2005 Evolution of the System of Radiological Protection: Second Asian Regional Conference, Tokyo, Japan, 28-29 July 2004, OECD, Paris.
- 2005 ISOE – Occupational Exposures at Nuclear Power Plants – 13th Annual Report of the ISOE Programme, 2003, OECD, Paris.
- 2005 Optimisation in Operational Radiological Protection. A Report by the Working Group on Operational Radiological Protection of the Information System on Occupational Exposure, OECD, Paris.
- 2006 The Process of Regulatory Authorities. A Report by the CRPPH Expert Group on the Regulatory Application of Authorisation / *Le processus d'autorisation réglementaire. Rapport du Group d'experts du CRPPH sur l'application réglementaire de l'autorisation*, OECD, Paris.
- 2006 Stakeholders and Radiological Protection: Lessons from Chernobyl 20 Years After / *Société civile et radioprotection : enseignements de Tchernobyl : 20 ans après*, OECD, Paris.
- 2006 ISOE – Occupational Exposures at Nuclear Power Plants. Fourteenth Annual Report of the ISOE Programme, 2004, OECD, Paris.
- 2007 Environmental Radiological Protection in the Law: a Baseline Survey / *Le Droit de la protection radiologique de l'environnement: état des lieux*, OECD, Paris.

- 2007 Radiological Protection in Today's World: Towards Sustainability / *La radioprotection sur la voie du développement durable*, OECD, Paris.

### **General distribution**

- 1995 The Meaning and Application of the Concept of Potential Exposure – December 1995. A Report from the CRPPH/CSNI/CNRA/RWMC Expert Group, OECD, Paris.
- 2000 A Critical Review of the System of Radiation Protection, May 2000, OECD, Paris.
- 2000 A Comparison of the Carcinogenic Risk Assessment and Management of Asbestos, Nickel and Ionising Radiation, November 2000, OECD, Paris.
- 2001 CRPPH Sponsored Survey of University Level Education Programmes in Radiation Protection, OECD, Paris.

### **Publications with other International Organisations**

- 1986 International Intercalibration and Intercomparison of Radon, Thoron and Daughters Measuring Equipment – Part I: Radon Measurement, OECD, Paris.
- 1988 International Intercalibration and Intercomparison of Radon, Thoron and Daughters Measuring Equipment – Part II: Radon Daughter Measurement, OECD, Paris.
- 1989 The Influence of Seasonal Conditions on the Radiological Consequences of a Nuclear Accident / *L'influence des conditions saisonnières sur les conséquences radiologiques d'un accident nucléaire*, Workshop, Brussels, Belgium, 27-29 June 1989, OECD, Paris.
- 1992 INES – The International Nuclear Event Scale – User's Manual. Jointly prepared by the IAEA and the NEA, OECD, Paris.
- 1993 Basic Safety Standards.
- 1996 Considerations on the Concept of Dose Constraint.



## *Annex 2*

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