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CONTRÔLE

AUTORITÉ DE SÛRETÉ NUCLÉAIRE REVIEW

LES DOSSIERS

AUTORITE DE SURETE NUCLEAIRE

ASN report: nuclear safety and radiation protection in France in 2003, abstracts

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RÉPUBLIQUE FRANÇAISE

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Paris, february 20th of 2004

The year 2003 saw no major events affecting nuclear safety, despite a number of alerts, in particular due to exceptional meteorological conditions. It saw the Nuclear Safety Authority devote considerable efforts to developing its radiation protection activities. 2003 was also marked by the effective implementation or the announcement of major decisions affecting the nuclear industry and concerning nuclear safety and radiation protection.

Facilities subject to the control of the Nuclear Safety Authority experienced no worthly of note events in 2003. We could even say that the year saw few incidents classified at significant levels on the INES scale. This overall tendency should not however mask a number of trends which call on us to maintain a high level of vigilance.

First of all, the expanded scope of responsibility of the Nuclear Safety Authority now leads it to look at new types of incidents, occurring in places which hitherto were not within its remit: thus significant exposure of two operators from a control agency was detected during the use of gammagraphs in non-nuclear installations such as refineries. Similarly, a leak of radioactive waste from a hospital pipe and the destruction of a radioactive control source by a maintenance error in a brewery are both incidents which fortunately had no effect on the persons involved, but do reveal the potential dangers that exist for a large number of radioactivity users.

One must also point out that a closer examination of the design and operating conditions of existing installations, the situation of which had been felt to be on the whole satisfactory, can lead to the discovery or re-discovery of risks hitherto underestimated. This is in particular what happened with re-assessment of the seismic risk for the power plants operated by EDF, or with re-examination of the possibility of sump clogging in the reactor buildings in these same plants in the event of a primary leak, which led to the declaration of a level 2 incident on the INES scale and the announced plan for modification of all the reactors. Bringing such risks to light is not in itself a sign of falling safety levels, but rather a means of taking safety forwards by coming back to problems which had incorrectly been considered resolved. This can only encourage the Nuclear Safety Authority to continue with its program of systematic re-assessment of facility safety at intervals which are normally of ten years, in order to highlight and insofar as is possible deal with any of the more shadowy areas in the existing safety files.

Finally, it is striking to note that during the course of 2003 alone, two types of exceptional meteorological conditions affected the nuclear facilities: heat wave and drought in the summer, then flooding in the autumn. In the first case, safety was at no point compromised, in that no safety-related operating parameter in the facilities was reached or exceeded, but the temperature of the discharges, which can affect the environment, temporarily had to be modified to enable the plants to continue to operate and avoid electrical power cuts. In the second case, we were able to see that the work done on the flooding risk following the late 1999 episode at the Le Blayais plant has borne fruit, since no nuclear facility was actually flooded. However, the exceptional flowrates of the rivers and the material carried by them lead to fouling of the water intakes at two plants, causing EDF to effect preventive shutdown of four reactors. The possibility of such climatic episodes becoming more frequent in the coming years,

means that we have to place yet more emphasis on prevention.

Overall, nuclear power plant operations by EDF offer a mixed picture for 2003. Progress has been achieved in working methods regarding staff radiation protection, in particular during maintenance work, and results are improving. From the safety viewpoint, however, greater strictness and thoroughness is required in day to day operations.

Special mention must be made of the operating conditions of the CIS bio International establishment. This establishment, which fabricates short-lived radioactive sources designed for medical and pharmaceutical applications, is hosted in the Saclay Centre by the CEA, which remains the de-jure operator, even if the Schering international pharmaceutical group is now really the owner. The CIS bio establishment at Saclay drew attention to itself throughout 2003, with a series of incidents, each of which was not in itself particularly serious, but their repetition indicates a lack of compliance with the requirements of the Nuclear Safety Authority and the general principles of safety and radiation protection. Despite more frequent controls on-site, the situation failed to improve by the end of the year. Considerable efforts will be necessary if this establishment is to continue to operate, given the fact that it is particularly useful for nuclear medicine activities in France and abroad.

2003 was also a year that saw the Nuclear Safety Authority increase its activities in the field of radiation protection. Work on drafting regulations continued in this area, with the aim of completing transposition of the European directives as rapidly as possible. After the 2001 ordinance and the decree on the protection of populations in 2002, the remaining three decrees were signed in March 2003, concerning patient protection, worker protection and radiological emergency response respectively. These decrees themselves entail several dozen implementing orders, which the Nuclear Safety Authority is now in the process of preparing, whenever necessary with the help of the other ministries concerned, in particular the Ministry for Labour. Some of these ministerial orders have already been published.

More specifically with regard to patient protection, this regulatory work was accompanied by preparation of a plan of action which aims to set up and develop an exposure surveillance program. This plan, which is coordinated by the Nuclear Safety Authority, will be the first step towards creating a system designed to collate all information needed to ascertain patient exposure, thus giving a clearer picture of the effectiveness of the optimisation work done in collaboration with the sector professionals, and enabling epidemiological studies to be conducted, targeted on the patient groups subjected to the highest doses.

Much has been done to better define and organise the actions of the Nuclear Safety Authority in the field of radiation protection and several working groups were active during the course of 2003: one advisory committee, chaired by Professor Vrousos, gave consideration to radiation protection priorities; another followed up the lessons learned from the « reconnaissance mission » conducted in two pilot regions, Rhône-Alpes and Basse-Normandie, to identify stakeholders and contacts and prepare for a radiation protection inspection; two committees were devoted to regional services, one looking into the role of the Regional and Departmental Directorates of Health and Social Affairs, the other into the internal organisation of the Regional Directorates for Industry, Research and the Environment, with regard to controlling radiation protection.

Based on the conclusions of this work as a whole, I believe that in 2004, true radiation protection inspections could be launched, region by region, with the aim of setting up an effective system covering the entire country within the next 5 years. On this basis, I also believe that during the course of 2004, it will

Information and documentation center of ASN

work: at a European level, the draft directives already mentioned concerning nuclear safety and radioactive waste respectively, are already under preparation. In France, a bill concerning nuclear transparency and safety, now a part of the energy bill, should increase transparency requirements, renovate the regulatory framework governing basic nuclear installations, and create a true system of radiation protection inspections. The Nuclear Safety Authority, which helped draft these texts, will naturally be involved in finalising and implementing them. The economic context, with the nuclear operators increasingly faced with competition, is also experiencing considerable upheaval; the possible change in the status of EDF and the partial sell-off of AREVA - the parent company of the operator COGEMA and manufacturer Framatome - are being closely looked at by the Nuclear Safety Authority.

Alongside the Nuclear Safety Authority, the Institute for Radiation Protection and Nuclear Safety (IRSN) which is its main technical support body, also experienced significant change. I have always felt that the presence of a robust and competent assessment body alongside the regulatory Authority was a guarantee of our joint efficiency. 2003 saw the IRSN finally given a Chairman, a Board and a Director General, enabling it to define a new organisation, ideally suited to the duties entrusted to it. I am pleased to note that these major changes were implemented with no significant interruption in the provision of the evaluation and appraisal services it provides to the Nuclear Safety Authority. This new organisation was also put in place in parallel with a debate concerning extension of these services to new sectors, in particular that of radiation protection.

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Everything I have just mentioned would of course be impossible without a rise in workforce numbers. The Government had accepted the principle of creating 225 jobs, including 150 radiation protection inspectors, and has taken steps in this direction, leading to the creation of 22 of these high-priority posts in 2003, with a further 22 in 2004. I am pleased to see these positions being effectively created and the Nuclear Safety Authority, which is already a melting-pot of various cultures, from the engineering background of nuclear safety control officers to the medical background of those involved in radiation protection problems, has shown itself capable of integrating persons offering the most original profiles, and hired on a contractual basis. This marriage of cultures, which is essential to our many and varied duties, is in my opinion one of the Nuclear Safety Authority's greatest successes.

André-Claude LACOSTE

MAIN TOPICS IN 2003

1 – Nuclear Safety and Transparency bill

2 – The safety of the EPR reactor project

3 – Radiation protection priorities

4 – Towards radiation protection inspection

5 – Action plan for monitoring patient exposure to ionising radiation

6 – The summer 2003 heat wave and drought and nuclear power plant operations

7 – The national plan for radioactive waste management

8 – The future of high-level long-lived waste

9 – The european nuclear package

1 Nuclear Safety and Transparency bill

The Nuclear safety and transparency bill, tabled before the Senate on 18 June 2002 by the Minister for Ecology and Sustainable Development was, with a few amendments, incorporated into the guideline energy bill, of which it now constitutes section V.

Following the report submitted by the deputy of Meurthe-et-Moselle, Jean-Yves Le Déaut, to the Prime Minister on 7 July 1998, « on the French system of radiation protection, control and nuclear safety » it will give a general legislative framework for nuclear activities as defined by the health code. It aims to prevent the hazards and problems for man and the environment linked to nuclear activities, and to increase available information on the risks associated with these activities and the steps taken to prevent them.

Basic nuclear installations classified as secret by the Prime Minister, defence-related facilities and the transport of radioactive and fissile materials for military purposes are, in the same way as the facilities and activities covered by this law, subject to an obligation of information and control. This obligation is implemented in conditions laid down by decree of the Conseil díEtat, in such a way as to reconcile the principles of the organisation of nuclear safety and radiation protection with the requirements of national defence.

1 - The bill gives the key definitions and main principles to be implemented with regard to nuclear activities

It defines nuclear security, nuclear safety and protection against ionising radiation, while recalling the role of the State, which determines nuclear safety and radiation protection policy, organises and implements control in these fields and guarantees information of the public and transparency.

It states the principles to be adhered to in the performance of nuclear activities: the principle of precaution, the principle of preventive action and the principle of polluter-pays, provided for in the Environment Code. It stipulates that the prime responsibility for the safety of a nuclear facility lies with the operator of said facility.

It also states that the general principles of radiation protection (principles of justification, optimisation and limitation) apply to all nuclear activities.

2 - The bill organises nuclear transparency

The Government's duties in the field of informing the public are clarified: it is responsible for informing the public concerning the nuclear safety and radiation protection control procedures and results and presents to Parliament the report produced by the Nuclear Safety Authority every year.

The right to access the information held by the operators of nuclear facilities and persons responsible for nuclear transports is created. This innovation distinguishes the nuclear industry from other industrial activities, which are not subject to such an obligation of transparency.

On each site hosting a basic nuclear installation (BNI), a local information committee (CLI) is set up. This committee is created at the initiative of the General Council. It may take the form of an association. Its general role is one of information and debate. It may call on experts, and have environmental measurements or analyses conducted. It is financed by allocation of a part of the revenue from the BNI tax and may receive public subsidies. A CLI federation is also created.

The High Committee for nuclear safety transparency is the guarantor of access to information and the principles of transparency laid down in the bill. It takes part in producing and distributing information and may be referred to by the Government, the Chairman of the Parliamentary Office for the assessment of scientific and technological options, the CLI chairmen and the BNI operators, with regard to any reform of a general nature such as to improve nuclear safety, radiation protection and control.

It comprises members appointed by decree for a five year period (members of Parliament, CLI and association representatives, the Chairman of the Administrative Documents Access Commission (CADA), operator and trade union representatives).

3 - The bill revises the administrative framework for nuclear facilities, clarifies and reinforces the system of controls and applicable penalties

A special framework is set up for large nuclear facilities, known as « basic nuclear installations » (BNI). This framework applies to nuclear reactors, industrial and commercial enrichment, fabrication and processing facilities, nuclear fuel storage and disposal facilities, and installations containing radioactive or fissile materials, according to thresholds set by decree of the Conseil d'Etat, and certain particle accelerators.

In its broad outlines, the authorisation framework reuses the system contained in decree n∞†63-1228 of 11 December 1963. It also includes new provisions such as the creation of a system of public utility constraints which maintain a protective perimeter around existing sites and the land occupied by the facilities after their dismantling, and such as the new obligation on the operator to produce a financial bond designed to cover the cost of dismantling the facility and cleaning up the site.

The nuclear safety inspectors, appointed by the administrative authority, are responsible for policing the facilities. They have the power to conduct legal investigations into violations brought to their attention.

The violations are of the same type as those covered by other risk prevention laws, in particular those of the Environment Code for classified installations. In terms of administrative and penal sanctions, the text takes account of the specific nature of the risks inherent in BNIs and the transport of radioactive materials. If necessary, the facility or installation may be closed or its activities suspended.

The provisions applicable in the event of a nuclear or other incident or accident, entail a general obligation to inform the authorities.

4 - The bill sets up a new framework for specialised radiation protection inspection

These provisions reinforce the current system, in particular in care establishments and research centres using radioactive sources. They supplement the nuclear safety and radiation protection control reforms and the reorganisation of the services in charge of this control, which took place in 2002.

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On 7 November 2003, the Minister for Ecology and Sustainable Development announced that these legislative provisions were available for consultation on the web site of the Directorate General for Nuclear Safety and Radiation Protection and on that of the Ministry for Ecology and Sustainable Development.

The bill should be tabled before Parliament in 2004.

2 The safety of the EPR reactor project

The specified safety goals

Even if the safety of the reactors today operating in France is felt to be satisfactory, the ASN believes that any plan for a new generation of nuclear power plants must attain a higher level of safety.

Thus in 1993, the French and German nuclear safety authorities jointly set reinforced safety goals for the planned EPR (European Pressurized water Reactor), as part of an evolutionary concept drawing on experience feedback from the reactors in service:

• the number of incidents will have to fall, in particular by improving systems reliability and by taking greater account of human factors related aspects;

• the risk of core meltdown must be reduced still further;

• any radioactive releases which could result from all and any conceivable accidents must be minimised;

- for accidents without core meltdown, measures to protect the populations living in the vicinity of the damaged plant should not be necessary (no evacuation or sheltering);

- for accidents with low-pressure core meltdown, measures to protect the populations must be highly limited in terms of scale and duration (no permanent rehousing, no emergency evacuation outside the immediate vicinity of the facility, limited sheltering requirements, no long-term restrictions on consumption of foodstuffs);

- accidents liable to lead to significant radioactive releases, in particular accidents with high-pressure core meltdown, must for their part be « practically eliminated ».

Finally, owing to operating experience acquired from reactors in service, the ASN also asked that the operating constraints and human factors related aspects be taken into account from the design stage onwards, particularly in order to improve worker radiation protection, limit radioactive discharges and the quantity and activity of the waste produced.

Examples of improvements resulting from the EPR project

These goals led the designers of the reactor to propose a certain number of safety improvements, including the following examples:

- with regard to reducing the risk of accidents, significant strengthening of the civil engineering work on the nuclear island to offer greater protection against external hazards, including earthquakes, industrial explosions and aircraft crashes (on this point, studies are currently under way to improve reactor protection against events

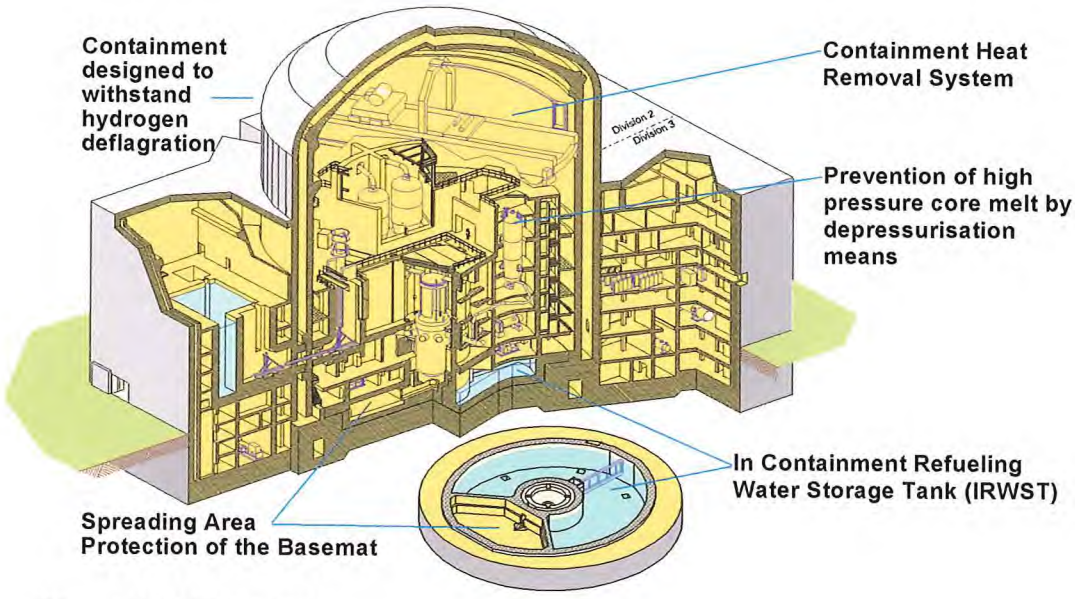


Diagram of an EPR type reactor

such as those that occurred in the United States on 11 September 2001);

- with regard to designing-in serious accident management, positioning under the reactor of a device specially designed to catch, contain and cool the molten core;

- with regard to taking account of human factors in accident management, the design should leave the operators greater time before their intervention becomes necessary.

The EPR project: an opportunity for harmonising safety approaches among European countries

From the outset of the project, the French and German nuclear safety authorities and their technical support organizations and advisory committees, worked in close collaboration to determine the project's safety requirements and examine the proposed design options.

Although scaled down since the German Government's 1998 decision to abandon nuclear power, this collaboration was maintained and certain German experts continue to take part in technical evaluation of the project.

Furthermore, the Finnish electricity production utility TVO, after issuing an international call for bids for the construction of a new reactor, announced its intention to ask the Finnish nuclear safety authority (STUK) for a license for an EPR reactor with the aim of starting work in early 2005. In this context, the Finnish and French nuclear safety authorities naturally decided to work together and harmonise their stances as far as possible.

The position of the French Nuclear Safety Authority

After examining the major safety options for the project presented by the builder, the French Nuclear Safety Authority considers that on the whole they meet the goals defined in 1993.

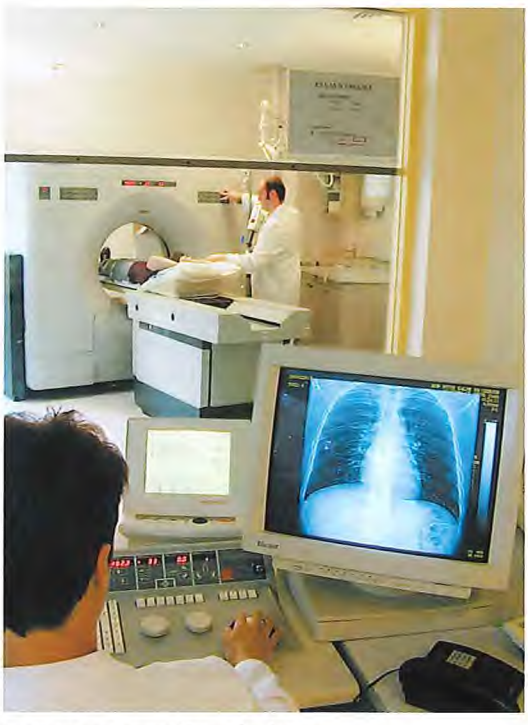
The ASN also asked that the new design requirements for the EPR project and the results of the R&D programs be used as comparative data for the periodic safety reviews of the 900 MWe reactors, on the occasion of their third ten-yearly inspection.

3 Radiation protection priorities

The role of the advisory committee

Under the authority of the Minister for Health, the Directorate General for Nuclear Safety and Radiation Protection is responsible for drafting and implementing Government policy in the field of radiation protection, defining the main guidelines for the long-term actions of the Government's departments over the coming years, in particular those concerning inspection.

To establish these guidelines and then define the corresponding action plans, the DGSNR wished to obtain opinions and proposals from a group of personalities of recognised expertise in the field of radiation protection. A letter was therefore sent on 23 December 2002 to Professor Constantin Vrousos, chairman of the committee, asking him to select the priority radiation protection fields for which action is required, taking account both of the health aspects and how they are perceived by the various components of society. The letter stressed the benefit to be gained from polling the widest possible variety of opinion, whether specialised or not in this field, in particular opinions from outside the radiation protection world, for example through interviews with elected, media and association representatives. Taking account of the priorities adopted in other European countries was also mentioned.



Examen scanographique du thorax

Composition of the advisory committee

Chairman: M. Constantin Vrousos, Oncology-radiotherapy, University hospital, Grenoble.

Committee members

- Mr Bernard Aubert (medical physics, Institut Gustave Roussy then IRSN)
- Mr Dietrich Averbecq (radiobiology, National Centre for Scientific Research (CNRS))
- Mr Pierre Barbey (biochemistry, Caen University)
- Mr Bernard Basse-Cathalinat (nuclear medicine, University hospital, Bordeaux)
- Mr Yves-Sébastien Cordoliani (medical imaging, Val-de-Grâce Hospital)
- Mr Jean-Michel Giraud (occupational medicine, French Atomic Energy Commission)
- Mr Michel Jouan (epidemiology/risk evaluation, Health Monitoring Institute)
- Mr Eric Lartigau (radiotherapy, Centre Oscar Lambret, Lille)
- Mr Jacques Lochard (Nuclear protection evaluation research centre)
- Mr Serge Prêtre (Swiss expert)

The advisory committee recommendations

This task mobilised the group for 12 months, involving 16 meetings and 38 hearings. The experience of Switzerland, the United Kingdom and Sweden was also analysed, with a delegation sent to the National Radiation Protection Board (NRPB) and the Swedish radiation protection authority (SSI).

The committee's report was submitted to the DGSNR in early February 2004 and can be consulted on the ASN's website (asn.gouv.fr). This report comprises recommended actions, with the priority actions being identified, and includes the reports of all the hearings conducted.

Subsequent action taken by the ASN

Further to these recommendations, the ASN has already decided that fresh actions will be need-

Extrait de la synthèse du rapport « Priorités en radioprotection »

... guidelines for fundamental subjects...

Adhering to the principle of precaution, the « Radiation Protection Priorities » group recommended that the current radiation protection debate among the experts be focused on reducing the doses received by the people (public, patients and workers). This debate is required in all fields, without exclusion, wherever exposure can be controlled. It should accompany implementation of the principles of justification and optimisation, recently enshrined in law, and which are to be followed by users of ionising radiation sources, whether in industry, medicine or research, but also by the public authorities who are in particular responsible for assigning and allocating public health resources.

In terms of method, and faced with the demands of an increasingly concerned society, in a context of doubt concerning the credibility of the official line, both that of the authorities and of the scientific community, the « Radiation Protection Priorities » group recommended, at least on an experimental basis, new forms of consensus with the « stakeholders » and new forms of decision-making based on transparency, democracy and a wide-ranging base of expertise. Radiological risk management could be an example for all industrial activities which entail a risk.

These new forms of consensus involving the « stakeholders » should also take in communication, in particular by the authorities, information of the citizens about the radiological and nuclear risks and training of the radiation protection players. Strong action must also be taken to ensure that secondary education curricula include the physical and biological basics of the effects of ionising radiation, its various applications and radiation protection, as part of a program of civic studies covering the environment and sustainable development.

Furthermore, faced with the relatively minor influence of French expertise in the international radiation protection bodies, the urgent need to organise exchanges between the various units in France involved in radiation protection related research was stressed. These exchanges should enable a true scientific watching brief to be organised, on a transparent and wide-ranging basis, informing experts and decision-makers of new scientific data, up to and including a periodic critical analysis of these data.

Following the example of Britain, the « Radiation Protection Priorities » group also recommended that alongside a scheduled strengthening of inspection means, user consultancy activities should also be developed, taking the form of services or practical management tools, stressing the role that the public authorities could play in this field. It asked the administrations in charge of radiation protection inspection to take a look at what already works successfully abroad, in particular in the countries of the European Union, and to develop cooperation between approved entities. In the inspection field, the group drew the attention of the Director General for Nuclear Safety and Radiation Protection to the medical radiology sector, where efforts are needed to reduce exposure: prior to the inspection, information and awareness-raising of the medical body concerned is required.

More specifically, the « Radiation Protection Priorities » group familiarised itself with the actions recently initiated by the authorities, in particular those concerning the creation of a centralised system for worker exposure monitoring results (SISERI) and a plan of action for monitoring patient exposure to ionising radiation, the preparation of a national radioactive waste management plan and the creation of the national environmental radiological monitoring network. Its proposals support these various initiatives by clarifying the essential points to be taken into account during their practical implementation.

The question of managing the radon risk, which is still the subject of controversy in France, was also examined. On this point, the « Radiation Protection Priorities » group felt that it is important to continue research into estimating the radon-related risk to the population as a whole, but at the same time to continue to consider defining construction standards for new-build homes and reducing exposure in homes with high concentrations.

France still does not have a true risk management strategy for dealing with the major contamination that would result from a nuclear accident or malicious act leading to long-term exposure of the population. The experts were amazed by the lack of any official programme for defining a strategy for the social and economic management of the areas thus contaminated, be they urban or rural, which would take account of health monitoring of the populations, radiological monitoring of the environment and foodstuffs, and development of a practical radiology culture within the population.

... short-term actions...

Going beyond these recommendations concerning fundamental subjects, the experts identified seven steps to be taken immediately or initiated without delay:

1. Boost the quality and supervision of radiation protection of high level sources, in particular in the field of industrial gammagraphy.

2. As part of the work to set up the centralised system for worker exposure monitoring results (SISERI), schedule the resumption of dosimetry data logging.

3. With a view to subsequent European-wide harmonisation, confer operational status on the existing regulatory provisions concerning individual management of the exposure of roaming workers.

4. Give thought to the non-BNI radiation protection trades (in particular the agent conversant with radiation protection), specifying training, areas of competence and the organisation of intervention conditions, even if this involves changing current regulations.

5. Set up an information and advisory system (toll-free telephone number for instance) for doctors and patients faced with the problem of exposure to ionising radiation during pregnancy.

6. For new and existing installations, make it mandatory to set up a system providing information on the quantity of radiation emitted during paediatric radiology procedures.

7. Check the pertinence of the radiological examinations requested, in particular by sports federations, insurance companies and even the public authorities.

ed to reinforce radiation protection on specific topics such as management of the radon risk or the use of radioactive sources, or to facilitate application of the regulations concerning protection of workers and patients. Organisation of the scientific watching brief on the effects of ionising radiation on health, plus the training of future generations will also need to be closely examined.

On the basis of this work, the ASN will in 2004 draw up a guideline program of work which, under the authority of the Minister for Health, it will submit for interministerial discussion. Although some of the recommendations from the advisory committee are the sole and direct responsibility of the ASN, most of them involve many ministerial departments (Ministries of Labour, Construction, National Education, Research, Agriculture, Ecology and Sustainable Development, Defence, and so on). For a number of the recommendations, the links with programs that either exist or are under preparation and which are run by other organisations or administrations (e.g.: national health and environment plan, cancer plan, etc.) will have to be clarified.

Finally, in 2004, the long and meticulous work to identify the sectors in which inspections by the ASN should be given priority status will have to be put to good use. For example, we will be paying particularly close attention to defining the methods for evaluating and controlling patient radiation protection, jointly with the health professionals

4 Towards radiation protection inspection

Since it was created in 2002, the DGSNR has worked at organising and developing the inspection of radiation protection outside BNIs. Identification of control priorities, definition of action procedures and deployment of the necessary workforce are all being carried out in parallel.

The ASN is devoting attention to setting up an effective and well-proportioned control system, drawing on the experience of the personnel from the permanent secretariat of the CIREA and OPRI who have joined it, and relying on the State's regional services, whose actions in the field are under its responsibility. The ASN also listens closely to the parties concerned by the use of ionising radiation and keeps an open mind with regard to foreign practices.

The nuclear transparency and safety bill comprises provisions which will be such as to back-up the regulatory tools in this inspection system, which will achieve maturity with the gradual addition of the one hundred and fifty inspectors.

ASN actions to prepare radiation protection inspection

With this aim in mind, the Director General for Nuclear Safety and Radiation protection decided that two DRIREs, in the Basse-Normandie and Rhône-Alpes regions, would carry out a « reconnaissance » mission until the end of 2003, in order to initiate radiation protection control practices in non-BNI areas. This mission is carried out in parallel with another mission, entrusted by the Director General for Nuclear Safety and Radiation Protection to an independent advisory committee, responsible for proposing action priorities in the radiation protection field. At the same time, a working group comprising representatives of the DRIRE, DRASS and DDASS was tasked with drawing up procedures for collaboration between the entities in this field. Finally, a working group consisting of representatives of the ASN, the DARPMI and the DRIREs was asked to give thought to the future organisation of the DRIREs with a view to increasing their workforce to take account of radiation protection control.

The lessons of the reconnaissance mission

The primary goal of the «reconnaissance» mission was to identify the scope of radiation protection control by the DSNRs by identifying the ASN's local contacts and the radiation protection issues. It also aimed to begin to define the content of radiation protection inspections. For the duration of this mission, the ASN's actions were carried out with no consideration being given to inspection.

This mission comprised two phases: learning and understanding, then preparing to inspect.

- ***Learning and understanding***

The aim was to identify which local stakeholders were concerned in one way or another by radiation protection control, to understand their duties and how they work and to get in touch with them to explain the ASN's role. The local stakeholders are on the one hand institutional, in other words representatives of the State'sregional and departemental services, and on the other the users of ionising radiation. Contacts were also made with organisations approved by the Ministry for Labour, which exercise a first level of control over the users of ionising radiation.

This phase highlighted the need for close collaboration with the many institutional stakeholders concerned, among which we must mention inspection of classified installations in the DRIREs, the services of the Ministry for Health (Departmental Directorates for Health and Social Affairs and Regional Directorates for Health and Social Affairs - DRASS and DDASS), the regional hospitalisation agencies, the regional social security departments, the services of the Ministry for Labour (Departmental Directorates for Labour, Employment and Training, Regional Directorates for Labour, Employment and Training - DRTEFP, DDTEFP).

Furthermore, the reconnaissance model showed the essential role of the organisations approved by the administration in carrying out training, first level controls and analyses linked to radiation protection. In order to ensure effective control of the safety of nuclear activities, two levels of external control would seem to be desirable: systematic and continuous control performed by the approved organisations, themselves monitored by the State, and more detailed control conducted directly by the State, with the intensity proportional to the risks inherent in the installations. Thus, the DSNR in Lyon set up a protocol with certain organisations enabling the ASN to be informed of significant nonconformities. This could pave the way for the future rela-

tions between the ASN and the approved organisations.

• ***Preparing to inspect***

The reconnaissance mission, which gave rise to about a hundred reconnaissance visits to the users, was also designed to prepare a methodology and tools for radiation protection inspection.

With regard to the inspection methodology, it would seem that a variety of inspection procedures and types is necessary. Initially, each inspector could carry out about twenty inspections a year, with the frequency of the visits being tailored to the risks (for example every 2 years for hospitals and universities). Inspection guides are also drawn up for certain standard installations (industrial gammagraphy) to facilitate the inspectors' work.

Although many questions are not yet resolved, this mission will in 2004 lead to the creation of a radiation protection inspection program in the Rhône-Alpes and Basse-Normandie regions. As for the other regions which as yet do not have enough personnel assigned to radiation protection control within the DRIREs, they will continue the reconnaissance mission, taking account of the experience acquired by the pilot regions. All these actions are coordinated by the DGSNR.

Radiation protection monitoring surveillance in a nuclear medicine service

Relations with the DDASS and DRASS

The working group responsible for examining the working methods between DDASS/DRASS and DRIRE concluded that given the current move by the Health Ministry's services to focus on health-environment questions, the DDASS and DRASS would have every interest in concentrating on management of the radon-related risk in residential premises and establishments open to the public, and on radiological checks on water intended for human consumption. These services will also take part in managing radiological emergencies and contaminated sites, and will continue to look at the radiological impact of the main nuclear activities. A circular from the DGSNR sent out to the DDASS and DRASS will lay out these duties in official terms.

Organisation of the DRIREs

The working group with responsibility for considering the future organisation of the DRIREs in terms of their radiation protection control activities, has returned its conclusions. They were discussed with the DRIRE directors and ratified by the DGSNR. These conclusions were drawn up on the basis of the creation of one hundred and fifty radiation protection inspector jobs, the principle of which had been adopted by the Government in 2002. The organisation of the DRIREs for non-BNI radiation protection control will eventually be based around eleven inter-regional zones, centred on the nine DSNR that already exist plus two new DSNRs (Regional Directorates) in Paris and Nantes. In 2004, the available workforce will be spread around the inter-regional headquarters, to avoid over-diluting resources; a DSNR or a DSNR will be placed at the disposal and under the authority of each DRIRE. Subsequently, depending on acquired experience and the available workforce, units linked to the DSNRs will be set up in the other regions, closer to the actual facilities.

The work done by the ASN means that in 2004 we can already make the transition from reconnaissance to actual inspection in the two pilot regions, and continue with setting up an overall radiation protection control system for the entire country.

5 Action plan for monitoring patient exposure to ionising radiation.

Radiation protection for persons exposed for medical purposes is based on two principles, justification of the procedures and optimisation of exposure, under the responsibility of the prescribing practitioners and the users of ionising radiation. These principles are stipulated in the new regulations included in the Public Health Code.

The regulation dose limits do not apply to medical exposure, as the optimum dose depends on the medical goal (diagnostic or therapeutic) and should be determined on a case by case basis. However, the notion of « reference dose levels » is introduced to enable physicians carrying out irradiating procedures to evaluate and optimise them.

The ASN is in charge of drawing up the regulations concerning medical exposure and controlling their application, and wished to underpin its work with an «action plan» produced jointly with the professionals and institutional partners concerned. This plan is designed to improve knowledge of the doses administered to patients and to build up a system for dosimetric monitoring and evaluation of the potential effects of these doses.

Better understanding of "medical exposure"

Along with exposure of natural origin, medical exposure is the main source of exposure of the population to ionising radiation in the industrialised nations. Studies conducted so far, both in France and abroad, show a fairly broad spread of doses administered for the same examination. The available data however remain too limited to enable us to identify the most exposed groups or categories of persons.

The new regulations provide for the production of practical guides concerning the indications for medical imaging examinations on the one hand, and the procedures for conducting them on the other, constituting tools for implementing the principles of justification and optimisation. These guides are currently being drafted by the health professionals concerned.

The regulatory work has been accompanied by wide-ranging deliberation, once again with the professionals, regarding optimisation of the doses received by the patient during the examination, with the aim of reducing these doses to the strict minimum, but without compromising the quality of the examinations or the effectiveness of the treatment. Practical implementation of the principle of optimisation will necessarily involve better knowledge of the doses received by the patients, for each type of examination, for their entire lives, given that the forthcoming application of standardised radiology and nuclear medicine procedures should lead to a significant reduction in the spread of doses administered for the same type of examination.

Room and equipment for operating radiology

An action plan coordinated by the DGSNR

Based on the recommendations published in 2002 by the InVS, the DGSNR in 2003 drew up an action plan designed to set up and develop monitoring of patient exposure to ionising radiation of medical origin. Drawn up in close collaboration with the concerned services of the IRSN and InVS, and then submitted to the various institutional partners involved for approval (General Directorate for Health, Directorate for hospitalisation and health care, Social Security Directorate, French Health Product Safety Agency, French environment safety Agency, Health Monitoring Institute, Institute for Radiation Protection and Nuclear Safety, National care accreditation and evaluation Agency), this multi-year plan should be implemented as of 2004. It will be regularly monitored by a committee chaired by the DGSNR and will comprise the directors concerned or their representatives.

The chosen actions are aimed at meeting the following two objectives:

- obtain a better understanding of patient exposure to ionising radiation, to allow greater optimisation of practices and determine the reference dose levels for medical radiology and nuclear medicine;

- pool the knowledge needed for subsequent development of epidemiological monitoring of the effects of ionising radiation.

These actions vary widely in nature and are grouped into 6 categories: regulations, information system, studies, monitoring the effects of ionising radiation, information/training/scientific watching brief and research (see box).

These steps will be carried out jointly with the professionals, involving learned societies in steering these actions and ensuring participation in the field by the professionals concerned (doctors, radiation physicists, electroradiology operators, biomedical engineers, and so on).

1/ Regulations

• Place persons specialising in medical radiophysics at the disposal of the services hosting radiodiagnosis, radiological surgery, nuclear medicine and radiotherapy installations.

• Make it mandatory to equip any new radiology equipment with a device providing information on the quantity of radiation produced during a radiological procedure.

• Enclose the dose readings with each examination report.

2/ Information system

• Identify and monitor the frequency and distribution of examination types in the various categories of the French population.

• Centralise accident and incident information concerning the field of medical applications using ionising radiation.

• Conduct studies prior to setting up a system of individual dose data.

• Incorporate the dosimetric data produced by the digital equipment into the patient's computer file.

3/ Studies

• Conduct surveys to determine exposure and define reference levels for medical practices comprising exposure to ionising radiation.

• Conduct various case studies to characterise the doses received by the patient in computer tomography, paediatric radiology and radiological surgery departments.

4/ Monitor the effects of ionising radiation

• Improve knowledge of the stochastic effects of medical uses of ionising radiation.

• Study the frequency of radiodermatitis and radioepidermatitis in patients.

5/ Information - training - scientific watching brief

• Develop information targeted at health professionals.

• Develop training activities for health professionals.

• Share the scientific watching brief with the various stakeholders in the sector, by regularly issuing critical reviews of scientific publications concerning medical exposure to radiation and its health effects.

6/ Research

• Increase research into the relationship between medical exposure to ionising radiation and the induced carcinogenic and non-carcinogenic effects.

• Evaluate the significance for the patients of the results of the individual susceptibility and genotoxicity tests.

Towards a centralised information system

The action plan defined in this way, involving a multi-year commitment by the IRSN and the InVs in their respective areas of competence, is the first step in a long-term process to set up a system in France for centralising information concerning patient exposure, in the same way as the system that already exists for workers.

During this first stage, the radiology and nuclear medicine departments should be given the tools needed for regularly estimating the doses received by the patients. These monitoring tools will be of particular use in evaluating the impact of the action taken in each department, and allow the gradual development of a radiation protection culture which can only benefit the patient, as part of the move to apply optimisation procedures.

This first stage will also be used to examine the feasibility of a centralised information system for evaluating the effectiveness of public policy and changes in terms of exposure, in the light of estimated doses but also the number of procedures carried out.

Finally, more accurate knowledge of patient exposure is an essential precondition to conducting epidemiological surveys among groups of patients who are the most heavily exposed owing to high doses or to particular radiosensitivity (children).

When taken as a whole, the knowledge gleaned from this action plan will enable the ASN to implement the regulations better, to modify them if necessary to ensure optimum patient protection and to encourage targeted epidemiological surveys, with the possibility of cross-referencing exposure data with the effects at an individual level.

6 The summer 2003 heat wave and drought and nuclear power plant operations

The meteorological conditions observed in France during the summer of 2003, involving a significant rainfall deficit and high atmospheric temperatures, reduced river flowrates and led to a significant rise in water temperature.

The exceptional meteorological conditions caused EDF to conduct closer monitoring of its nuclear facilities and take steps to guarantee the availability of its production resources to meet electricity demand. EDF in particular asked the DGSNR temporarily to modify the thermal discharge conditions for some of its nuclear power plants and the operating conditions of the ventilation in a number of premises and of equipment cooling systems.

The installations thus operated under special waiver conditions for a limited time and the ASN and the various environmental protection stakeholders raised their level of control and monitoring.

Water: a vital element in operation of power plants in general and nuclear power plants in particular

Watercourses constitute the cold source supplying the cooling systems of nuclear reactors.

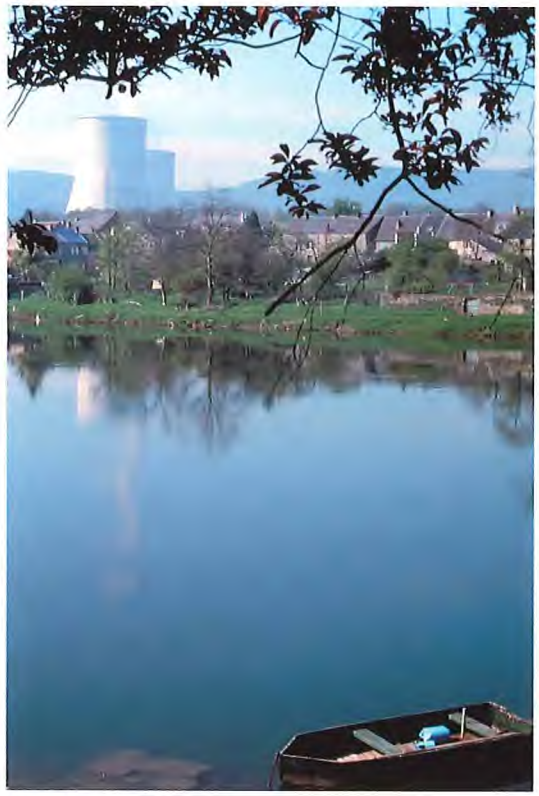
The high temperatures of the cold source in particular reduced the efficiency of the cooling systems in certain premises and reduced the power evacuation capacity during reactor outages.

In order to optimise management of the cooling capacity of the cold source, the operators increased monitoring of the efficiency of those devices exchanging heat with this cold source. For the Belleville and Chooz sites, the operators had to adopt special operating procedures to adapt the power to be evacuated by these systems to the temperature of the river.

They also asked the ASN for a waiver to the general operating rules (RGE) in order to increase the cleaning frequency of these exchangers, to boost the exchange coefficients.

Meeting temperature criteria to guarantee installation safety

The RGE also set the temperature criteria to be met inside the premises or by certain systems.



Chooz nuclear power plant

During the summer of 2003, the nuclear facility operators set up additional air cooling systems (fogging, additional air-conditioning, etc.), as the existing systems did not have sufficient cooling capacity.

In particular, the temperatures recorded in the reactor buildings on the Fessenheim site led the operator to set up a system for cooling the outside of the containment, the effectiveness tests of which were performed at the beginning of the heat wave.

Owing to the gradual temperature rise inside the reactor buildings on the Dampierre and Chooz sites and the ineffectiveness of the sprinkler system used on the Fessenheim site, the three sites asked the ASN for a waiver to the RGE so that they could use a special air mixing system inside the reactor buildings. This authorisation was granted by the ASN.

Controlled relaxation of environmental constraints in order to meet electricity demand

Nuclear power plants generate thermal discharges into watercourses or the sea, either

Dampierre-en-Burly nuclear power plant

directly for those plants operating in an « open circuit », or after passage through cooling towers, enabling some of the calories to be released into the atmosphere. Thermal discharges from the plants raise the temperature between upstream and downstream of the discharge by values ranging from a few tenths of a degree to several degrees.

These discharges are also regulated by the ministerial orders authorising plant discharges.

The meteorological conditions observed during the summer of 2003 raised the temperature of certain watercourses by about 5°C above the mean historical values observed over the past 25 years. For these reasons, the operators reduced power or halted production from several of their reactors, on the Le Blayais, Golfech, Tricastin and Bugey sites.

However, electricity demand was high, precisely because of the heat wave, with increased use of air-conditioning for example, at a time when electricity production facilities other than nuclear reactors were also experiencing operating difficulties. For conventional thermal power plants this was due to the heat wave (thermal releases into water courses and the atmosphere) and for hydroelectric plants it was due to the lack of rainfall (obligation to ensure that leisure activities could continue in reservoirs). This situation highlighted the risk of the electricity production resources being insufficient and significant load-shedding having to be carried out.

This constraint led the operators to request modifications to the provisions of the discharge licensing orders. The Ministers for the Environment, Health and Industry issued an order on 12 August 2003, authorising electricity production facilities located on the Rhone, Moselle, Garonne and Seine rivers to continue operating with thermal discharges higher than the limits authorised in the discharge authorisation orders for these installations, while limiting the temperature rise in these watercourses to between 1 and 3 °C depending on the type of facility and the river.

This authorisation, which ended on 30 September 2003, was in fact used very little.

Publication of this order was accompanied by the creation of an oversight committee for the environment of nuclear production facilities, with the role of monitoring the impact of thermal releases into the watercourses.

Lessons learned

The experience of 2003 showed that the operators had problems with meeting certain temperature criteria specified in the nuclear reactor operating rules. They were forced to provide proof to back up the protective measures that were chosen and, in certain cases, ask for waivers to these same rules in order to allow operation of certain

particular ventilation systems. These measures as a whole were such as to guarantee installation safety and maintain the minimum electricity production resources necessary.

This combination of heat wave and drought is a situation that is likely to occur again and should be taken into account, both in sizing and designing nuclear facilities (increased ventilation rates for the premises, installation of air-conditioning systems, etc) and in developing an alert system capable of anticipating such a situation.

The ASN will be vigilant in this respect.

7 The national plan for radioactive waste management

Context

Further to a request from the Parliamentary Office for the Assessment of Scientific and Technological Options, on the basis of the report produced in 2000 by the deputy of the Drôme department, Michèle Rivasi, the Nuclear Safety Authority (ASN) confirms that it is in favour of drawing up a national plan for radioactive waste management.

This proposal is in conformity with a provision already included in article L.541-11 of the Environment Code (resulting from law 75-633 of 15 July 1975 concerning the disposal of waste and recovery of materials). This article gives the Minister for the Environment the option of drawing up national disposal plans for waste considered to be particularly harmful or requiring special treatment and storage. This option was for example used for waste contaminated by polychlorinated biphenyls (PCB).

For radioactive waste, a more global framework appeared necessary, to allow consistent management of all radioactive waste, guaranteeing safe management and the corresponding financing, in particular for its disposal, by determining the relevant priorities.

The Nuclear Safety Authority organised two meetings in the first half of 2003 to examine the feasibility of a national plan for radioactive waste management.

During a presentation to the Council of Ministers on 4 June 2003, the Minister for Ecology and Sustainable Development stated her intention to produce such a plan. On behalf of the public authorities, the ASN was tasked with overseeing its production. Two initial meetings were organised during the second half of 2003 to present the subjects to be dealt with and discuss the organisation to be put in place to produce such a plan.

The following were invited to take part in the work on the national plan for radioactive waste management: representatives of the waste producers, the disposal facilities, the National Agency for Radioactive Waste Management, environmental protection associations, elected representatives and the directorates of the ministries concerned.

Goals of the national plan for radioactive waste management

The goals of the plan were examined by all parties concerned. Following the debate, these goals were clarified and are presented below:
clear definition of the waste to be considered as radioactive, taking account of the existence of natural radioactivity of variable levels and of certain radioactive materials for which reuse has not been envisaged;

- reliable and exhaustive inventory of radioactive waste, no matter what the origin (including that from defence activities);
- search for management solutions for each category of radioactive waste produced;
- taking charge of older radioactive waste which has been more or less « forgotten »;
- consideration of the concerns of the public, who rightly or wrongly are worried about the fate of radioactive waste;
- the consistency of the entire radioactive waste management structure, whatever the level of radioactivity or the chemical or infectious toxicity, in particular for waste with a « mixed » risk;
- optimisation of waste management by the waste producers: nuclear industry, more conventional industries (in particular those using naturally radioactive substances but for their other properties), activities using radionuclide sources, medical sector, earth taken from old polluted sites, mining industry (uranium mines in particular);
- consistency of practices to deal with polluted sites and reclamation methods;

leading to clear, meticulous and safe management.

Interface with ANDRA's inventory work

At the same time, the National Agency for Radioactive Waste Management (ANDRA) set up an organisation for inventorying all radioactive waste in France (radioactive waste observatory, with launch of a forward-looking inventory in accordance with the proposals of the Le Bars report). This inventory will enable the quantities of waste produced to be estimated for various time-frames, including 2010-2020.

The national plan for radioactive waste management (PNGDR) does not aim to duplicate the inventory work done by ANDRA. It will therefore be more particularly based on the information already available in this framework. It is not however impossible that this plan could bring to light certain waste that does not appear in the inventory, in particular through a more detailed definition of radioactive waste.

Interface with research into high-level long-lived waste

For high-level long-lived waste, research into disposal channels is governed by law (article L.542 of the Environment Code, resulting from the law of 30 December 1991), which requires that a report on the progress of research into the disposal of high-level long-lived waste be presented to Parliament before the end of 2006, so that a debate can be held on the follow-up to be given to this research, which has intensified and diversified since the 1991 law.

Producing a national plan for radioactive waste management does not interfere with this process, which solely concerns high-level long-lived waste. The national plan for radioactive waste management above all meets the need to provide channels for managing and disposing of waste which does not fall into this category, such as sealed sources, waste containing radium, graphite waste, dismantling waste, and so on. However, producing it at the same time as the Government's report requested in article L.542 of the Environment Code will give the political decision-making bodies an overview of radioactive waste problems and will place the special case of high-level long-lived waste in a more general context.

Initial conclusions

The first meetings of the plenary group tasked with producing the national plan for radioactive waste management, comprising the leading stakeholders, dealt primarily with technical subjects in order to get the ball rolling. Several topics were then discussed, concerning waste with enhanced natural radioactivity, as defined in the Public Health Code, graphite waste and waste containing radium, waste resulting from the treatment of uranium ore and the future of sealed sources at the end of their useful life. Draft recommendations were produced concerning the recovery of certain types of waste from private individuals or establishments without the resources to dispose of it. It would also seem important to monitor the consistency of the regulatory provisions concerning radioactive waste and the benefits of requiring a declaration from all radioactive waste producers need to be examined.

Prospects

The initiative consisting in producing the national plan for radioactive waste management (PNGDR) was on the whole warmly received by the various parties involved, including the representatives of activities which are not among those the public authorities normally find themselves faced with in this field. It should be noted that internationally, this approach was seen as a good practice, in particular within the framework of the meeting to review the national reports drafted under the terms of the joint convention on the safety of spent fuel management and the safety of radioactive waste management, which took place in Vienna on 3 to 14 November 2003: production of a PNGDR in each country was recommended in the final report issued by the review meeting.

However, to prevent this remaining a purely technical exercise, all the participants concerned by the future of radioactive waste must mobilise: participation by elected representatives and by environmental protection associations is an essential precondition for the success of such a plan.

The ASN considers that developing the PNGDR is a priority and that it will eventually lead to more open, more exhaustive and safer management of radioactive waste in France.

Graphite stack in a gas-graphite Uranium reactor

8 The future of high-level long-lived waste

Context

The provisions of the law of 30 December 1991 concerning high-level long-lived waste were codified in article L.542 of the Environment Code. This article therefore includes the provisions voted by Parliament concerning the future of this waste.

Article L.542 of the Environment Code sets the broad outlines for research into the field of radioactive waste management:

- high-level long-lived radioactive waste must be managed in such a way as to protect nature, the environment and human health, taking into consideration the rights of future generations;

- work is being conducted into:

a) searching for solutions allowing the separation and transmutation of long-lived radioactive elements present in this waste. The aim is to reduce the period during which these elements are radiologically toxic by using a neutron reaction to transform them into non-radioactive elements or short-lived radionuclides. This research direction comprises two steps which require the use of different technical processes,

b) studying the possibility of reversible or irreversible disposal in deep geological formations, in particular by building underground laboratories,

c) studying packaging and long-term surface storage solutions for this waste, pending development of a management solution liable to reduce its long-term toxicity.

Article L.542 stipulates that this research should be conducted under the control of the National Evaluation Commission, which produces a yearly report on the progress of the research. At the end of a 15-year period starting on 31 December 1991, the Government must submit a report reviewing the research done, accompanied by a bill which may authorise the creation of a high-level long-lived radioactive waste disposal centre, specifying the constraints and restrictions applying to the centre.

Progress of research

This research work is primarily conducted by the French Atomic Energy Commission (CEA) and the National Agency for Radioactive Waste Management, which receive contributions from other stakeholders both in France and abroad.

Package of high-level long-lived waste stored at COGEMA La Hague

a) Separation/transmutation

Reprocessing of part of the spent fuel taken from EDF and CEA reactors led to initial de-facto separation of radionuclides contained in these fuels. The minor actinides and fission products are thus encapsulated in a glass matrix.

Research into the separation of minor actinides demonstrated the feasibility of further separation of americium and curium, following a series of tests conducted on solutions of dissolved fuels, in the Atalante installation in Marcoule. The feasibility of separating certain fission products such as caesium was also demonstrated. Work is continuing with the aim of carrying out an economic assessment of advanced separation on an industrial basis.

The theoretical feasibility of transmuting minor actinides has been demonstrated, in particular thanks to the extensive knowledge of transmutation efficiency resulting from the development of reactor physics. These same theoretical studies show that transmutation of long-lived fission

products, some of which could be highly mobile in a deep geological disposal site, offers lesser efficiency or implies technical implementation problems. Work is continuing to demonstrate the technological feasibility of transmutation. This work is being done in France in the CEA's Phenix reactor in Marcoule. Post-burnup examinations will be conducted as of 2004.

Going beyond this examination of the theoretical possibilities, transition to an industrial phase of advanced separation of minor actinides and certain fission products, plus their transmutation, would require:

- a significant research effort;

- decisions concerning energy policy, in particular the choice of electricity production technologies compatible with the transmutation of certain radionuclides;

- considerable investment in the construction of installations employing the separation and transmutation processes.

The ASN believes that transition to the industrial phase for these processes could not reasonably be envisaged in the immediate future.

b) Disposal in deep geological formations

Research into the geological disposal of high-level long-lived waste is being carried out by the National Agency for Radioactive Waste Management (ANDRA). ANDRA was authorised in 1999 to create an underground laboratory at a site on the boundary between the two départements of Haute-Marne and Meuse, and designed to study the Callovo-Oxfordian argilite formation and its environment. Soundings made on the site helped characterise the geological environment. Sinking of shafts for access to the galleries in which various experiments are to be conducted is continuing. However, it was impossible to create an underground laboratory in a granite geological formation, which could also constitute an environment likely to be used for this type of disposal.

In 2001, ANDRA presented a dossier on the findings obtained from the argilite research project, constituting a methodological test of the safety assessment approach it will have to present in 2005 to justify the feasibility of a disposal centre. This dossier was sent to the Nuclear Safety Authority, which submitted it to the advisory committee on waste. This dossier was examined by other organisations, in particular by a team of experts from the NEA/OECD during the peer review ordered by the French Government. This review concluded that the research work done by ANDRA was of high quality and mentioned areas for improvement which would seem to be necessary in the light of the dossier to be submitted in 2005.

c) Long-term storage

Finally, the work concerning the third area covered by the law, that is long-term storage of LLHLW is continuing in two directions.

The first direction concerns radioactive waste packaging. The packaging processes for radioactive materials are being examined, as are the characterisation and long-term performance of the packages.

The second direction concerns the definition and qualification of concepts for long-term storage on or near the surface. The CEA has submited the storage safety option dossiers for generic sites at the end of 2003.

Preparation for the deadlines mentioned in the law

The three areas of research into the future of high-level long-lived waste mentioned in article L.542 of the Environment Code are complementary. They should allow the development of appropriate waste management strategies. A significant amount of scientific and technical data has been obtained in all three areas. It is important for Parliament in 2006 to state what is to happen to the process initiated in 1991, drawing on the results already obtained. The need to continue or diversify the areas of research beyond 2006 will have to be examined. Similarly, the legal conditions for licensing the creation of a deep geological disposal centre for high-level long-lived waste will have to be clarified.

It is up to the authorities to ensure that the steps made necessary by the law of 30 December 1991 are carried out in satisfactory conditions: all those involved in the research work will have to submit their results within a time-frame enabling the Government, but also all parties concerned, to give their opinion on the possible options after 2006. This implies greater coordination between the stakeholders involved in the process.

9 The european nuclear package

On 30 January 2003, the European Commission officially adopted two proposed directives, one defining general principles of the safety of nuclear facilities, the other the management of spent fuel and radioactive waste. This initiative is commonly called the « nuclear package ».

The aims of the « nuclear package »

The aims of the « package » are as follows:

- draft « safety » directive:

to guarantee protection of the population and workers against the hazards of ionising radiation emanating from a nuclear facility, by laying down general principles which will ensure that the basic standards specified in the Euratom treaty are applied;

- draft « waste » directive:

to guarantee that all spent nuclear fuel and radioactive waste is managed safely, so that the workers, population and environment are adequately protected against the effects of ionising radiation.

The debate around the « nuclear package »

The initial content of the texts indicated that the Commission wanted to exert its influence over areas that had hitherto been considered as strictly national. Even if facility safety and the management of radioactive waste had in the past been the subject of community documents, they had not as yet been binding. The initial « package » would have had the effect of transferring competence from the member states of the Union to the Commission.

As soon as it was presented, reaction to the « package » was anything but enthusiastic, with certain States even demonstrating outright hostility.

A number of States also consider that directives are not the best way of setting up general community principles to deal with nuclear safety in the current and future member countries. They believe that texts such as resolutions or recommendations, which are not legally binding, would be preferable. Two proposed texts were therefore presented in September 2003 by Sweden, Finland and the United Kingdom, with the support of Germany.

The current content of the « nuclear package »

Faced with this opposition, the two texts were extensively reworked, in particular under the impetus of the French authorities. The resulting texts were officially presented by the Italian presidency in November, with the hope of bringing the hostile states back on board.

With respect to the initial text, the following profound changes in particular were made to the draft « safety » directive:

- confirmation of the principle of national responsibility for control and technical regulation of nuclear safety;

- deletion from the text of all legal provisions enabling subsequent introduction of « daughter directives »;

- alleviation of the legal provisions concerning financing of dismantling;

- replacement of inspections carried out under the aegis of the Commission by a process of « peer » examinations.

The current content of the «Nuclear package» is fairly similar to that of the two international conventions (ratified by all member states of the European Union):

- convention on nuclear safety;

- joint convention on the safety of spent fuel management and the safety of radioactive waste management.

Its operative field is however more extended than the nuclear safety convention (restricted to only reactors), the safety directive project concerning all power plants. However, some details remains to precise on the "package" for example: the examination process by "peer" reviews.

The ASN position

The DGSNR feels that a move towards harmonising nuclear safety principles and standards is needed.

Thus, when WENRA (association of nuclear regulatory authorities from the European Union and Switzerland) was created at the ASN's initiative in 1999, its members set themselves the goal of developing a common approach to nuclear safety and regulations, in particular within the Union. To develop these

activities, WENRA set up two working groups, in which the ASN plays an active role, one (under the control of the British safety authority) for nuclear power reactors, the other (under the control of the DGSNR) for management of spent fuel and radioactive waste and dismantling operations.

The current version of the « nuclear package » is a move towards harmonisation, while ensuring that the European Commission respects national competences.

The ASN, which believes that the points still outstanding can be improved through discussion, supports the « package » which overall corresponds to what it wants. Legally binding directives will give more stability to the European legislative and regulatory framework for nuclear safety.

Prospects

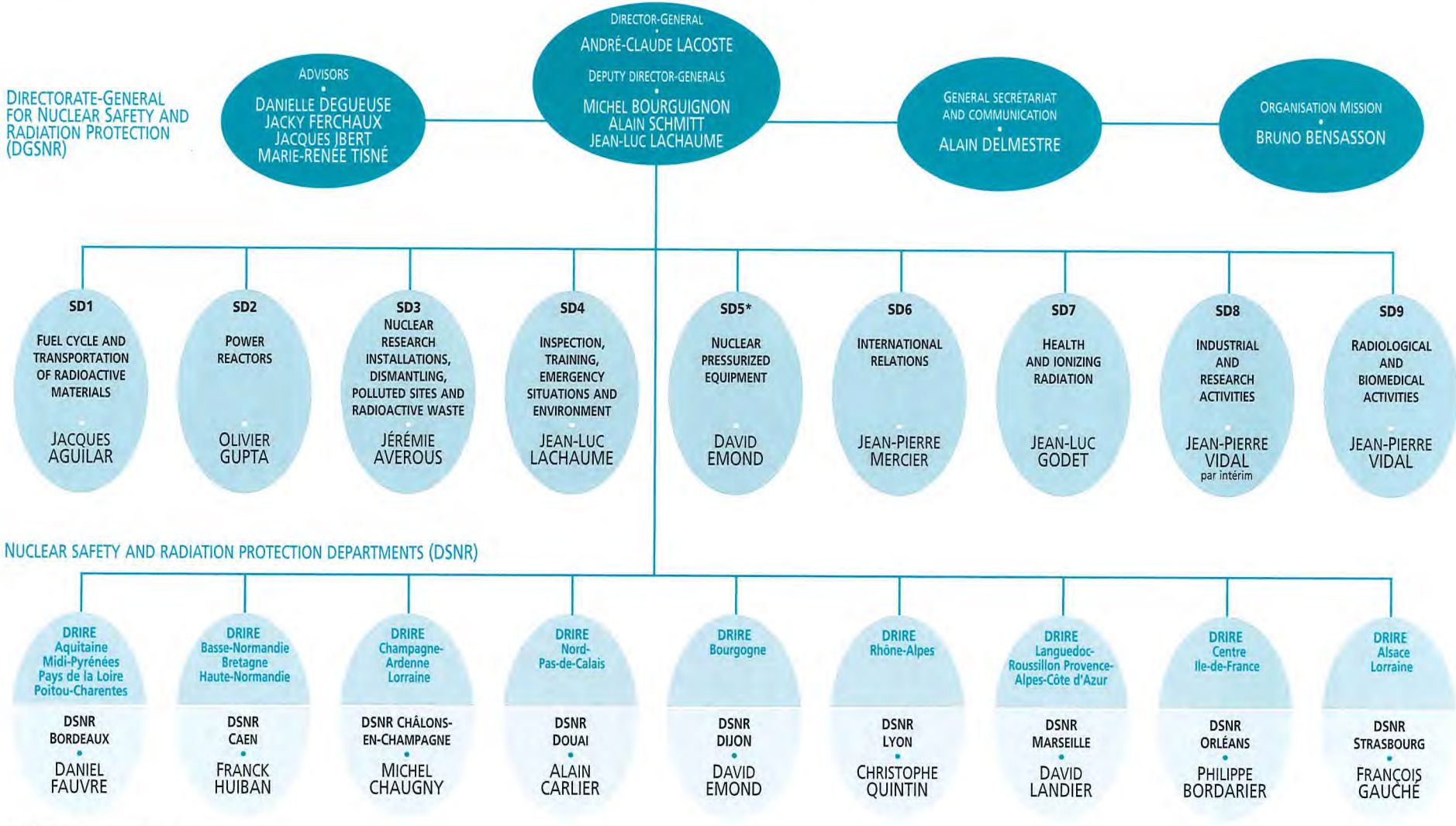
Although the content of the new, amended, proposals is close to the non-binding drafts presented by the United Kingdom, Sweden and Finland, these texts still divide the fifteen members states, who are unable to agree on their legal status.

The « nuclear package » was submitted to the COREPER (Committee of Permanent Representatives - national ambassadors to the European Union) at the end of November 2003. After noting the disagreement, the COREPER decided to forward to the Irish presidency (starting on 1 January 2004) the task of seeing this matter through to completion.

Finally, the arrival of new member states in the European Union in May 2004, and given their current stance, should strengthen the position of those in favour of directives.

ASN organization chart

at March 1st, 2004



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144	L'inspection des installations nucléaires (janvier 2002)	Available	
145	Rapport sur la sûreté nucléaire en France en 2001 (mars 2002)	Available	
146	Transport des matières radioactives (mai 2002)	Available	
147	Les réexamens de la sûreté des installations nucléaires (juillet 2002)	Available	
148	La radioprotection des patients (octobre 2002)	Available	
149	La surveillance radiologique de l'environnement (novembre 2002)	Available	
150	Sûreté et compétitivité (janvier 2003)	Available	
151	La sûreté nucléaire et la radioprotection en France en 2002 (mars 2003)	Available	
152	Le démantèlement des installations nucléaires : le nouveau panorama (mai 2003)	Available	
153	Le radon : évaluation et gestion du risque	Available	
154	Les enjeux de la maintenance	Available	
155	Les études probabilistes de sûreté	Available	
156	Epidémiologie et rayonnements ionisants	Available	

* Maximum 5 numéros

« CONTRÔLE
AUTORITÉ DE SÛRETÉ NUCLÉAIRE REVIEW »

BULLETIN D'ABONNEMENT*

NOM |_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_| Prénom |_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|

Adresse à laquelle vous souhaitez recevoir *Contrôle*

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Vous vous abonnez à titre : ☐ Personnel ☐ Professionnel

Veuillez cocher la case correspondant à votre demande

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☐ Modification *N° abonné* |_|_|_|_|_|_|_|_|

Veuillez indiquer les changements intervenus

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☐ Suppression *N° abonné* |_|_|_|_|_|_|_|_|

Motif |_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|

RENSEIGNEMENTS COMPLÉMENTAIRES

Afin de nous aider à mieux connaître nos lecteurs, merci de bien vouloir répondre aux questions ci-dessous :

1. *Travaillez-vous dans le secteur nucléaire ?* ☐ Oui ☐ Non

2. *À laquelle de ces catégories appartenez-vous ?*

☐ Élu
☐ Journaliste
☐ Membre d'une association ou d'un syndicat
☐ Représentant de l'Administration
☐ Exploitant d'une installation nucléaire
☐ Industriel
☐ Enseignant
☐ Chercheur
☐ Étudiant
☐ Particulier
☐ Autre (préciser) : |_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|

À renvoyer à : Direction générale de la sûreté nucléaire et de la radioprotection
6, place du Colonel Bourgoin, 75572 Paris Cedex 12, Fax : 33 (0)1 40 19 87 31

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