Highlights of 2010

classified according to main topics and to areas and activities regulated and inspected


ASN ACTIONS

ACTIVITIES REGULATED AND INSPECTED BY ASN

This introduction to the ASN Report on the state of nuclear safety and radiation protection in France in 2010 gives a summary of ASN actions and its assessment of the activities it regulates and inspects.

It proposes a thirty page round-up of the significant points developed within this report. This summary follows the same structural layout as the main report. It will therefore be easy to refer to the relevant chapters.

There is a difference in the form of this summary between the first chapters, which are more descriptive of the role and functions of ASN (1 to 8), and the other chapters which present its actions in the various sectors regulated and inspected (9 to 16). Each chapter begins with a summary of the function or activity concerned, continues by highlighting the significant aspects of the past year, and ends with the outlook for the coming one. For the chapters dealing with the regulated and inspected activities, the summaries also contain ASN's assessment of nuclear safety and radiation in the main fields considered.

1

Nuclear activities: ionising radiation and health and environmental risks

The common objective of nuclear safety and radiation protection is to protect individuals and property against the hazards and detrimental effects of whatsoever nature, arising from the operation of nuclear and radiological installations, the transport, utilisation and transformation of radioactive or fissile materials, and exposure to naturally occurring radioactive materials.

The effects of ionising radiation on living beings can be "deterministic" (health effects will necessarily appear when the radiation dose received exceeds a certain threshold) or "probabilistic" (for example, appearance of cancers with a probability of occurrence for an individual, but with no certainty). The application of measures to protect against ionising radiation, in particular compliance with the regulation dose limits for workers, virtually rules out the possibility of deterministic effects, but also aims to reduce the probability of radiation induced cancers. Patients require particular attention because the dose limitation principle does not apply to them.

The steps taken in the fields of nuclear safety and radiation protection to prevent accidents and mitigate detrimental effects have led to a reduction, although not the complete elimination, of risks. There is no such thing as zero risk. There are also a number of situations for which there are still uncertainties and unknown factors. These include:

• deterministic damage due to high doses is encountered during accidental exposure to high-level radioactive sources and as a complication and side-effect of radiotherapy and interventional radiology. This damage poses difficult therapeutic problems;

• the effects of chronic low doses of ionising radiation, for which the health effects are unknown. At this level, the risk of cancer is slight;

• individual radiation sensitivity is without doubt a major issue for radiobiology, because about 5% of individuals are hyper-sensitive to ionising radiation;

• no specific attention has so far been given to the effects on non-human species, based on the assumption that the protection of man implies protection of the environment. ICRP 103 proposes a methodology for specifically and gradually taking account of these effects.

Finally, as knowledge progresses, the regulations have to be adapted regularly. ASN is very closely monitoring ongoing scientific work.

Exposure to ionising radiation in France

The entire French population is potentially exposed to ionising radiation, but not everyone to the same extent (this depends in particular on where they live and the number of radiological examinations undergone), whether this radiation is of natural origin or the result of human activities.

The average exposure of an individual in France has been estimated by IRSN at 3.7 millisieverts (mSv) per year; the sources of this exposure are as follows:

– representing 1 mSv/year, naturally occurring radioactivity, excluding radon (in particular see the 2009 publication by ASN, the Ministry for Health and the IRSN on the radiological quality of the water distributed by public networks);

– representing 1.4 mSv/year, radon, which varies widely. This exposure is as yet inadequately documented: the creation of a radon exposure database, as required by the second national action plan for radon-related risks, is a key step towards obtaining a clearer understanding of these risks;

– representing 1.3 mSv/year, medical treatments, with a clear upwards trend (from 0.8 mSv per year in 2002 to 1.3 mSv per year in 2007) primarily due to the higher doses delivered during diagnostic examinations. At the end of 2010, ASN sent the Minister for Health proposals for action to control this rise;

– representing 0.03 mSv/year, the other artificial sources of exposure: past airborne nuclear tests, Chernobyl accident, releases from nuclear installations.

The automated monitoring networks managed by IRSN nationwide allow real-time monitoring of environmental radioactivity, signalling any abnormal variation.

Some workers are subject to particular levels of exposure. With regard to workers in nuclear activities, the annual dose remained below 1 mSv (effective annual dose limit for the public) for more than 95% of the workforce monitored. The number of monitored workers for whom the annual dose exceeded 20 mSv (regulation limit for nuclear workers) has fallen significantly. The same applies to the collective dose (fall of about 45% since 1996) whereas the population monitored has risen by about 40%. For workers in activity sectors entailing technological enhancement of naturally occurring radioactive materials, the doses received in 83% of cases are less than 1 mSv/year. In a number of known industrial sectors however, it is quite probable that this value will be occasionally exceeded.

Finally, aircrews are subject to particularly close monitoring owing to their exposure to cosmic radiation at high altitude. Of the recorded doses, 85% are between 1 mSv per year and 6 mSv per year, while 15% are below 1 mSv per year.

In addition to its regulation and inspection duties, ASN closely follows developments in research and available knowledge in the fields of health and ionising radiation and international radiation protection doctrine. ■

2 The principles and players in regulating nuclear safety, radiation protection and environmental protection

Nuclear activities must comply with the fundamental principles of the Environment Charter, the Environment Code and the two main legislative and regulatory texts which are the basis for the regulation of these activities: the 13th June 2006 Nuclear Security and Transparency Act (TSN Act) and the Public Health Code (CSP).

The principles involved are the prevention principle (anticipation of any environmental threat through rules and measures taking account of the "best available techniques at an economically acceptable cost), the "polluter-pays" principle (the polluter responsible for the environmental damage bears the cost of pollution prevention and remediation), the precautionary principle (the lack of certainty, in the light of current scientific and technical knowledge, must not delay the adoption of proportionate preventive measures), the participation principle (the populations must take part in determining public decisions), the justification principle (a nuclear activity can only be carried out if justified by the advantages it offers by comparison with its inherent exposure risks), the optimisation principle (exposure to ionising radiation must be kept as low as is reasonably achievable), the limitation principle (the regulations set limits for an individual's exposure to ionising radiation resulting from a nuclear activity except for medical or biomedical research purposes) and the principle of the nuclear licensee's responsibility for the safety of its installation.

The nuclear activity regulators

In France, responsibility for the regulation of nuclear safety and radiation protection lies essentially with three players: Parliament, the Government and ASN. The TSN Act and the CSP define the respective roles of the Government and ASN.

In addition to its role of passing laws dealing with nuclear safety, Parliament regularly monitors the regulation of nuclear safety

Presentation to OPECST of the ASN 2009 report on the state of nuclear safety and radiation protection in France – April 2010

and radiation protection, in particular through its special commissions, which conduct hearings, or the Parliamentary Office for the Evaluation of Scientific and Technological Choices (OPECST), which has issued a number of reports on this subject and to which ASN presents its annual report on nuclear safety and radiation protection in France.

On the advice of ASN, the Government defines the general regulations for nuclear safety and radiation protection. Also on the advice of ASN, it takes key individual decisions concerning BNIs (creation or decommissioning authorisation, closure in the event of unacceptable risk, etc.). It is responsible for civil protection in an emergency.

In the current Government organisation, the ministers responsible for nuclear safety are the Minister for Ecology, Sustainable Development, Transport and Housing and the Minister for the Economy, Finance and Industry, while the Minister for Labour, Employment and Health is responsible for radiation protection.

In the *départements*, the *préfets*, as representatives of the State, are the guarantors of public order and have a particular role to play in the event of an emergency, given that they are in charge of prevention measures for the population. The *préfet* also takes part in the various procedures concerning the nuclear installations in his département, overseeing local consultations and providing the Ministers or ASN with his recommendations as applicable.

Other territorial institutions intervene in areas of interest to ASN, in particular the regional health agencies (ARS).

ASN is an independent administrative authority (AAI) created by the TSN Act. It is responsible for regulating nuclear safety and radiation protection and contributes to informing the population on these subjects. It sends the Government proposals for regulatory texts and is consulted on the texts prepared by the Ministers. It clarifies the regulations by issuing regulatory decisions which are then sent to the competent ministers for approval. It issues certain individual authorisations. Nuclear activities are monitored and inspected by the ASN staff and by organisations duly authorised by ASN. ASN contributes to France's European and international actions. It alerts and informs the Authorities of third-party States in the event of a radiological emergency and in turn receives alerts and information from them. Finally, it provides its assistance for management of radiological emergencies.

ASN can call on the technical expertise provided by the Institute for radiation protection and nuclear safety (IRSN) and by the Advisory Committees that it has set up.

ASN has made a commitment to research, to identify areas of knowledge essential for medium and long-term expertise. In 2010, it therefore created a Scientific Committee.

ASN is run by a Commission of five full-time, non-revocable Commissioners, appointed for a non-renewable six-year mandate by the President of the Republic, the President of the Senate and the President of the National Assembly. It has head

office departments and eleven regional divisions around the country.

ASN's total workforce on 31st December 2010 stood at 451. In 2010, the ASN budget reached 52.2 million euros, not including the services it receives from certain ministries for the operation of its head office departments or regional divisions. The IRSN also receives a government subsidy to cover the technical assistance it provides to ASN. In 2010, this amounted to 78.1 million euros (in 2011, this subsidy will be partially replaced by the revenue from a tax levied on the licensees of large nuclear facilities).

These resources as a whole allow ASN to perform most of its duties. However, these credits are at present split between four budget programmes, within which they are not always clearly identified. ASN therefore hopes to see a simpler system put into place, giving greater visibility and flexibility for financing the regulation of nuclear safety and radiation protection.

2010 was the first year of implementation of the multi-year strategic plan (PSP) for the period 2010-2012, adopted by ASN at the end of 2009.

Consultative bodies

The organisation of nuclear security and transparency also involves a number of consultative bodies, in particular the High Committee for Transparency and Information on Nuclear Security (HCTISN), an information, consultation and debating body for the risks related to nuclear activities and the impact of these activities on human health, the environment and nuclear security. There is also the French High Public Health Council (HCSP), a scientific and technical consultative body reporting to the Minister for Health and which takes part in defining multi-year public health objectives, evaluates the extent to which national public health targets are met and helps with their annual monitoring. ■

3 Regulations

The legal framework for radiation protection is based on international norms, standards and recommendations issued by various organisations, including the International Commission on Radiological Protection (ICRP), an NGO which publishes recommendations about protection against ionising radiation (the latest recommendations appear in the 2007 ICRP publication 103), the International Atomic Energy Agency (IAEA) which regularly publishes and revises nuclear safety and radiation protection standards, and the International Organisation for Standardisation (ISO) which publishes international technical standards.

At the European level, pursuant to the Euratom Treaty, various directives lay down basic rules for radiation protection and, since 2009, for safety. These directives are binding on all member States. In late 2010, the European Commission presented a draft directive on the management of radioactive waste and spent fuel.

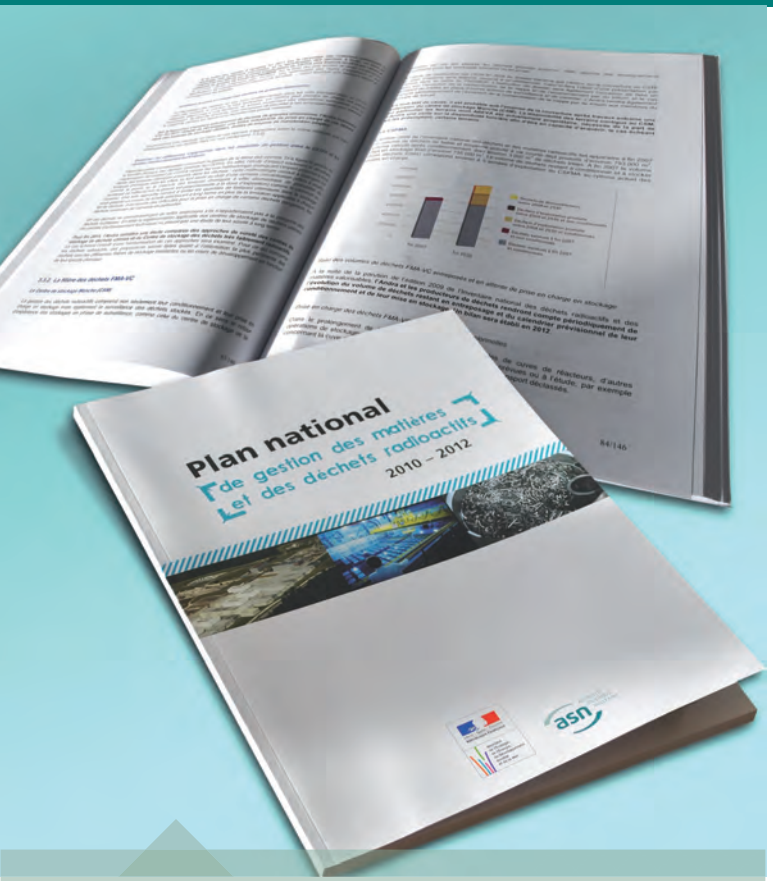
Concerning radiation protection, a process to merge and revise a number of directives led in March 2010 to the production of a draft directive, currently being examined. ASN plays an active role in the process to constitute a European regulatory framework.

Nationally, the legal framework for nuclear activities has been extensively overhauled in recent years. The legislative arsenal is now relatively complete and the publication of the implementing texts is well advanced, albeit not yet complete. The main requirements are contained in the Public Health Code (CSP) and the TSN Act, which should be incorporated into the Environment Code in 2011. Other texts are more specialised, such as the Labour Code, which deals with radiation protection of workers, or the 28th June 2006 Planning Act on the sustainable management of radioactive materials and waste (known as the "Waste" Act). Finally, various texts apply to certain nuclear activities but without being specific to them.

The activities regulated by ASN include a number of different categories presented below, along with the relevant regulations.

Basic nuclear installations (BNI): This concerns the 126 largest nuclear installations located on about 40 sites. These are nuclear power generating sector facilities (nuclear power plants, main "fuel cycle" installations), the large radioactive material stores and repositories, certain research facilities and the large accelerators and irradiators.

The BNI legal regime is defined by part IV of the TSN Act and its implementing decrees. This regime is said to be "integrated" because it aims to prevent or manage all risks and detrimental effects that a basic nuclear installation is liable to create for man and the environment, whether or not radioactive in nature. It in particular requires that the creation or decommissioning of a BNI be authorised by a decree issued on the advice of ASN, and that this decree authorises start-up of the installation and



Second edition of the National radioactive materials and waste management plan 2010-2012

stipulates requirements regarding its design and operation with respect to protection of the population and the environment.

Following the adoption of the TSN Act, ASN in 2008 began overhauling general technical regulations, jointly with the Ministry responsible for ecology. This should lead to the publication of a ministerial order and about twenty ASN regulatory decisions. In 2010, the draft order and ten draft decisions were discussed with all the stakeholders. ASN hopes to see most of these texts published during the course of 2011.

The transport of radioactive materials: The safe transport of radioactive materials is based on the "defence in depth" principle involving on the one hand the packaging and its content, which must withstand the foreseeable transport conditions, and on the other the means of transport and its reliability, plus the response measures deployed in the event of an incident or accident. Responsibility for implementing these lines of defence lies with the consignor.

The regulations concerning the transport of radioactive materials have a particularly international flavour. They are based on the IAEA recommendations integrated into the national agreements covering the various modes of dangerous goods transport. At a European level, the regulations are grouped into a single 24th September 2008 directive, transposed into French law by an order dated 29th May 2009.

Within this legal framework, ASN is responsible for approving package models for the most hazardous shipments. Working groups will be set up in 2011 for the forthcoming revision of the radioactive materials transport regulations (publication planned for 2012/2013).

Small-scale nuclear activities: This category covers the many fields that use ionising radiation, including medicine (radiology, radiotherapy, nuclear medicine), human biology, research, industry and certain veterinarian, forensic or foodstuff conservation applications.

The Public Health Code (CSP) created a system of authorisation or notification for the manufacture, possession, distribution (including import and export), and utilisation of radionuclides or products or devices containing them. The authorisations are issued by ASN and the notifications are filed with its regional divisions.

ASN is continuing to publish the decisions required by the CSP and the Labour Code updated at the end of 2007. This will continue in 2011. Moreover, in 2011, ASN should begin to take charge of regulating "source security".

Radioactive waste: In the same way as any other industrial activity, nuclear activities produce waste. Some is radioactive. The three fundamental principles underpinning rigorous management of radioactive waste are: the responsibility of the waste producer, the traceability of the waste and information of the public. If a management system based on these principles is to be fully effective, it must rule out any general radioactivity threshold ("release threshold") below which the disposal of waste from nuclear installations would be unregulated.

The technical management requirements to be implemented must be tailored to the risk presented by the radioactive waste. This risk can primarily be assessed on the basis of two parameters: the activity level, which contributes to the toxicity of the waste, and the half-life, defined by the time after which the activity is halved.

Finally, radioactive waste management must be determined prior to any creation of a new activity or any modification of an existing activity, in order to optimise the waste management solutions and ensure that there are channels for dealing with the various categories of waste liable to be produced, from the upstream phase (production of waste and packaging) to the downstream phase (storage, transport, disposal).

At the European level, pursuant to the Euratom Treaty, various directives lay down basic rules for radiation protection and, since 2009, for safety. These directives are binding on all member States.

Contaminated sites: The management of sites contaminated by residual radioactivity, either as the result of a past nuclear activity or an activity which produced a concentration of natural radionuclides, warrants specific radiation protection measures. Depending on the current and future uses of the site, decontamination objectives must be set and the removal of the waste produced during clean-out of the contaminated premises and soil must be managed, from the site up to storage or disposal.

In the event of long-term exposure of humans to ionising radiation, Article R. 1333-90 of the CSP gives the *préfet* the duty, after notifying ASN, of taking various protective measures (definition of a perimeter, deployment of a system for monitoring exposure, regulating access or use of the land and buildings, restrictions on marketing of foodstuffs produced in the zone, taking charge of the contaminated materials, etc.).

Activities involving technological enhancement of naturally occurring radioactive materials: Certain professional activities which cannot be defined as "nuclear activities" can lead to a significant increase in the exposure to ionising radiation for the workers and, to a lesser extent, for the neighbouring populations. This in particular concerns activities which use raw materials, construction materials or industrial residues containing naturally occurring radionuclides, not used for their radioactive, fissile or fertile properties. Examples are the phosphate mining and phosphated fertiliser production industries, the dye pigments industries, in particular those using titanium oxide and those utilising rare earth ores such as monazite. The radiation protection measures required in this field are based on a precise identification of the activities, an estimation of the impact of exposure for the persons concerned, the implementation of corrective measures to reduce this exposure, if necessary, and to monitor it.

Monitoring of human exposure to radon in premises open to the public focuses on the risk to the general population, but also to workers. This is a priority radiation protection measure in geographical areas where there is high potential for radon exhalation owing to the geological characteristics of the terrain. A strategy is required to reduce this exposure if the measurements taken exceed the regulatory action levels. Monitoring obligations have been created. ■

4

Regulation of nuclear activities and exposure to ionising radiation

In France, the licensee of a nuclear activity is responsible for the safety of its activities. It cannot delegate this responsibility and must ensure permanent monitoring of its installation.

ASN's regulation of nuclear activities consists in ensuring that any party responsible for a nuclear activity assumes its full responsibility and complies with the requirements of the regulations with regard to safety and radiation protection. ASN adapts the scope, methods and intensity of its regulation and inspections to the health and environmental safety stakes involved. Some inspections can be carried out by organisations and laboratories with the required level of expertise, validated by ASN approval. Regulation and inspection may take place with the support of the IRSN.

ASN checks compliance with the general rules and special requirements concerning nuclear safety radiation protection that apply to the licensees of basic nuclear installations (BNI), those responsible for construction and utilisation of pressure equipment (ESP) used in BNIs, those responsible for radioactive material transport activities, those responsible for activities entailing a risk of exposure of the public and workers to ionising radiation, those responsible for implementing measures to monitor exposure to ionising radiation, and the organisations and laboratories approved by itself.

Regulation and inspection have been broadened and today include organisational and human factors, taking account of individual and collective behaviour, management, organisation and procedures, relying on a variety of sources: significant events, inspections, relations with the stakeholders (personnel, licensees, contractors, occupational physicians, inspection services, approved organisations, etc.). They includes inspection of environmental protection measures and, in the nuclear power plants, the correct application of the Labour Code.

Inspection is one of ASN's primary means of monitoring. The inspections are generally carried out by two inspectors, if necessary with the assistance of an IRSN engineer specialising in the installation being inspected or the technical topic of the inspection.

The inspections can be unannounced or the licensee can be notified several weeks before the visit. They mainly take place on the site or during the course of the activities (construction site, transport operation). They can also concern the head offices or design offices of the larger nuclear licensees, the workshops or design offices of subcontractors, construction sites, plants or workshops manufacturing various safety-related components.

ASN has recourse to different types of inspections: routine inspections, in-depth inspections which take several days and require ten or so inspectors, inspections with sampling and measurements to run discharge checks independently of those carried out by the licensee, inspections in the aftermath of a significant event, construction site inspections which ensure a significant ASN presence on the sites during reactor outages or specific work, especially during the decommissioning phase.

With regard to enforcement and sanctions, ASN has a range of tools at its disposal, such as the inspector's comments to the

Tritium White Paper website,
http://livre-blanc-tritium.asn.fr/

licensee, the official letter from ASN to the licensee, formal notice from ASN to the licensee to rectify the administrative situation or meet certain specified conditions, within a specified period of time, administrative sanctions applied following formal notice. As necessary, ASN may suspend or revoke its authorisation. In parallel with ASN's administrative action, the inspector can draft reports which ASN sends to the public prosecutor's office with a view to initiating criminal proceedings.

With regard to monitoring environmental radioactivity, which is essentially carried out by the IRSN, which conducts nationwide monitoring, and by the BNI licensees in compliance with the terms of the discharge licenses, ASN approves specialist laboratories to check the quality of their measurements. The results of these measurements are centralised on the national environmental radioactivity monitoring network and are made available to the public on the *www.mesure-radioactivite.fr* website.

The main significant events of 2010

In 2010, ASN carried out 1,964 inspections on BNIs, radioactive material transport operations, activities involving ionising radiation, the organisations and laboratories it approved and the construction and utilisation of pressure equipment for BNIs.

With regard to enforcement and sanctions, ASN took administrative measures (formal notice, suspension, etc.) against six nuclear activity contractors and licensees. Further to the breaches found, it sent eighteen reports to the public prosecutor, including four for violation of conventional safety requirements in nuclear power plants.

With regard to protection of the environment, the two pluralistic think tanks set up by ASN in 2008, concerning sources and the health and environmental impact of tritium, submitted their conclusions and recommendations to ASN in April 2010. The work done recalled the low impact of tritium discharges in France, but also highlighted the need to carry out additional studies and research to confirm current data and knowledge on the behaviour of tritium in the environment. On the basis of the conclusions and recommendations of the think tanks, ASN proposed a plan of action for standardising tritium measurement, for the management of tritiated discharges, and for improvements to environmental monitoring and estimation of the impact of tritium. The entire Tritium White Paper, including the ASN plan of action, is available on the *http://livre-blanc-tritium.asn.fr* website.

Outlook

For 2011, ASN has scheduled 1,920 inspections of BNIs, radioactive material transport operations, activities involving ionising radiation, the organisations and laboratories it approved and the construction and utilisation of pressure equipment for BNIs.

ASN has initiated a review of the significant event notification procedures, which will take account of the small-scale nuclear facilities event experimental notification guide and the regulatory changes that have occurred in the BNI field. The notification criteria and procedures will be clarified and harmonised between the various sectors.

ASN will continue with implementation of its tritium action plan. This action plan will continue to be monitored by an oversight committee, which will meet for the first time in early 2011.

With regard to monitoring environmental radioactivity, ASN will be continuing the work begun with all the players on the national monitoring network. This will involve drawing conclusions from one year of operation of the national environmental radioactivity monitoring network website and defining changes to the monitoring strategy implemented around nuclear sites and in the rest of the country.

Finally, ASN is preparing to regulate and inspect a new field, that of radioactive source security (see chapter 10). ■

5

Emergency situations

Even if nuclear activities are designed to be carried out in such a way as to prevent accidents, the principle of defence in depth means that provision must be made to deal with an emergency situation concerning these activities, by both the licensee and the public authorities.

Management of these emergency situations is based on special response organisations and emergency plans. In situations such as these, ASN assists the *préfet* and the Government, checks the soundness of the decisions taken by the licensee and informs the public, international organisations and the countries likely to be concerned by the accident.

This regularly tested and evaluated arrangement is regularly revised, to take account of operating experience feedback from exercises and from the handling of real situations.

The main significant events of 2010

With regard to managing urban development around BNIs, the circular of 17th February 2010 from the Ministry for ecology asked the *préfets* to exercise greater vigilance concerning urban development in the vicinity of nuclear installations. This circular, which ASN helped draft in 2009, states that particular attention must be given to projects that are sensitive with regard to their size, their purpose or potential problems with regard to protection of the population in the immediate danger zone.

This circular gave ASN and the General Directorate for Risk Prevention (DGPR) the role of coordinating a pluralistic working group to define ways of controlling activities around nuclear installations.

In 2010, ASN coordinated work with the administrations, elected officials and licensees concerned, which led to the drafting of a guide presenting the general principles for controlling urban development: ensuring that nothing impedes the implementation of the emergency plans, controlling population growth inside the danger zone, giving preference to land use development outside the danger zone and ensuring controlled development meeting the needs of the resident population.

ASN aims to see these principles applied at the local level and, following a wide-ranging consultation, incorporated into urban planning documents so that the neighbouring populations are better informed and protected against the risks generated by nuclear installations.

Consuming stable iodine tablets is one way that the populations can protect themselves in the event of a radiological emergency. In 2009, jointly with the other administrations and EDF, ASN oversaw the fourth iodine tablets distribution campaign to the populations living around NPPs. This comprised three phases: collection from the pharmacy, mailing of tablets direct to the home, provision of a permanent stock in the pharmacies.

Nationwide, following the first distribution phase, nearly 50% of those concerned collected boxes of tablets from their pharmacy. In early 2010, boxes were mailed directly to persons who had not collected theirs. Following this second phase, the overall coverage of the population around the NPPs is about 93%.

Complete operating experience feedback will be collated in 2011 from all the stakeholders concerned, along with a more precise review with the *préfectures*[3]. A survey was conducted to find out why boxes were not collected and will help optimise the procedures for stable iodine distribution to the populations.

The Steering committee for managing the post-accident phase of a nuclear accident or radiological emergency situation (CODIRPA) set up a new organisation in 2009 and created two commissions, one dedicated to the transition phase, the other to long-term studies. CODIRPA commission 1 produced an operational guide in 2010 covering management plans for making the transition from the emergency phase, giving the local public authorities information of use for preparing their local plan for the end of emergency phase transition. The first draft of this guide is being trialled in a number of pilot *départements* which are home to an NPP, but also in a number of *communes*[4] involved in preparing the radiological part of the communal safeguard plan. Commission 2 is also preparing guidelines for management of the long-term phase, in particular taking account of international work (CORE, COREX) carried out in Belorussia after the Chernobyl accident.

In 2010, ASN prepared the international seminar scheduled for May 2011, the aim of which is to share CODIRPA's work with the local stakeholders (préfectures, communes, CLI, etc.), national experts and foreign experts engaged in comparable work, plus foreign radiation protection authorities and the French and foreign organisations concerned.

In 2010, ASN's emergency response centre was activated once owing to the meteorological situation threatening the le Blayais NPP (storm Xynthia).

In 2010, ASN continued its meetings with its foreign counterparts responsible for managing emergency situations. ASN met the British, Irish, Swiss and German authorities during the course of crisis management discussion meetings. ASN also welcomed a delegation from the USA who, on 9th September 2010, came to observe a nuclear emergency exercise on the Penly site. In November 2010, ASN was invited by its Spanish counterpart (CSN) to observe a dirty bomb attack post-accident management exercise.

Seven national exercises were held in 2010 and tested the provisions of the end of emergency phase transition guide drafted by the CODIRPA.

3. Office of the *préfet*
4. Smallest administrative subdivision administered by a mayor and a municipal council

ASN command centre during the emergency exercise in the Cattenom NPP on 8th April 2010

Seven national exercises were held in 2010 and tested the provisions of the end of emergency phase transition guide drafted by the CODIRPA.

Outlook

In 2011, ASN will be involved in meeting national emergency exercise objectives. They concern the performance of an exercise to test the security/safety interface, to test the response procedures defined by the CODIRPA, the actual evacuation of the populations, the inclusion of extensive communication to the population, a scenario involving a "minor" accident, the gravity of which does not necessarily require immediate implementation of the off-site emergency plan (PPI) and the performance of an exercise concerning a major fire. A nuclear or radiological emergency of seismic origin will also be simulated.

ASN will continue its work to reinforce its doctrine on controlling urban development around basic nuclear installations. Via the *préfet*, ASN has the duty to inform local councils of the risk generated by nuclear installations. This information role must be carried out coherently and systematically for all installations which have a PPI. In the longer term, a methodology will need to be defined for establishing public protection restrictions to control urban development and thus limit the consequences of an accident occurring in an installation.

In the post-accident domain, the international seminar scheduled for May 2011 will give an overview of all the work currently in progress. The expected publication of the end of emergency phase transition guide and the management guidelines for the transitional and long-term phases will be accompanied by a debate on the future programme of work in the post-accident field and the resulting changes to CODIRPA's current organisation. ■

6 Public information and transparency

"Transparency in the nuclear field consists in the set of provisions adopted to ensure the public's right to reliable and accessible information on nuclear security" (article 1 of the TSN Act). ASN is fully aware of its role in implementing these transparency provisions of the TSN Act.

ASN strengthens its own transparency-related actions through active communication with the general public, the media, the institutional public and the professionals.

It monitors application of the TSN Act by the stakeholders and supports action in favour of transparency by the local information committees (CLI) and the French High Committee for Transparency and Information on Nuclear Security (HCTISN).

In its regulation of nuclear licensees, ASN is developing compliance with the transparency obligations contained in the TSN Act. To anyone who so requests, the licensees are now required to transmit the information in their possession on the risks linked to their activity and the safety or radiation protection measures they have taken to prevent or minimise these risks.

Every year, ASN presents its Report on the state of nuclear safety and radiation protection in France to Parliament. Discussions with its institutional, parliamentary and local authority audiences enable it to be more effective in its duties and exercise the independence granted to it by the TSN Act.

The main significant events of 2010

In 2010, ASN reinforced its public information activities. Since 2002, ASN has been publishing follow-up letters to all the

inspections carried out in basic nuclear installations (BNI) and, since 2008, ASN has been publishing follow-up letters to radiotherapy inspections. Since April 2010, ASN has also included small-scale nuclear facility inspection follow-up letters on its *www.asn.fr* website.

In 2010, new sections were added to the site, for example those devoted to the ASN's Scientific Committee, to ASN strategy and doctrine. Several dossiers, including "sites polluted with radium and other radioactive substances" and the Tritium White Paper, were also placed on-line. In addition to updating all the regional pages, the 2009 reviews taken from ASN's annual report were included for each division. Furthermore, in order to take part in the debate on nuclear safety, a public consultation was launched in May 2010 on "the overhaul of the BNI general regulations". This will continue into 2011.

Since 2010, the "Advisory Committees (GPE)" section of its website presents summaries of the IRSN reports presented to the GPE and the opinions that IRSN sent to the Authorities. Since March 2010, ASN has been present on social networks such as Facebook, Twitter and Dailymotion. In 2010, more than 300,000 browsers logged onto the *www.asn.fr* site and nearly two million pages were consulted.

The *Contrôle* magazine in 2010 looked at the regulation and inspection of nuclear reactor pressure equipment; the monitoring of environmental radioactivity and the construction of a European nuclear safety and radiation protection hub.

In April 2010, ASN launched the magazine *Transparence* aimed at ASN personnel, but also distributed to an outside audience (institutional players, public authorities, stakeholders, schools, etc.).

The fourth stable iodine tablets distribution campaign around the EDF nuclear power plants took place between June 2009 and the first quarter of 2010. It concerned about 500,000 people within a 10 kilometre radius around 19 French NPPs and involved a particular effort to inform the populations: personal letter addressed to each home concerned, national and local press coverage, pedagogical information documents (folders, posters, special website *www.distribution-iode.com*). Nationwide, 88% of those questioned said that they had heard about this campaign, 49.2% of those concerned collected their boxes and more than 338,000 boxes were delivered. A survey carried out in November 2010 showed that the public had contrasting perceptions of the nuclear risk. The radiation protection culture of the population therefore needs to be further developed in the field with the support of the local players (préfectures, CLI, communes, health professionals, schools).

Throughout 2010, through more than thirty national and regional press briefings, about twenty press releases, a hundred or so information memos and numerous interviews, ASN answered media questions on nuclear regulation in France. The media in particular queried ASN on topical and strategic issues: day to day safety of nuclear installations, the EPR reactor construction site at Flamanville, the level 2 incident in the ATPu (plutonium technology facility), the evaluation of EPR instrumentation & control, the extended operating life of NPPs, the safety level of the new reactors being built around the world.

In 2010, ASN also held joint press conferences on various subjects: launch of the national environmental radiation monitoring network (RNM) with the IRSN, the national radioactive materials and waste management plan, with the Ministry responsible for ecology (MEEDDM), the Tritium White Paper, the report from the Limousin Advisory Committee (GEP) on the management of the former uranium mining sites in France, with the MEEDDM.

In 2010, in Marseille (February 2010) and Avignon (December 2010) ASN organised regional discussion days on how the seismic risk is taken into consideration in the nuclear installations in the South of France.

With regard to the CLI, implementation of the TSN Act's provisions was almost complete in 2010, with the creation of new CLIs for sites on which they did not yet exist. At the end of 2010, there were thirty-six CLIs as stipulated by the TSN Act.

The CLIs are financed by the regional authorities and by ASN. In 2010 ASN devoted about 600,000 euros to the CLIs and their federation. It also submitted a proposal to the Government for implementation of the system, specified by the TSN Act, replacing the budget allocated to the CLIs based on their association status, by a levy on the BNI tax, but this system has not yet been put into place.

The HCTISN held four plenary meetings in 2010 and activated several working groups. It in particular drafted a report on the "transparency of the management of nuclear materials and waste produced at the different stages of the fuel cycle", which was submitted to the Minister for Ecology and the OPECST in July 2010. The High Committee continued its work on the topic "Transparency and confidentiality" and on the creation of a web portal for information about nuclear matters. On several occasions, it raised questions relating to waste (presentation of the PNGMDR, LLW-LL waste repository siting process, situation of former uranium mines, etc.). It was also able to discuss aspects of the "cancer" plan concerning radiation protection, considerations regarding environmental monitoring policy, and so on. During its plenary sessions, the High Committee also looked at various topical issues, inviting the main parties concerned to make presentations.

The matters presented and discussed during the HCTISN meetings can be consulted on its website, *www.hctisn.fr*.

Outlook

In 2011, ASN will continue to strengthen transparency and information on subjects within its scope, jointly with the other players and stakeholders. It will aim to develop the organisation of national and international debates on general subjects

ASN aims to ensure greater public involvement in its decision-making process and explain its decisions. It will therefore encourage greater public consultation via its website.

relating to nuclear safety and radiation protection, but also on society's approach to risk in general. ASN aims to ensure greater public involvement in its decision-making process and explain its decisions. It will therefore encourage greater public consultation via its website. The development of exchanges with institutional partners and stakeholders will also be a key area of progress for information of the public.

In 2011, ASN will also continue to work to develop application of the TSN Act's provisions on the transparency of nuclear activity licensees and procedures. It will contribute to the reform of the public consultation procedures regarding nuclear activities, as required by the Act constituting the national environment undertaking ("Grenelle 2" Act): this in particular involves a reform of public inquiries and, as proposed by ASN, the creation of a systematic public consultation procedure for projects liable to lead to a significant rise in water intake from or discharges into the environment by a BNI, but which do not require a public inquiry.

ASN will continue to monitor correct application of the new requirements concerning access to the information in the possession of the licensees and the safety reports. In this respect, it will examine the conditions for implementation of the recommendations that the HCTISN should be publishing in early 2011 regarding how to reconcile transparency and confidentiality as protected by law.

Following the consultations started in 2010, ASN will submit a proposal to the Government for extending to the field of transport the right of access to information in the possession of those responsible for nuclear activities.

22nd CLI conference, 8th December 2010 in Paris

Finally, ASN will continue its support for CLI activities. Together with the ANCCLI and jointly with the licensees, it will establish rules of good practice to make it easier for the CLIs to carry out their duties. It will renew its proposals to the Government aimed at giving the CLIs the means and resources they need. ■

7

International relations

The fleet of nuclear installations regulated by ASN is one of the largest and most diverse in the world. This extensive experience has led ASN to engage widely in international relations with its foreign counterparts with a view to strengthening safety and radiation protection worldwide and achieve the goal of becoming recognised as an "international benchmark".

The main significant events of 2010

Europe is the focus of ASN's international actions and it aims to help build a Europe with a leading role in nuclear safety, the safe management of waste and spent fuel and radiation protection. After the adoption of the European nuclear security directive in June 2009, the construction of a European nuclear safety and radiation protection hub is progressing, as indicated by the Commission's submission of a draft directive on the management of waste and spent fuel. This directive will complete the European nuclear safety and radiation protection regulations.

ASN makes an active contribution to the work of WENRA (Western European Nuclear Regulators' Association), an informal club created in 1999 at the initiative of the ASN Chairman and it today brings together the heads of all the safety regulatory authorities in the expanded European Union, plus Switzerland. The safety regulators from ten European countries without nuclear power generating reactors attend as observers and have been joined since 2010 by those from Armenia, Russia and Ukraine. The WENRA association has just adopted safety

objectives for the new nuclear power generating reactors in Europe. ASN hopes to see these objectives initially endorsed by the European institutions, and then promoted by the EU on the international stage. Moreover, the European regulators will in 2011 be organising the first European conference on nuclear safety.

In the field of radiation protection, the work by the HERCA (Heads of the European Radiological protection Competent Authorities) association led in 2010 to the creation of a European Radiation Passbook and to the joint declaration on the justification for the use of full-body X-ray scanners in airports. The Commission should in 2011 adopt a draft directive revising the basic standards for the health protection of the population and workers against ionising radiation, in line with the recommendations of the ICRP and IAEA.

Outside Europe, there are numerous multilateral cooperation agreements, in particular within IAEA and the NEA. Within IAEA, ASN actively participates in the work of the Commission on Safety Standards (CSS) which drafts international standards for the safety of nuclear installations, waste management, the transport of radioactive materials and radiation protection. Although not legally binding, these standards do constitute an international reference, including within Europe. The ASN Chairman has been Chairman of the CSS since 2005. ASN also takes part in the IRRS (Integrated Regulatory Review Services) audit missions.

The United States Nuclear Regulatory Commission (NRC) and ASN took the initiative of launching an international project, the Multinational Design Evaluation Program (MDEP) for the joint evaluation of the design of new reactors. This programme, which has been expanded to include numerous partners worldwide and whose secretariat has been entrusted to the OECD's Nuclear Energy Agency (NEA), shares information about the safety assessment of the EPR and AP1000 reactors. The initiative eventually aims to harmonise the safety objectives, codes and standards associated with analysing the safety of a new reactor.

ASN has signed bilateral cooperation agreements with many countries. The usually annual meetings of the "steering committee" identify subjects for cooperation and the joint action to be taken. ASN also promotes staff exchanges with its foreign counterparts, contributing to improved mutual understanding and development. This may concern isolated actions, such as cross-inspections and short-term missions, in order to examine a precise technical topic, or the secondment of an inspector to a foreign regulator for an extended period of time (one to three years). It is also worth noting the appointment of representatives of foreign safety regulators to the ASN advisory committees. ASN adopted this practice, which enables experts from other countries not only to be members of these committees, but also sometimes to stand as chair or vice-chair.

ASN is often contacted by countries seeking its assistance. ASN first analyses the nuclear safety situation of the countries issuing the request. If, following this analysis, ASN concludes that safety cannot be guaranteed, it expresses its reservations as to the suitability of the envisaged cooperation. In those cases in which ASN decides to initiate cooperation, the aim is to enable the countries concerned to acquire the independence and safety and transparency culture essential to setting up an effective and credible national system for the regulation of nuclear safety and radiation protection. ASN is also examining ways of pooling nuclear safety assistance with its counterparts within the Regulatory Cooperation Forum, a structure hosted by IAEA.

Visit by E. Leeds, Director of the NRC's Office of New Reactors, to the AREVA components manufacturing plant in Chalon/Saint-Marcel – June 2010

Finally, France is a contracting party to four international agreements aimed at preventing accidents linked to the use of nuclear energy and mitigating their consequences. IAEA is the depository of these agreements and acts as secretary. 2010 was devoted to preparing the ASN report for the fifth review meeting of the Convention on Nuclear Safety, to be held in Vienna in April 2011.

Outlook

In 2011, in the field of international relations, ASN will focus on continuing its active contribution to improving nuclear safety and radiation protection worldwide, within the context of the bilateral relations already established, as well as for those countries expressing a serious interest in the adoption of nuclear energy. This goal will be pursued while maintaining a strong and permanent ASN presence in European and international bodies. ASN's aim is to have the new reactor safety objectives defined by WENRA endorsed by the European institutions and then adopted internationally. The European regulators will also be organising the first European conference on nuclear safety in June 2011. ■

8

Regional round-up of nuclear safety and radiation protection

This chapter presents the state of nuclear safety and radiation protection as seen locally by the ASN regional divisions.

Summary sheets present the basic nuclear installations and small-scale nuclear facilities (medical, industrial and research) and the local actions particularly representative of ASN's work in the regions.

This presentation follows the same principle as that adopted in the various ASN information media, *www.asn.fr* or the quarterly *Contrôle* magazine, and aims to allow easier access to local information (for more information, please consult the ASN website - *www.asn.fr*). ■

9

Medical uses of ionising radiation

Whether for diagnosis or therapy, medicine uses various sources of ionising radiation, produced either by electric generators or by radionuclides.

In France, there are several thousand conventional or dental radiology appliances, about a thousand computed tomography facilities, more than 200 nuclear medicine departments using unsealed sources for in vivo or in vitro diagnosis and internal radiotherapy, and 180 external radiotherapy centres treating some 200,000 patients every year.

The technologies involved are continuing to evolve (multi-detector scanner) as are their conditions of use, such as tele-radiology, which enables radiology examinations to be carried out and interpreted remotely.

The medical benefits and usefulness of these techniques have been proven. However, the exposure of health professionals, patients and the population to the associated radiation has to be justified and controlled and the currently expanding applications require close attention. This is why about 180,000 people working in the field of medical uses of ionising radiation were subject to dosimetric monitoring of their exposure. Medical radiology alone accounts for 65% of the medical personnel exposed.

The main significant events of 2010

The number of significant radiation protection events (ESR) notified to ASN in the medical field in 2010 stands at 419, up by more than 50% since 2008. Of the 372 notifications analysed, it would seem that 66% of the ESR concern radiotherapy, 18% nuclear medicine, 13% diagnostic and dental radiology and 3% interventional radiology.

Of these events, 29 concern persons working in medical facilities, 5 of which were rated 1 on the INES scale. Although few in number, they are rising and either reflect practices involving particularly high exposure (long-duration interventional radiology procedures, preparation of radiopharmaceuticals), or professionals who are regularly exposed owing to their expertise or competence ("seniors" or radio-pharmacists). 282 events concern patients exposed for diagnostic or therapeutic purposes. It should be noted that the ESR notification approach in the field of radiotherapy has become significant and now accounts for nearly 66% of all notifications. In this field, the number of notifications received by ASN is unchanged in relation to 2009. The number of centres which have never issued a notification is also falling, 20% of centres as against 29% at the end of 2009.

The trends observed during the course of the experimental period confirm that the majority of the events notified are linked to organisational and human shortcomings (96%). ASN observes that the causes often focus on the operators and that the underlying causes linked to the organisation, the working environment or the institutional context are insufficiently examined when analysing the events, thus limiting the ability to enhance system reliability by identifying and implementing lines of defence.

Since 2007, radiotherapy health care safety has been a priority area for ASN regulation, entailing the annual inspection of each centre. ASN is also playing an active role in the work of the national committee for radiotherapy monitoring, run by the national cancer institute (INCa). The result in 2010 was the identification of additional measures to be incorporated into the

radiotherapy roadmap arising from the conclusions of the international conference on the radiation protection of patients, held by ASN in Versailles in December 2009. The conclusions of this conference were closely reviewed jointly with all the stakeholders concerned, in order to identify the measures required to complete the national radiotherapy plan overseen by INCa. This subject will be examined by the national plan supervisory committee in 2011.

The ASN inspections carried out in 2009 confirm the positive trend begun in 2008 with regard to the increased human resources deployed in the medical radiation physics field.

Since 2007, radiotherapy health care safety has been a priority area for ASN regulation, entailing the annual inspection of each centre.

However, as in the previous year, ASN observed that the medical radiation physics situation at the end of 2009 remained precarious in several centres, in particular those which directly employed too few medical radiation physicists (PSRPM) (about a dozen centres at the end of 2009). The steps taken in the centres to make up for PSRPM absences of less than and more than 48 hours, need to be more clearly defined. The inspections also confirm a positive trend with regard to the gradual implementation of radiotherapy safety and quality management. The results of these inspections show real commitment to the national radiotherapy plan on the part of the healthcare professionals. However, ASN identifies highly disparate degrees of progress in this approach depending on the centre, along with widely varying levels of commitment by the management. More specifically with regard to managing the preparation and performance of treatment, the situation is considered to be on the whole satisfactory. However, concerning risk management, few preliminary risk analyses are conducted, mainly owing to the fact that they will not be mandatory for quite some time and owing to a lack of time and/or specific expertise in this field. Finally, the notification and analysis of malfunctions have become widely applied. On the other hand, progress is needed in the analysis of causes and in the medium and long-term monitoring of measures to improve the healthcare safety and quality management system, as well as in the internal circulation of information concerning the malfunctions and the improvements made.

ASN inspection of the nuclear medicine department in the Nord de Saint-Denis radiology centre – December 2010

In the medical imaging field, both in France and the other Western countries, the significant rise in the doses delivered to patients (+50% between 2002 and 2007) is due to several factors, including:

– the increase in the number of examinations carried out, owing to their diagnostic performance,

– the rise in the number of scanners in use, which deliver higher doses than conventional appliances,

– the rise in the number of new examinations which deliver high doses (whole-body scanner, virtual colonoscopy, CT heart scanner, etc.).

This situation led ASN to organise a seminar in September 2010 with all the professionals and organisations concerned, the conclusions of which are available on the ASN website. ASN identified two main actions as a result of this seminar:

– encourage access to MRI through the regional planning of heavy equipment investments and through more effective pricing incentives in favour of MRI;

– continue efforts to train and recruit radiation physicists: this effort was started in 2008 in order to address urgent needs in the radiotherapy field and will need to be continued for at least five consecutive years to ensure adequate levels of medical imaging personnel.

Outlook

Until 2012, ASN will at the least be maintaining its inspections in all radiotherapy centres: it will be particularly vigilant concerning compliance with the requirement for the presence of a radiation physicist during treatment, as of the end of the interim period, for which transitional criteria were published in July 2009 by the Minister responsible for health, and the gradual development of quality assurance, regarding which the first requirements will be mandatory at the beginning of 2010. In this context, ASN will pay particular attention to those centres where, owing to a lack of manpower, the medical radiation physics requirements will need to be covered by external contracting or by resorting to collaboration between centres. ASN will be attentive to strengthening the medical radiation physics staffing levels.

In the coming years, particular attention will be needed on the rise in ionising radiation doses delivered to the patients. ASN will therefore be closely monitoring the creation of nationwide programmes by the Minister responsible for health, in particular concerning the growth in the numbers of non-irradiating imaging appliances, the development of decision-making tools for correct implementation of the justification principle and the continued reinforcement of human resources in medical radiation physics, which are the means of guaranteeing true implementation of the principle of optimisation of the doses delivered to patients. ■

10

Non-medical uses of ionising radiation

Industry, research and numerous other sectors use sources of ionising radiation in a wide variety of applications ranging from industrial irradiation, to non-destructive testing, to the detection of lead in paint. The radiation sources are either sealed or unsealed radionuclide sources or electric generators of ionising radiation.

Faced with this diversity, the safety of workers, the public and the environment in particular requires source management, from manufacture to end-of-life.

The main significant events of 2010

With regard to the activity regulations, the steps taken to revise the authorisation and licensing regimes initiated in 2008, with a view to simplification and graduation of the risks, led ASN in 2010 to issue new definitions of the requirements of the contents of the authorisation application files. Similarly, work to introduce a notification regime led to the publication of several approved decisions defining the scope and the procedures for implementation of the new regime.

Finally, in 2010, ASN continued with its general actions to boost awareness of and promote compliance with the regulations.

On the subject of justification, ASN initiated exchanges with its European counterparts on the issues associated with implementing this principle. The aim in particular is to minimise the disparities with the other members states, while preserving the way in which France applies the justification principle. For existing activities, justification is reassessed if current knowledge and technology so warrants. This is in particular the case for ionization smoke detectors, devices for which ASN in 2010 submitted a draft order to the Government and two draft decisions proposing gradual replacement by alternative technologies.

Old objects containing radioactive sources, such as lightning conductors and surge arresters, are still present around the country. ASN considers that these radioactive objects, even if not generally a risk as long as they are not handled, should be gradually collected in an organised manner by specialised companies. To raise the awareness of the professionals and ensure that these objects are recovered in good conditions, ASN in 2010 contacted all the professionals concerned to remind them of the regulations, while at the same time beginning inspections of companies involved in the collection of these objects.

A significant event occurred in May 2010 in the Feursmetal (Loire) plant, rated level 2 on the INES scale. Six people, along with the foundry premises and tools, were contaminated during an attempt to recover a radioactive source jammed inside a gamma radiography device guide tube.

The legislative and regulatory texts for implementing the monitoring of radioactive source protection against malicious acts are nearing completion. Although the additional means requested for this new role were not included in the Budget Act, the ASN Commission in September 2010 confirmed its approval of ASN's involvement in this role, as part of its duty to protect the general public interest.

ASN assessment

On the subject of industrial radiography, ASN feels that, depending on the company, the situation regarding consideration of the risk of worker exposure to ionising radiation varies widely and that improvements are still necessary. Even if the regulations are on the whole followed, progress must still be made in the preparation for interventions and the coordination between clients and contractors. Regional approaches for establishing charters of industrial radiography good practices are under way and should be continued.

With regard to research activities, action taken in recent years has produced significant results, particularly concerning the involvement of persons with competence for radiation protection, ASN has observed an overall awareness of radiation protection issues. However, the lack of commitment by certain parties and a legacy from past activities that is problematical for installation conformity with radiation protection requirements, along with the disposal of very old "forgotten" radioactive sources, remain hurdles that are sometimes hard to overcome.

The inspections carried out in 2010 in veterinary surgeries showed that the administrative picture was still far from satisfactory. Technical radiation protection checks, workstation and risk analyses all still need to be improved. However, ASN has seen considerable progress in recent years. At present, the vast majority of structures employ a person with competence for radiation protection and the workers receive dosimetric monitoring; a large number of administrative regularisation files were submitted in 2010.

Outlook

With regard to regulation of the applications of ionising radiation in the non-medical sector, ASN is aiming to ensure that the licensees take full account of the risks linked to the use of ionising radiation. ASN will therefore be continuing its oversight of radioactive source suppliers, both for examination of authorisation files and inspections within the entities. On the user side, it will focus on the use of sources of ionising radiation on worksites and on searching for establishments in breach of the regulations.

As a result of incidents involving gamma radiography sources, ASN has launched specific measures targeting high-level sources. It will continue with these measures, enhancing the aspects relating to safety, in anticipation of its new roles. ■

11

Transport of radioactive materials

About 900,000 packages of radioactive materials circulate in France every year, or a small percentage of the total dangerous goods traffic. Most (two-thirds) comprise packages for medical or industrial uses (lead analysers, gamma radiography devices, etc.). These packages are extremely diverse.

Their radioactivity varies by more than twelve orders of magnitude, that is from a few thousand becquerels (pharmaceutical packages) to millions of billions of becquerels (spent fuel) and their mass from a few kilograms to about a hundred tons.

Road transport accounts for about 90% of radioactive material shipments, rail 3% and sea 4%. Air transport is widely used for small, urgent packages to be transported long distances, for example short-lived radiopharmaceuticals. All of these transport operations can be international.

The sectors using these packages are also extremely diverse. There is obviously the nuclear sector, but also the medical, conventional industrial and research sectors. These last three sectors account for more than 85% of the traffic involving radioactive material packages. The nuclear power generating cycle generates transport operations for a variety of radioactive materials. The most important represent about 300 annual shipments of new fuel, 250 of spent fuel, about thirty of MOX fuels and about sixty of plutonium oxide powder.

The main parties involved in the transport operation are the consignor and the transporter. The consignor is responsible for package safety and, when it hands the package over to the transporter, it accepts its liability via the shipment declaration.

ASN is responsible for the regulations concerning the safe transport of radioactive and fissile materials for civil uses and for monitoring their application. This safety must not be confused with security, or physical protection, which is the prevention of loss, theft or misappropriation of nuclear materials (usable for making weapons), for which ASN is not responsible.

ASN is thus closely involved in the various international exchanges associated with the drafting and implementation of these regulations.

In 2010, ASN issued 75 certificates for package models, defining their conditions of manufacture, utilisation and maintenance.

In 2010, ASN carried out 92 inspections at the various parties involved in radioactive material transport operations, consistently with the other regulators responsible for inspecting means of transport, conventional safety inspections in the transport sector or the protection of nuclear materials. The consignors and transporters receive constant attention, but the inspections also concern activities related to transport, such as the manufacture and maintenance of the containers. For example, in 2010, the inspections primarily concerned the following situations: handling of radioactive packages in airports, BNI field inspections, design, testing, manufacture and maintenance of containers, manufacture and testing of packages not subject to approval by the competent authority.

The observations or findings following the inspections show that the most frequent anomalies concern quality assurance and documentation, the responsibilities of the various parties, or compliance with procedures and instructions stipulated in the approval certificates, the safety files or, more generally, the regulatory texts.

The inspections in 2009 and 2010 show progress, especially in the drafting of the radiation protection programmes, which have been mandatory since 2001, but also reveal that this progress is as yet insufficient. ASN considers that the situation is unsatisfactory, in particular for packages which do not require approval by the competent authority. This situation is all the more unsatisfactory as these packages are the cause of a large share of the incidents that occurred in 2010.

In 2010, 53 events were rated level 0 and nine level 1. These events occurred during handling of packages or during the actual transport operation. They could also involve nonconformity with the regulations stipulated in the orders specific to each mode and in the package model approval certificates.

The medical, conventional industry and research sectors are the origin of about 46% of the transport events, even though they account for the vast majority of transport operations. This is no doubt due to a lack of notification from the professionals in the small-scale nuclear sector. It is therefore striking to note that most of the anomalies notified to ASN in the medical, conventional industry and research sectors are events which cannot be concealed, such as damage, theft or loss of packages, or road accidents. ASN considers this situation to be unsatisfactory, because a poor design or incorrect use of these packages can lead to the workers or public receiving doses that are higher than the regulation limits, in particular if their contents leak. The transport event notification obligation and procedures were recalled at the various information seminars. ASN supplements its regulation and inspection work by a more

pedagogical approach: four information seminars for the various radioactive material transport stakeholders were thus organised to present the key points and changes to the regulations, to recall the importance of notifying events that may have affected package safety.

Article 19 of the TSN Act states that the transparency requirements introduced by that same Act apply to the transport of radioactive substances once the quantities transported are higher than thresholds defined by decree. A first decree drafted by ASN was submitted to the various stakeholders in 2010.

The managers of the largest infrastructures were required by decree 2007-700 of 3rd May 2007 to submit a hazard assessment of their installation to the *préfet* of the *département* no later than May 2010. In 2010, ASN distributed a draft guide for the performance of radioactive material hazard assessments in transport infrastructures to provide the infrastructure managers with the methodology and data they need to determine the specific risks associated with radioactive materials and to be included in their hazard assessments.

By its very nature, transport is international. The regulations are therefore also essentially international. ASN is thus closely involved in the various international exchanges associated with the drafting and implementation of these regulations; multilateral exchanges with IAEA, or under the aegis of the European Commission, or bilateral exchanges with its counterparts. ASN was thus in close contact with its German counterparts on the occasion of the return of vitrified waste from the La Hague plant to the Gorleben site in Germany, in December 2010.

Outlook

In 2011, ASN will be continuing its regulation of packages not subject to approval, particularly in the medical, conventional industry and research sectors. ASN will pursue its efforts to harmonise and reinforce the nuclear industry's emergency plans to deal with a transport accident. ASN will also seek to improve the regulations for the transport of dangerous goods inside nuclear sites. ■

ASN inspectors, together with the IRSN, taking radioactivity measurements at Cadarache before the spent fuel shipment leaves for the Greifswald centre in Germany – December 2010

12

Nuclear power plants (NPP)

The design of the fifty-eight pressurised water reactors in the French nuclear power plants is on the whole the same. These plants are operated by a single licensee, EDF.

EDF has considerable engineering capacity and an organisation enabling it to take advantage of the benefits of this standardisation, and also to manage its drawbacks: given that the EDF NPPs provide nearly 80% of France's electricity, it is important to be able to prevent any serious and generic anomalies. ASN is particularly attentive to the measures adopted by EDF in this respect. Since 2007, EDF has also begun to build an EPR type reactor on the Flamanville site, for which ASN is in charge of regulating the design and construction, and at the end of 2010 it submitted a creation authorisation application for an EPR type reactor on the Penly site *(Seine-Maritime département)*. Finally, in 2010 and with the support of the IRSN and its advisory committees, ASN began to review the safety options for the planned 1,000 megawatt reactor being developed by the company ATMEA. This review should be completed by end 2011.

The main significant events of 2010

The periodic safety review associated with the third ten-yearly outages of the 900 MWe reactors

The periodic safety reviews are one of the cornerstones of safety in France, by requiring not only that the licensee maintain the

safety level of its installation, but also improve it. The safety review process comprises:

– a "conformity check", which requires an in-depth examination of the condition of the installation, to check that it is compliant with all the applicable safety requirements;

– an "in-depth review" of the installation to improve its safety level, especially by comparing the requirements applicable to the installation with those in force for more recent installations and taking account of national and international operating experience feedback.

Following these two steps, the licensee sends ASN a report, on the basis of which ASN then adopts a stance on whether or not to allow continued operation by the installation.

The third ten-yearly outages for the 900 megawatt reactors began in 2009 on Tricastin 1 and Fessenheim 1 and will end in about 2020 with those at Chinon. The periodic safety review associated with these ten-yearly outages concerned the following topics in particular: on-site flooding and explosions, fire, earthquake, resistance to extreme climatic conditions, protection of water intakes against oil slicks and situations liable to lead to simultaneous loss of the heatsink and electrical power supplies.

After adopting a stance in 2009 on the generic aspects of continued operation of the 900 megawatt reactors, ASN in 2010 began to determine its position, reactor by reactor, based on the results of the inspections carried out during the conformity check on each reactor during the third ten-yearly outage and the assessment of the safety review report for each one. In 2010, ASN thus considered that the Tricastin 1 reactor could be operated for a further ten years.

Inspection and maintenance operations conducted by EDF on the steam generators. In recent years, the inspections carried out on the steam generators, during maintenance and refuelling outages or as a result of unexpected events, revealed a certain amount of damage. Some, which was extensive and unanticipated, required that EDF take wide-ranging maintenance measures on many of its French NPPs, which could not fail to have an impact on the level of availability of its reactors. With regard to the damage observed on a steam generator at Bugey 3, the justification files produced by EDF were not felt by ASN and its technical support organisations to be sufficient to allow reactor restart before replacement of the steam generators concerned. This was then carried out between July and December 2010.

Ten-yearly inspection of the Tricastin NPP – May 2009

Reactor building, EPR construction site at Flamanville – December 2010

This operating experience feedback led ASN to ask EDF to carry out a complete review of steam generator design and monitoring, which should in particular ensure that the replacement operations are planned far enough in advance to prevent these items from suffering excessive damage. The first results were presented to ASN and its technical support organisation at the end of 2010 and in particular concern an overhaul of the maintenance programmes for this equipment, taking account of recent French and international operating experience feedback. EDF will also be continuing its steam generator replacement programme by carrying out these operations on the 1300 MWe reactors: manufacture of the equipment concerned will begin in 2011.

Regulation of construction of the EPR reactor in Flamanville

Construction work on the Flamanville 3 EPR reactor began in September 2007, following the Government's authorisation, based on a favourable opinion issued by ASN. In this opinion, ASN considered that the proposed design was able to meet the ambitious safety objectives it had set for new reactors.

The next regulatory step is "commissioning" authorisation by ASN. In preparation for this step, ASN in 2007 initiated a review of certain topics requiring lengthy examination and checks on the detailed design of the more important systems, including the control and instrumentation system, so that it could rule on their ability to comply with safety requirements. In accordance with the request submitted by ASN in 2009, consistent with the stance adopted by its Finnish and British counterparts, EDF reviewed the design of the I&C system for the EPR reactor. ASN considered in 2010 that these new proposals were a step in the right direction.

At the same time, ASN is in charge of oversight of reactor construction (detailed design studies, factory manufacturing, construction site), through documentary examinations and inspections, in a manner proportionate to safety, radiation protection and environmental protection issues. In 2010, with the

support of IRSN, ASN thus carried out 9 inspections in the engineering centres, 37 on the construction site, including 13 relative to conventional safety. ASN also carried out, or had approved inspection organisations carry out, nearly 900 checks on this equipment at the AREVA NP, its suppliers and subcontractors.

With regard to civil engineering activities on the site, and whenever anomalies were detected, ASN checked that EDF's handling of the problem was satisfactory from the safety standpoint.

Concerning the manufacture of nuclear pressure equipment, ASN assesses, or has approved inspection organisations assess, their conformity with the requirements of the regulations applicable to this equipment. This assessment involves documentary examinations and inspections at the manufacturers, as well as at their suppliers and subcontractors. In 2011, these actions will be supplemented by monitoring operations carried out on the Flamanville 3 site.

ASN is making efforts to impart an international dimension to the regulation described above, in particular by maintaining close relations with the safety regulators of countries in which construction of an EPR type reactor is either in progress (Finland) or planned. Therefore since 2009, ASN has reinforced its cooperation with the British (HSE) and US (NRC) regulators, including the secondment of British and American inspectors to ASN and French inspectors to the HSE and NRC. Jointly with IRSN, ASN also organised a specific seminar for the Indian safety regulator on EPR authorisation and regulation procedures. ASN is in addition an active participant in the new reactors Multinational Design Evaluation Program (MDEP). Four meetings devoted to the EPR reactor have been held within the framework of this programme. This cooperation in 2010 took the form of a joint inspection with STUK, in the presence of HSE, of the anomalies encountered on the reactor coolant piping intended for the Finnish EPR. These cooperative actions are guarantees of the robustness of the safety reviews conducted.

ASN assessment

ASN considers that 2010 was on the whole satisfactory from the safety and radiation protection standpoint in the nuclear power plants.

With regard to day to day operations, ASN considers that the efforts made by EDF in recent years to improve operational stringency have borne fruit on certain sites but need to be continued on others.

ASN considers that EDF's preparation for managing emergency situations is satisfactory.

With regard to maintenance, ASN feels that EDF failed in the past to anticipate certain problems, which means that it is today faced with delicate, large-scale corrective maintenance work on the steam generators to ensure their safety. This lack of anticipation in the equipment maintenance and replacement programmes, including the steam generators, has also in recent years led to extensive inspection and appraisal programmes. ASN does however note that EDF has learned the lessons from this and now for example has a programme for replacement of this equipment on the 1300 MWe reactors. With regard to implementation of maintenance policy on the sites, ASN considers that EDF must ensure that it has adequate human and material resources. Progress is also expected with regard to the quality of preparation of maintenance work, the management of spare parts and the quality of the actual maintenance work.

The equipment maintenance and replacement programmes, the safety review approach and the correction of conformity anomalies identified help maintain NPP equipment in a condition that is on the whole satisfactory. However, ASN does feel that EDF needs to reinforce how it maintains equipment qualification for accident conditions, whether during preventive maintenance or equipment replacement.

Most maintenance activities on the sites are entrusted to contractors, selected on the basis of a qualification and evaluation system. ASN considers that application of this system is satisfactory but that EDF needs to evaluate its contracting policy, as ASN has observed a deterioration in field monitoring of the activities carried out by the contractors and considers that this needs to be rapidly improved and strengthened. Finally, as in previous years, ASN observes that the material resources are frequently inadequate or inappropriate.

With regard to radiation protection, EDF proved itself capable of reacting to the findings of 2009, by once again focusing on and committing to the ALARA approach. Dosimetry results from the NPPs showed improvement after two years of deterioration. ASN also observes that the action plan put into place by EDF to improve the radiation protection of workers during industrial radiography inspections is continuing to bear fruit.

In the environmental protection field, ASN considers that in 2010, after the regression observed in 2009 with regard to non-radioactive releases, EDF has once again focused on this issue, although the sites cannot yet be said to have returned to a satisfactory situation.

On the 19 sites:

Five sites stand out in this general assessment: Bugey, Penly and Tricastin with regard to nuclear safety; Civaux and Golfech with regard to radiation protection.

Four sites are under-performing: Saint-Alban, in all aspects; Chinon with regard to radiation protection and nuclear safety, in particular operating stringency; Chooz and Nogent-sur-Seine, with regard to the environment.

Outlook

Concerning the NPPs in operation, ASN's regulatory work in 2011 will focus on the following main aspects.

Regulation of the NPPs in operation will remain a priority. ASN considers that maintaining the condition of the reactors will demand a sustained maintenance effort on the part of EDF. The significant extension of the duration of the outages of certain reactors since 2009 reflects the scale and scope of the maintenance operations required when equipment deterioration has not been anticipated sufficiently well in advance. With regard to environmental protection, ASN expects EDF to consolidate and continue the efforts it started in 2010 to obtain satisfactory

environmental performance. ASN will strengthen its inspections, including on subcontracted maintenance activities and the management of equipment qualification for accident conditions. Finally, with the support of the IRSN and the Advisory Committee for nuclear reactors, ASN will define guidelines for the conditions in which operation of the reactors currently in service could be extended beyond forty years.

The development of technical regulations consistent with the best European practices will be continued so that in 2011, a coherent set of regulatory (ministerial orders, ASN decisions) and related texts (ASN guides) can be proposed to the Government, based on the benchmark levels adopted in Europe by the WENRA association.

With regard to new reactor projects, ASN's regulatory work in 2011 will focus on the following main aspects.

Monitoring of the construction of the Flamanville 3 EPR reactor, by means of sampling proportionate to the safety issues, will continue. At the peak of the civil engineering and systems erection activity, ASN intends to focus its oversight on conventional accident risk prevention and EDF monitoring of the quality of the work done. In addition, oversight of the manufacture of the main pressure equipment will continue through monitoring of the operations carried out on the Flamanville site. At the same time, ASN will continue to review certain aspects preparatory to the commissioning application, in particular the accident study methods and the installation operating principles. It will seek (whenever possible) to cooperate with its foreign counterparts, in order to define a harmonised stance. ASN will also begin to review the creation authorisation application for an EPR reactor at Penly. For the longer term, with the support of the IRSN and the Advisory Committee for nuclear reactors, ASN will examine the extent to which fast sodium reactor technology operating experience feedback is taken into account, for example for selection by CEA, EDF and AREVA of the future technology to be adopted for the fourth generation. Finally, ASN - with the support of IRSN and its Advisory Committees - will in 2011 issue a position statement on the safety options for the 1000 megawatt reactor project being developed by the ATMEA company. ■

13

Nuclear fuel cycle installations

The fuel cycle runs from fabrication to the reprocessing of nuclear fuel after it has been used in nuclear reactors.

The main plants in the cycle – COMURHEX, AREVA NC Pierrelatte, EURODIF, GEORGES BESSE II, FBFC, MÉLOX, AREVA NC La Hague – are part of the AREVA group. These plants include facilities which have BNI status.

The main significant events of 2010

There were no major events in the fuel cycle in 2010.

With regard to the uranium enrichment activities, ASN is pleased to note AREVA's decision to cease operations at Eurodif at the end of 2012 and to immediately begin preparing the final shutdown and decommissioning application. ASN observes that at the same time, the operations to commission the GEORGES BESSE II plant, designed to replace EURODIF, are progressing satisfactorily.

With regard to fuel fabrication activities, 2010 was marked by the 9th February event in the MELOX facility, which was rated level 1 on the INES scale. During a glove box maintenance operation, a mechanical flywheel was turned by a motor operating intermittently, leading to rupture of the containment through tearing of the glove being used by an operator, with internal contamination of said operator's forearm. This event led the licensee to review the human factors analysis incorporated into the work authorisation procedure.

In the front-end cycle, the event of most significance on the La Hague site was the 17th June start-up of the cold crucible vitrification process in unit B of installation R7. This innovative process reflects the licensee's desire to protect the environment and optimise its industrial tool.

The licensee also completed the safety review of UP3 and began that of UP2 800. These operations make a major contribution to improving installation safety.

Finally, the ASN decision of 14th December is noteworthy. It will be applicable as of 1st January 2011 and authorises the La Hague licensee to implement a system of internal authorisations. In order to enhance the level of licensee awareness and responsibility, this system makes provision for two levels of internal authorisation, depending on the importance of the operations and the associated radiation protection and safety issues. Before being authorised, the envisaged operation or modification is evaluated, according to the defined level, either by a safety specialist independent of the operating unit making the application, or by an internal

ASN inspection of the EURODIF plant – March 2010

authorisations evaluation commission (CDAI) for the more important or large-scale operations.

ASN Assessment and Outlook

Cross-disciplinary aspects

In 2010, the licensees of the fuel cycle installations made progress in the way they take account of operating experience feedback. On the whole, they showed themselves to be more rigorous in complying with notification criteria and in report transmission times. Several incidents however demonstrated that there were still weaknesses in the organisation of safety and radiation protection in the AREVA group's facilities, even though the number had on the whole fallen. ASN will remain vigilant with regard to the measures taken by the licensees to prevent numbers rising again. In September 2010, ASN also began the overall review of safety and radiation protection management within the AREVA group.

In 2011, ASN will be continuing the steps started in 2010 to improve management of ongoing and future authorisation applications and the planned periodic safety reviews.

Tricastin site

Although ASN approves of the changes on the Tricastin site, involving the shutdown of older installations and their replacement by safer plants, it is concerned by the recent postponement of certain projects it feels to be essential, such as that concerning the site's effluent and waste treatment plants. In 2011, pollution prevention will remain a key issue on this site. ASN will check the progress of the remedial measures taken by the various installations.

Finally, ASN will ensure that the preparations for shutdown of the EURODIF plants take place in the conditions defined by the TSN Act, in particular with regard to information of the public and minimisation of the waste produced by the future decommissioning.

Romans-sur-Isère site

On the Romans-sur-Isère site, ASN will in 2011 remain attentive to confirmation of the progress already made with regard to safety. It is in particular expecting improved management of waste storage. It will also be attentive to the steps taken following the safety reassessment of the CERCA company's facilities.

MÉLOX plant

With regard to the MÉLOX plant in Marcoule, ASN will remain vigilant concerning the organisation and the resources deployed, in order to increase the industrial tool's production capacity and assist it in dealing with the new materials utilised, in compliance with the expected safety and radiation protection requirements. Management of dosimetry and the ability to prevent organisational and human factor risks will therefore be regulation and inspection priorities.

The periodic safety review of the MÉLOX plan is scheduled for 2011. It will be a key step in the life of the facility, in that it will assess its conformity with the regulations and with its safety requirements, while establishing the programme of work for the safety improvements for the next ten years. This review will be an opportunity to look at fundamental questions about the choice of the computerised production management system, which today manages both criticality risk prevention and nuclear materials accounting.

La Hague site

For the La Hague plants, ASN considers the situation to be satisfactory, in particular with regard to personnel exposure. However, ASN considers that further efforts are needed, especially during the periodic safety reviews, in the drafting of the general operating rules and the definition of elements important for safety. In this respect, ASN asked IRSN to more particularly examine the UP3 plant conformity reviews and the effects of ageing on structures and equipment.

With regard to the recovery of legacy waste, ASN will be attentive to ensuring that U-turns in industrial strategy do not significantly delay the recovery and removal of the waste from silo 130 and the sludges from STE2 and HAO. ASN has already issued the corresponding instructions for silo 130 and will keep a closer watch on the programme as a whole in 2011. ■

14

Nuclear research facilities and other nuclear facilities

Nuclear research facilities and facilities not directly related to the nuclear power generating industry, includes all the basic nuclear installations of the civil part of the French Alternative Energies and Atomic Energy Commission, the basic nuclear installations of other research organisations and some other basic nuclear installations which are not power reactors and are not involved in the nuclear fuel cycle.

The main significant events of 2010

There were no significant events in 2010 in the research facilities field.

Periodic safety review

A large number of the facilities currently operated by CEA entered service in the early 1960s. The design of these facilities is old and their equipment is ageing. They have also been modified over the years, sometimes with no overall safety review. All the facilities for which no periodic safety review has been scheduled, will need to perform one no later than 2017, and thereafter every ten years.

In 2010, on the basis of the opinion of the Advisory Committee for reactors, ASN examined the periodic safety review file for the ORPHÉE installation.

Although a number of requests were made, especially concerning the methodologies adopted for certain highly hypothetical accidents or for fire prevention, ASN observed that the level of safety in this installation was satisfactory and it issued no objection to its continued operation.

ASN also completed its examination of the periodic safety review for the OSIRIS installation. In 2010, CEA submitted its periodic safety review files for the ÉOLE and MINERVE installations, which will be examined in 2011, and will be submitted to the Advisory Committee for reactors for its opinion.

Consideration of the seismic risk

The seismic risk is the subject of constant attention on the part of ASN. This risk is in particular reassessed during the periodic safety reviews of each installation in order to take account of scientific progress in characterising the hazard and changes to design rules.

On 4th February 2010 in Marseille and then on 7th December 2010 in Avignon, ASN organised two information days covering incorporation of the seismic risk in the design and operation of nuclear installations in South-Eastern France.

The installations

The main subjects of concern for ASN with regard to CEA installations in 2010 are:

– the end-of-life tests on the PHÉNIX reactor;

– the periodic safety review of the ORPHÉE and OSIRIS installations;

– the end of the renovation work on the CABRI installation and the continuation of construction work on the RJH reactor (reactor to be used for experimentation and the production of artificial radionuclides);

– commissioning of the MAGENTA installation.

The main subjects concerning installations other than those operated by CEA:

– signing of a new agreement regarding the safety of the CERN installations;

– initial examination of the ITER facility creation authorisation application;

– the periodic safety review of the CIS bio international facility. It would seem necessary for the radioactive iodine inventory in this facility be reduced in order to minimise the potential consequences of a severe accident.

Seismic reinforcement by strips of carbon fibre fabric (TFC) in Cadarache

ASN assessment

Even if certain areas still need improvement, ASN notes that CEA has made considerable progress since 1999 with regard to the management of safety and radiation protection. It in particular takes note of the ongoing improvements concerning skills management and the management of safety and radiation protection in contracted services.

However, ASN firmly hopes that the "major commitments" approach will be continued and rigorously applied. In 2007, CEA acquired a tool enabling it, at the highest level, to control the decisions concerning upgrading the older installations and the new projects. These "major commitments", which are officially checked by CEA every six months, ensure greater transparency and visibility for ASN with respect to the processes liable to delay complex projects with high nuclear safety and radiation protection stakes. This enables priority to be focused on areas with the highest risk. ASN has however observed that budget constraints have led CEA to request the postponement of certain operations, a move which runs contrary to the very principle of the major commitments.

ASN considers that by ring-fencing a limited number of projects with high stakes, the approach aims precisely to avoid postponements for reasons other than justified technical problems. It is important that CEA devote the budgetary and human resources necessary for correct performance of these "major commitments".

ASN noted that some postponements concerning removal from storage or final shutdown and decommissioning of installations no longer comply with current standards. It wishes to see CEA update its decommissioning strategy, giving justification for the time-frames chosen and explaining the technical or other reasons for the delays observed.

Outlook

The research and other facilities regulated by ASN are extremely diverse, but usually small. ASN will continue to concentrate on regulating the safety and radiation protection of these installations as a whole and on comparing practices per type of installation in order to identify the best one and thus encourage operating experience feedback. ASN considers that by ring-fencing a limited number of high-stakes projects, the "major undertakings" approach, which is currently checked every six months by CEA, aims to avoid postponements for reasons other than justified technical problems. It is important that CEA devote both budget and human resources to the correct performance of these "major commitments". This is why ASN will continue to request that CEA pursue this approach, which should lead to improved project management.

In 2011, ASN will continue its field checks of the CEA internal authorisations system. This will include the overall process, proof of compliance with the criteria for application of the decision which will officially approve the system proposed by CEA, but will also check the independence, within CEA, between the applicants, the support services and the first and second level inspectors.

For the periodic safety reviews, ASN will conduct a safety review of the ÉOLE and MINERVE installations, for which CEA has scheduled shutdown within the coming ten years. It will also examine the safety of the GANIL installation in parallel with its review of the decree modification request for this installation with a view to siting the new accelerator. It will complete examination of the periodic safety review file for the CIS bio international radiopharmaceuticals production facility in order to rule on whether or not its continued medium or long-term operation is acceptable.

ASN will also examine the authorisation application file for the ITER project, which will require a meeting of the members of the Advisory Committee for laboratories and plants as well as of the members of the Advisory Committee for reactors.

ASN will continue its work regarding commissioning of facilities such as STELLA (Saclay effluent treatment plant) or RJH.

Furthermore, in 2011, through its review of the ASTRID prototype project and the work on the fourth generation reactor series, ASN will examine operating experience feedback from the fast neutron reactors (PHÉNIX, SUPERPHÉNIX and RAPSODIE, now shut down), along with data for comparing the safety of the various possible technologies for this generation.

Finally, in 2011, ASN will continue its efforts to promote international harmonisation of research reactor safety, in particular at a European level (WENRA) and within the NEA. ■

15

The safety of basic nuclear installation decommissioning

Decommissioning, a phase covering all the activities performed after shutdown of a nuclear facility, until it reaches a predetermined final state, at present concerns about thirty nuclear installations. This phase entails radiological and conventional risks, some of which are similar to those present during the operation of the installation, while others are more specific.

The main significant events of 2010

Installation decommissioning doctrine, as defined by ASN together with the stakeholders, was published in 2010. In addition, ASN published a final shutdown, decommissioning and delicensing guide for basic nuclear installations (guide n°6 of June 2010) and finalised the draft guide for acceptable complete clean-out methodologies in basic nuclear installations in France (draft guide n°14 of June 2010).

Decommissioning operations are also the subject of campaigns to inform the public and the Local Information Committees. in 2010, ASN chaired a round-table at the national conference of CLIs on this topic.

With regard to the financing of decommissioning, ASN reviewed the two three-yearly reports evaluating the spent fuel and radioactive waste management costs transmitted by the licensees, on which an opinion will be issued in 2011. Based on the experience acquired, ASN has also begun drafting a guide for licensees, specifying how to apply the regulations, in particular with regard to the description of technical scenarios and assessment of the corresponding costs.

ASN assessment

Decommissioning of EDF reactors continued in 2010 and was on the whole satisfactory. The decommissioning authorisation application for the Brennilis NPP, which was the subject of a public inquiry at the end of 2009, was rejected by the inquiry commission in March 2010. Based on this opinion, ASN will propose a partial decommissioning decree to the Government in early 2011. For GCR reactors, the question of what to do with the graphite waste can be an obstacle to correct implementation of the decommissioning strategy. ASN confirmed that it was favourable to the creation of a disposal facility for low-level, long-lived waste, in particular for graphite waste, as rapidly as possible. It set an initial 2012 milestone for an assessment of developments regarding the creation of a repository for graphite waste and will take a decision at that time.

Clean-out of the hot cell of the former TRITON research reactor

Concerning the decommissioning of CEA installations, ASN notes that although the ongoing operations are on the whole satisfactory, a large number of delays have been confirmed or are announced for the forthcoming work sites. It considers that the updating of the CEA strategy and the decommissioning schedules need to be justified, in particular explaining the technical or other reasons for the delays. In any case, the installations concerned will need to retain an acceptable level of safety until delicensing.

Concerning the decommissioning of the AREVA installations, ASN notes that the preparatory operations prior to the decommissioning of the BNIs at La Hague are now well-advanced and that it is essential for decrees to be published regulating AREVA's final shutdown and decommissioning operations. This is already the case for BNI 80 and applications concerning the other three BNIs (BNI 33, 38 and 47) are being reviewed. AREVA will need to be proactive in terms of human, technical and financial resources, if it is to meet the announced deadlines for the recovery of legacy waste and the decommissioning of these installations.

Finally, it should be noted that in 2010 decommissioning of the Strasbourg university reactor was completed, prior to its delicensing. ASN considers that the decommissioning work was carried out satisfactorily and that the clean-out objectives were met.

Outlook

Over and above the individual decommissioning of each installation, ASN ensures that the licensees' overall strategies take full and complete account of safety and radiation protection constraints.

In the licensees' strategies, ASN more particularly examines the availability of waste disposal solutions, the management of flow and capacity, the handling of uncertainties and technical problems, organisational measures, and so on.

Even if the decommissioning of nuclear installations has now reached an industrial stage, ASN considers that there is still room for progress, including in the consistency of the decommissioning strategies implemented by the licensees, the estimation of the cost of decommissioning, consideration of organisational and human factors, and the implementation of all the requirements contained in the TSN Act regarding transparency and involvement of the public in decommissioning projects. ■

16

Radioactive waste and polluted sites

The management of radioactive waste is governed by the 28th June 2006 Act on the sustainable management of radioactive materials and waste. This Act sets out a roadmap for the management of all radioactive waste, including by requiring the adoption every three years of a National radioactive materials and waste management plan (PNGMDR).

The purpose of the PNGMDR is to inventory the existing radioactive materials and waste management methods, to identify the foreseeable needs in terms of storage or disposal facilities and to clarify the necessary capacity for these facilities and the storage durations. PNGMDR defines the objectives concerning radioactive waste for which there is as yet no final management solution.

The main significant events of 2010

The national radioactive materials and waste management plan

The second version of the PNGMDR (2010-2012) was sent to Parliament in early 2010 and was analysed by the parliamentary office for the evaluation of scientific and technological choices (OPECST). The provisions of the PNGMDR will in 2011 be the subject of a decree and an order prepared by the Ministry for Ecology, Sustainable Development, Transport and Housing (MEDDTL) with the assistance of ASN.

Waste management in the basic nuclear installations

In this field, the legacy waste at La Hague must be mentioned. ASN observed recurring delays in the recovery of this waste, along with a lack of an integrated approach by the establishment to the prioritisation of waste recovery projects with respect to the storage safety issues. In late 2010, ASN therefore asked AREVA to define and submit to it a consolidated, binding calendar for recovery of this waste, incorporating both compliance with the storage safety requirements and the need to recover the ILW-LL waste no later than the end of 2030.

Uranium mine-working waste

The final report from the pluralistic expert group on the Limousin region uranium mining sites (GEP Limousin) was the subject of a joint press conference given by the Ministry for Ecology and ASN on 17th September 2010. The GEP examined the problems related to the past management of this dossier and the significant progress achieved in recent years in resolving them, both in the Limousin region and nationally. It considers that this progress must be continued and developed so that within the next ten years a clear vision for the sustainable management of these sites can be defined. The strategy to be

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implemented to do this will include all aspects of the problem (technical, institutional, social) and will require the corresponding monitoring and oversight. This strategy will need to be shared with the local players and incorporate specific local aspects. The Ministry for Ecology and ASN examined how best to implement these recommendations and monitor them, within the context of the PNGMDR working group.

Deep geological disposal

ANDRA has drafted a development plan (PDD) for the HLW-LL project, which presents the research and design strategy for the project, covering the period 2007-2014, in order to comply with the objectives of the 28th June 2006 Act. In June 2010, ANDRA submitted the updated scientific programme for 2008-2014, the results of which constitute the basis for the safety demonstration.

The disposal project milestones are as follows:

– 2012: public debate dossier;

– 2014: creation authorisation application file;

– reversibility Act;

– 2025: commissioning.

ANDRA has defined a 30 square kilometre zone of interest for detailed reconnaissance (ZIRA), with a view to siting the underground facilities of the future repository. On 5th January 2010, ASN sent the Government a favourable opinion on the choice of the ZIRA. After the Government approved the ZIRA, ANDRA undertook detailed reconnaissance (3D seismic in particular) in the ZIRA, the results of which should be available by the end of 2011.

In late 2009, ANDRA transmitted a file presenting an update of the repository's safety and reversibility options. ASN asked the Advisory Committee for waste and the Advisory Committee for laboratories and plants to review this file. ASN issued a position statement in early 2011 on this file, along with a certain number of recommendations.

ASN Assessment and Outlook

In 2010, ASN continued its efforts to ensure that radioactive waste is managed safely, right from the moment it is produced. ASN thus regulates waste management within nuclear installations and periodically evaluates the management strategies implemented by the licensees. ASN in particular remains attentive to AREVA's implementation of its strategy for the recovery of the legacy waste stored on the La Hague site.

In accordance with the ASN and DSND joint application, CEA in 2010 sent a summary file to the two Authorities concerning its management strategy for managing the waste produced in its civil nuclear facilities. This file presents the management strategy for the waste already produced and for future waste, identifying the requirements in terms of processing, conditioning, transport packaging and storage of the waste. It will be reviewed by an Advisory Committee, so that ASN can issue a position statement. ASN also observes that CEA is on the whole finding it hard to meet its undertakings, including with regard to deadlines, leading to regular postponement of the dates it had set for removal from storage of the waste present in its older facilities.

With regard to the long-term management of radioactive waste, ASN takes a positive view of the way ANDRA operates its currently operational waste facilities. ASN considers that all waste must eventually benefit from a safe disposal solution. In this respect, it considers it essential for France to acquire a repository for the disposal of low-level, long-lived waste. ASN will therefore continue to closely monitor the process involved in searching for a site and developing the disposal concepts.

It considers that key milestones in the development of the disposal project will be reached in the next few years. In its opinion issued at the end of 2010 on the file submitted by ANDRA in 2009, ASN set the main areas for work that needed to be taken further between now and the creation authorisation application, which should be submitted at the end of 2014. ASN will remain vigilant in ensuring that ANDRA provides the expected elements.

ASN is involved in regulating the management of sites polluted by radioactive materials. The circular published in 2008, which clarifies the roles and responsibilities of the various stakeholders with regard to dealing with polluted sites and soils, reaffirms ASN's duty to provide support for the *préfets*. After consultation, ASN thus issued several opinions in 2010 on polluted site management strategies. Within this new regulatory framework, ASN's actions have been strengthened since 2009, a process that will continue in 2011 in collaboration with the administrations concerned and the other stakeholders. ASN intends in 2011 to publish its management doctrine for sites polluted by radioactive materials. It already points out that it considers the solution whereby the contamination is maintained in-situ should not be the reference solution for management of sites polluted by radioactive materials and that this option can only be an interim solution, or one reserved for cases in which the complete clean-out option is inconceivable owing to the volumes of waste to be excavated. It should also be noted that the radium diagnostic operation being run by ASN, and which began in the Ile-de-France region, will be continuing in 2011.

Finally, ASN will remain closely involved in international work, maintaining its active participation in various working groups, in particular IAEA's WASSC working group validating the requirements concerning radioactive waste management, in WENRA, and in the examination by various international bodies of radioactive waste disposal facilities, particularly with regard to reversibility. ■