ASN actions

summary

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Fukushima : one year later

Activities regulated by ASN

ASN Commission

Jean-Jacques DUMONT
Michel BOURGUIGNON
André-Claude LACOSTE
Marie-Pierre COMETS
Philippe JAMET

Paris, April 2, 2012

« There is a before and after Fukushima »

This is the fifth year running that the ASN Commission presents the annual report on the state of nuclear safety and radiation protection in France.

It represents an opportunity to conduct a first review of these five years, before two members of the Commission, including the Chairman, are replaced at the end of 2012.

As in previous years, 2011 was relatively satisfactory in France in terms of nuclear safety and radiation protection. At the end of this five-year period, it is worth highlighting the progress made in the field of patient safety, owing to the rise in the number of radiological physicists and the tightening up of procedures. Also worthy of note is the progress achieved with regard to transparency, in particular thanks to the work done by the French High Committee for Transparency and Information on Nuclear Security and by the local information committees, as well as the publication by ASN of follow-up letters to all the inspections it carries out and of the opinions of the Advisory Committees of experts, which are an important factor in the decisions it takes.

The ASN Commission considers that there are a number of key issues and challenges for the next few years..

The Fukushima accident

2011 was marked by the Fukushima accident. This major accident reminded everyone that despite all the precautions taken, an accident can never be completely ruled out. There is most clearly a before and after Fukushima, because this accident raises fundamental questions which go far beyond the specific characteristics of the Fukushima reactors and how they were operated. Full analysis of the feedback could take up to 10 years, but ASN immediately initiated a series of targeted inspections on topics related to the accident and a series of complementary safety assessments on the French civil nuclear facilities. These assessments are in response to the Prime Minister's 23rd March 2011 request for an audit of French facilities and that of the European Council of 24th and 25th March 2011, for the performance of stress tests on the European nuclear power generating reactors. ASN published its report, which was submitted to the Prime Minister and forwarded to the European Commission in early 2012.

Subsequent to the complementary safety assessments, ASN considers that the level of safety in the facilities examined is high enough not to require that any of them be shutdown. At the same time, it considers that their continued operation is conditional upon increasing their robustness to extreme situations, over and above their existing safety margins, as rapidly as possible. It therefore imposes a range of measures on the licensees. Furthermore, ASN considers that social, organisational and human factors are a key aspect of safety. It will thus be particularly attentive to the renewal of licensee staff and skills, as well as how the use of subcontractors is organised. All the steps taken and the opinions issued by ASN following the Fukushima accident are described in the "Fukushima: one year later" part.

A process of peer-review of the national reports, conducted at a European level, has already started and should continue until June 2012. ASN will draw its conclusions from the results of these peer reviews.

In order to improve safety worldwide, it is essential that there be complete feedback from the Fukushima accident and Europe must promote the stress tests approach and results internationally. A major step will be the extraordinary meeting of the Convention on Nuclear Safety, to be held in Vienna at the end of August 2012.

As part of the energy debate currently ongoing in France, ASN would recall that, whichever scenario is chosen, the safety of the nuclear facilities must be guaranteed in all circumstances, whether in terms of construction, operation or decommissioning. ASN will ensure that the necessary investments are made and that sufficient skills are maintained for all the scenarios.

It stresses the fact that were reactor operations to be continued beyond 40 years, this would require significant safety improvements, in particular with respect to severe accidents. It

would adopt as its benchmark the safety objectives of the new reactors (EPR), taking account of the experience feedback from the Fukushima accident. ASN will require shutdown of those facilities unable to achieve the required level of safety. In this context, to avoid creating situations in which the demands of safety conflict with those of energy supply, it is crucial to be able to anticipate the renewal of electricity production capacity, whichever production method is chosen.

Radioactive waste management

In the field of the regulation of radioactive waste management, 2012 will be devoted to preparing the new edition of the national radioactive materials and waste management plan (PNGMDR) (2013-2015), which is a key element in waste management because its aim is to ensure that there are reliable management solutions for each category of radioactive material and waste, to identify the foreseeable needs in terms of storage and disposal facilities and to define all the corresponding steps and measures to be taken. ASN considers that in terms of nuclear safety and radiation protection, it is essential that for each category of waste, there is a management and disposal solution and that this solution is put into place as rapidly as possible. ASN will ensure that the preparations for the public debate concerning the geological disposal project for intermediate level and high level, long-lived waste, which should take place in 2013, are carried out in the best possible conditions. Prior to the examination of the application file for such a disposal facility, it will continue to work on the subject of reversibility with its European counterparts.

Regulating the medical sector

After radiotherapy, ASN focused its efforts on medical imaging, which represents significant issues in terms of radiation protection of patients.

The performance of medical imaging, in particular computed tomography, is continuing to rise, leading to improvements in diagnosis quality, more precisely targeted therapeutic strategies and treatment under radiological visual control. However, this is also leading to a significant rise in the average dose per inhabitant, a trend that is being observed worldwide. ASN therefore considers that it is becoming urgent to take steps to control this rise in doses.

In addition to increasing the number of MRI machines, it recommends working with the health professionals on reinforcing application of the principle of the justification of radiological examinations and with the equipment manufacturers on equipment optimisation. This is a subject on which it works together with its European counterparts within the Heads of European Radiological Protection Competent Authorities association, HERCA.

It also stresses the importance of continuing research into individual radiation sensitivity with a view to developing a detection test. It would appear that about 10% of the population is hyper-sensitive to ionising radiation, as a result of genetic anomalies in the signalling and repair of DNA damage, itself a factor in the onset of cancers. Individual radiation sensitivity would also seem to be responsible for serious undesirable effects observed in radiotherapy, even when no dose error is involved. A routine detection test would help ensure progress in radiobiology, radiation protection and cancerology.

Regulating source security

The aim of achieving consistency between the radiation protection and security approaches (in other words the prevention of malicious acts) led ASN to suggest to the Government that it take charge of regulating source security, an area for which there was as yet no specific framework. The principle was adopted in 2008. An Act is needed to entrust this mission to ASN. The relevant provisions were included in a Bill intended, among other things, to ratify the ordinance of 5th January 2012 which codified the TSN Act. ASN has begun to set up an organisation to take charge of this new role.

Construction of a European nuclear safety and radiation protection area

For ASN, the construction of a European nuclear safety and radiation protection area has always been a major objective. The construction of this area has made progress, with the adoption of two European directives, one in 2009 on nuclear safety, the other in 2011 on the management of radioactive waste and spent fuel. The first European conference on nuclear safety was also held in Brussels in June 2011. The work done by WENRA, the Western European Nuclear Regulators' Association, enabled the specifications to be rapidly drafted for the European stress tests conducted subsequent to the Fukushima accident.

In the same way, work is progressing within HERCA on, for example, medical imaging. ASN will continue to heavily involved at a European level, so that Europe can discuss its positions with its American and Asian colleagues and promote them.

* * *

Faced with the challenges mentioned, in particular the need to improve the approach to safety in order to take account of the lessons learned from the Fukushima disaster, ASN will continue to carry out its role of regulating nuclear safety and radiation protection, while striving to strengthen the implementation of its four fundamental values: competence, independence, rigor and transparency. ASN will continue with its goal of improving nuclear safety worldwide. The quality of its own staff and the expertise contributed by those at IRSN are key factors in its success. ■

Nuclear safety authority (ASN)

ASN was created by the 13th June 2006 Nuclear Security and Transparency Act. It is an independent administrative authority responsible for regulating civil nuclear activities in France. It also contributes towards informing citizens.

ASN is tasked, on behalf of the State, with regulating nuclear safety and radiation protection in order to protect workers, patients, the public and the environment from the hazards involved in nuclear activities.

ASN aims to provide efficient, impartial, legitimate and credible nuclear regulation, recognised by the citizens and regarded internationally as a benchmark for good practice.

its roles, key figures, its organisation

competence
independence
rigour
transparency

Its roles

REGULATING

ASN contributes to drafting regulations, by giving the Government its opinion on draft decrees and ministerial orders, or by taking regulatory decisions of a technical nature.

AUTHORISING

ASN examines all individual authorisation applications for nuclear facilities. It can grant all authorisations, with the exception of major authorisations for basic nuclear installations, such as creation and decommissioning. ASN also issues the licenses provided for in the Public Health Code concerning small-scale nuclear activities and issues authorisations or approvals for radioactive material transport operations.

MONITORING

SN is responsible for ensuring compliance with the rules and requirements applicable to the facilities or activities within its field of competence. Inspection is one of ASN's main means of monitoring, although it also has appropriate powers of enforcement and sanction.

INFORMING

Primarily through its website www.asn.fr and its *Contrôle* magazine, ASN informs the public and the stakeholders (local information committees, environmental protection associations, etc.) of its activity and the state of nuclear safety and radiation protection in France.

IN EMERGENCY SITUATIONS

ASN assists the Government and in particular sends the competent Authorities its recommendations concerning the civil security measures to be taken. It monitors the steps taken by the licensee to make the facility safe. It informs the public of the situation.

REGULATION AND MONITORING OF DIVERSE ACTIVITIES AND FACILITIES

Nuclear power plants, management of radioactive waste, nuclear fuel shipments, radioactive material packages, medical facilities, research laboratories, industrial activities, and so on. ASN regulates a wide variety of activities and facilities. This regulation covers:

– 58 nuclear reactors producing nearly 80% of the electricity consumed in France, along with the EPR reactor currently under construction;
– all French fuel cycle facilities, from fuel enrichment to reprocessing;
– several thousand facilities or activities which use sources of ionising radiation for medical, industrial or research purposes;
– several hundred thousand shipments of radioactive materials made annually nationwide..

THE HELP OF EXPERTS

When taking certain decisions, ASN calls on the expertise of technical support bodies. This is primarily the case with the Institute for Radiation Protection and Nuclear Safety (IRSN). ASN also requests opinions and recommendations from scientific and technical Advisory Committees of experts.

Key figures in 2011

456 STAFF

593 TECHNICAL OPINIONS — sent to ASN by IRSN

250 INSPECTORS

8,795 INSPECTION FOLLOW-UP LETTERS — available on the website *www.asn.fr*

80% MANAGEMENT

34 MEETINGS — of the Advisory Committees of experts

2,061 INSPECTIONS — in the nuclear facilities; radioactive material shipments; the medical, industrial and research sectors; approved organisations.

46 PRESS CONFERENCES

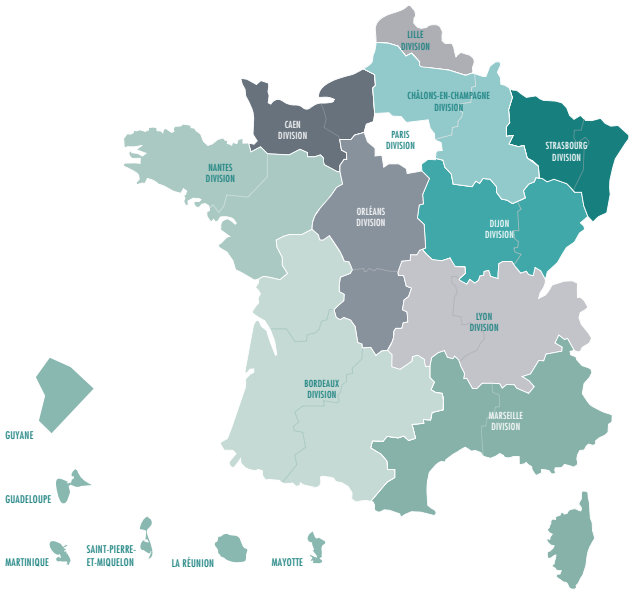
68 MILLION — Total budget for ASN

76.5 MILLIONS € — budget devoted to IRSN appraisal work

3,348 AUTHORISATIONS

7 ACCIDENT SIMULATION EXERCISES

Its organisation



ORGANISATION

ASN comprises head office departments and eleven regional divisions with competence for one or more administrative regions. This organisation enables ASN to carry out its regulation and monitoring duties over the entire country and in the overseas territories of France.

THE ASN ORGANISATION CHART

The departments are organised thematically and manage national affairs concerning the activities for which they are responsible.
The ASN regional divisions operate under the authority of the regional representatives, appointed by the ASN Chairman. They are ASN's representatives in the regions and contribute to the ASN's public information role. The divisions carry out most of the direct inspections on nuclear facilities, radioactive material transport operations and small-scale nuclear activities.
In emergency situations, the divisions assist the *préfet* of the *département*, who is in charge of protection of the populations, and monitor operations to safeguard the installation on the site, provided that it is accessible and does not constitute a hazard.

Commission

André-Claude LACOSTE, CHAIRMAN

Michel BOURGUIGNON, Marie-Pierre COMETS, Jean-Jacques DUMONT, Philippe JAMET, COMMISSIONERS

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ADVISER
Henri LEGRAND
HEAD OF STAFF
Pascal LIGNÈRES

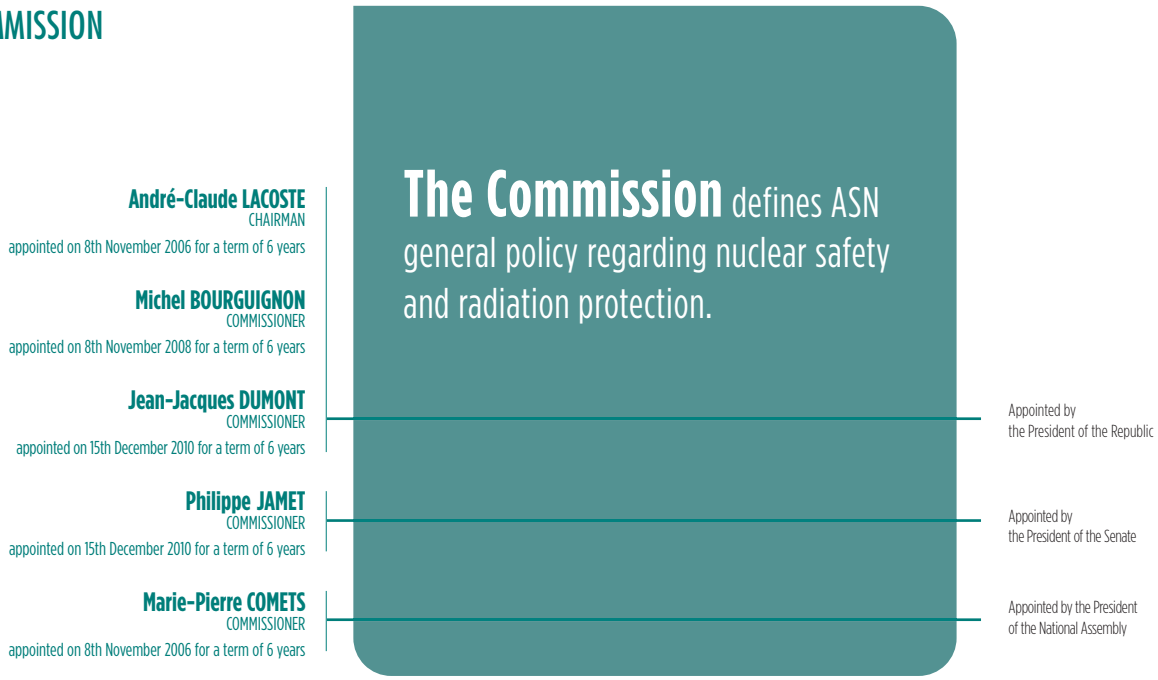
Office of administration (SG)
Luc CHANIAL

Nuclear power plant department (DCN)	Nuclear pressure equipment department (DEP)	Transport and sources department (DTS)	Waste, research facilities and fuel cycle facilities department (DRC)	Ionising radiation and health department (DIS)	Environment and emergency department (DEU)	International relations department (DRI)	Communication and public information department (DCI)
Thomas HOUDRÉ	**Sébastien CROMBEZ**	**Laurent KUENY**	**Lydie ÉVRARD**	**Jean-Luc GODET**	**Sophie CHEVALIER**	**Guillaume GILLET**	**Alain DELMESTRE**

BORDEAUX DIVISION	CAEN DIVISION	CHÂLONS-EN-CHAMPAGNE DIVISION	DIJON DIVISION	LILLE DIVISION	LYON DIVISION	MARSEILLE DIVISION	NANTES DIVISION	ORLÉANS DIVISION	PARIS DIVISION	STRASBOURG DIVISION
Regional representative **Patrice RUSSAC**	Regional representative **Christophe QUINTIN**	Regional representative **Jean-Christophe VILLEMAUD**	Regional representative **Corinne ETAIX**	Regional representative **Michel PASCAL**	Regional representative **Philippe LEDENVIC**	Regional representative **Laurent ROY**	Regional representative **Hubert FERRY-WILCZEK**	Regional representative **Nicolas FORRAY**	Regional representative **Bernard DOROSZCZUK**	Regional representative **Marc HOELTZEL**
Regional Head **Anne-Cécile RIGAIL**	Regional Head **Simon HUFFETEAU**	Regional Head **Jean-Michel FERAT**	Regional Head **Alain RIVIÈRE**	Regional Head **François GODIN**	Regional Head **Grégoire DEYIRMENDJIAN**	Regional Head **Pierre PERDIGUIER**	Regional Head **Pierre SIEFRIDT**	Regional Head **Fabien SCHILZ**	Regional Head **Delphine RÜEL**	Regional Head **Florien KRAFT**

on 31th december 201

ASN COMMISSION



85 SESSIONS

34 OPINIONS

50 DECISIONS

9 DEBATES

Impartiality

The Commissioners perform their duties in complete impartiality and receive no instructions either from the Government or from any other person or institution.

Independence

The Commissioners perform their duties on a full-time basis. Their mandate is for a six-year term. It is not renewable. The duties of a member can only be terminated if a majority of the Commissioners sitting on the Commission rule on his or her incapacity or accept his or her resignation. The President of the Republic may also terminate the duties of a member of the Commission in the event of a serious breach of his or her obligations.

Competences

The Commission takes decisions and publishes opinions in ASN's *Official Bulletin*. It defines ASN external relations policy both nationally and internationally.

It defines ASN regulatory policy. The Chairman appoints the nuclear safety inspectors, the radiation protection inspectors, the conventional safety inspectors for the nuclear power plants and the staff responsible for verifying compliance with the requirements applicable to pressure vessels.

The Commission opens inquiries following incidents or accidents. It presents the ASN Report on the state of nuclear safety and radiation protection in France. Its Chairman reports on ASN activities to the relevant commissions of the French Parliament's National Assembly and Senate as well as to the Parliamentary Office for the Evaluation of Scientific and Technological Choices.

It drafts ASN internal regulations and appoints its representatives to the High Committee for Transparency and Information on Nuclear Security.

Jean-Christophe NIEL
ASN DIRECTOR GENERAL

Paris, April 2, 2012

2011, a pivotal year for nuclear safety

For ASN, 2011 is the fiftieth anniversary of the creation of the basic nuclear installations regime, the fifth anniversary of the creation of ASN and, finally, the year of the Fukushima disaster.

50th birthday
of the basic nuclear installation.

In the 1950s, the Minister of Health tasked the central service for the protection against ionising radiation (SCPRI) with handling radiation protection issues; the French atomic energy commission (CEA) for its part dealt with regulating the safety of its own facilities. The Government felt no need to establish a regulatory system that involved them directly. The very notion of nuclear facilities – later to be known as "basic nuclear installations (BNI)" – that represented a particular risk requiring monitoring and regulation, did not even exist.

This notion came about in France almost unintentionally, as a result of international constraints. The Euratom Treaty, signed in 1957, stipulated that nuclear facilities should be subject to a regime of authorisation, or at the very least notification; moreover, the Paris Convention on Nuclear Third Party Liability, signed in 1960, required identification of the facilities which could be the source of any damage.

To establish the basic nuclear installations administrative regime, the Government then chose a relatively unusual legislative vehicle; a bill concerning mitigation of atmospheric pollution, which became the atmospheric pollution and odours Act. This bill, submitted by the Government in 1960, did not primarily target industrial facilities, which had been regulated for a long time by a law dating back to 1917. It was therefore aimed mainly at other sources of potential atmospheric pollution: vehicles, non-industrial facilities such as domestic hearths and diffuse sources.

However, the text of the Government's draft contained the word radioactive: radioactivity was just beginning to be recognised as a component of ambient atmospheric pollution, mainly as a result of the atmospheric atomic tests being carried out by the major powers.

It was thus designated as the appropriate medium for introducing an administrative regime for basic nuclear installations, in order to meet France's international obligations.

One could be forgiven for thinking that it would have been simpler to change the nomenclature of installations covered by the 1917 Act on classified installations and simply add nuclear facilities.

There would appear to be two reasons for not having done so:
– the scope of the 1917 Act was then limited to industrial and commercial establishments; however CEA's sites, which housed a large number of the nuclear facilities, did not fall into this category;
– the other reason was the extremely specific technical nature of these facilities, which justified centralised monitoring and regulation, by specialised individuals, whereas the principle of the classified facilities was that the inspectors of these facilities be appointed in each *département*[1] by the *préfet*[2], and be able to cover all facility categories.

The first provisions concerning nuclear facilities were therefore incorporated into an Act dealing with mitigation of atmospheric pollution and odours. According to the minutes of the debates in the National Assembly and the Senate, the members of parliament showed that even at that time, they were aware of the problems of radioactivity:

1. In a *département*, representative of the State appointed by the President
2. Administrative region headed by a *préfet*

the problem of ambient radioactivity as a result of atomic testing was highlighted by a number of speakers. Fewer speakers however mentioned nuclear facilities, although one member of parliament did express concern about sites too close to Paris.

This is how the BNI came about, almost as an afterthought.

ASN is 5 years old.

In November 2006, the ASN Chairman, André-Claude Lacoste, stated that the creation of ASN would lead initially to little change but that after five years, we would be able to see how far we had come. I believe that the best way to talk about these five years is to present the significant milestones reached during the period, although this choice has to be somewhat arbitrary given the wealth of potential topics:

The lessons learned from the Épinal and Toulouse accidents

Following these accidents, ASN took steps to promote the safety of radiotherapy treatment.

For example:
– jointly with the French Society for Radiation Oncology (SFRO), by creating the scale for rating radiation protection events affecting patients receiving radiotherapy treatment;
– by recommending an increase in the number of radiological physicists;
– by suspending the operations of several radiotherapy centres as a result of major anomalies;
– by organising an international conference in Versailles, in 2007, entitled "Advances and challenges in radiation protection of patients";
– by adopting a decision concerning radiotherapy quality management in 2008.

BNI regulatory provisions

The regulations applicable to BNIs were already well under way with the "BNI procedures" decree of 2007. The BNI order was published on 7th February 2012 and a dozen regulatory decisions are already well advanced: this work was extensively discussed with the various stakeholders. ASN will be implementing a complete and rigorous working and intervention framework that is consistent with that of its European colleagues, as it is using the "reference levels" of WENRA, the Western European Nuclear Regulators' Association.

Source security

Source security is a new role, taken on by ASN in 2008. ASN is making active preparations for effective performance of this role, which requires legislation: the Government has decided to include it in the draft bill ratifying the ordinance codifying the TSN Act and to table it before the Senate. It could thus be passed by the next Parliament.

Transparency on environmental matters

Jointly with the Institute for Radiation Protection and Nuclear Safety (IRSN) and the stakeholders, ASN has developed the www.mesure-radioactivite.fr website which collates all environmental radioactivity measurements made by the licensees, institutions and approved associations. The events of Socatri, Fukushima and Centraco have shown that the public is increasingly interested in these questions.

Continued operation of the 900 MWe reactors

ASN has issued an initial generic opinion on the continued operation of the 900 MWe reactors beyond thirty years. This assessment will need to be supplemented by a position statement reactor by reactor. This has already been done for Tricastin 1 and Fessenheim 1.

Monitoring the EPR construction site

ASN is heavily involved on a day to day basis in monitoring of the Flamanville 3 construction site. This is an activity that had to be re-learned after more than ten years with no construction work on such a scale. This monitoring is leading to a number of important decisions, such as the decree creating this facility, suspension of the site, in particular the concrete pouring activities, or the joint position statement by the British, Finnish and French regulatory authorities concerning the architecture of the EPR reactor's instrumentation and control system.

Production of the PNGMDR

This is a requirement of "the other 2006 Act", that concerning radioactive waste. ASN and the ministry responsible for ecology have, since then, drafted two editions of the national radioactive material and waste management plant.

Construction of the European nuclear safety and radiation protection area

Over the past five years, nuclear safety and radiation protection in Europe has been strengthened:
– WENRA finalised its "safety reference levels" for the European power plants in service and each of its members has agreed to incorporate them into its national regulations;
– WENRA drafted safety objectives for new reactors;
– HERCA, the association of Heads of European Radiological Protection Competent Authorities, was created;
– the European Union issued two directives, one on nuclear safety and one on the management of radioactive waste and spent fuel;
– ENSREG, a grouping of all the European safety regulators and the Commission, has been adopted as an advisory body for the European institutions;
– the first European conference on nuclear safety was held in Brussels in the post-Fukushima context.

Dose optimisation in medical imaging

Exposure linked to medical examinations has increased by more than 70% in five years.

ASN organised a seminar on medical imaging in order to raise the awareness of institutions, professionals and manufacturers of the need for more rigorous application of the principles of radiation protection (justification of procedures and dose optimisation) and the development of alternative techniques, a prime example of which is MRI.

Following on from this seminar, it issued several position statements on this subject last July.

The post-accident approach

Post-accident doctrine is being clarified: it is presented in guidelines, tested during exercises and should be integrated into the off-site emergency plans (PPI).

The full value of an approach such as this became apparent at the time of the Fukushima accident. It was presented to the Codirpa international seminar on 5th and 6th May 2011.

And now to 2011.

What a contrast between the beginning of the year, when ASN was criticised by some for over-playing the safety card and issued warnings concerning the risk of creating a two-speed nuclear world, and the end of 2011 in the wake of the Fukushima accident! 2011 will remain synonymous with Fukushima.

This accident is a major event and it will for ever mark the history of nuclear power, as did Three Mile Island and Chernobyl: there will be a before and after Fukushima.

As early as 11th March, ASN foresaw the potential scale of this natural disaster, combined with a nuclear crisis. Its emergency centre was activated on the afternoon of 11th March and remained operational round the clock, 7 days a week, until 13th April. Its activities were subsequently scaled back but it remained operational for a considerable time.

Two hundred people, or nearly half the ASN workforce, in the regions and the Paris area, were mobilised in the emergency centre.

Daily audio-conferences were held with IRSN, the International Atomic Energy Agency (IAEA), the foreign safety regulators and the French Embassy in Japan.

During the course of this first month, the level of communication was intense, with ASN holding seventeen press conferences and publishing twenty-eight press releases. About fifteen staff were mobilized to answer 1200 media queries. A special website was created and received more than 700,000 hits. A call centre was set up to answer the public's questions.

At the same time, ASN initiated the complementary safety assessments (CSA) process. In addition to these CSAs, ASN in 2011 organised a campaign of targeted inspections on topics related to the Fukushima accident. Thirty-eight inspections were thus carried out on all the nuclear facilities felt to be high-priority, corresponding to a total of one hundred and ten days of inspection.

ASN also wanted to ensure that this process was transparent and to involve civil society. Therefore the members of the local information committees (CLI) and foreign experts, representing a total of fifty people, were able to take part in the inspections. Foreign experts and members of the French High Committee for Transparency and Information on Nuclear Security (HCTISN) took part in the meetings of the Advisory Committees of experts, which for three days in November brought together more than two hundred people.

ASN received and took full account of numerous contributions from the CLIs, the ANCCLI, foreign experts and trade union organisations

Given the exceptional nature of this situation, ASN made public in real-time the reports from its licensees, that from the IRSN produced at its request and the opinions of the Advisory Committees. ASN published its report and its opinion on 3rd January 2012.

ASN worked with the HCTISN, which issued two opinions, one on 3rd May concerning the specifications for the complementary safety assessments, the other on 8th December concerning the transparency of the process. The involvement of the HCTISN and the CLIs represented a crucial contribution to the necessary transparency and openness of this entire approach.

Considerable work was done in a very short time, commensurate with the scale of the disaster.

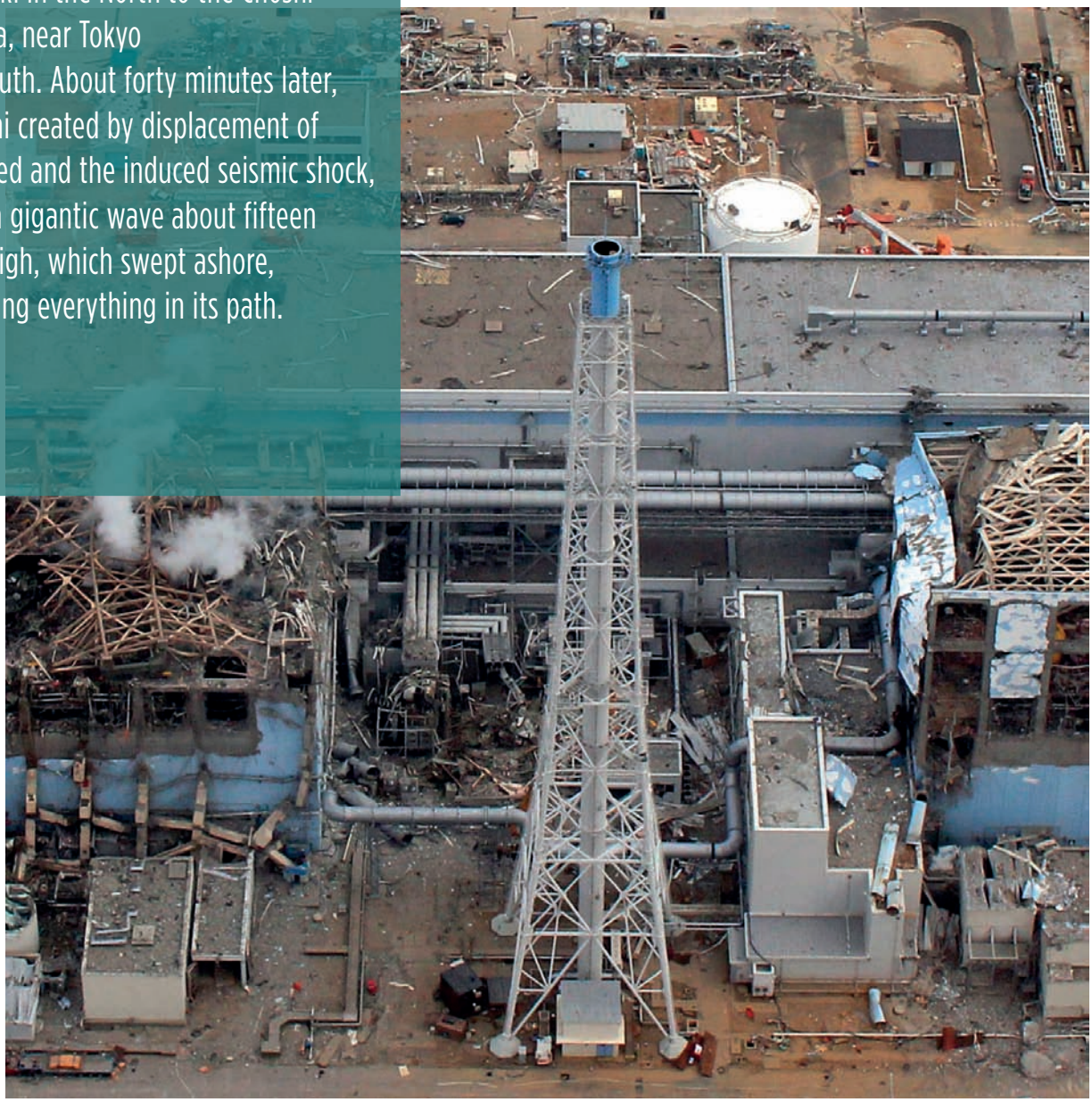
This work needs to be continued nationally, at a European level, and internationally. It must concern both the safety of the facilities and the management of emergencies.

The commitment, professionalism and availability of the ASN and IRSN staff, as well as the considerable work they have done since 11th March 2011, has enabled ASN to learn the first lessons from the Fukushima accident, for which complete experience feedback analysis will take many years.

These three periods - 50 years, 5 years, last year - remind us that the time-scale of change in nuclear safety, radiation protection and their regulation, is a very long one. It is essential that adaptation is always based on experience feedback and stringency and vigilance must be the watchwords at all times. ■

Fukushima: one year later

In 2011, ASN's activities were significantly affected by the disaster that struck Fukushima in Japan. On 11th March 2011, at about 14 h 45 local time, an exceptional earthquake, of magnitude 9 on the Richter scale, occurred off the coast of Honshu, Japan's main island, and struck the entire north-eastern shoreline over several hundred kilometres, from Cape Shiriyazaki in the North to the Choshi peninsula, near Tokyo in the South. About forty minutes later, a tsunami created by displacement of the seabed and the induced seismic shock, created a gigantic wave about fifteen metres high, which swept ashore, devastating everything in its path.



The epicentre of this earthquake, referred to as the "Pacific coast of Tohoku", is located in the Pacific Ocean, along the Japan Trench, off the north-eastern coast of the Island of Honshu, at a depth of about 25km below the seabed and 130km from the port of Sendai, itself located about 300km North of Tokyo, the capital of Japan. This earthquake was preceded by a number of shocks starting on 9th March, and was followed by numerous after-shocks in the hours and then the days and weeks that followed, including about fifty with a magnitude of 6 to 7, but there were no further tsunamis.

According to the available information on the subject, this earthquake resulted in relatively few victims and little damage despite its considerable intensity, thanks to the quality of anti-seismic construction and know-how in Japan. It would appear than more than 90% of the victims and the destruction were because of the enormous tsunami wave which followed.

This extraordinary wave, more than 20m high in places, swept up to 10km inland, destroying everything in its path. The coastal zone around the port of Sendai, located right opposite the epicentre, was particularly badly affected. The earthquake and the tsunami together resulted in more than 20,000 dead and missing, about 6,000 injured and several hundred thousand homeless. They destroyed several coastal towns, residential areas by the seaside, the port of Sendai, and severely damaged various industrial facilities such as refineries, oil depots, chemical plants, and so on. They damaged infrastructure, in particular roads, water supply and sanitation networks, electrical power transmission and telecommunication lines, as well as certain hydroelectric dams. This resulted in a widespread power black-out, fires and the dispersal of chemical, toxic and radiological pollutants. The emergency response was considerably disrupted by the generally chaotic situation which followed these events.

This major natural disaster had consequences for Japan's nuclear facilities. Six nuclear sites located along the north-eastern edge of the Island of Honshu were affected by the earthquake and tsunami. From North to South, these are the spent fuel reprocessing plant at Rokkasho Mura, and the nuclear power plants of Higashidori, Onagawa, Fukushima Daiichi, Fukushima Daini and Tokai Mura, representing a total of fifteen boiling water reactors, four of which were shutdown for maintenance at the time.

At first, following the violent shocks created by the earthquake, the seismic wave detectors fitted to the nuclear reactors triggered automatic insertion of the control rods into the core, to quench the nuclear reaction. Off-site electrical power having been lost, the backup diesel generators automatically started up to provide the necessary power to operate the pumps circulating the cooling water. The facilities were thus automatically shut down in accordance with their seismic risk management design specifications.

Subsequently, the tsunami wave overtopped the protective embankment of the Fukushima Daiichi power plant and submerged the facilities, destroying the electricity generators and damaging the cooling installations. Consequently, the reactor cores and the nuclear fuel storage pools could no longer be cooled, resulting in a nuclear accident.

The other sites did not experience the same problems, either because they were not submerged, or because the electricity generators were spared or rapidly returned to service to perform their emergency functions, or because connection to the power grid was restored rapidly. A fire following the earthquake broke out in the Onagawa nuclear power plant, but was brought under control without any radioactive leaks being detected in the environment.

This is the scenario as constructed from the information so far available. A complete understanding of all aspects of the accident will take years, as was the case following the accidents at Three Mile Island and Chernobyl. This may even lead to the first lessons already learned from this accident having to be revised.

Emergency management by ASN

As soon as the disaster was announced, ASN activated its emergency centre in order to obtain a clear picture of the accident which had struck the Fukushima Daiichi nuclear power plant, so that the French population could be informed.

With the help of the Institute for Radiation Protection and Nuclear Safety (IRSN) which had also activated its emergency centre, it sought to collate all the information enabling it to understand the events and how the situation was developing.

The emergency centre, which was operational 24/7, was kept active for a month, until the situation was stabilised. ASN then kept a team on duty, to monitor how the situation was developing and issue information on a regular basis.

To obtain information about the local situation and any developments, the emergency team was in daily contact with the emergency unit at the French Embassy in Japan, in particular with the Ambassador's technical adviser and then with the expert sent out by IRSN. It permanently analysed the Japanese press releases, the information supplied by the

Japanese organisations (NISA[1], METI[2], MEXT[3], JAIF[4], etc.) and the information broadcast by the Japanese media, especially the television stations.

Daily telephone conferences with the International Atomic Energy Agency (IAEA), with the western safety regulators – who were also monitoring the events, in particular the United States NRC, the Canadian CNSC and the ONR of Great Britain, led to a clearer understanding of the events and enabled the steps taken or required to be assessed.

This work led ASN to regularly inform and advise the French Authorities, especially the General Secretariat for Defence and National Security (SGDSN) and the Interministerial Emergency Unit (CIC). ASN also informed the Parliamentary Office for the Evaluation of Scientific and Technological Choices (OPECST) and the High Committee for Transparency and Information on Nuclear Security (HCTISN). It issued a daily press release and organised daily press conferences. In the regions, this information was relayed by ASN's regional divisions to the préfets, the local information committees (CLI), the nuclear sites and the local media.

To facilitate public information, ASN set up a special website which it kept permanently updated, as and when new information became available. This site is still on-line and it is regularly updated to keep pace with the developing situation (*http://japon.asn.fr*). Anyone can visit it to obtain more information about the accident and its consequences.

ASN also made sure that information about radioactivity levels and advice on precautions to be taken and checks to be carried out was given to French nationals in Japan, travellers returning from Japan and the inhabitants of French Polynesia.

11st March 2011, an exceptional earthquake, of magnitude 9 on the Richter scale, occurred off the Japanese coast. Forty minutes later, a tsunami of unprecedented proportions swept ashore and destroyed everything in its path. The auxiliary facilities of the Fukushima nuclear power plant were affected, in particular the emergency installations ensuring cooling of the reactors. ASN activated its emergency centre to monitors the events round the clock and inform the French Authorities and population.

1. Nuclear and Industrial Safety Agency
2. Ministry of Economy, Trade and Industry
3. Ministry of Education, Culture, Sports, Science and Technology
4. Japan Atomic Industrial Foruma

In a letter dated 22nd March 2011, ASN also asked the nuclear licensees (EDF, CEA, AREVA, ANDRA) to reinforce monitoring around their sites in order to detect any atmospheric fallout from Japan. All the results obtained were published on the information website of the national environmental radioactivity monitoring network, set up jointly by ASN and IRSN (*www.mesure-radioactivite.fr*), in addition to the information placed directly by IRSN on its own website (http://environnement.irsn.fr). Given the very low radioactive impact observed on French territory and the constant fall in the values measured, this arrangement was lifted on 26th May 2011.

On 20th April 2011, ASN issued recommendations concerning contamination checks on goods other than foodstuffs imported from Japan. Foodstuffs were for their part covered by an amended European regulation dated 25th March 2011, which automatically applies in France.

ASN offered the Japanese safety regulator (NISA) assistance with emergency management, especially in the post-accident phase, for which, as a result of the lessons learned from analysing the Chernobyl accident, it had developed a doctrine through the work done by the Steering committee for managing the post-accident phase of a nuclear accident or radiological emergency situation (CODIRPA).

Throughout the management of this emergency, the large scale mobilisation and commitment by the ASN staff must be underlined:

– the emergency centre was activated on the afternoon of 11th March 2011 and remained operational 24/7 until 13th April 2011. Scaled-back operations continued for much longer. ASN is even now still regularly monitoring what is happening in Japan;
– 200 staff, or nearly half the ASN workforce, from the Paris and regional divisions, were mobilised in the emergency centre during this period;
– daily audio-conferences were held with IRSN, the IAEA, foreign safety regulators and the French Embassy;
– ASN took part in numerous ministerial meetings, including 13 meetings of the Interministerial Emergency Unit (CIC);
– ASN communications involved:
• 17 press conferences,
• 28 press releases,
• 1,200 media queries,
• more than 700,000 visits to the *http://japon.asn.fr* website,
• and the opening of a telephone call centre to answer the public's questions.

The lessons of Fukushima

The Fukushima accident confirms that, despite the precautions taken in the design, construction and operation of nuclear facilities, an accident can never be completely ruled out.

The role of ASN is to ensure that the probability of a severe accident is extremely low and that any consequences are also as limited as possible.

As a result of nuclear safety issues, French nuclear facilities are – as of the design stage – the subject of nuclear safety studies which envisage all plausible scenarios liable to lead to accident situations. The design and the operating rules applicable to these facilities aim to minimise these risks. However, the occurrence of such accidents is examined so as to assess the consequences and make provision for an emergency response to protect the population against the effects of such an event.

The facilities, in particular all the equipment important for safety and the emergency equipment, undergo checks and periodic tests to verify their conformity and their availability. ASN regularly carries out inspections to check that the facilities are in conformity with their baseline safety standards and that the licensee's organisation is capable of guaranteeing safe operations, including in the event of incidents, or human or material failures.

Every ten years, the licensee carries out a periodic safety review and the nuclear power plants are shut down for a ten-year inspection, during which a complete and exhaustive check is conducted on the facilities, maintenance is carried out and modifications made if considered necessary to improve safety, plus post-maintenance qualification of equipment for a further period of operation. These operations are monitored particularly closely by ASN, which issues a ruling on the ability of the facility to continue to operate, in the light of the objectives set for the periodic safety review.

Drawing on the lessons learned from the Three Mile Island accident in the United States, the French facilities were thus equipped with:

– hydrogen recombiners working independently by means of catalysis to produce water by combining hydrogen and oxygen, thus limiting the risk of explosion from a build-up of hydrogen in the facilities;
– sand-bed, or ultimate filters, to trap certain radioactive elements in the event of intentional discharge from the containment to lower the internal pressure in the event of a severe accident affecting the reactor; these filters are capable of trapping more than 90% of radioactive discharges, hence a significantly reduced environmental impact.

In the same way, the steps taken to organise the emergency response, both at the facility and in its environment, were reinforced. Periodic exercises are held, including for management of the post-accident phase, which was extensively reviewed by the CODIRPA in the wake of the Chernobyl accident.

As with the major accidents mentioned above, the Fukushima accident will be the subject of in-depth analysis in order to learn all the lessons. This process is a lengthy one, which will last nearly a decade if the sequence of

12th to 15th March 2011,
the fuel began to melt, generating hydrogen which built up in the buildings housing the reactors. Explosions blew out the superstructures, leading to fears of reactor containment cracking.

events is to be analysed in detail and countermeasures defined to prevent such an accident happening again, in particular on French facilities. However, an initial analysis clearly identifies one area for investigation: the widespread destruction caused by the tsunami wave showed that in exceptional circumstances, it was possible to lose all the back-up and emergency systems designed to ensure the safety of the facilities.

This led ASN to envisage studying these disaster scenarios in order to identify measures and systems to be implemented to deal with such situations, no matter how improbable they may appear.

Aware of the importance of the safety of the French nuclear facilities and the emotion triggered by this nuclear accident, the Prime Minister asked ASN, in a letter of 23rd March 2011, pursuant to article 8 of the TSN Act of 13th June 2006, to perform a safety audit of the nuclear facilities in the light of the Fukushima accident. At its meeting of 24th and 25th March 2011, the Council of the European Union asked the Safety regulators of the European union countries to perform stress tests to check the robustness of the nuclear power plants to a certain number of extreme conditions with which they could be faced. These were earthquake, flooding, loss of electrical power supplies, loss of heatsinks, combinations of various events, as well as failure of the emergency organisation. These assessments were in particular to look at situations not considered in the design of the facilities and specify where the robustness of these installations could be reinforced to deal with these extreme situations.

In response to this request, each country is required to present an interim report by the end of the summer and a final report by the end of 2011.

To meet these complementary objectives, ASN drafted a plan of action comprising two aspects:

– a complementary safety assessment of the French nuclear facilities;
– a campaign of targeted inspections on these facilities.

ASN also took part in the work initiated following the Fukushima accident concerning:
– nuclear emergency management;
– international harmonisation of standards.

The complementary safety assessments

ASN played an active part in the work of the Western European Nuclear Regulators' Association (WENRA) to draft the specifications for the stress tests to be carried out on the nuclear power plants, which was approved on 25th May by the European Nuclear Safety Regulators Group (ENSREG).

At the national level, to ensure that the French and European approaches were consistent, ASN adopted these specifications for the complementary safety assessments and, even though the request from the Council of the European Union only concerned nuclear power plants, ASN decided to extend the approach to all French nuclear facilities, in particular research reactors and facilities involved in the fabrication or reprocessing of nuclear fuel and presenting a potential criticality risk related to the handling of fissile nuclear materials.

12th March 2011, the Japanese authorities evacuated the population from a zone 20 km around the plant and monitored the contamination of individuals who could have been exposed to radionuclides.

ASN consulted the HCTISN regarding the orientations of its approach. In its opinion dated 3rd May 2011, the High Committee stated that it was in favour of the approach and the specifications and stipulated that this assessment should also take account of social, organisational and human factors, in particular for subcontracted activities within the nuclear facilities. ASN thus decided to enhance the French specifications with respect to those adopted by ENSREG at a European level, by in particular emphasising social, organisational and human factors, especially with regard to subcontracting. The Fukushima accident in fact showed that the ability of the licensee and, as necessary, its subcontractors, to organise their work in a severe accident situation is a key factor in controlling such a situation. This ability is also decisive in accident prevention, facility maintenance and the quality of operations. This is why the conditions for the use of subcontracting are included in the French complementary safety assessments.

5th May 2011, twelve ASN decisions require the French nuclear licensees to carry out a complementary safety assessment of their facilities, in accordance with precise specifications incorporating those approved by Europe for nuclear power plants and expanding them to take account of social, organisational and human factors according to the HCTISN recommendations and to cover all nuclear facilities, including laboratories and fuel cycle plants.

Finally, although the Fukushima accident was not linked to any malicious act and even if consideration of such acts is not included in the conclusions of the European Council of March 2011, the complementary safety assessments approach is able to cover some of the situations following a malicious act. Malicious acts are in fact one of the possible causes (equipment failure, natural hazard, etc.) of a loss of electrical power supply or cooling which can lead to a nuclear accident. The loss of electrical power or cooling, regardless of the cause, is specifically dealt with in the complementary safety assessments.

According to the specifications, the complementary safety assessment thus consists of a targeted re-appraisal of the safety margins of the nuclear facilities in the light of the events which took place in Fukushima, in other words, extreme natural phenomena (earthquake, flooding) and their combination, which overwhelmed the safety functions of the facilities and led to a severe accident. The assessment first of all concerns the effects of these natural phenomena; it then looks at the loss of one or more systems important for safety involved at Fukushima (electrical power supplies and cooling systems), regardless of the probability or the cause of loss of these functions; finally, it deals with the organisation and management of severe accidents which could occur as a result of these events.

Three main aspects are included in this assessment:
– the steps included in the design of the facility and its conformity with the design requirements applicable to it;
– the robustness of the facility beyond its design parameters; the licensee must in particular identify those situations leading to a sudden deterioration of the accident sequences (cliff-edge effect) and present the measures capable of avoiding them;
– any possible modification liable to improve the level of safety of the facility.

In these extreme situations, the approach adopted assumes the successive loss of the lines of defence, by applying a deterministic approach, independently of the probability of this loss. For a given facility, the assessment covers, on the one hand, the facility's behaviour in the face of extreme situations and, on the other, the effectiveness of the prevention and mitigation measures, in particular all potential weak points and all "cliff-edge effects", for each of the extreme situations. The aim is to assess the robustness of the defence in depth approach and the pertinence of the accident management measures, as well as to identify possible areas for safety improvements, both technical and organisational.

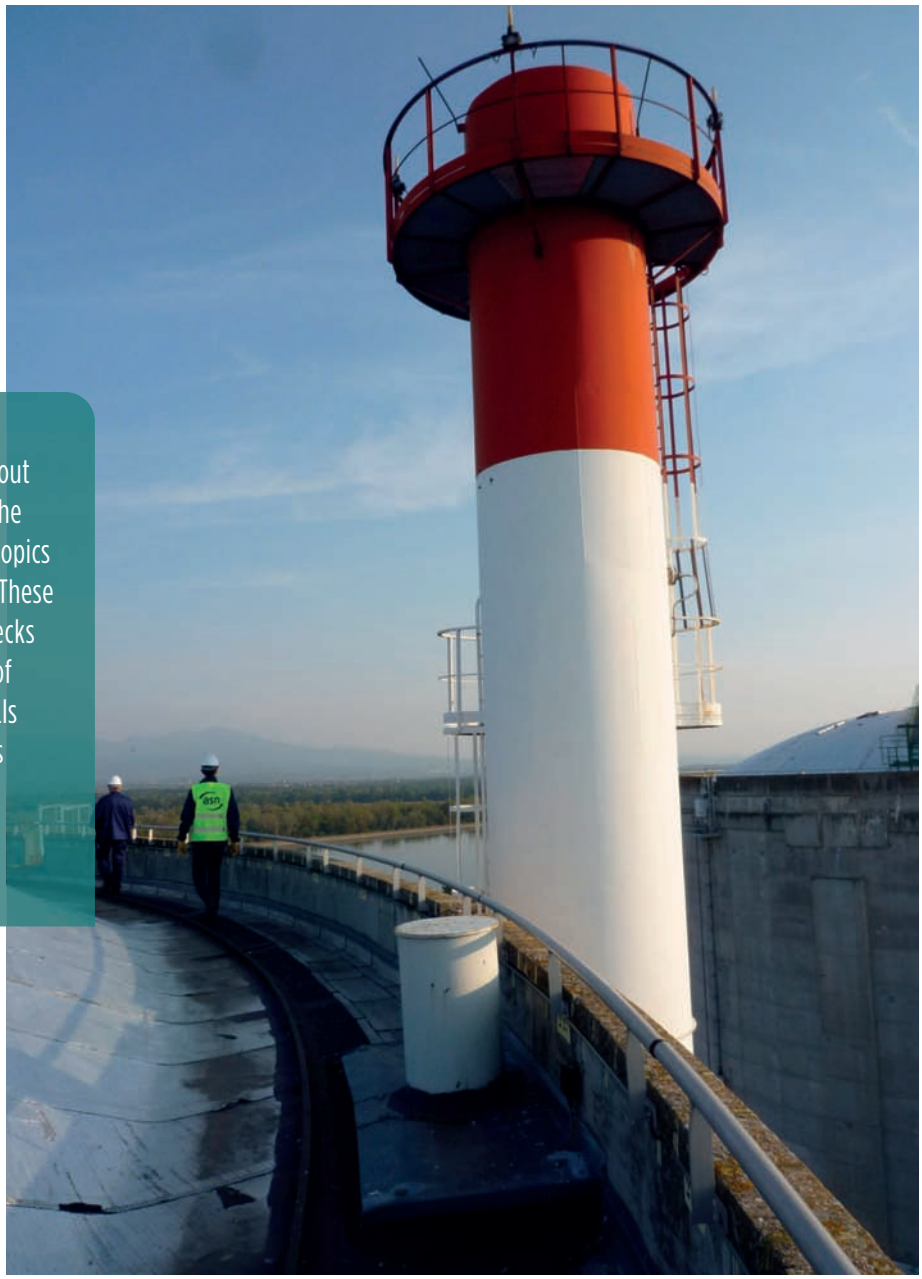
The scope of the complementary safety assessment includes the following situations:
– conceivable initiating events on the site: earthquake, flooding, other extreme natural phenomena;
– resulting losses of safety systems: loss of all electrical power supplies, loss of heatsinks, including ultimate heatsink, combination of the two;
– management of severe accidents;
– conditions for use of subcontractors.

For each technical field, the licensee was required to check the design of the facility and assess the available margins, by identifying the level beyond which the severe accident becomes inevitable ("cliff-edge effect") and the level which the facility can withstand with no loss of containment integrity.

In its decisions of 5th May 2011, the ASN Commission instructed the French nuclear licensees (EDF, CEA, AREVA, Institut Laue-Langevin, CIS bio and ITER) to carry out a complementary safety assessment on each of their facilities. These facilities were divided into three categories:
– the first, comprising the nuclear power plants in operation, the main research reactors and the main facilities of the nuclear fuel cycle, for which the licensees were to submit their reports by 15th September 2011;
– a second, in particular comprising facilities undergoing decommissioning and research facilities, for which the licensee were to submit their reports by 15th September 2012;
– and a third, in particular comprising waste disposal facilities and other facilities entailing lesser risks, for which experience feedback from analysis of the Fukushima accident will be incorporated on the occasion of the next periodic safety reviews, which could if necessary be brought forward.

Given that in 2011, the complementary safety assessment approach concerned a large number of facilities (79) and that they are operated by a s mall number of licensees, ASN introduced an intermediate step into the assessment process, requiring that the licensees present their methodologies by 1st June 2011. The Advisory Committee of experts for reactors (GPR) and the Advisory Committee

19th July 2011, ASN issues a position statement on the methodologies presented by the licensees.



Summer 2011, ASN carried out 38 complementary inspections on the French nuclear facilities, targeting topics related to the Fukushima accident. These inspections involved 110 days of checks in the field, with the participation of fifty members of the HCTISN, the CLIs and certain foreign counterparts, as observers.

of experts for laboratories and plants (GPU) took due note of IRSN's analysis of the approaches adopted by the licensees in response to the ASN specifications, at their meeting of 6th July 2011. Following this analysis, ASN on 19th July 2011 considered that the approaches adopted were on the whole satisfactory, but that the licensees should take account of certain particular requests expressed by ASN.

The reports submitted by the licensees on 15th September 2011 were immediately published on the ASN website. At the request of ASN, these reports were analysed by IRSN, with its findings presented to the Advisory Committees (GPR et GPU) from 8th to 10th November 2011. Following these presentations, the Advisory Committees formulated about ten recommendations, incorporated by ASN into its conclusions.

ASN attached the greatest importance to this approach being carried out openly and transparently: the French High Committee for Transparency and Information on Nuclear Security (HCTISN), the local information committees (CLI) and several foreign national safety regulators – from Belgium, Germany, Luxembourg, Switzerland and the Netherlands – were invited to take part in the targeted inspections carried out by ASN, as observers, and to attend the meetings of the Advisory Committees; these various stakeholders were also sent the reports submitted by the licensees and were asked to submit contributions, which were taken into account by ASN. In addition, ASN placed the licensee reports, the IRSN report, the opinions of the Advisory Committees and the inspection follow-up letters on-line on its website. It also published

several information notices and organised four press conferences between May 2011 and January 2012.

On 8th December 2011, the HCTISN issued an opinion on the complementary safety assessment process. This opinion underlines the good level of public information throughout the complementary safety assessment process, whether through press conferences, virtually immediate placing of reports and opinions on-line, or through the contribution of the local information committees, plus the quality of the analyses produced by the licensees, IRSN, the Advisory Committees and ASN. It nonetheless recommends greater openness on the part of CEA and AREVA, as well as efforts with regard to presentation in order to make it easier for the public to understand highly technical subjects. It confirms that it hopes to see social, organisational and human factors incorporated into the next steps of the process.

ASN opinion of the complementary safety assessments

On 3rd January 2012, ASN published its conclusions in the form of a report and a formal opinion, which it transmitted to the Prime Minister.

In its opinion, ASN recallend that:
– the natural disaster which struck the Fukushima Daiichi nuclear power plant confirms that, whatever the precautions taken in the design, construction and operation of nuclear facilities, an accident can never be completely ruled out;
– the licensee has overall responsibility for the safety of its facilities while, on behalf of the State, ASN is responsible for regulating and monitoring nuclear safety, with the technical support of IRSN and its Advisory Committees. Pursuant to the law, ASN ensures that the safety of French civil nuclear facilities is continuously, in particular through the periodic review process and the integration of experience feedback.

15th September 2011,
the nuclear licensees submit their reports to ASN, which publishes them on its website and then undertakes to analyse them with the assistance of IRSN.

Following the complementary safety assessments on the high-priority nuclear facilities, ASN considers that those examined show a level of safety that is sufficient to warrant no immediate closure of any of them. At the same time, ASN considers that their continued operation demands that their robustness to extreme situations be increased beyond their existing safety margins, as rapidly as possible.

ASN is thus requiring that the licensees adopt a range of measures designed to provide the facilities with the means to enable them to deal with:
– a combination of natural phenomena of an exceptional scale and exceeding those adopted in the design or the periodic safety review of the facilities,
– severe accident situations following the prolonged loss of electrical power or cooling and liable to affect all the facilities on a given site.

Among these new provisions, ASN would in particular stress the importance of the following measures:
– for all the facilities, the creation of a "hard core" of material and organisational arrangements making it possible to manage the fundamental safety functions in extreme situations, with the aim of preventing a severe accident, limiting large-scale radioactive releases if the accident cannot be controlled and enabling the licensee, even in extreme situations, to perform its emergency management duties. This will for example involve setting up a "bunkerised" emergency management centre with diesel electricity generator, and an ultimate backup water supply. The equipment to be included in this hard core must be designed to withstand major events (earthquake, flood, etc.), of a scale far in excess of those used to determine the strength of the facilities, even if not considered to be plausible. By 30th June 2012, the licensees shall notify ASN of the content and the specifications of the "hard core" for each facility;
– for nuclear power plants, gradual deployment, as of 2012, of the "Nuclear Rapid Intervention Force (FARN)" proposed by EDF. This is a national intervention force comprising specialised teams and equipment, able to take over from the personnel of the site affected by the accident and deploy additional emergency response means within 24 hours. The system will be fully operational by the end of 2014;
– for the fuel storage pools in the various facilities, the implementation of reinforced measures designed to reduce the risk of uncovering of the fuel;
– for the nuclear power plants and the silos at La Hague, feasibility studies concerning the use of technical measures such as a geotechnical containment or system

with equivalent effect, designed to protect the ground and surface waters in the event of a severe accident.

These new requirements entail considerable work and large-scale investments, which are beginning in 2012 and will be spread over several years.

Over and above these measures, ASN considers that particular attention must be focused on social, organisational and human factors. As a result of the appraisals conducted on these assessments, ASN has identified a number of priorities in this field:
– renewal of licensee manpower and skills, which is a crucial point at a time when one generation is replacing another and when considerable work is required as a result of the CSAs;
– the organisation of the use of subcontracting, which is an important and complicated subject;
– research on these topics, for which programmes must be set up, at national or European levels.

ASN will be setting up a pluralistic working group on these subjects.

ASN has placed all the information concerning the complementary safety assessments on-line on its website *www.asn.fr,* under the heading "Complementary safety assessments" which is regularly updated, in particular on the occasion of the key steps scheduled for monitoring the work resulting from this approach.

The ASN report also constitutes France's report for the European stress tests. The reports from the various countries were transmitted to the European Commission by early January 2012 and are undergoing peer review by experts from all the safety regulators and the European Commission, from January to April 2012.

8th to 10th November 2011,
the Advisory Committees examine the complementary safety assessments produced by the licensees, and the analyses made by IRSN and ASN.

Targeted inspections

In addition to the complementary safety assessments, ASN initiated a campaign of complementary inspections of the nuclear facilities, targeting topics related to the Fukushima accident. The purpose of these complementary inspections was to run checks in the field on the conformity of the licensees' equipment and organisations with the existing safety baseline standards.

The following topics were covered during these inspections:
– protection against off-site hazards, in particular earthquake resistance and protection against flooding;
– loss of electrical power supplies;
– loss of heatsinks;
– operational management of emergency situations.

These inspections were carried out during the summer of 2011, on all the nuclear facilities felt to be of high priority for the complementary safety assessments.

Each one was carried out by a team of several inspectors accompanied by IRSN experts. For each given site, they took the form of in-depth inspections lasting several days (either consecutive or not) such as to cover all the topics mentioned above. They were based on baseline safety standards common on the one hand to the nuclear power plants, and on the other to the other nuclear facilities. They placed emphasis on field visits rather than documentary checks. For each of the nuclear facilities, following the inspection on the various topics, a follow-up letter was sent out to the licensee and published on the website (*www.asn.fr*). Thirty-eight complementary inspections were thus performed on the French nuclear facilities considered to be high-priority, corresponding to a total of 110 days of inspection. The overall results of these inspections were incorporated into the ASN final report published on 3rd January 2012.

Inspectors from Belgium, Luxembourg, Germany, Switzerland, the Netherlands and representatives of the CLIs and the HCTISN took part in the EDF site

inspections as observers. Conversely, ASN staff took part in the inspections conducted in Belgium by the Belgian safety regulator, the Agence fédérale de contrôle nucléaire (AFCN).

Feedback from nuclear emergency management

ASN is a participant in all the national and international reviews concerning the organisational measures to be adopted by the public authorities in the wake of the Fukushima nuclear accident.

At a national level, therefore, ASN takes part in the ministerial work being done on experience feedback concerning management of a nuclear emergency. At an international level, ASN takes part in the experience feedback work being done within international bodies such

3rd January 2012,
ASN submits its report and its opinion to the Prime Minister.
These documents are transmitted to the European Commission.
They specify a plan of action for improvements to the safety of the French nuclear facilities.

as IAEA or NEA, or within regulatory body networks, such as WENRA and HERCA, which bring together the heads of the European nuclear safety and radiation protection authorities.

Experience feedback from the Fukushima Daiichi accident will also be an opportunity for ASN to take further the work being done by CODIRPA on management of the post-accident phase, concerning the processing of the consequences of a nuclear accident, from the economic, health and social standpoints in the short, medium and long terms, with a view to returning to a situation considered to be acceptable. The doctrine concerning post-nuclear accident management, which will collate in a single document the specific recommendations for exiting the emergency phase and the guidelines for the transitional and long-term phases, should be approved by CODIRPA in 2012. Experience feedback from the accident in Japan will make a valuable contribution to this approach.

Revision of international safety standards

In order to harmonise practices and exchanges with its foreign counterparts, ASN is heavily committed to international relations, whether bilateral, European or international. It in particular took an active role in the international consulting bodies which worked on the follow-up to the Fukushima accident, in particular within WENRA and the IAEA.

One ASN commissioner took part in a fact-finding mission comprising representatives of safety regulators and IAEA members, which went to Japan from 22nd May to 1st June 2011, visiting the Fukushima Daiichi site in particular. ASN also took part in the ministerial level conference organised by the IAEA from 20th to 24th June 2011. This event laid the bases for the IAEA action plan, which was approved by the Council of Governors in September 2011.

At a European level, ASN took part in the first European conference on nuclear safety organised by ENSREG in

Brussels, on 28th and 29th June 2011. It contributed to the work done by WENRA to draft the stress test specifications. It is a stakeholder in the peer review of the national reports on the nuclear power plant reactors stress tests, from January to June 2012, under the supervision of an ASN commissioner. ASN is also a source of proposals for changes to the European nuclear safety regulatory framework. It will continue to be heavily involved and aims to see Europe become a driving force behind improvements to nuclear safety worldwide.

Programme of future actions

Over and above the initial steps taken in 2011, experience feedback from the Fukushima accident needs to be further analysed. As with the Three Mile Island and Chernobyl accidents, detailed analysis of experience feedback from the Fukushima accident could take about a decade.

However, ASN has already identified a certain number of measures:

– in its opinion following the complementary safety assessments, ASN considers that continued operation of the facilities requires that their robustness to extreme situations needs to be increased as rapidly as possible. In the first half of 2012, ASN will thus be taking a range of decisions, officially requiring that the licensees implement the specified measures. In the light of experience feedback from the Fukushima accident, it will reinforce the safety requirements concerning the prevention of natural hazards (earthquake and flooding), the prevention of risks linked to other industrial activities, subcontractor surveillance and the processing of deviations. The corresponding ASN decisions will be published on the www.asn.fr website;
– ASN will take part in the in the European peer reviews, the conclusions of which should be examined by ENSREG in April 2012 and presented to the European Council at the end of June 2012, and it will aim to draw the relevant consequences from their results;
– ASN also considers that additional studies are required to complete certain aspects, in particular the initial analyses made by the licensees. It will ask the licensees to do so in letters which will also be posted on its website;
– ASN will be particularly vigilant in monitoring the implementation of all of its stipulations, as well as in reinforcing the baseline safety standards, especially with regard to earthquakes, flooding and risks linked to other industrial activities. As of the summer of 2012, it will periodically present the progress of all of these actions;
– ASN will continue to run the complementary safety assessment process on lower priority facilities, for which the reports must be submitted by the licensees before 15th September 2012;
– ASN considers that the first complementary safety assessments confirmed the benefits of this innovative approach, which complements the existing safety approach. It envisages making this complementary assessment of safety margins a permanent feature, by adding it as a requirement of the future ten-year periodic safety reviews;
– finally, ASN will continue to play an active part in all the analyses to be carried out worldwide, to gain a clearer understanding of the Fukushima accident and learn the relevant lessons.