REGIONAL OVERVIEW OF NUCLEAR SAFETY AND RADIATION PROTECTION

CHAPTER 8

ASN has 11 regional divisions through which it carries out its regulatory responsibilities nationwide and in the Overseas France and Territorial Communities.

The activities of the ASN regional divisions are carried out under the authority of the regional ASN representatives (see chapter 2 - point 2|3|2.

The ASN divisions carry out direct inspections on the basic nuclear installations (BNIs), on radioactive material transport and on small-scale nuclear activities and investigate most of the licensing applications submitted to ASN by the nuclear activity licensees within their regions. The divisions check application of the regulations relative to nuclear safety and radiation protection, labour inspection, pressure equipment, installations classified on environmental protection grounds (ICPEs) and liquid and gaseous effluent discharges, in these installations.

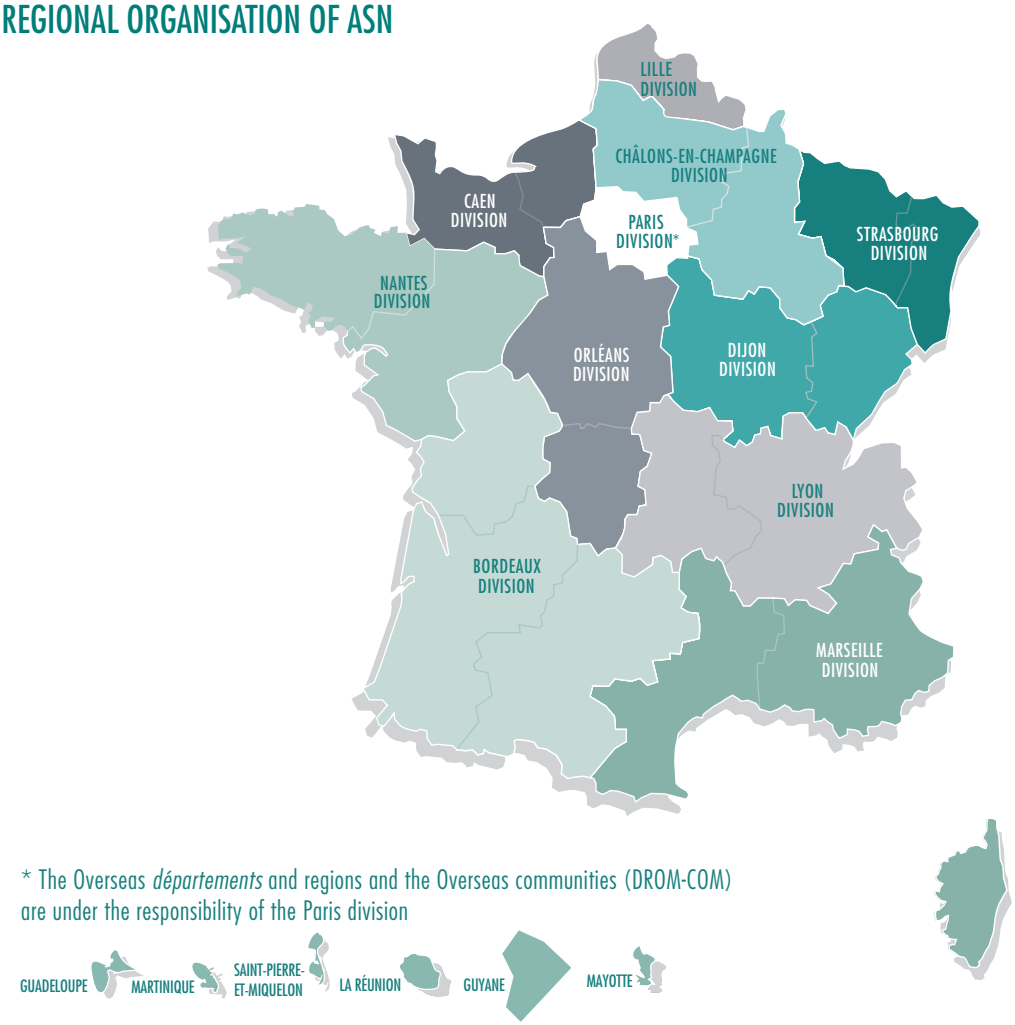
In radiological emergency situations, the divisions assist the *Préfet*[1] of the *département*, who is responsible for protection of the population, and check the measures taken on the site by the licensee to make the installation safe. To ensure preparedness for these situations, they take part in preparing the emergency plans drafted by the *Préfets* and in periodic exercises.

The ASN divisions contribute to the public information duty. They for example take part in the meetings of the local information committees (CLIs) of the BNIs, and maintain regular relations with the local media, elected officials, associations, licensees and local administrations.

The purpose of this chapter is, in addition to ASN's overall assessment of nuclear safety and radiation protection for each major activity and main licensee, to present an assessment of the situation observed locally by the ASN divisions.

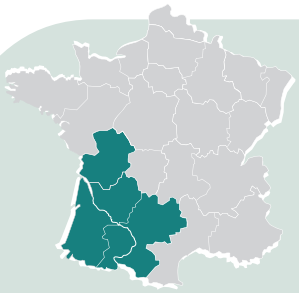
Each section addresses the nuclear safety and radiation protection aspects of the nuclear facilities on the sites in a particular region. It also provides insight into the local issues and identifies certain local initiatives that are particularly representative of ASN's regional action, particularly in terms of communication and cross-border relations.

THE REGIONAL ORGANISATION OF ASN



1. In a *département*, representative of the State appointed by the President

BORDEAUX



1 THE STATE OF NUCLEAR SAFETY AND RADIATION PROTECTION IN THE AQUITAINE, POITOU-CHARENTES AND MIDI-PYRÉNÉES REGIONS REGULATED BY THE **BORDEAUX** DIVISION

The Bordeaux division is responsible for regulating nuclear safety and radiation protection in the 17 *départements* of the Aquitaine, Poitou-Charentes and Midi-Pyrénées regions.
As at 31 December 2011, the workforce of the ASN Bordeaux division stood at 22 officers: 1 regional head, 2 deputies, 15 inspectors and 4 administrative officers, under the authority of an ASN regional representative.

The activities and installations to regulate in Aquitaine, Poitou-Charentes and Midi-Pyrénées comprise:
– the Le Blayais NPP (4 reactors of 900 MWe);
– the Civaux NPP (2 reactors of 1,450 MWe);
– the Golfech NPP (2 reactors of 1,300 MWe);
– 22 external radiotherapy departments;
– 8 brachytherapy departments;
– 24 nuclear medicine departments;
– 150 departments carrying out interventional radiology procedures;
– 150 tomography devices;
– about 6,900 medical and dental radiodiagnostic devices;
– about 1,500 veterinary radiodiagnostic devices;
— 32 industrial radiology companies;
– 600 industrial and research equipment items.

In 2011, ASN carried out 51 nuclear safety inspections, including 9 post-Fukushima inspections, and 26 labour inspections in the Le Blayais, Civaux and Golfech NPPs, 6 radioactive material transport inspections and 125 small-scale nuclear facility inspections in the Aquitaine, Poitou-Charentes and Midi-Pyrénées regions.

Eight significant events rated as level 1 on the INES scale were notified by the nuclear installation licensees of these regions in 2011. In small-scale nuclear activities, ASN was notified of two significant events rated level 2 and twenty-six significant events rated level 1 on the ASN-SFRO scale, and one significant event rated level 1 on the INES scale.

In the exercise of its regulation duties, ASN's Bordeaux division sent three violation reports to the public prosecutor's department.

1 Assessment by domain

1|1 Assessment of BNI nuclear safety

Blayais NPP

ASN considers that nuclear safety and radiation protection performance of the Blayais site on the whole matches ASN's general assessment of EDF, and that the radiation protection performance stands out positively. ASN considers that the site has shown rigour in this area, particularly in the management of controlled areas and dosimetry.

ASN considers that the site must be more rigorous in the preparation, performance and inspection of operating and maintenance activities. Consequently, application of the reliability enhancement practices must be improved.

Lastly, despite improved control of discharges, the site must be more rigorous in the tracking and maintenance of the equipment that contributes to environmental protection and monitoring, in order to guarantee compliance with the regulatory requirements.

Civaux NPP

ASN considers that the nuclear safety, radiation protection and environmental protection performance of the Civaux site on the whole match ASN's general assessment of EDF performance.

With regard to nuclear safety, ASN notes that certain improvements are required in the preparation and reliability of interventions on the site. It also observes recurrent conformity deviations on earthquake-qualified equipment.

In other respects, ASN notes that the collective dosimetry remains low despite the numerous work activities that went on during the 10-year inspection. It nevertheless wishes to see improvements in the conditions of implementation of the EVEREST initiative (entry into controlled areas wearing standard working overalls).

Lastly, ASN considers that the site must remain vigilant in the management of its discharges during low water periods.

Golfech NPP

ASN considers that nuclear safety and radiation protection performance of the Golfech site on the whole matches ASN's general assessment of EDF, and that the environmental protection and radiation protection performance stands out positively with respect to ASN's general assessment of EDF.

ASN considers that the site must be more rigorous in the preparation, performance and second-level inspection of plant operations and in the monitoring of maintenance activities performed by outside contractors. Furthermore, ASN thinks that the seismic risk should be given greater consideration and that emergency situation management must be improved.

ASN notes that the site continues the good radiation protection performance it has displayed for several years now, and ensures satisfactory contamination control in the controlled areas.

1|2 Assessment of radiation protection in the medical field

The inspection of the radiotherapy departments in 2011 revealed progress - to varying degrees - in application of the ASN decision relating to the quality and safety of radiotherapy treatments. While some centres have devoted considerable energy to this, others have fallen well behind in application of the decision. ASN will continue its inspections in this area.

ASN also endeavoured to check that the medical radiation physics teams were adequate, particularly with regard to the complexity of the devices used in each of the centres.

ASN's Bordeaux division moreover received a larger number of significant event notifications in radiotherapy, which reflects the undertaking of an experience feedback initiative to be continued in 2012.

This drive to improve treatment safety is to be reinforced in 2012, particularly with regard to the analysis of a priori risks and deepening the analysis of adverse events.

ASN continued its inspections in the field of interventional radiology and the use of X-rays in the operating theatre. Numerous shortcomings in worker and patient radiation protection were observed in the course of the 29 inspections carried out in operating theatres, including the failure of health professionals to wear dosimeters, the lack of enhanced medical surveillance of doctors, and deficiencies in the optimising of the equipment delivering the ionising radiation.

Owing to the lack of medical radiology technologists in the operating theatres, shortcomings in medical staff training in patient radiation protection, and deficiencies in quality checks of the equipment used, ASN considers that the doses received by patients are not sufficiently optimised.

The inspections conducted by ASN moreover reveal that measures must be taken to minimise the doses received by workers.

1|3 Assessment of radiation protection in the industrial and research sectors

ASN continues regular inspections of activities that have potentially high consequences from the radiation protection aspect, such as industrial radiology. During the twelve inspections carried out in 2011, ASN observed progress in the in-house radiation protection checks and precise defining of radiation protection zoning. It nevertheless considers that the ordering customers of the gamma radiography companies are insufficiently involved in radiation protection. More specifically, they make excessive use of on-site gamma radiography services instead of having the examinations performed in protected bunkers. Furthermore, they rarely draw up prevention plans and the zoning plans are poorly formalised.

Over the last two years, ASN's Bordeaux division has inspected each gamma radiography agency of South-West France at least once in an on-site situation. Moreover, on 16 June 2011 it invited the main industrial radiology enterprises to a day of information and discussion on application of the regulations.

ASN has noted that a number of universities in South-West France have established a procedure for regularising and disposing of the legacy radioactive sources held in their laboratories.

ASN inspection industrial radiography (gamma radiography) – October 2011

To do this they have created an organisational structure to track the activities that use radioactive sources and have decided on investments to bring the structures into compliance and ensure the disposal of sources. These efforts are to be continued in 2012.

ASN deems that any university that has not yet started these regularisation procedures must now make it a priority.

1|4 Assessment of nuclear safety and radiation protection in the transport of radioactive materials

ASN carried out six inspections concerning the transport of radioactive material in 2011. It considers that the findings for the inspected organisations are generally satisfactory. Progress has been observed since 2006 among the local shippers of radiopharmaceutical products in particular.

This being said, the pre-departure verifications of the packages must be further improved, making them more systematic and rigorous.

Furthermore, the involvement of the transport safety advisors must result in greater presence and verifications on the ground so that their annual reports contain more precise and relevant recommendations that will improve worker radiation protection.

2 Additional information

2|1 Public information actions in 2011

ASN supported the work of three local information committees (CLIs) in south-west France by attending all their annual general meetings and several technical committee meetings.

The CLIs sent observers who were able to attend several inspections, including the targeted post-Fukushima inspections conducted in each NPP in the region.

ASN held a press conference in Bordeaux on 24 May and in Toulouse on 26 May 2011.

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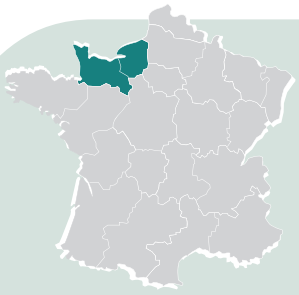


2 THE STATE OF NUCLEAR SAFETY AND RADIATION PROTECTION IN THE BASSE- AND HAUTE-NORMANDIE REGIONS REGULATED BY THE **CAEN** DIVISION

The Caen division regulates nuclear safety and radiation protection in the five *départements* of the Basse- and Haute-Normandie regions. The Caen division also covers the Monts d'Arrée site (Brennilis NPP currently undergoing decommissioning) in the Bretagne region.
As at 31 December 2011 the workforce of the Caen division stood at twenty-six officers: one regional head, three deputies, eighteen inspectors and four administrative officers, under the authority of an ASN regional representative.

The activities and facilities to regulate in Normandy and Brittany comprise:
– the EDF NPPs at Flamanville (2 reactors of 1,300 MWe), Paluel (4 reactors of 1,300 MWe) and Penly (2 reactors of 1,300 MWe);
– the construction site for the future EPR Flamanville 3 reactor;
– the AREVA NC spent nuclear fuel reprocessing plant at La Hague;
– the ANDRA Manche repository
– GANIL national large heavy ion accelerator (Caen)
– the Brennilis NPP (Finistère *département*) undergoing decommissioning;
– 8 radiotherapy centres (21 machines);
– 3 brachytherapy departments;
– 11 nuclear medicine units;
– 62 users of scanners;
– 35 interventional radiology departments;
– 750 medical radiodiagnostic devices;
– 1,400 dental radiodiagnostic devices;
– 18 industrial radiography companies;
– 250 industrial and research devices (including a cyclotron for the production of radionuclides);
– 6 head offices and 19 agencies of organisations approved for radiation protection checks.

In 2011, ASN carried out 150 inspections of nuclear facilities in Normandy and Brittany, including 19 inspections based on the initial experience feedback from the Fukushima accident:
– 60 inspections on fuel cycle and research facilities, and facilities undergoing decommissioning, including the AREVA NC site at La Hague;
– 60 inspections in the EDF's Flamanville, Paluel and Penly nuclear power plants;
– 25 inspections on the construction site for the future EPR Flamanville 3 reactor.

69 inspections were also carried out in 2011 in small-scale nuclear activities in Normandy, and 10 inspections in radioactive material transportation.

In addition, 91 days of labour inspection were carried out on the NPPs and the Flamanville 3 site. Sixteen events rated level 1 on the INES scale were notified by nuclear installation licensees of the Normandie and Bretagne regions in 2011. One event rated level 2 and seven events rated level 1 on the ASN-SFRO scale were declared by the heads of radiotherapy departments in the Normandie region. The inspections conducted in 2011 by ASN's Caen division led to the submission of five violation reports to the competent public prosecutors.

1 Assessment by domain

1|1 Assessment of BNI nuclear safety

AREVA NC plant at La Hague

ASN considers that the situation of the AREVA NC plants in La Hague is satisfactory with regard to personnel exposure and discharges into the environment. The year 2011 was nevertheless marked by the unavailability of an evaporative capacity[1] that obliged changing the industrial operations schedule. ASN considers that AREVA NC must ensure that such technical difficulties are better anticipated in order to limit the delays in the recovery of certain wastes, and to repair the faulty equipment within acceptable times.

The industrial organisation of the AREVA La Hague site underwent major changes in 2011, which that consisted essentially in grouping the operating teams in charge of the in-service plant production and maintenance on "industrial platforms". While this general reorganisation went well on the whole, the project to outsource operational control of the energy production facilities failed. Insourcing of the safety engineers was also carried out and led to a relatively high rate of renewal of this engineering branch. ASN maintains vigilance to ensure that such reorganisation projects help maintain or improve interfaces, particularly between the operating control of the units and their maintenance.

ASN considers that AREVA must continue its efforts to improve the baseline safety standards of its plants by defining the elements important for the safety of its facilities, in compliance with the order of 10 August 1984[2]. Insofar as specific safety studies were demanded for the site as part of the Fukushima accident experience feedback, several other studies fell behind schedule during 2011. ASN is nevertheless ensuring that the studies necessary for the safety review of the

1. Evaporative capacity: equipment item using a heat source that separates the most radioactive substances in a liquid solution; the ultimate aim of the equipment is to direct the most radioactive substances towards waste packages and limit the other effluents to be treated or discharged.
2. Order of 10 August 1984 relative to the quality of design, construction and operation of BNIs.

UP3-A plant, which is currently in progress, are provided within the deadlines.

ASN observes that significant event notifications were satisfactory in 2011; the number is down in the safety sector, particularly for inspections and periodic tests, and stable in the environmental sector.

With regard to legacy waste recovery operations, ASN carried out a review inspection that revealed the good overall organisation of the management of the projects, most of which are in the study phase. In spite of the definite progress observed in the project studies, ASN notes that the tangible results of legacy waste recovery for 2011 remain very limited, given that the vitrification of UMo fission products has not started and the chemical treatment of the reconditioned drums in building 119 was virtually zero in 2011. ASN considers that the licensees must consider these legacy waste recovery projects - some of which have significant implications for safety - as priorities, and that they must comply with the schedules they have undertaken to follow or that ASN has prescribed.

Flamanville NPP

The Flamanville site in 2011 remains involved in a programme to improve the site's safety performance. ASN considers that in this area the site has attained a stable situation, and its performance now matches ASN's assessment of EDF's performance as a whole. The weaknesses of the site, which ASN has clearly identified, result from organisational problems, maintenance shortcomings, and inadequacies in the safety culture.

The investments in the facilities, made notably in the context of a specific action plan implemented since mid-2010, have considerably improved their condition. ASN also notes positively that efforts are being made to catch up on the substantial maintenance backlog.

ASN has observed a lack of responsiveness and foresightedness in several technical files during outages simply to refuel the reactors.

Paluel NPP

For the Paluel NPP, the year 2011 was a marked by significant events that reveal a decline in the rigour of operating and maintenance operations. These events also indicate weaknesses in activity monitoring and the safety culture of the personnel, and inadequate preparation for work interventions, particularly during the transient phases of shutdown and restarting.

The site has however progressed in occupational radiation protection. Emergency situation management is satisfactory, as was shown by the national emergency exercise held on 29 September 2011.

ASN considers that the site has improved the management of its non-radioactive waste discharges into the environment, despite the persistence of non-radioactive gaseous discharges from certain cooling units.

Penly NPP

The inspection conducted on the Penly NPP in 2011 revealed no particular difficulties and the site stands out positively with respect to ASN's general assessment of EDF. More particularly, ASN noted the progress the site has made in pressure equipment tracking and monitoring.

Reactor 1 was shut down in the last quarter of the year to undergo its second 10-year inspection, during which many maintenance operations performed, including full requalification of the main primary system, the reactor building containment tightness test, and partial overhaul of the rotating drum screens filtering the cooling sea water.

Construction of the EPR Flamanville 3 reactor

After delivering the creation authorisation decree (DAC) and the building permit, the construction work on the Flamanville 3 reactor began in September 2007. The first concrete for the nuclear island buildings was poured in December 2007. Since then the civil engineering works have continued. The installation of the first components (tanks, pipes, cables and electrical cabinets, etc.) began in 2010 and continued during 2011.

ASN conducted twenty-five inspections on the Flamanville 3 construction site in 2011. The inspections focused chiefly on the civil engineering of the buildings and structures, the mechanical and electrical assemblies of the systems and components, worker occupational exposure, environmental protection, the impact of the construction activities on reactors 1 and 2, and the monitoring of outside contractors. ASN also carried out inspections concerning the transfer of the facilities to the future licensee.

During the inspections on the construction site in 2011, ASN was particularly attentive to checking that the efforts devoted to worker safety culture training and awareness were adequate, and that this safety culture is lastingly maintained. On the whole, ASN considers that the organisational setup implemented by EDF is satisfactory in the areas inspected.

With regard to the civil engineering, ASN noted an overall improvement in the quality of the work, but it also noted technical difficulties with certain complex activities that required the implementation of specific plans of action at its request. ASN makes sure that these actions are monitored over time in order to guarantee satisfactory construction quality of the Flamanville 3 reactor. ASN also ensures that the workmanship standards in the activities that have become much more intense since early 2010, such as mechanical and electrical assembly operations, are maintained over time. Given the reactor commissioning times announced by EDF, ASN also ensures that appropriate equipment protection is maintained.

ASN considers that the environmental protection performance on the Flamanville 3 construction site is satisfactory on the whole. ASN considers that despite improvements in worker occupational exposure on the Flamanville 3 construction site, further improvements can be made. EDF must remain vigilant with regard to radiographic inspection procedures and ensure that they are strictly applied by the contractors working on the site. Lastly, concerning the preparation of the future licensee for entry into service, ASN considers that the main tasks are under way and that the organisation is gradually taking shape.

ASN fulfils the labour inspection duties on the Flamanville 3 construction site. During the first half of 2011, the construction

Overall view of the Flamanville EPR construction site – September 2011

site was marked by occupational accidents on 24 January and 11 June respectively, resulting in the death of two workers, and by the death of an employee in a road accident on 24 June when driving home from work. The ASN labour inspectorate submitted its conclusions on the accidents of 24 January and 11 June to the judicial and administrative authorities. For the accident of 24 June, it communicated the relevant information to the competent common law labour inspectorate. Further to these events and in response to the demand from ASN, EDF initiated measures to improve safety on the construction site. These measures will be monitored and checked by the ASN labour inspectorate in 2012.

ASN also investigated the conditions of notification of occupational accidents on the Flamanville 3 construction site and the administrative conditions of employment of the employees from the European Union working on the site. This work is carried out in close cooperation with the other State services.

ANDRA's Manche repository

During 2011 ANDRA continued its modification work on the cover by reducing the gradient of the embankments in the north section applying a comparable methodology to that used in the east section in 2010. ASN considers that this work increases the stability of the embankments and is part of a more general process to ensure the long-term integrity of the repository cover. ANDRA has also carried out work to optimise the management of the effluents collected in the buried gravitational separation system. Lastly, ANDRA has produced the updates of the Centre's operating and monitoring rules and its on-site emergency plan (PUI), in accordance with the conclusions of the safety review finalised at the end of 2009.

GANIL (national large heavy ion accelerator)

GANIL started construction work on the SPIRAL 2 facility, for which examination of the creation authorisation application could not proceed as initially planned. ASN opted to proceed only with the examination of phase 1 of SPIRAL 2, because GANIL had failed to provide certain safety studies for phase 2 within the initially specified times. ASN asked GANIL to file a new application for phase 2 of SPIRAL 2.

ASN has remained particularly attentive to compliance with the general operating rules following a number of events in 2011, but has also noted the continuing improvements in monitoring of the issues relating to safety and radiation protection.

The Brennilis NPP undergoing decommissioning

A decree of 27 July 2011 authorised EDF to resume the decommissioning work. This decree is a partial decommissioning authorisation, as the public inquiry commission had

recommended, with the aim of completing the inventory of the initial radiological and chemical status of the site, completing the effluent treatment station decommissioning operations, cleaning out and filling in the effluent discharge channel leading to the river Ellez, cleaning out the diffuse pollution areas, and lastly, starting decommissioning of the heat exchangers following their radiological characterisation.

Furthermore, on 1 September 2011, ASN adopted two decisions relative to water intake conditions and the conditions and limits of effluent discharges from the Brennilis NPP corresponding to the activities authorised by the partial decommissioning decree.

At the end of 2011, EDF lodged a file for the complete decommissioning of the facility as required by the decree of 27 July 2011.

1|2 Assessment of radiation protection in the medical field

In 2011, ASN inspected those radiotherapy departments in Normandy that were not inspected in 2010, along with the departments suffering a shortage of medical physicists. These inspections revealed continuing progress in the rigour, organisation and traceability of interventions and the progressive implementation of management systems to ensure the quality and safety of treatments. Nevertheless, in spite of the increased personnel numbers in some radiotherapy centres, several of the centres in Normandy lack personnel, and more particularly in the medical radiation physics sector. These difficulties are often an obstacle to progress.

The Caen division intensified its checks in the interventional radiology sector and the use of X-rays in operating theatres. This field entails risks for both patients and workers, risks that have to be well controlled. The inspections carried out revealed many areas for improvement, including with regard to the training and qualification of the staff using the equipment, equipment quality controls, the quality of staff individual protective equipment, medical monitoring of non-salaried workers, and optimisation of practices in this sector.

In 2011, ASN inspected one third of the nuclear medicine departments in Normandy. The inspections revealed a relatively satisfactory situation, although a few areas for improvement remain in the coordination of the prevention measures for outside contractors and taking account of radiation exposure of workers' extremities (hands).

1|3 Assessment of radiation protection in the industrial and research sectors

Regulation of industrial radiology remains a high priority for ASN, which implemented an increased level of unannounced night-time inspections in 2011, notably with an inspection campaign in Haute-Normandie conducted jointly with the DIRECCTE (Regional directorate for enterprises, competition, consumption, work and employment) and the CARSAT (Retirement and occupational health insurance fund) of Normandy. These inspections have brought to light a widely contrasting picture of the way different companies handle the risk of worker exposure to ionising radiation: work conditions are improving on the whole, but some companies are not making progress. At the same time, the ASN, together with the DIRECCTE of Haute-Normandie and the CARSAT of Normandy is continuing to disseminate and promote good practices in this field, by urging the ordering customers and the radiology contractors to adhere to a regional charter drawn up in December 2007 at the instigation of ASN and the labour inspectorate. About forty companies have signed up to date.

1|4 Assessment of nuclear safety and radiation protection in the transport of radioactive materials

The ten inspections conducted by ASN in the area of radioactive materials transport in 2011 hinged around different priority topics, in both the basic nuclear installations and small-scale nuclear activities.

ASN considers that the organisational measures in the BNIs in Normandy are satisfactory, with a good degree of involvement of the transport safety advisors. The inspections conducted in 2011 did nevertheless disclose deviations on which ASN must provide information. In small-scale nuclear activities, ASN considers that the situation can be improved, even if the deviations detected during the inspections do not call into question the safety of the transport operations. The deviations concerned

ASN inspection of a convoy of radioactive waste in Valognes – November 2011

more particularly the radiation protection of the carrier, the radiological inspections and quality assurance.

ASN also monitored the transportation from France to Germany of containers of vitrified radioactive waste originating from the reprocessing of German spent fuel on the AREVA NC site in La Hague. ASN performed two inspections to check that the dose rate around the convoy did not exceed the regulatory limits.

2 Additional information

2|1 International action by the Caen division

Given that EPR reactors are being built at Olkiluoto in Finland and Flamanville in France, the ASN Caen division is participating in the close cooperation between ASN and the Finnish nuclear regulator.

Thus in 2011, three inspectors from the Finnish nuclear regulator took part in a cross-inspection of the Flamanville 3 construction site and a day of technical discussions.

The Caen division was also able, in the context of the bilateral relations with the Chinese nuclear regulator (NNSA), to discuss the regulation practises of the two authorities, each of which is responsible for overseeing nuclear facilities under construction.

In addition to this, technical discussions were held, allowing the sharing of experience feedback specific to the EPR reactor construction sites in France and China.

An inspector from the Caen division took part in a cross-inspection with the UK's Office for Nuclear Regulation (ONR) on the Sizewall B nuclear power plant in England.

A cross-inspection was also held with the ONR on the Sellafield nuclear fuel reprocessing site. This inspection provided the opportunity for technical discussions on subjects that also concern the La Hague site: facilities in operation, legacy waste recovery, the decommissioning of old plants.

2|2 Public information actions in 2011

The Caen division held three press conferences on the nuclear safety and radiation protection situation in 2011, in Caen, Rouen and Rennes (the last was held jointly with the Nantes division).

ASN took part in various meetings of the CLI of Normandy and Brittany. During these meetings, ASN presented its assessment of the situation of the nuclear facilities concerned, and the control of the activities around the basic nuclear installations. ASN also presented the procedure for the complementary safety assessments required by the ASN as part of the initial experience feedback from the Fukushima accident.

Visit of the Flamanville EPR construction site with the Chinese nuclear regulator – November 2011

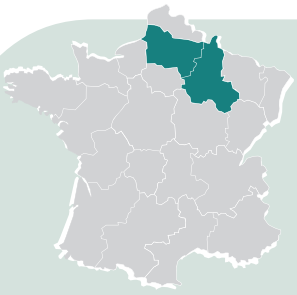
OPECST visit to the La Hague site – May 2011

ASN's Caen division invited the CLIs to attend the ASN inspections on several occasions. The inspections carried out in the EDF facilities, and the two inspections out six for which AREVA accepted the presence of the CLIs, in the framework of the initial experience feedback from the Fukushima accident, gave the CLI observers a precise picture of the ASN's duties.

2|3 Prospects for 2012

ASN's Caen division will carry out inspections to specifically verify that the corrective actions following the inspections of 2011 in the light of the initial feedback from the Fukushima accident and drawn from the complementary safety assessments, have been properly engaged. The ASN inspectors will also inspect the Brennilis NPP, currently being decommissioned, in the light of the Fukushima accident.

CHÂLONS-EN-CHAMPAGNE



3 THE STATE OF NUCLEAR SAFETY AND RADIATION PROTECTION IN THE PICARDIE AND CHAMPAGNE-ARDENNE REGIONS REGULATED BY THE CHÂLONS-EN-CHAMPAGNE DIVISION

The Châlons-en-Champagne division is responsible for regulating nuclear safety and radiation protection in the seven *départements* of the Champagne-Ardenne and Picardie regions.
As at 31 December 2011 the workforce of the Châlons-en-Champagne division stands at twelve officers: one regional head, two deputies to the regional head, seven inspectors and two administrative officers, under the authority of an ASN regional representative.

The activities and facilities to regulate in Champagne-Ardenne and Picardie comprise:
- the Chooz A NPP (currently being decommissioned);
- the Chooz B NPP (two 1,450 MWe reactors);
- the Nogent-sur-Seine NPP (two 1,300 MWe reactors);
- the low and intermediate level short-lived radioactive waste repository located at Soulaines-Dhuys in the Aube *département;*
- ANDRA's underground research laboratory in Bure, in preparation for the creation of a geological repository for high-and medium-level long-lived radioactive waste;
- about 80 licensed medical institutions, including 12 radiotherapy departments, 3 brachytherapy departments, 13 nuclear medicine departments and some fifty scanners;
- about 400 licensed industrial activities, with more than one-third of the licenses being for possession of devices to detect lead in paint;
- about ten research laboratories, mainly situated in the universities of Champagne-Ardenne and Picardie.

In 2011, ASN carried out 46 inspections of nuclear facilities (EDF power plants, radioactive waste disposal facility), of which six were targeted "post-Fukushima" inspections. 60 inspections were also carried out in small-scale nuclear activities and 3 inspections in radioactive material transportation.

ASN conducted 7 labour inspections in the nuclear power plants.

Five significant events rated level 1 on the INES scale were notified by nuclear installation licensees in 2011. In the small-scale nuclear facilities, 4 significant events of level 1 on the ASN-SFRO scale and 1 significant event of level 1 on the INES scale were notified to ASN.

In the framework of its regulation duties, ASN submitted two violation reports to the public prosecutor's department.

1 Assessment by domain

1|1 Assessment of BNI nuclear safety

Nogent-sur-Seine NPP

ASN considers that the results for the Nogent-sur-Seine site are globally satisfactory in the areas of radiation protection and conventional pressure equipment.

ASN observes a slight reduction in safety performance, with progress to be made in operating rigour. Three events rated level 1 on the INES scale were effectively notified during reactor shutdowns in 2011. The equipment padlocking errors resulting partly from the excessive work load during shutdown periods remain a subject of concern for ASN. The site must moreover ensure better dissemination of experience feedback within the operating teams. ASN also notes a deterioration in the quality of the operations performed on the nuclear pressure equipment compared with the previous years.

ASN moreover considers that monitoring of outside contractors can be improved, from the aspects of process control, transposing national requirements into the site organisation memos, and ensuring the presence of EDF personnel on the ground.

Lastly, ASN considers that the NPP's environmental efforts are not yet conclusive. ASN observes in particular that the management of certain liquid effluent retentions areas is still not up to standard.

Chooz NPP

ASN considers that in 2011 the Chooz NPP maintained satisfactory standards in radiation protection, especially during the

ASN inspection on the theme of the environment at the Nogent-sur-Seine NPP – December 2011

reactor 1 maintenance outage, and in the operation of pressure equipment.

With regard to safety, ASN considers that the operator must remain vigilant in the application of the facility operating instructions; several failures to comply with the operating technical specifications were observed, essentially during the reactor 1 maintenance outage.

This being said, ASN considers that the licensee has made progress in the control of the maintenance activities, and these efforts must be continued. The majority of the deviations from the operating technical specifications originate in work carried out in 2010 or earlier. Improvements must also be made in work site ergonomics (lighting, work stations).

With regard to the environment, ASN has observed inadequacies in the operation and maintenance of the monochloramine treatment facilities for the cooling effluents. It has, on the other hand, noted the good quality of the work of the environmental monitoring laboratory, even though the environmental monitoring systems are still often unavailable. ASN has also noted the significant reduction in leaks of coolant compared with previous years; the licensee must not slacken its vigilance in this respect, particularly with regard to intervention times.

Lastly, ASN considers that significant and appreciable progress was made in the control of containment, radiation protection and safety in the dismantling activities on the Chooz A decommissioning site in 2011. The licensee responded positively and energetically to the deviations observed in late 2010 and early 2011.

The waste repository at Soulaines-Dhuys and the Bure laboratory

Operation of the low-and intermediate-level, short-lived, waste repository at Soulaines-Dhuys, and the work done by ANDRA in the Bure underground laboratory continued in 2011 with a good level of quality that is comparable with the performance of previous years.

1|2 Assessment of radiation protection in the medical field

External beam radiotherapy

Considering the conclusions of the inspections of all the twelve centres carried out in 2010, only four centres with structural difficulties (personnel shortage) and/or organisational difficulties (delay in applying quality assurance to the patient management process) were inspected in 2011. These inspections revealed positive developments in both personnel numbers and quality management system deployment. In 2012 it is planned to inspect the eight centres that were not inspected in 2011.

Interventional radiology

Continuing the measures undertaken since 2009, eleven inspections were carried out in 2011, mainly in operating theatres. As in the previous years, highly contrasting situations were observed, but on the whole they call for strong measures in terms of radiation protection of the workers and the patients. More specifically, progress is required in personnel training and inspection of the medical equipment. Considering this context, the level of inspections applied in 2011 will be maintained in 2012, that is to say about ten inspections.

Nuclear medicine

Six of the thirteen centres were inspected in 2011, thereby ensuring that all the centres have been inspected at least once since 2009. These inspections show that radiation protection is duly taken into account. Improvements are nevertheless expected in the management of contaminated effluent and the optimising of worker occupational exposure. These conclusions were presented to all the centres at a seminar attended by some fifty participants, held in Reims on 4 November 2011. The participants greatly appreciated the seminar, and would like to see it become a periodic event.

Computed tomography (CT)

For inspections were carried out in 2011, stepping up the examination of the patient radiation protection measures taken by the centres. The reason for this is that CT examinations represent a significant source of exposure to ionising radiation in the French population. It has been found that patient radiation protection is a genuine concern in the centres, taken into account in the choice of new equipment and resulting in mean exposure levels for the most common examinations that are lower than the reference levels indicated in the regulations. Progress can nevertheless still be made by optimising certain protocols. Increased involvement of medical physicists could contribute to progress in this respect.

1|3 Assessment of radiation protection in the industrial sector

Industrial radiography

Given the potential implications in terms of radiation protection, ASN performed a large number of inspections on work sites using gamma radiography. The areas for progress in this domain include personnel training, work site preparation, development of the safety culture and preparation for incident situations.

Lead detectors

ASN conducted a sampling inspection campaign of holders of detectors of lead in paint. These inspections confirmed the numerous deviations from the regulations observed in a similar campaign carried out in 2010: regulatory verifications not carried out, expired authorisations, transfer of devices to unauthorised users, etc. This activity sector will be subject to further inspections in 2012.

Along with decentralized Government services and ANDRA, ASN contributed to the study of the treatment of legacy radioactive pollution resulting from the operation of the former ORFLAM-PLAST plant in Pargny-sur-Saulx (*département* 51). The first clean-out operations that began in 2010 were continued in 2011 and should normally be completed in 2012.

1|4 Assessment of nuclear safety and radiation protection in the transport of radioactive materials

ASN carried out three inspections in 2011, involving two carriers and one shipper of radiopharmaceuticals. These inspections reveal that the regulations governing the transport of radioactive substances are generally well respected. Certain operations nevertheless need to be better documented.

2 Additional information

2|1 International action by the Châlons-en-Champagne division

The Châlons-en-Champagne division continued to maintain regular relations with AFCN, the Belgian nuclear regulator. The cross-inspections continued in small-scale nuclear activities and in the field of nuclear safety. Belgian and French inspectors took part in the inspections conducted on the Chooz and Tihange sites in the light of the experience feedback from the Fukushima accident. The Châlons division took part in the meetings of the Franco-Belgian management committee and the work of the Franco-Belgian "safety" working group, as well as the meetings held by the EDF and Electrabel - the licensees of the Chooz and Tihange sites respectively - to present the complementary safety inspections to the AFCN and ASN. It also took part in the Franco-Luxembourg committee meeting.

Lastly, it helped host several foreign delegations that came to visit the Bure Laboratory and the Soulaines-Dhuys repository, and accompanied a delegation from the Bure CLIS that visited the waste disposal research facilities of Mont Terri in Switzerland.

2|2 The other notable findings in the Champagne-Ardenne and Picardie regions

In the context of major risk prevention, the ASN division participated – in collaboration with the Ministry of Defence – in the emergency exercise organised on the Saint-Dizier airbase.

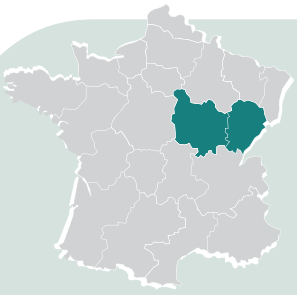
2|3 Public information actions in 2011

The Châlons-en-Champagne division held two press conferences on the status of nuclear safety and radiation protection in spring 2011, one in Châlons-en-Champagne, the other in Amiens.

ASN took part in various meetings of the Chooz, Nogent-sur-Seine and Soulaines CLIs. At these meetings it presented ASN's assessment of the safety of the nuclear facilities concerned, the work of the CODIRPA on the management of post-accident phases, the known information relative to the accident at the Fukushima NPP in Japan, and the process of the complementary safety assessments (CSA) implemented by the licensee EDF on the Chooz and Nogent-sur-Seine sites, and the results of the inspections carried out on the themes adopted for the CSAs. The Châlons-en-Champagne division also attended annual general meetings, meetings of the board of governors and meetings of the commissions of the Bure CLIS, contributing in particular to the informing of the local populations.

Day of information and discussions with the nuclear medicine professionals of the Champagne-Ardenne and Picardie regions on 4 November 2011

DIJON



4 THE STATE OF NUCLEAR SAFETY AND RADIATION PROTECTION IN THE BOURGOGNE AND FRANCHE-COMTÉ REGIONS REGULATED BY THE **DIJON** DIVISION

The Dijon division of ASN monitors nuclear safety and radiation protection in the eight *départements* of the Bourgogne and Franche-Comté regions.
As at 31 December 2011 the workforce of the Dijon division stood at 6 officers: 1 regional head, 4 inspectors and 1 administrative officer, under the authority of an ASN regional representative.

The activities and installations to regulate in Bourgogne and Franche-Comté comprise:
– 8 external radiotherapy departments (19 accelerators, 1 contact radiotherapy device);
– 3 brachytherapy departments;
– 14 nuclear medicine departments;
– 42 surgical units using interventional radiology;
– 41 diagnostic tomography devices;
– about 700 medical radiodiagnostic devices;
– about 1,100 dental radiodiagnostic devices;
– 310 industrial and research facilities.

ASN carried out 63 inspections in 2011, of which 6 addressed radioactive material transport and 57 were in small-scale nuclear facilities.

No radiation protection incidents affecting patients rated above level 0 on the ASN-SFRO scale were notified to the Dijon division in 2011.

In the framework of its regulation duties, the Dijon division sent one violation report to the public prosecutor's department.

1 Assessment by domain

1|1 Assessment of radiation protection in the medical field

External radiotherapy

In 2011, ASN inspected four of the eight external radiotherapy centres of Bourgogne and Franche-Comté. It also conducted four technical visits for the commissioning of accelerators (replacement of two machines and installation of new accelerators in Auxerre and Nevers). All the centres thus have a machine that complies with the criteria required by the INCa.

The shortage of human resources in medical radiation physics evidenced in the previous years is becoming less marked. The situation nevertheless remains delicate due to the numerous job opportunities available to medical physicists.

The implementation of a quality assurance system pursuant to the ASN decision of 1 July 2008 is under way. Although many centres have not complied with the implementation deadlines, this initiative, which enables the centres to formalise their practices and analyse the risks, should be concluded in 2012, with the aim of improving the safety of treatments.

The centres have set up an organisation to ensure the in-house and external quality checks required by the decision of AFSSAPS, the French Health Product Safety Agency. This being said, the organisation is not always formalised in writing, and the in-house checks are not carried out in full. Progress remains to be made in this area.

ASN observes a clear improvement in the health professionals' awareness of the need to detect, analyse and notify events liable to affect the health of patients or workers. Seven of the eight external radiotherapy centres have notified ASN of events since 2008.

Interventional radiology

In 2011, the number of surgical platforms fell sharply in the Bourgogne and Franche-Comté regions (closure of operating theatres in small hospital centres and sharing of means in private clinics).

In 2011, ASN carried out twelve inspections of centres that use image intensifiers in the operating theatre. The situation remains contrasted from one centre to another: there are great disparities in the performance of the devices used, in the performance of the quality checks of these devices as required by the AFSSAPS, and in the setting up of controlled areas ("zoning") within the operating theatres.

The involvement of doctors in radiation protection in the operating theatre remains low, and far below that of the rest of the personnel, particularly in the case of operations carried out by private practitioners.

The inspections carried out over the last three years in interventional radiology show an improvement in the dosimetric monitoring of the workers. Likewise, ASN observes a slight improvement in the integration of radiation protection in the operating theatres. Greater involvement of medical physics in this sector of activity would ultimately help to achieve a more tangible reduction in doses delivered to patients.

Nuclear medicine

Over the last three years ASN has observed a notable improvement in the formalising of risk assessments and zoning in nuclear medicine. It is moreover increasingly frequent to have a medical physicist analyse the activity levels of radiopharmaceuticals administered in the context of the diagnostic reference levels (DRL), thereby helping achieve an appreciable reduction in the activities administered to patients.

The quality inspections, however, are not always conducted exhaustively, and the work station analyses are rarely complete.

Computed tomography (CT)

The inspection of medical imaging services equipped with a CT scanner was stepped up in 2011. Particular attention was paid to patient radiation protection. Eleven services were thus inspected in the Bourgogne and Franche-Comté regions.

ASN observes that techniques for reducing or optimising doses delivered to patients are widely applied through the adaptation of examination protocols and when choosing new equipment.

Nevertheless, although compliance with the principle of optimisation that controls the individually delivered doses is generally observed, the justification for the CT examination is not always provided.

Furthermore, ASN notes that certain examinations that could be performed using a magnetic resonance imaging (MRI) scanner instead of the CT scanner, are not performed because there are not enough MRI scanners available.

1|2 Assessment in the industrial sector

The inspections of the industrial radiology activity conducted by the Dijon division of ASN in 2011 provide contrasting results.

The radiation doses likely to be received by the personnel during radiological inspections are almost always estimated on a predictive basis. Radiation measuring equipment is worn equally well on the outdoor job sites as during inspections performed in dedicated enclosures.

On the other hand, improvements can be made in the marking out of operation areas, of areas prohibited to the public, and in the control of access to these areas, particularly on the outdoor job sites. The job site preparatory work must therefore be improved in order to remedy this situation.

The use of X-ray generators instead of the traditional high-activity sources seen in the previous years is becoming more widespread, particularly for the inspection of pipes.

1|3 Assessment of the transport of radioactive substances

ASN notes an improvement in the conditions of transport of radiopharmaceuticals and increased rigour in the management of the statutory documentation and the verification of the safety equipment. Securing of the loads has been substantially improved.

The same goes for the holders of radioactive sources who transport their equipment themselves. However, the documentation relative to the transport operations is not always referenced in the company quality manuals.

2 Additional information

2|1 The other notable findings in the Bourgogne and Franche-Comté regions

The former uranium mining sites

After inspecting virtually all the mining sites of Saône-et-Loire in 2009, ASN participated in 2011 in an unannounced inspection of the residue disposal site in Gueugnon, alongside the DREAL (Regional Directorate for the Environment, Planning and Housing) of Bourgogne.

As regards the Gueugnon site, the clean-out operations were carried out in 2009 and 2010. A final radiological inspection of these zones revealed that a small number of them required further clean-out. This clean-out was performed by AREVA in 2011. The population and local associations were informed regularly of the progress of the works and involved in the surveillance actions. Thus, a meeting of the local information and surveillance committee (CLIS) was held on 20 September 2011 to present a full review of the work and the radiometric measurements taken.

Furthermore, on 8 November 2011 the administrative tribunal of Dijon cancelled the complementary prefectural order of 29 June 2009 that had been taken to allow the material excavated during the clean-out work to be stocked on the site. In 2012, a new complementary order will be taken to integrate the modification of the classified installations nomenclature that took place in January 2011.

With regard to the Issy-l'Évêque site, investigations must be carried out in early 2012 to better characterise this disposal site. The works undertaken were presented to the elected officials and local associations on 30 September 2011, at a meeting of the CLIS created for this purpose.

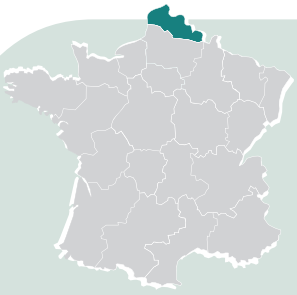
2|2 International action by the Dijon division

The Dijon division took on a Moroccan trainee for two weeks, at the request of the IAEA. He took part in the preparation and performance of several inspections in the industrial and medical sectors. Besides this, discussions were held with all the division's personnel on the authorisation delivery practices and the inspections carried out in this context.

2|3 Public information actions in 2011

At the end of May 2011 the Dijon division held a press conference on the status of nuclear safety and radiation protection in the Bourgogne and Franche-Comté regions.

LILLE



5 THE STATE OF NUCLEAR SAFETY AND RADIATION PROTECTION IN THE NORD-PAS-DE-CALAIS REGION REGULATED BY THE **LILLE** DIVISION

The Lille division is responsible for regulating nuclear safety and radiation protection in the 2 *départements* of the Nord Pas-de-Calais region.
As at 31 December 2011 the workforce of the Lille division stood at 16 officers: 1 regional head, 2 deputies, 5 nuclear safety inspectors and 6 radiation protection inspectors as well as 2 administrative officers, under the authority of an ASN regional representative.

The activities and installations to be regulated by the Lille division include:
– the EDF Gravelines NPP (6 reactors of 900 MWe);
– the SOMANU (nuclear maintenance company - AREVA) site in Maubeuge (Nord *département*);

Installations and activities using ionising radiation in the medical, industrial and research sectors:
– 12 external radiotherapy departments;
– 2 brachytherapy departments;
– 15 nuclear medicine departments;
– 85 tomography devices;
– about 3,000 medical and dental radiodiagnostic devices;
– about 1,500 industrial devices;
– 30 research laboratories.

EASN carried out 128 inspections in 2011: 31 inspections in the Gravelines NPP (including 3 post-Fukushima inspections) and 2 inspections of SOMANU, the nuclear maintenance company in Maubeuge. 90 inspections were also carried out in small-scale nuclear activities, in the medical, industrial and research sectors, and 5 inspections in the area of radioactive material transport.

Three labour inspections were carried out in the Gravelines NPP.

Number of events in 2011:
– The Gravelines NPP notified 10 significant safety events rated level 1 on the INES scale;
– The radiotherapy centres notified 5 events rated level 1 or less on the ASN-SFRO scale.

The division drew up three violation reports and one formal notice to comply further to its inspections of the facilities.

1 Assessment by domain

1|1 Assessment of BNI nuclear safety

Gravelines NPP

ASN considers that the nuclear safety, radiation protection and environmental protection performance of the Gravelines site on the whole match its general assessment of EDF performance.

ASN nevertheless considers that the site must demonstrate greater rigour, firstly in the detection and analysis of significant events in terms of safety, and secondly in the maintenance and operation of the reactors. ASN has more particularly asked the licensee to rapidly remedy the conformity deviations of certain equipment items involved in reactor cooling, which could be affected in the event of an earthquake.

In 2011, EDF began the third 10-year inspection programme for the Gravelines site. ASN has examined the results of the reactor 1 inspections. These inspections evidenced a crack in a bottom-mounted instrumentation penetration of the reactor, the first finding of such a fault in the French nuclear fleet.

ASN notes the positive development in the way EDF takes industrial risks into account in the site environment. These efforts must continue.

2011 was also a year marked by a fatal occupational accident that occurred while working at height.

The Société de Maintenance Nucléaire *(nuclear maintenance company) in Maubeuge*

ASN considers that operation of its installations is satisfactory. As part of its periodic safety review, SOMANU has committed itself to a large-scale rework of its documentary baseline. The identified areas for improvement concern the tightening of the links between the operating documentation and the standard of practices, particularly in the areas of inspections and periodic tests, management of waste from reprocessing foreign nuclear materials and its return to the country of origin, and on the response times to ASN demands. Lastly, ASN has noted an increase in the number of significant events in the areas of safety, the environment and the transport of radioactive substances.

1|2 Assessment of radiation protection in the medical field

Radiotherapy

In 2011, ASN observes the continuation of real improvement in rigour, organisation and traceability in the radiotherapy departments. The implementation of a quality assurance system within the establishments is continuing in a satisfactory manner.

In 2011, ASN's inspections focused primarily on the radiotherapy centres with structural problems (shortages of personnel and more specifically physicists) and/or organisational problems (delays in applying quality assurance to the patient care process). The overall situation regarding numbers of physicists improved during the year, even if two centres still have difficulties

ASN commissioning inspection of a radiotherapy installation in the Dentellières clinic in Valenciennes – October 2011

in this respect. Over the last few years, the region has widely benefited from the arrival of medical physicists qualified in Belgium. The number of medical physicists in the region's centres is nevertheless below the national average. Regarding the application of quality assurance to the patient care process, the progress observed with respect to the applicable regulatory provisions is satisfactory. Encouraging progress is being made in the area of treatment safety and reliability.

The areas for improvement concern the finalising of the radiotherapy process risk studies, more particularly with the identification of the main failure scenarios and the implementation of the "Defence in Depth" concept. Likewise, the individual responsibilities of each person involved in the care of the patient must be more clearly defined. As far as document management is concerned, the use of specific computerized tools has enabled the fluidity and reliability of the applicable documentation to be greatly improved. Lastly, all the centres have implemented procedures for recording and analysing adverse events since 2008, but notifications of significant radiation protection events lost momentum in the course of the year.

Nuclear medicine

ASN continued its inspections in the nuclear medicine sector. These inspections have revealed that these structures are still proceeding too slowly in their implementation of radiation protection measures. ASN also confirms that certain departments fail to plan ahead for authorisation renewal applications, or creation authorisation applications when new departments are set up.

Computed tomography (CT)

ASN conducted six inspections in computed tomography facilities. The rules relative to the occupational radiation protection are known and on the whole applied satisfactorily. Nevertheless, improvements can still be made, notably by giving the persons competent in radiation protection sufficient time to fulfil their duties, by formalising to a greater extent the radiation protection technical checks and outside contractor personnel interventions, and by making doctors on temporary contracts apply the radiation protection rules.

With regard to patient radiation protection, it is not yet common practice to have the practitioner formally approve the radiological procedure; improvements are still required in terms of optimisation of doses delivered to patients. The machine quality checks are carried out in the majority of cases, but their exhaustiveness and organisation can still be improved.

Interventional radiology

ASN has intensified its inspections in interventional radiology, and in operating theatres in particular. Margins for improvement have been identified, particularly with regard to the wearing of dosimeters and personal protective equipment by medical staff, their training in radiation protection and the optimisation of doses delivered to patients.

1|3 Assessment of radiation protection in the industrial and research sectors

Industrial radiology

Thirty companies practise industrial radiography in the region. The inspections carried out in 2011 showed continuing but slow improvement in the organisation of radiation protection in the companies, and worker monitoring is still satisfactory. Unannounced inspections continued to be performed: there are still shortcomings in the application of the radiation protection rules, particularly as regards the delineation, signalling and monitoring of the work area.

Veterinary clinics: targeted inspections campaign

As in 2010, ASN renewed its random inspections of the thirty-two veterinary clinics in the Nord Pas-de-Calais region in June 2011. This revealed, as in 2010, inadequate application of radiation protection measures by the profession and provided the opportunity to underline the main regulatory provisions applicable.

Research

Thirty research laboratories in the region use ionising radiation. The division's inspection measures have led to improvement initiatives, notably in the management of ionising radiation sources and radioactive waste. The division considers that these laboratories are moving in the right direction with regard to radiation protection.

1|4 Assessment of radioactive material transport

In 2011, ASN continued its regulation activities in the radioactive materials transport sector. These inspections did not reveal any major deviations from the regulations.

2 Additional information

2|1 Emergency situation management

The exercise of 18 January 2011 in the Gravelines NPP provided the opportunity to test a real evacuation of the local population and extensive public communication measures, particularly via Radio France. The exercise led to the evacuation of about 1300 people, essentially school pupils, in coaches chartered by the public authorities. The results of the exercise reveal areas for improvement in the behaviour of the population, the means of evacuation and public information, in the alert systems and the nuclear site personnel management in an accident situation.

2|2 International action by the Lille division

In 2011, the division continued its international exchanges, including with the Belgian and British nuclear safety authorities, with a view to mutual sharing of experience in the field of nuclear safety and radiation protection. These exchanges involve joint inspections in nuclear installations and in the industrial and medical environment. The Lille division participated in meetings with the Belgian nuclear safety authority to discuss the complementary safety assessments of the Tihange (Belgium), Gravelines and Chooz NPPs.

Lastly, the division took part in the training of African radiation protection inspectors organised by the International Atomic Energy Agency (IAEA) in Tunis.

2|3 Other significant events in Nord-Pas-de-Calais

Assessment of waste management by the division

At the request of ASN, the Robin des Bois Association carried out a survey of the radioactive ash and phosphogypsum spoil heaps in 2009. On the basis of this survey, ASN has continued its efforts, jointly with the DREAL (Regional directorate of the environment, planning and housing), to implement radiological monitoring of the sites.

ASN, in partnership with the DIRECCTE (Regional directorate for enterprises, competition, consumption, work and employment), has instituted a charter of good practices in industrial radiography. This charter, the objective of which is to optimise the use of ionising radiation in this activity sector, has been signed by 18 gamma radiography companies as well as ordering customers in the region. A monitoring committee has been set up. Exchange and work protocols between the division and DIRECCTE on the one hand, and the ARS (Regional Health Agency) on the other, set the framework of joint actions to improve integration of radiation protection measures in the industrial, research and medical sectors.

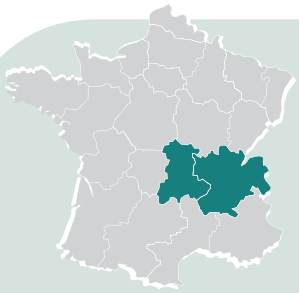
The nuclear licensees published their annual report as required by Article 21 of the TSN Act.

ASN has kept the local information committees (CLI) of the Gravelines NPP and SOMANU in Maubeuge regularly informed about the files in progress in the two nuclear facilities. More specifically, the Gravelines CLI has been involved in the

ASN inspection in reactor 1 building of the Gravelines NPP – January 2012

division's inspections on account of the complementary safety assessments. The CLI has also been regularly informed about the performance of the third 10-year inspection of the Gravelines NPP reactor 1. Lastly, it was involved in the national emergency exercise of 18 January 2011.

In 2011 ASN held two press conferences on the status of nuclear safety and radiation protection, one in Lille, the other in Dunkerque.



6 THE STATE OF NUCLEAR SAFETY AND RADIATION PROTECTION IN THE RHONE-ALPES AND AUVERGNE REGIONS REGULATED BY THE **LYON** DIVISION

The Lyon division regulates nuclear safety and radiation protection in the 12 *départements* of the Rhône-Alpes and Auvergne regions.
As at 31 December 2011, the workforce of the Lyon division stood at 37 officers: 1 regional head, 1 delegate regional head, 3 deputies, 16 nuclear safety inspectors, nine radiation protection inspectors and 7 administrative officers, under the authority of a regional representative.

The activities and installations to regulate in the Rhône-Alpes and Auvergne regions comprise:
- the NPPs at Bugey (4 reactors of 900 MWe), Saint-Alban (2 reactors of 1,300 MWe), Cruas-Meysse (4 reactors of 900 MWe) and Tricastin (4 reactors of 900 MWe) operated by EDF;
- the AREVA FBFC nuclear fuel fabrication plants in Romans-sur-Isère;
- the nuclear fuel cycle plants operated by AREVA and situated on the Tricastin industrial platform;
- the high flux reactor in the Laue-Langevin Institute in Grenoble;
- reactor 1 undergoing decommissioning at the Bugey NPP operated by EDF;
- the activated waste packaging and storage facility (ICEDA), under construction on the Bugey nuclear site operated by EDF;
- the SUPERPHÉNIX reactor undergoing decommissioning at Creys-Malville, and its auxiliary installations;
- the IONISOS irradiation facility in Dagneux;
- the nuclear fuel fabrication plant and pelletising unit in Veurey-Voroize operated by AREVA SICN, undergoing decommissioning;
- the reactors and plants of the CEA (French Alternative Energies and Atomic Energy Commission) in Grenoble, undergoing decommissioning;
- the CERN international research centre located on Swiss-French border;
- the small-scale nuclear activities, comprising about 4,500 dentists, 500 radiologists, 500 veterinary surgeons, 100 scanners, 22 radiotherapy departments (6 of which also conduct brachytherapy), 22 nuclear medicine departments, 20 gamma radiography devices, 190 X-ray generators, 30 unsealed source users, 200 lead detector users and 20 gammadensimeter users.

ASN conducted 335 inspections in Rhône-Alpes and Auvergne in 2011. Of these inspections, 91 were carried out in the four nuclear power plants, and 12 of these were targeted post-Fukushima inspections. 136 inspections were carried out in small-scale nuclear activities, 99 inspections were carried out in the other nuclear facilities overseen by the division, and 16 of these were targeted inspections in the light of the Fukushima accident, while 9 inspections concerned radioactive material transport.

In addition, ASN conducted 36.5 days of labour inspection on the four nuclear power plants and the Creys-Malville site.

During 2011, 331 significant events were notified by the BNI licensees of the Rhône-Alpes region. Twenty-nine of these events were rated level 1 on the INES scale. On February 16, 2011, an incident affecting the emergency diesel generators of the Tricastin NPP was rated level 2 on the INES scale by ASN.

In the small-scale nuclear activities sector in the Rhône-Alpes and Auvergne regions, of the 55 significant events notified to ASN, 21 in the medical field were rated level 1 on the ASN-SFRO scale, while 2 events related to industrial activities were rated level 1 on the INES scale.

In the area of BNIs, ASN issued two formal notices to comply concerning the Superphénix facility and reactor 1 of the Bugey NPP. It also drew up one violation report further to the detection of weakly radioactive rubble from reactor 1 of the Bugey NPP.

In the area of small-scale nuclear activities, ASN drew up two formal notices to comply and one violation report.

1 Assessment by domain

1.1 Assessment of BNI nuclear safety

• *Nuclear power plants*

Bugey NPP

ASN considers that the nuclear safety, radiation protection and environmental protection performance of the Bugey site on the whole match its general assessment of EDF performance.

With regard to nuclear safety, ASN notes that the quality of operation of the Bugey site showed signs of weakness in 2011, as it did in 2010. ASN considers more specifically that substantial improvements must be made with respect to padlocking, the configuring of systems and compliance with the operating technical specifications.

In 2011 the site had to cope with major reactor shutdowns, including the third 10-year inspections of reactors 4 and 5, which lasted five and six months respectively. Restarting of reactor 5 was disturbed by several operating incidents linked to system configuration deviations, delaying the return of the reactor to commercial operation by one month.

With regard to radiation protection, ASN notes a slight improvement in site worker dosimetry.

With regard to protection of the environment, ASN considers that the site must improve its waste management.

More generally, ASN expects the Bugey site to make considerable progress in its operating rigour in 2012, after two years marked by major works programmes.

Bugey NPP reactor 1 undergoing decommissioning

At the end of 2010, ASN authorised starting of the first phase of decommissioning, outside the reactor vessel. On the whole, ASN considers that these operations have been conducted under satisfactory conditions of safety.

Nonetheless, following the dumping of weakly radioactive rubble in a quarry on 9 August 2011, and the reactive inspection it conducted further to this, ASN issued formal notice to EDF to update the waste analysis of the Bugey NPP reactor 1.

The activated waste packaging and interim storage installation (ICEDA) at Bugey

The ICEDA was licensed by the decree of 23 April 2010. ASN conducted two inspections of the construction work in 2011 to check the construction quality of the buildings that will house the packaging process.

ASN considers that EDF shows rigour in its management of the construction site, from both the documentary organisation and the contingency management aspects.

Saint-Alban NPP

As in 2009 and 2010, ASN considers that the overall performance of the Saint-Alban site falls short of its general assessment of EDF performance.

In 2011, ASN observed that important requirements issued by EDF's national body are not correctly applied on the site, and the lateness accrued in this area over the last three years not being remedied. ASN also considers that the independent safety organisation is insufficiently deployed and that the site's major decision-making bodies do not give adequate consideration to its analyses and recommendations.

Post-Fukushima inspection by ASN in the Cruas NPP – October 2011

With regard to the monitoring of pressure equipment, the *Préfet* of the Isère *département* decided, after consulting ASN, not to renew the approval of the site's inspection service in 2011.

With regard to radiation protection, ASN considers that the site's performance is in line with its general assessment of EDF performance. Although control of access to limited stay areas and prohibited areas is satisfactory, the control of contamination on the work sites during reactor shutdowns must be improved.

With regard to environmental protection, ASN considers that the site's performance falls short of its general assessment of EDF performance, and notably lacks rigour in the operation of installations classified on environmental protection grounds.

More generally, ASN considers that the Saint-Alban site must rapidly take determined, concrete measures on a scale commensurate with the types of problems it has observed.

Cruas-Meysse NPP

ASN considers that the nuclear safety, radiation protection and environmental protection performance of the Cruas-Meysse site on the whole match ASN's general assessment of EDF performance.

With regard to nuclear safety, the site must continue its efforts to increase rigour in operational control, notably by increased application of practices to enhance reliability during interventions.

In terms of radiation protection, the site again displays contrasting results in 2011: the results for gamma radiography inspections are satisfactory, but control of access to limited-stay radiological areas must be tightened. ASN considers moreover that the radiological cleanliness of the site must be substantially improved.

With regard to protection of the environment, in 2011 ASN again found deficiencies in the way in which the environmental implications of new facilities are taken into account.

ASN noted a marked deterioration in work safety conditions in 2011, and expects to see concrete measures in this area in 2012.

Lastly, given the way the personnel training plans have fallen behind schedule, ASN considers that the Cruas-Meysse site must improve its skills management. The monitoring of outside contractors working on the site must also be significantly increased.

Tricastin NPP

Regarding nuclear safety, ASN considers that the site's performance stands out positively with respect to its assessment of EDF as a whole.

ASN observes more specifically that the site duly managed a particularly intense level of activities in 2011. The site must however reinforce the application of requirements on the ground and not give priority to the management of short-term contingencies at the expense of important medium-term measures. The site must also ensure that the independent safety organisation is correctly manned.

ASN post-Fukushima targeted "flood" inspection in the Cruas NPP – October 2011

With regard to radiation protection, ASN considers that the conditions of radiological cleanliness must be improved, particularly during reactor shutdowns.

The environmental performance of the Tricastin NPP can be improved. Greater attention must be paid to this subject and efforts must be made to ensure compliance with the regulations and the quality of the files submitted to ASN.

Lastly, ASN observes that working safety conditions improved on the Tricastin site in 2011, but still remain very tenuous.

- *Nuclear research facilities or facilities undergoing decommissioning, nuclear plants and units*

The AREVA FBFC nuclear fuel fabrication plants in Romans-sur-Isère (Drôme département*)*

ASN considers that the safety performance of AREVA FBFC must be improved. The industrial equipment renewal programme of the nuclear fuel fabrication unit is nearing completion. This site is nevertheless late in implementing its commitments with respect to ASN, particularly those concerning the updating of the baseline safety standards and the renovation of the laboratory and reprocessing unit. Some shortcomings were nevertheless detected in the site's management of inspections and periodic tests. Lastly, ASN notes that the cleaning and upgrading works on the effluent drainage systems were completed in 2011.

High flux reactor in the Laue-Langevin Institute (ILL) in Grenoble (Isère département*)*

ASN considers that the safety of the ILL is satisfactorily ensured. Nevertheless, the operator must progress with the formalising of the quality assurance requirements as provided for by the order of 10 August 1984 on the quality of design, construction and operation of the basic nuclear installations.

In 2011 the ILL devoted great efforts to the complementary safety assessments demanded by ASN further to the Fukushima nuclear accident. Lastly, the ILL has successfully taken over the management of environmental monitoring, formerly ensured by the CEA (Alternative Energies and Atomic Energy Commission).

SUPERPHÉNIX reactor at Creys-Malville (Isère département*)*

ASN considers that the safety of SUPERPHÉNIX reactor is satisfactorily ensured. However, in 2011 the site was issued formal notice to comply with the regulations relative to pressure equipment, some equipment inspections having been postponed beyond the regulatory deadlines. The industrial operation of the sodium treatment facility and the on-site storage of the concrete blocks produced by this process continued under satisfactory conditions of safety (about 7,000 blocks produced). The Off-Site Emergency Plan (PPI) was revised to take into account shutdown of the reactor and the sodium treatment facility. Removal of the large primary components (pumps, intermediate heat exchangers) continued. These components were treated, cut up then disposed of as nuclear waste.

IONISOS irradiator in Dagneux (Ain département*)*

ASN considers that the safety of the IONISOS irradiator is satisfactorily ensured. ASN also reiterated the obligation to set up a CLI for this installation.

The AREVA SICN nuclear fuel fabrication plant in Veurey-Voroize (Isère département*)*

The decommissioning work in the former AREVA SICN plant is completed. However, ASN's inspections in 2011 found shortcomings in the post-operational clean-out of certain galleries and the treatment of certain underground pipes. ASN considers that these shortcomings reveal inadequate monitoring of the work sites. Consequently, the regulatory delicensing of this nuclear facility is dependent on carrying out further work in these areas.

CEA centre reactors and plants in Grenoble (Isère département*)*

ASN considers that CEA Grenoble is a rigorous licensee but must nevertheless remain vigilant in the control of installation safety and security, as it makes extensive use of subcontractors.

Decommissioning of the CEA's nuclear installations in Grenoble continued in 2011. The delicensing procedure for the MÉLUSINE reactor is about to be concluded. The SILOE clean-out operations are nearing completion, but they have revealed that the reactor basemat also needs to be cleaned out. Lastly, as a precautionary measure, the effluent and waste treatment station (STED) decommissioning operations have had to be suspended since October 2011 further to the discovery of grenades buried on the work sites. The bomb disposal squad was called in to dispose of these grenades.

- *Nuclear fuel reprocessing plants situated on the Tricastin industrial platform (Drôme* département*, Vaucluse)*

AREVA NC - W and TU5 plants in Pierrelatte (Drôme département*)*

ASN considers that the safety performance of AREVA NC must be improved. In 2011, AREVA NC had difficulties in controlling the quantity of hydrogen present in the process of the W plant.

ASN also considers that modernisation work is necessary in the W plant's hydrofluoric acid storage area (tanks and structures). The licensee has undertaken to carry out this work by the end of 2014. Lastly, on 5 October 2011, AREVA NC notified ASN of a significant event concerning an accrued dose higher than 1mSv on two monitoring dosimeters placed on the site perimeter fencing. In the light of this event, ASN considers that AREVA NC must make substantial efforts regarding its communication of information to ASN.

COMURHEX fluoridation plant for converting uranium into hexafluoride - Pierrelatte (Drôme département*)*

ASN has observed that COMURHEX implemented several action plans to improve operating rigour and pollution prevention in 2011. The site's transparency with regard to deviations and events has progressed. Nevertheless, ASN considers that the site's safety results are still insufficient. Several events result from incomplete preparation of the work interventions on the facilities. Lastly, construction of the COMURHEX 2 plant continued in 2011.

EURODIF - European gaseous diffusion enrichment plant in Pierrelatte (Drôme département*)*

The level of safety of the EURODIF facilities is considered relatively satisfactory. Nevertheless, the ASN inspectors observed a failure of the reinforced protection systems for the containers containing liquid uranium hexafluoride in the cooling phase. This event was rated level 1 on the INES scale. In 2011, EURODIF reduced the plant operating conditions, thereby reducing the quantities of hexafluorine present in the enrichment facilities. The plant will be gradually shut down in 2012, after ASN has delivered the successive authorisations.

SET GEORGES BESSE II - Uranium enrichment plant in Pierrelatte (Drôme département*)*

The GEORGES BESSE II gas centrifuge uranium enrichment plant entered service in 2011. ASN had imposed three holding points in the various opening phases. The satisfactory conclusions of the safety tests before proceeding to the next phase led ASN to progressively lift these holding points. Lastly, the construction of the North part of the plant is continuing.

SOCATRI - Company operating a clean-up and recovery installation - Bollène plant (Vaucluse département*)*

ASN considers that the level of safety of the SOCATRI facilities is relatively satisfactory. Nevertheless, ASN observes that a large number of deviations and significant events originate from shortcomings in work preparation (incomplete or even non-existent operating procedures). The periodic safety review of the facilities began in 2011. ASN's analysis of the conclusions of this review will be a prerequisite for the implementation of the facility development projects planned by SOCATRI.

CERN – Accelerator and research centre (Geneva)

Further to the signing of an international agreement between France, Switzerland and the CERN, measures to clarify the safety and radiation protection requirements applicable at the CERN have been undertaken between ASN, the OFSP (the Swiss radiation protection inspection agency) and the CERN. They concern transport, waste and radiation protection. ASN and the OFSP jointly conducted two inspections of the CERN facilities in 2011.

1|2 Assessment of radiation protection in the medical field

On the whole, ASN considers that radiation protection in the medical field in the Rhône-Alpes and Auvergne regions is relatively satisfactory.

Radiotherapy

In 2011, ASN inspected half of the radiotherapy centres in the Rhône-Alpes and Auvergne regions. This campaign has enabled the inspections concerning the implementation of the quality assurance system, which is mandatory since 2011, to continue. This system addresses aspects such as the worker responsibility, management of resources, delivery of treatments and the management of adverse situations and malfunctions. Particular attention has also been focused on the centres that put in place innovative treatment technologies.

The results of these inspections show that the large majority of the centres have taken organisational steps since 2009 to implement a quality assurance approach to improve the delivery of treatments to patients. Nevertheless, the quality assurance systems deployed must now be used systematically and be subject to continuous improvement.

With regard to the medical physicist workforce, ASN found no critical situations in 2011. The summer vacation period did not lead to interruptions in the activity of radiotherapy departments due to personnel shortages. This being said, medical physicist numbers remain limited in certain centres and tenuous situations can arise in the event of personnel changes or departures.

Interventional radiology

ASN considers that patient radiation protection practices can be optimised in interventional radiology. Although the medical teams are generally trained, large disparities between the centres have been observed. The good practices are on the whole known and applied, but the doses delivered are only occasionally optimised. Medical physicists are still too rarely assigned to this activity. In 2011, ASN conducted a survey of 266 centres that could use interventional radiology procedures in the Rhône-Alpes and Auvergne regions. Out of the 120 centres that indicated that they had practised interventional radiology procedures, 86 perform them in the operating theatre. In 2012, the Lyon division will present the conclusions of its survey to the professionals concerned in order to improve the protection of workers against occupational exposure.

Dental surgeries

En 2011, ASN conducted a targeted inspection campaign in the dental surgeries of the Rhône-Alpes and Auvergne regions. ASN considers that even if the radiation protection implications are limited for this type of facility, the radiation protection of patients and workers can be significantly improved.

View of the Saint-Priest site in 2011

1|3 Assessment of radiation protection in the industrial radiology sector

ASN considers that radiation protection of workers is taken into account relatively satisfactorily in the industrial radiology sector. The inspections carried out in 2011 brought to light no significant regulatory non-conformities, even if there is still room for improvement in worker radiation protection.

Furthermore, following the signing of a charter of good practices in industrial radiology in 2010, ASN is continuing its awareness-raising work to improve occupational radiation protection in the gamma radiography sector by coordinating a network of professionals in the Rhône-Alpes and Auvergne regions, within which the good practices are disseminated.

1|4 Assessment of the transport of radioactive substances

In 2011, ASN conducted nine inspections concerning the transport of radioactive substances in the Rhône-Alpes and Auvergne regions. These inspections concerned the transport operations carried out by nuclear installation licensees, nuclear medicine departments and technical inspection companies (gamma radiography, gamma densitometry). They did not reveal any worrying situations.

Progress can nevertheless still be made in the transport of the packages "not subject to approval" used to transport the least hazardous radioactive substances and which represent the majority of radioactive substance transport operations in France.

2 Additional information

2|1 International action by the Lyon division

In 2011, the Lyon division continued the bilateral exchanges of views with the Swiss nuclear safety authority (ENSI) concerning the inspection practices applied for NPPs and industrial radiology.

Inspectors from the Lyon division also took part in discussions with the Japanese and Chinese nuclear safety authorities concerning the inspection practices and measures implemented further to the Fukushima accident.

The Lyon division has established contacts with the American nuclear regulator on the monitoring and regulation of the safety of sources.

As a general rule, these exchanges have allowed the sharing of good practices in the methods of monitoring and regulating nuclear facilities.

2|2 The other notable findings in the Rhône-Alpes and Auvergne regions

Monitoring of the former uranium mines

ASN considers that the work carried out by AREVA on the sites of Saint-Pierre-du-Cantal (Cantal *département*) and Saint-Priest-la-Prugne (Loire *département*) limits the risk of the neighbouring populations being exposed to ionising radiation.

The implementing of institutional controls at Saint-Pierre-du-Cantal will enable the future use of the site to be controlled and the industrial history of the land to be archived.

This being said, ASN observes that the redevelopment work undertaken by AREVA on the Saint-Priest-la-Prugne site and the identification of the mining waste rock have fallen behind schedule. ASN expects significant improvements in this respect on the part of AREVA in 2012.

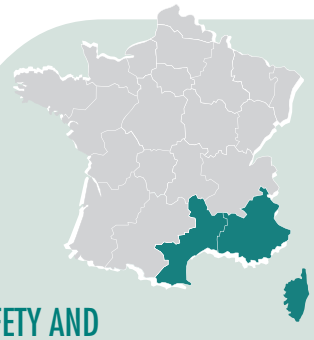
2|3 Public information actions in 2011

All the nuclear facilities in the Rhône-Alpes region, apart from the Ionisos irradiator in Dagneux (Ain *département*), have a local information committee (CLI). All these CLIs, whose activity has developed considerably since 2009, held meetings in 2011.

ASN organised two information seminars, held on 5 October and 6 December 2011 and addressing professional audiences on the subjects of approved organisations and nuclear medicine respectively.

Lastly, on 10 May 2011, ASN held a press conference on the state of nuclear safety and radiation protection, and on the first follow-ups in France from the Fukushima nuclear accident.

asn MARSEILLE



7 THE STATE OF NUCLEAR SAFETY AND RADIATION PROTECTION IN THE PROVENCE-ALPES-CÔTE-D'AZUR, LANGUEDOC-ROUSSILLON AND CORSE REGIONS REGULATED BY THE **MARSEILLE** DIVISION

The Marseille division regulates nuclear safety and radiation protection in the 13 *départements* of the Provence-Alpes-Côte-d'Azur, Languedoc-Roussillon and Corse regions. It exercises this activity in the BNIs, in small-scale nuclear activities and in the transport of radioactive materials.
As at 31 December 2011, the workforce of the Marseille division stood at 22 officers: 1 regional head, 2 unit heads, 15 inspectors and 4 administrative officers, under the authority of an ASN regional representative.

The range of activities regulated covers 27 basic nuclear installations (BNI) that are in the project , construction, operation or decommissioning phase, and 2 installations under creation.

Cadarache site (Bouches du Rhône *départements*):
– the CEA Cadarache research centre which counts 20 BNI's, including the Jules Horowitz reactor currently under construction;
– the international ITER project that is under construction, adjacent to the CEA Cadarache centre.
Marcoule platform (Gard *départements*):
– the MÉLOX "MOX" nuclear fuel production facility;
– the CEA Marcoule research centre, which includes the ATALANTE and PHENIX BNIs, and the project for the creation of DIADEM, a waste storage facility;
– the CENTRACO facility for processing low-activity waste;
– the GAMMATEC industrial ioniser, currently under construction.
Narbonne (Aude *départements*):
– certain storage areas of the COMURHEX Malvési uranium ore conversion facility (AREVA group), that will constitute the ECRIN facility.
Marseille (Bouche-du-Rhône *départements*)
– the GAMMASTER industrial ioniser.

In addition to this pool of BNIs, there are many small-scale nuclear activities scattered around the region.

Medical field:
– 5 blood product ionisers
– 8 brachytherapy departments;
– 21 external radiotherapy departments;
– 27 nuclear medicine departments;
– 113 computed tomography departments;
– 140 departments practising interventional radiology;
– about 2,500 medical radiodiagnostic devices;
– about 4,500 dental radiodiagnostic devices.

Industrial and research sector:
– 11 head offices of industrial radiography companies;
– 350 establishments holding sealed and/or unsealed sources;
– 500 users of lead detectors.

Organisations approved by ASN for the performance of radiation protection checks:
– 21 approved organisation locations, including 11 head offices.

ASN conducted 208 inspections in the three regions of PACA, Languedoc-Roussillon and Corsica in 2011: 97 inspections in the BNIs and 111 inspections in small-scale nuclear activities. 9 of these inspections examined the transport of radioactive substances. Five BNI's underwent post-Fukushima inspections: MELOX, PHENIX, RJH, ATPu and MASURCA.

Five significant events rated level 1 on the INES scale (including the CENTRACO industrial accident of 12 September) were notified by BNI licensees, and fifteen significant events rated level 1 on the ASN-SFRO scale (concerning patients) were notified by the radiotherapy centres of the PACA, Languedoc-Roussillon and Corsica regions in 2011.

Seven violation reports were drawn up in 2011.

1 Assessment by domain

1|1 Assessment of BNI nuclear safety

• *Cadarache site*

CEA's centre in Cadarache

ASN considers that the safety of the centre improved in 2011. It finds a good level of management involvement, but considers that the CEA's monitoring of outside contractors varies greatly from one BNI to another.

ASN conducted a tightened inspection of criticality from 11 to 13 July 2011, with about ten inspections on the different BNIs in the centre. It did not identify any major shortcomings in the CEA's management of this risk, but it found disparities between the BNIs and remains attentive that the licensee does not minimise the importance of this risk.

The CEA must demonstrate greater forward planning and rigour in the management of radioactive waste and liquid effluents. ASN also observed that the commissioning of the new liquid effluent treatment station at the Cadarache centre has again fallen behind schedule and is now planned for the second half of 2012.

ASN inspection on the STER construction site – January 2012

ASN considers that the licensee must remain very attentive to the progress of decommissioning and post-operational clean-out work on its oldest installations. ASN notes that the CEA is persistently behind schedule with its commitments.

In 2011, ASN continued its "civil engineering" inspections on the construction sites. ASN's assessment in this area is globally positive.

A nuclear emergency exercise integrating a seismic dimension, simultaneously affecting various installations in the centre as well as neighbouring communities, was held at Cadarache on 17 January 2012. It was actively prepared for in 2011.

ASN delivered partial authorisations allowing decommissioning of the ATPu facility to continue. At the end of 2011, 170 of the ATPu equipment items had been decommissioned and 155 remained to be decommissioned.

ITER

The public enquiry relative to the creation authorisation application was held from 15 June 2011 to 4 August 2011, and resulted in the enquiry commission issuing a favourable opinion accompanied by recommendations. Other consulted administrative services and the ITER CLI gave their opinion on the file. ASN will continue its examination in 2012 on the basis of these opinions, the technical opinion of the IRSN and that of the advisory committees of experts to whom the ASN submitted the file at the end of 2011.

ASN performed its first inspection of ITER on 20 July 2011. The inspection showed that the licensee had a robust organisation that could ensure rigorous management of the civil engineering operations inherent to the construction of the nuclear facility.

• *Marcoule platform*

At the request of the French civil and defence nuclear safety authorities (ASN and ASND respectively), an overall radiological impact study of the Marcoule platform was carried out by the licensees in September 2010. This study was revised and resubmitted by the licensees to the two safety authorities in January 2012 further to their requests for complementary information. This initiative was engaged at the same time as the platform licensees asked to modify their environmental effluent discharge limits for the ATALANTE, CENTRACO, and MELOX facilities, and for the secret BNI in the CEA centre of Marcoules, whose application has been submitted to the ASND. In relation with the Gard-Marcoule CLI, a public information initiative was held from 5 November to 5 December 2011; several public information meetings were organised allowing summaries of the abovementioned modifications to be presented in layman's terms. ASN will adopt a position with respect to the licensees' demands in 2012, and will be induced to issue new requirements.

MELOX plant

Progress has been made in criticality risk management in the MELOX plant, notably through better integration of the social, organisational and human factors, but in-house skills in this area must be further improved. The licensee implements an action plan that notably provides for an increase in safety engineer numbers. ASN will be attentive to ensure that this is a lasting initiative, and remains vigilant regarding the role of the facility's instrumentation and control - which the licensee is currently modifying - in preventing the criticality risk.

2011 was marked by an incident that occurred on 28 June 2011 and was rated level 1 on the INES scale. During a fuel rod

assembly operation, five rods hit a mechanical element and were damaged.

The premises in which assembly was taking place were contaminated, and major decontamination work was carried out until November. ASN asked the licensee to draw all the relevant lessons from this event, particularly as regards the ergonomics of the assembly operation and the associated procedures.

CEA's centre in Marcoule

ASN's assessment of the CEA Marcoule centre's safety and radiation protection management is positive on the whole, and partly matches that of the CEA Cadarache centre. ASN nevertheless remains vigilant regarding the monitoring of outside contractors and meeting commitments within deadlines.

In 2011, ASN was obliged to initiate nationwide action further to malfunctions in the CEA Marcoule centre concerning masks for protecting the respiratory system. As the defect in question, found on a limited series of masks, could be of a generic nature, ASN asked all the nuclear licensees to verify their masks and make the necessary replacements.

ASN considers that the licensee must step up its efforts to integrate the social, organisational and human factors on the ATALANTE facility, and expects to see progress in the quality of the safety files submitted to ASN.

ASN will pay particular attention to the decommissioning strategy for the PHENIX reactor, for which the authorisation application file was communicated to ASN in late 2011. The ongoing decommissioning preparation operations involve many outside contractors and ASN remains vigilant about how the CEA monitors them. ASN considers that operating deviations and significant event notifications must be managed with greater rigour.

CENTRACO facility

Since 2009 ASN has applied tightened monitoring to the CENTRACO facility in order to verify the effectiveness of its action plan to develop the safety culture at all levels of the organisation and to reinforce on-the-ground supervision measures. Although improvements have been observed, tightened monitoring by ASN was continued in 2011 to verify the robustness and durability of the measures implemented. Eight inspections were thus carried out in 2011, including one unannounced night-time inspection on 31 May and 1 June to test the licensee's night-shift organisation.

The year 2011 was marked by an occupational accident on 12 September 2011 that caused the death of one employee and injured four others, one very seriously. This accident, although serious in its human consequences, was rated level 1 on the INES scale due to the limited implications from the purely radiological standpoint. This accident and ASN's intervention are described in chapter 16 of this report.

GAMMATEC ioniser

Isotron France started the construction of the new GAMMATEC ionisation facility in 2011.

ASN inspection on the GAMMATEC installation at Marcoule – February 2012

• *Other installations*

ECRIN installation (COMURHEX Malvési)

In 2009 ASN had considered that some of the storage areas of the COMURHEX Malvési facility constituted a BNI pursuant to the regulations in effect, and came under ASN control. A creation authorisation application file had therefore been requested, and is currently being examined by ASN. The licensee is planning major development work to limit the environmental impact of the site as a whole.

GAMMAMASTER ioniser

The GAMMAMASTER industrial ionisation installation is intended for the gamma radiation treatment (with cobalt 60 sources) of medical equipment in particular (sterilisation). The safety issues chiefly concern access management, and ASN is vigilant about this.

1|2 Assessment of nuclear safety in the transport of radioactive materials

In 2011, ASN continued its inspections of small transport companies working in the medical nuclear field (transportation of radiopharmaceuticals, etc.), which vary greatly in their application of the regulatory provisions.

ASN conducted an awareness-raising operation with the maritime transport players in the Port of Marseille.

ASN inspected several air transport companies based at Marignane airport, and pointed out the large disparities in personnel training and the radiation protection measures applied.

1|3 Assessment of radiation protection in small-scale nuclear activities

• *Medical applications*

Medical imaging

ASN continues its vigilance with regard to the increase in average doses delivered in medical imaging.

The inspections carried out in interventional radiology in 2011 generally reveal a low level of application of the optimisation principle in the radiological procedures, due in particular to the lack of medical physicists in this field. ASN also points out the shortcomings in the setting up of a dosimetry system adapted to the workers, particularly for the extremities (hands, etc.). The ASN's findings are particularly marked with regard to applications in the operating theatre, where the awareness of health professionals to the radiological risks is considered insufficient.

In 2011, ASN supplemented its inspection process with an awareness-raising initiative. In June it organised a first inter-regional meeting of health professionals in Marseille, attended by some one hundred participants.

Radiotherapy

In 2011 ASN noted that the radiotherapy centres of the PACA, Languedoc-Roussillon and Corsica regions had at least two medical physicists and did not detect any significant non-conformity with respect to the regulatory criteria for the presence of medical physicists.

On the whole, ASN observes a positive development in quality management, but remains attentive to the long-term mobilisation of the players. ASN maintains its vigilance over those establishments it considers insufficiently mobilised with respect to the new regulatory requirements, such as the Pays d'Aix radiotherapy centre, the Clémentville clinic (part of the Greater Montpellier oncology GCS (cooperative health grouping), and to a lesser extent the Oncodoc establishment in Bézier and the Carémeau CHU (university hospital centre) in Nîmes.

ASN notes that all the radiotherapy centres have an internal system for notifying incidents but considers that progress nevertheless remains to be made in the effective notification of events to ASN, and in the quality of the analyses conducted for experience feedback purposes.

Following on from initiatives of these last few years, in 2011 ASN continued to encourage discussions and experience sharing between the region's centres, by organising the first inter-regional forum on safety in radiotherapy, which was held on 13 December 2011 in Marseille and attended by about one hundred health professionals from the three regions of South-East France.

Nuclear medicine

ASN considers that the radiation protection of patients in nuclear medicine is duly taken into account. As for the radiation protection of health professionals, this remains an important issue in nuclear medicine and ASN maintains its vigilance over application of the labour code requirements.

• *Universities and research laboratories*

Over the last few years, ASN has observed appreciable progress in the management of radioactive sources in the Universities of Montpellier, Perpignan, Marseille and Nice. ASN does however note that the University of Aix-Marseille has still not applied the requested measures regarding the holding of radionuclides used in the past. ASN continued its monitoring of the University of Toulon, where radioactive sources had been discovered by the faculty personnel. Likewise, Montpellier University remains subject to monitoring, as it still has waste and sources requiring disposal.

• *Industrial applications*

Industrial radiography

Industrial radiology remains a high priority for ASN, with unannounced night-time inspections on the work sites being continued in 2011. ASN moreover continued its prevention actions in a context complementary to that of the inspections, by organising a meeting day with the professionals in Martigues in November 2011, in relation with the labour inspectorate in particular.

Lead detectors

A campaign of unannounced inspections of twenty-six property surveyor firms using devices to detect lead in paint (devices containing a radioactive source) was conducted from 1 to 15 April 2011. Criminal proceedings were instituted against users who did not have a valid authorisation.

• *Polluted sites, former uranium mines and enhanced natural radioactivity*

ASN is continuing to ensure that sites polluted by radioactive materials, such as Bandol (Var *département*) or Ganagobie (Alpes-de-Haute-Provence *département*), have been identified and are secure. A solid waste sorting operation was carried out on the Ganagobie site in November. The sampled products were analysed and drums were shipped to a waste treatment facility. The Bandol site is subject to regular monitoring and discussions with the Bandol town council with regard to its future.

ASN continued its collaboration with the ministry in charge of the environment on the "post-uranium mines" measures. In relation with the Languedoc-Roussillon DREAL (Regional directorate for the environment, planning and housing), ASN conducted a joint inspection of the Lozère sites and participated in their CLIS.

2 Additional information

2|1 International action by the Marseille division

In 2011, the Marseille division participated in two IAEA advisory missions in Mauritania concerning the setting up of a nuclear safety authority. It also took part in an NEA working group on the safety of experimental reactors. Two of the division's inspectors took part in an international seminar organised by the IAEA on this same subject, in Rabat (Morocco), while another inspector contributed to a post-earthquake assignment in Spain. Lastly, in 2011 the division met a delegation from the American NRC (Nuclear Regulatory Commission) that had travelled to South-East France, a Euratom delegation conducting an environmental verification on the Cadarache site, and a delegation from the European Parliament visiting the ITER construction site.

ASN inspection on the Jules Horowitz reactor construction site – December 2011

2|2 Public information actions in 2011

• *The general public and the CLIs*

In 2011, ASN held three press conferences in Marseille, Montpellier and Nice on the state of nuclear safety and radiation protection, which raised subsequent intense media interest.

2011 was marked by particular attention from the media and local associations further to ASN's inspections. A very substantial increase in external information or document communication requests was noted (including prior to the Fukushima accident). ASN ensures that the nuclear licensees meet their obligations in terms of transparency in this respect, notably by promoting application of article 19 of the TSN Act.

In 2011 ASN continued to support the CLIs by actively participating in the majority of the meetings and annual general meetings of the Cadarache, ITER and Gard-Marcoule CLIs, and by making contributions at public meetings organised by the CLIs.

Following on from the public information days on the consideration of the seismic risk in the nuclear installations in the south of France, held on 4 February 2010 in Marseille and 7 December 2010 in Avignon, a specific meeting was organised on the subject of natural external hazards with the Gard-Marcoule CLI (proceedings available at *www.journeeseisme-asnmarseille.org*).

With regard to the targeted post-Fukushima inspections conducted in 2011, ASN deeply regrets the refusal of the CEA and AREVA to allow external observers - particularly the CLIs - to attend these inspections, as it was favourable to their presence.

Lastly, ASN considers that the CLIs of GAMMASTER in Marseille and COMURHEX Malvési in Narbonne must now be set up as quickly as possible.

• *The professional public*

With regard to informing and raising awareness in the professional public, 2011 was marked by the organisation of three days of meetings and discussions in the sectors of interventional radiology (June), industrial radiography (November) and radiotherapy (December). ASN remains attached to this approach, which promotes the sharing of experience between professionals with a view to making radiation protection progress in the small-scale nuclear activities.

3 Outlook

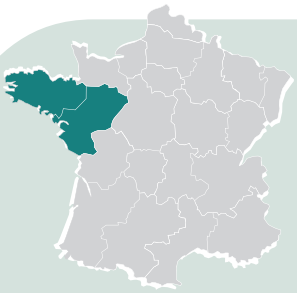
In 2012, ASN will carry out post-Fukushima inspections on 10 BNIs classified as "priority 2", and will reinforce its oversight of outside contractor monitoring. ASN will continue examining and monitoring the construction sites of the new BNIs, especially JHR and ITER. It will extend its technical enquiry into the CENTRACO accident in liaison with the judicial authority, and oversee restarting of the facility. ASN will issue new

requirements governing the discharge of effluents from the Marcoule platform BNIs.

The optimisation of doses delivered to patients in medical imaging, quality management in radiotherapy and the protection of industrial radiography workers against occupational exposure will remain high priorities for ASN in the PACA, Languedoc-Roussillon and Corsica regions.

ASN will continue its initiative to inform the general public and raise the awareness of the professionals on the issues of safety and radiation protection.

NANTES



8 THE STATE OF NUCLEAR SAFETY AND RADIATION PROTECTION IN THE PAYS DE LOIRE AND BRETAGNE REGIONS REGULATED BY THE **NANTES** DIVISION

The Nantes division is responsible for regulating nuclear safety and radiation protection in the 9 *départements* of the Pays de Loire and Bretagne regions.
As at 31 December 2011 the workforce of the Nantes division stood at 11 officers: 1 regional head, 8 inspectors and 2 administrative officers, under the authority of an ASN regional representative.

The activities and facilities to regulate in the Pays de la Loire and Bretagne regions comprise:
– three basic nuclear installations (BNIs): the NPP of the Monts d'Arrée site*, the IONISOS irradiator in Sablé-sur-Sarthe and the IONISOS irradiator in Pouzauges;

* The Monts d'Arrée site (Brennilis plant currently being decommissioned) is regulated by the ASN Caen division.

– the medical services: 16 radiotherapy centres (17 locations), 9 brachytherapy departments, 18 nuclear medicine departments, 97 establishments practising interventional radiography, 89 computed tomography scanners, and approximately 5,000 medical and dental radiology machines;
– industrial and research uses: 43 industrial radiology companies, including 10 gamma radiography contractors, about 750 licences for industrial and research equipment, including more than 300 users of devices to detect lead in paint, devices containing a radioactive source;
– 9 agencies and one head office of organisations approved for radiation protection technical checks, 7 establishments for radon checks and three head offices of laboratories approved for taking environmental radioactivity measurements.

In 2011, ASN carried out 132 inspections, including 3 inspections in BNIs and 5 in the transport sector.

At the end of 2011, a significant event was notified on the Sablé-sur-Sarthe site by the company IONISOS. This event, rated level 1 on the INES scale at the beginning of 2012, concerns a radioactive source identification error when preparing the shipment of old radioactive sources to Canada.

Three violation reports were drawn up for small-scale nuclear activities: the first two in industrial radiography came with a suspension of activity and formal notice to put the situation into order, while the third concerned the holder of a device for detecting lead in paint.

Thirteen significant events rated level 1 on the ASN-SFRO scale were notified by the radiotherapy departments of the Bretagne and Pays de la Loire regions. An overexposure incident affecting an interventional radiology patient in the Angers CHU (university hospital centre) resulted in an information note being published on the ASN web site. Two events rated level 1 on the INES scale were also notified, one in nuclear medicine, the other in the industrial sector.

1 Assessment by domain

1|1 Assessment of BNI nuclear safety

The IONISOS nuclear facilities in Sablé-sur-Sarthe and Pouzauges

The company IONISOS operates two industrial irradiation facilities used chiefly for two applications: product sterilisation (essentially medical equipment, and to a lesser extent foodstuffs) and the treatment of plastic materials to improve their mechanical characteristics.

Following the significant incident of June 2009 relative to the untimely opening of the irradiation cell access door on the Pouzauge site, the licensee implemented the transient technical measures demanded by ASN to reinforce security of access to this cell. IONISOS moreover submitted a safety assessment of the overall management of cell access for the Pouzauges installation in February 2011 and for the Sablé-sur-Sarthe installation in May 2011. Further to the first opinion of the IRSN given in November 2011 for the Pouzauges installation, and after receiving the second opinion concerning the Sablé-sur-Sarthe installation, expected in February 2012, ASN will adopt a position in early 2012 on the measures to apply to enhance the irradiation cell access management.

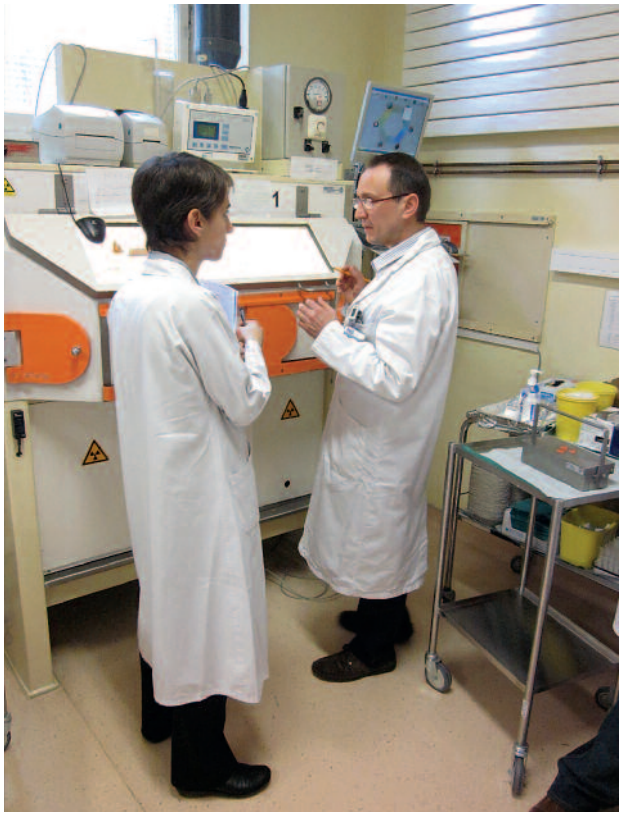
During ASN's inspection of the removal of numerous radioactive sources having reached their service life limit, a storage area was found outside the irradiation cell, and a situation regularisation request was issued for it. This case, and the transport operations associated with the removal of the radioactive sources will be subject to specific inspections in 2012.

1|2 Assessment of radiation protection in the medical field

Sixty-five inspections were carried out in the medical field, twenty of which were part of the inspection campaigns targeting dentists and radiologists. These inspection campaigns revealed continuous progress in training in patient radiation protection and the provision of personal protective equipment. Furthermore, all the radiologists inspected are engaged in the diagnostic reference levels (DRL) initiative to optimise doses delivered to patients. This being said, progress is still required in the training of workers and the performance of in-house radiation protection checks. In dental radiology, shortcomings were again found in the administrative registrations and in the implementation of periodic external radiation protection inspections and quality inspections. There are still numerous regulatory deviations due to the failure to use persons competent in radiation protection (PCR).

Radiotherapy

Ten external radiotherapy centres out of the sixteen in the Bretagne and Pays de la Loire regions were inspected in 2011. ASN observed continuing progress in rendering treatments safer. The increase in numbers of medical physicists observed in the last few years means that virtually all the centres can now meet the regulatory requirements regarding the presence of medical physicists during the treatments. Implementation of the quality assurance system is also progressing: in the inspected centres, the various steps in the treatment process are correctly formalised in writing, but several centres still have document management shortcomings. All the centres have set up a system for managing and analysing adverse events that could occur during the radiotherapy treatment process, but do not adequately integrate the new criteria for notifying ASN of significant events. Furthermore, about a third of the inspected centres must still carry out or complete the analysis of the risks run by the patients, as required by ASN decision 2008-DC-103.



ASN inspection in the nuclear medicine department of the Morvan CHU in Brest on 1st March 2012

The equipment quality checks provided for in the regulations are, on the whole, correctly performed. Nevertheless, the organisational setup for ensuring these inspections and maintenance of the medical devices must be more clearly defined.

In 2011, the Nantes division also gave ASN a report drawn up in partnership with the regional health professionals concerning the assessment of risks in brachytherapy. This guide is subject to an ultimate validation step with the learned societies concerned.

Interventional radiology

Ten establishments were inspected in 2011. The inspections chiefly concerned coronarography, angiography/angioplasty and cardiology. ASN observes that continuing progress is required in the quantification of doses received by the health professionals at the extremities (hands/eyes). With regard to patient radiation protection, the Nantes division placed the emphasis on the efforts required to optimise the intervention protocols and to record information relative to the doses delivered in the medical procedure reports. This is because, on the basis of the incident that occurred in Pays de Loire in 2011, ASN has identified three chief factors behind patient overexposure: inadequate knowledge of the equipment operating mode, the lack of additional X-ray filtration devices, and the lack of intervention protocols.

Computed tomography (CT)

Six centres were inspected in 2011. Emphasis was placed more particularly on patient radiation protection. The regulations applicable in this area were found to be well implemented on the whole in the inspected centres. All the inspected centres have adopted the diagnostic reference levels approach and protocols have been developed to optimise the doses delivered to patients. Efforts must however still be made in radiation protection training, in the performance of in-house radiation protection and quality checks, and in the implementation of active dosimetry during interventional procedures.

1|3 Assessment of radiation protection in the industrial and research sectors

Fifty-four inspections were carried out in industrial and research facilities, and eleven of these were part of the inspection campaign targeting holders of devices for detecting lead in paint. This inspection campaign revealed highly contrasting situations: three companies implement the main provisions applicable in radiation protection in a highly satisfactory manner. The other companies, however, still display poor knowledge of radioactive source management rules, failure to replace the radioactive sources according to the technical characteristics of the devices, and lastly, insufficient protection against fire and theft.

Industrial radiology

Sixteen inspections were carried out in 2011, which meant that all the gamma radiography professionals had been covered over a three-year period. ASN notes the satisfactory design of the fixed radiography installations, the improved organisational measures (procedures), and the periodic performance of external technical radiation protection checks. Progress nevertheless remains to be made in the in-house technical radiation protection checks, and the setting up of an operation zone on construction sites.

In 2011, ASN was induced to suspend the operations of an industrial radiography contractor established in Loire-Atlantique owing to serious and repeated violations of the regulations intended to protect workers against ionising radiation. This company is currently under compulsory liquidation.

The Nantes division has also set up, on an experimental basis, a system for remotely declaring construction site schedules for industrial radiography contractors. The nationwide extension of this tool will be examined in 2012.

Lastly, in collaboration with the DIRECCTE (Regional directorate of enterprises, competition, consumption, labour and employment) of the Pays de la Loire and Bretagne regions, and the professionals of the sector, a regional charter for optimising industrial radiography practices has been drawn up and was presented to the industrial radiography professionals at a seminar held on 17 November 2011. Twelve companies have already signed this charter.

Research

Three inspections were carried out in this area in 2011, meaning that 75% of the public research sector has been covered in six years. ASN observes the continuing reduction in the number of irregular administrative situations, and strong involvement of the persons competent in radiation protection, enabling practices to be turned towards techniques that reduce personnel exposure, and even techniques that avoid using radioactive sources. Progress is still expected with regard to the updating of the zoning and the waste and effluent management plans, and formalising and updating the periodic in-house and external radiation protection checking programmes.

2 Additional information

2|1 International action by the Nantes division

On the international front, the Nantes division participated in an IRRS mission in Slovenia in October 2011, and the training of some fifteen African decision-makers on the regulation of ionising radiation sources organised by the IAEA in Tunisia in October 2011. The Nantes division also hosted an Israeli representative from the Soreq nuclear research centre in June 2011, for a nuclear medicine inspection.

2|2 The other significant events in Pays de Loire and Bretagne regions

The former uranium mines

ASN conducted two inspections on the former mining sites in the Pays de la Loire region. ASN also took an active part in the information and discussion meetings organised by the offices of the *Préfets* of the Loire-Atlantique and Vendée *départements* on the subject of the former uranium mines. It also participated in a meeting organised by the offices of the *Préfet* of Morbihan with the view of creating an information committee for the former Breton mining sites of the Morbihan and Finistère *départements*. The first meeting of this committee is planned for the first quarter of 2012.

On 11 July 2011 ASN received AREVA's environmental assessments for the former mining sites of the Morbihan and Finistère *départements* in application of the prefectural orders of July 2010. These studies provide a precise situation assessment of all the former mining sites in Brittany. At the beginning of January 2012, after analysing these studies jointly with the Brittany DREAL, ASN sent the *Préfets* concerned the additional information to be requested from AREVA for a small number of sites presenting radiological characteristics that could give rise to remediation measures.

2|3 Public information actions in 2011

In 2011, ASN held two press conferences in Nantes and Rennes on the state of nuclear safety and radiation protection.

It also contributed to patient radiation protection training courses dispensed to medical radiation technologists and dentists.

In 2011, ASN participated in the meetings of the local information committees (CLIs) for the IONISOS nuclear installations on 6 July in Sablé-sur-Sarthe, and 28 June and 25 October in Pouzauges.

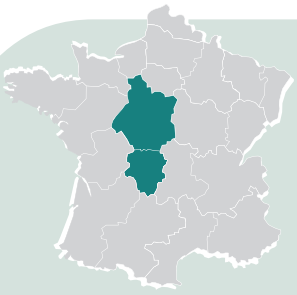
ASN also organised three regional seminars on:
– occupational radiation protection for some twenty external PCRs working in the companies of the Pays de la Loire and Bretagne regions;
– nuclear medicine, that was attended by more than seventy professionals (doctors, medical physicists, technologists) from the two regions;
– industrial radiography, on the occasion of the signing of the charter on industrial radiography in the Pays de la Loire and Bretagne regions. This seminar was attended by more than eighty professionals (ordering customers, outside contractors, etc.).

"La robe et le nuage" (The dress and the cloud" exhibition in Nantes – October 2011

Lastly, ASN participated in the organising and financing of two exhibitions on nuclear topics:

– *"la robe et le nuage"* (the dress and the cloud) in Nantes (more than 13,500 visitors). As part of this operation, in late September it took part in a conference on radiation protection: *"Citoyen, sommes-nous protégés ?"* (Citizen, are we protected?);
– *"sur les traces des Becquerel"* (tracking the Becquerels) in Pornichet (nearly 3,500 visitors).

ORLÉANS



9 THE STATE OF NUCLEAR SAFETY AND RADIATION PROTECTION IN THE CENTRE, LIMOUSIN AND ILE-DE-FRANCE REGIONS REGULATED BY THE **ORLÉANS** DIVISION

The Orléans division is responsible for regulating nuclear safety and radiation protection in the 9 *départements* of the Centre and Limousin regions. The Orléans division is also at the disposal of the ASN Paris regional representative, under whose authority it regulates the safety of the BNIs of the Ile-de-France region[1].
As at 31 December 2011 the workforce of the ASN Orléans division stood at 27 officers: 1 regional head, 3 deputies, 18 inspectors and 5 administrative officers, under the authority of an ASN regional representative.

The activities and installations to be regulated in the Centre, Ile-de-France and Limousin regions comprise:
– the Belleville-sur-Loire NPP (2 reactors of 1,300 MWe);
– the Dampierre-en-Burly NPP (4 reactors of 900 MWe);
– the Saint-Laurent-des-Eaux site: the NPP (2 reactors of 900 MWe) in operation, as well as the 2 French gas-cooled reactors (GCR) undergoing decommissioning and the irradiated graphite sleeve storage silos;
– the Chinon site: the NPP (4 reactors of 900 MWe) in operation, the 3 French gas-cooled reactors undergoing decommissioning, the irradiated material facility (AMI) and the inter-regional fuel warehouse (MIR);
– the 8 BNIs in the CEA Saclay centre, including the OSIRIS, ISIS and ORPHÉE experimental reactors;
– the CIS bio international plant in Saclay;
– the 2 BNIs undergoing decommissioning in CEA's Fontenay-aux-Roses centre;
– the electromagnetic radiation laboratory in Orsay, undergoing decommissioning (LURE);
– the medical services of the Centre and Limousin regions that use ionising radiation: 12 radiotherapy centres, 5 brachytherapy departments, 12 nuclear medicine departments, 33 interventional radiology departments, 60 computed tomography scanners, 1,600 medical radiology machines and 2,100 dental radiodiagnostic devices;
– the industrial and research utilisations of ionising radiation in the Centre and Limousin regions: 20 industrial radiology companies, including 6 gamma radiography contractors, some 400 industrial, veterinary and research devices subject to the licensing system, and some 100 industrial, veterinary and research devices subject to the notification system.

In 2011, ASN carried out 239 nuclear safety and radiation protection inspections: 124 inspections of the nuclear installations on EDF's Belleville-sur-Loire, Chinon, Dampierre-en-Burly and St-Laurent NPPs, including 39 labour inspections; 43 inspections on the nuclear sites in the Ile-de-France region (CEA Saclay and Fontenay-aux-Roses centres, CIS bio at the Saclay centre, CNRS - the French National Centre for Scientific Research - at Orsay), 72 inspections on small-scale nuclear facilities in the Centre and Limousin regions. ASN conducted 14 post-Fukushima inspections in 2011 (Chinon, Belleville-sur-Loire, Dampierre-en-Burly, Saint-Laurent-des-Eaux and OSIRIS at Saclay), two of which were attended by members of the local information committee.

It also carried out 7 inspections in the radioactive material transport sector.

In 2011, 5 significant events of level 1 on the INES scale were declared by the licensees of EDF nuclear installations in the Centre region, and 4 significant events of level 1 were notified by the licensees of the Ile-de-France nuclear sites. In the small-scale nuclear activities, five events of level 1 on the ASN/SFRO scale were notified in the Centre and Limousin regions. The inspections conducted by the Orleans division led to the issuing of four formal notices and two violation reports, which were submitted to the competent public prosecutors.

CIS bio notified ASN of the exceeding of one of its annual gaseous discharge limit values. This event, rated 1 on the INES scale, led ASN to give CIS bio formal notice in April to comply with the discharge provisions for the facility.

In June 2011, ASN deployed ten inspectors for two weeks to conduct an in-depth inspection of occupational radiation protection in the four nuclear power plants of the Centre region.

1 Assessment by domain

1|1 Assessment of BNI nuclear safety

Belleville-sur-Loire NPP

ASN considers that the improvements in safety of installations registered by the Belleville-sur-Loire site in 2010, continued in 2011. Its performance on the whole matches the ASN's general assessment of EDF. The efforts must be maintained with regard to the operation of the facilities and the rigour of work interventions, for which there are still some deviations. ASN considers the implementation of a more operational programme for integrating EDF's national prescriptive documents is a positive measure. Better managerial tracking of the deadlines for remedying the identified deviations is also apparent.

Some radiation protection deviations still persist on the maintenance work sites. The licensee, however, is pursuing several

1. Radiation protection in Ile-de-France is ensured by the Paris division.

ambitious improvement measures that seem to bring better control in this area.

Lastly, with regard to the environment, ASN considers that the fundamental measures started in 2010 must be maintained in order to continue improving the NPP's performance in this domain.

Chinon site

ASN considers that the nuclear safety and radiation protection performance of the reactors in operation at the Chinon NPP is still below the average assessment level for EDF.

The site's safety results remain marred by numerous deviations linked to inadequate preparation of the interventions or laxity in the application of the operating procedures. Nevertheless, site management is implementing a determined plan of action to improve operating rigour. ASN, which is monitoring the effectiveness of this plan, noted some positive developments at the end of 2011, even if there is still considerable room for progress.

Alongside this, the Chinon site's performance in radiation protection is still not up to standard. During its inspections, ASN has more particularly observed a serious lack of a radiation protection culture and a lack of personnel on the ground responsible for checking radiation protection. ASN observes that shutdown durations are still poorly controlled and lead to work overloads and a lack of vigilance on the part of the workers.

In the changing context of the AMI (irradiated materials) facility, with the preparation for the transfer of the expert appraisal activities to a new facility in 2012 and organisational changes appropriate for the future use of the facility, ASN considers that the licensee must in particular reinforce compliance with the requirements of the safety baseline standard, its operating rigour, its control over outside contractors and its radiation protection management.

ASN considers that on the whole the level of safety of the nuclear facilities of the former Chinon NPP is satisfactory. The main issue in the monitoring of these facilities lies in the future decommissioning of the Chinon A3 heat exchangers. This is because the future effluent emissions must remain in conformity with the discharge limitation values, which are currently being modified.

Dampierre-en-Burly NPP

ASN considers that the Dampierre-en-Burly NPP's performance is on the whole in line with ASN's average assessment level for EDF. The safety results for 2011 are in line with those of 2010 and the efforts to improve operating rigour must be continued. Further to the deficiencies in maintenance contractor monitoring observed in 2010, the site has implemented a plan of action that should reverse the trend.

Deviations from the regulations in the areas of safety and radiation protection are still observed during work site inspections. Nonetheless, the good results in collective dosimetry and the reduction in the number of significant events relating to radiation protection are to be noted.

With regard to the impact of the facilities on the environment, the Orleans division considers that the site is still positively positioned. The continuous improvement in chemical and radioactive discharges was maintained in parallel with the implementation of new discharge and intake permits.

Saint-Laurent-des-Eaux site

ASN considers that the Saint-Laurent-des-Eaux site's performance is on the whole in line with ASN's general assessment of EDF. With regard to safety, ASN considers the monitoring and performance of the corrective actions to be satisfactory. Progress has also been made in certain domains, particularly with respect to component padlocking and the integration of experience feedback. Nonetheless, a deterioration in several weak points already identified in 2010 has been observed. Numerous technical inspection deficiencies have been identified, notably involving the operating supervisors, and especially during peak activity periods. In addition, coordination deficiencies have arisen between certain services, such as for the management of the periodic tests. The appropriateness of the corrective actions initiated recently by the site therefore remains to be evaluated as from 2012.

The site's radiation protection organisation is satisfactory on the whole. In certain areas, the site demonstrates a spirit of initiative by setting requirements that are more stringent than those of the EDF in-house safety baseline standard. Nevertheless, the site must remain attentive to the way the workers take into account the question of radiation protection.

On the environmental front, the optimising of radioactive discharges remains one of the site's positive points. This being said, further to the lack of foresightedness on the impact of the new discharge decisions, the site must ensure that its action plan is properly implemented.

ASN considers that on the whole the level of safety of the nuclear installations of the former Saint-Laurent-des-Eaux NPP (BNIs 46 and 74) is satisfactory. The main issue in the monitoring of these installations lies in the removal of certain contaminated liquid effluents. The installation of the geotechnical containment around the irradiated graphite sleeve storage silos in 2010 has reinforced the protection of this facility against the risk of flooding by the River Loire.

• *Nuclear research facilities or facilities undergoing decommissioning, nuclear plants and units*

CEA's Saclay centre

ASN considers that the safety of the BNIs in the CEA centre in Saclay is properly controlled, in particular for the experimental reactors and the irradiated fuels and materials appraisal laboratory.

The ASN review conducted in 2011 confirmed the good emergency organisation of the centre and its ability to engage the operational resources necessary to respond to an emergency situation. ASN nevertheless considers that improvements must be with regard to the training requirements of the players involved in the emergency, the conditions of integrating experience feedback from the exercises, and emergency management coordination between the BNIs and the centre. The complementary inspection of the OSIRIS reactor conducted by ASN as part of

the campaign of targeted inspections on the first experience feedback from the Fukushima accident concluded that the safety baseline standard in effect was correctly applied.

Overall monitoring of the centre's radioactive gaseous discharges appeared rigorous. Likewise, the requirements of ASN decision No. 2010-DC-0178 of 16 March 2010 on the conditions of implementation of the in-house authorisations systems were found to be well respected.

ASN also verified application of the European regulations relative to the recording, assessment, authorisation and utilisation of chemical substances: a few deviations were noted here and there.

ASN also underlined the quality of the conditions of restarting of the concreting unit of BNI 72 and of entry into service of the STELLA unit of BNI 35.

Nevertheless, the inspections revealed a lack of rigour in several periodic inspections and tests, and maintenance operations. Consequently, ASN considers that the efforts undertaken in the last few years in this respect must be continued.

The CIS bio international plant in Saclay

The renovation work currently being finalised should help improve the safety of the plant. However, the operating weaknesses observed, combined with the late submittals and shortcomings of the safety files, particularly the periodic safety review file, gave ASN a sustained workload in 2011. Furthermore, this situation prevents the safety review from being concluded before 2012. This being said, the plant's radioactive iodine inventory has already been decreased in order to reduce the potential consequences of a severe accident.

One event of noncompliance with the gaseous discharge limits led ASN to issue formal notice to CIS bio to comply with the plant's discharge provisions. This deviation and the identified operating weaknesses, particular with regard to compliance with the safety baseline standard and operating rigour, highlight the need for the licensee to continue reinforcing its safety management. Although organisational changes and improvements in the operating processes have been initiated, clearly tangible progress is required.

The CEA's centre in Fontenay-aux-Roses

ASN considers on the whole that the level of safety of the centre's facilities is satisfactory. The system of in-house authorisations is well mastered by the licensee. At present the discharge limits and monitoring conditions for the BNIs in the centre are regulated by ministerial orders dating from 1988. In the near future, ASN will take a decision to ask the licensee to lodge an updated discharge authorisation application file.

There has been an appreciable increase in the number of significant events notified to ASN compared with 2010, including two events rated level 1 on the INES scale. They reveal technical failures of equipment and deficiencies in work preparation and personnel training.

Lastly, control of the dynamic containment in the facilities of BNI 165 can be further improved, given that there are still deviations from the negative pressure ranges set in the baseline standard. New operating criteria must therefore be defined.

1|2 Assessment of radiation protection in the medical field

To guarantee the safety of treatments by external beam radiotherapy, ASN checks that a quality improvement approach for all the patient treatment stages is implemented in the medical centres in the Centre and Limousin regions.

In 2011, ASN observed that the management of each centre inspected had defined a "quality" policy and was now ensuring it had the human resources to implement that policy. These centres have also set up an effective organisational structure to detect and analyse the adverse events noted during the treatments, and to take measures to reduce their number and their consequences.

In this context of tangible improvement, ASN notes that only the "quality" referencing of a few common practices can be further improved, and some sites still seem to lack robustness in the application of the "quality" approach when there is a shortage of human resources.

ASN notes the improvement in practices in nuclear medicine, particularly through the progressive decrease in radiological exposure of the personnel. Nevertheless, in ASN' opinion, insufficient consideration is given to occupational radiation protection issues. ASN also considers that the management of contaminated effluents and waste can be improved. The interest in positron emission tomography (PET), which opens new perspectives in the diagnosis of cancers, has raised new radiation protection issues for four centres licensed by ASN in the Centre and Limousin regions in 2011.

ASN considers that radiation protection measures are not sufficiently implemented in the operating theatres. The eight inspections in interventional radiology carried out by the division revealed that the organisation of in-house and external quality checks of the radiology devices is progressively materialising, as are the training of personnel in the use of the devices and raising worker awareness of the risks involved. More generally, ASN considers that the centres using this technique should conduct a deeper reflection on the subject. This reflection should lead to the optimisation of practices and of the use of radiology devices in operating theatres.

1|3 Assessment of radiation protection in the industrial and research sectors

For the companies established in the Centre and Limousin regions, ASN notes that radiation protection measures are satisfactorily implemented in the industrial radiology activities.

More particularly, non-destructive testing contractors using gamma radiography devices are showing ever-greater control of their on-site working conditions: the virtually systematic use of equipment (collimators, collective protective equipment, etc.) to limit the exposure of the workers and the public must be underlined.

ASN has however noticed that the time between ordering and conducting an inspection is often very short. Thus, the preliminary phase of radiological optimisation (predicted dose assessments, defining of the operation zone), in the same way as the

overall prevention of other risks, may be incomplete, or even inexistent. ASN will continue to be very attentive to this point in its inspections in 2012.

The year 2011 was marked by tighter ASN monitoring of the organisations responsible for the external radiation protection checks. These ASN-approved organisations are subject to checks on the ground, branch office visits and head office audits when they make their approval renewal application, which was the case for three of them in 2011, coinciding with significant changes in the regulatory baseline that same year. ASN considers that the organisational structures within the organisations audited in 2011 must be consolidated.

ASN conducted a veterinary inspection campaign that targeted 17 practices, mainly in the equine sector. This allowed the regularisation of administrative situations relating to the use of X-ray generators, while at the same time checking the conditions of diagnostic X-ray imaging on the animal owners' premises (wearing of protective equipment, active dosimetry monitoring, etc.).

1|4 Assessment of radioactive material transport

In 2011, ASN performed nine inspections of consignors – with highly diverse quantities, materials and types of packages shipped – and road transport carriers. The checks, which focused primarily on the operational measures applied, the organisational structures in place, the conformity of the packages, and which were supplemented by the examination of the security advisors' reports, show that on the whole the regulatory requirements are satisfied, but some improvements are expected in terms of organisation and quality assurance.

The significant events, essentially caused by human or organisational factors, had no notable impacts. They are limited in number, except for the incidents in airport zones, where handling conditions must be improved.

2 Additional information

2|1 International action by the Orleans division

The Orleans division hosted a Chinese delegation from the Ministry of Water in 2011, to discuss the issues associated with the installation of a nuclear power plant beside a river, and a Croatian delegation to discuss occupational radiation protection.

2|2 The other significant events in the Centre, Limousin and Ile-de-France regions

Monitoring of former uranium mines in the Limousin region

ASN considers that the actions undertaken to further knowledge of the impact of the former mining sites in the Limousin region on the environment and health must be continued. As part of the inventorying of waste rock from mines required by the circular of 22 July 2009, AREVA conducted helicopter overflights of the identified areas of interest. This was supplemented by a ground investigation phase. The aim of this procedure is to verify the compatibility of the use of mining waste rock with the areas concerned by its reuse. ASN will examine this inventory, which must be finalised in 2011 for the Limousin region.

Searching for radioactive mining waste rock in a tile factory in the Limousin region – May 2011

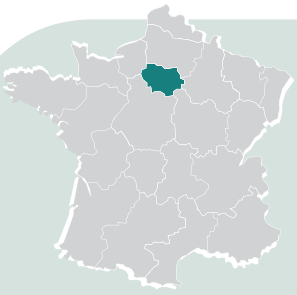
2|3 Public information actions in 2011

Pursuant to the new regulatory provisions, the Chinon and Dampierre CLIs were consulted on ASN's draft decisions defining the requirements applicable to the NPP's water take-offs and discharges.

In 2011, ASN held two press conferences in Orléans and Nanterre on the state of nuclear safety and radiation protection.

ASN, in partnership with the Centre region DIRECCTE (Regional directorate of enterprises, competition, consumption, labour and employment), organised an inter-regional day on industrial radiology (gamma radiography and X-ray radiography), held on 7 April 2011 in Orléans. This event, intended for "ordering customers" and NDT services contractors, was attended by more than fifty people.

PARIS



10 THE STATE OF NUCLEAR SAFETY AND RADIATION PROTECTION IN THE ILE-DE-FRANCE REGION AND OVERSEAS FRANCE *DÉPARTEMENTS* AND TERRITORIAL COMMUNITIES REGULATED BY THE **PARIS** DIVISION

The Paris division regulates the small-scale nuclear activities in the eight *départements* of the Ile-de-France region and the 5 overseas (Outre-Mer) *départements* (Guadeloupe, Martinique, Guyane, La Réunion, Mayotte). It also fulfils duties as expert to the competent authorities of French Polynesia and Nouvelle-Calédonie. As at 31 December 2011 the workforce of the Paris division stood at 22 officers: 1 regional head, 2 deputies, 17 radiation protection inspectors and 2 administrative officers, under the authority of an ASN regional representative.

The small-scale nuclear facilities to be regulated in the Ile-de-France region and in the *départements* of Overseas France represent 22% of the French total. The two particularities are the diversity and the number of facilities to be regulated. It effectively comprises:
– 33 external radiotherapy departments (nearly 90 accelerators);
– 18 brachytherapy departments;
– 65 nuclear medicine departments;
– more than 250 tomography devices;
– about 4,000 medical radiodiagnostic devices;
– about 8,000 dental radiodiagnostic devices;
– 15 industrial radiology companies;
– more than 500 industrial research devices or sources.

The BNIs of Ile-de-France are regulated by the ASN Orléans division.

The Paris division carried out 216 inspections in small-scale nuclear activities in 2011. These inspections covered a variety of areas: radiotherapy, nuclear medicine, interventional radiology, computed tomography, industrial radiology, radioactive material transport, monitoring of organisations approved by ASN, etc.

116 events were notified to the Paris division in 2011. 2 concerned the transport of radioactive materials and 114 concerned radiation protection of workers, patients, the public or the environment in small-scale nuclear activities.

1 Assessment by domain

1|1 Assessment of radiation protection in the medical field

External radiotherapy

ASN carried out 42 inspections of radiotherapy departments in the Île-de-France region and the overseas *départements* in 2011.

The 33 radiotherapy departments were all inspected for the fifth year in succession.

Nine entry-into-service inspections of new machines were also carried out.

Significant progress was observed in the actions contributing to treatment safety (analysis of deviations, in vivo dosimetry, etc.). The contrasting situation is still observed in the development of the quality assurance procedures and compliance with the regulatory requirements demanded by ASN in this area.

Interventional radiology

ASN carried out 21 inspections in 2011. These inspections confirmed the strong radiation protection implications for patients and workers during interventions carried out using ionising radiation. ASN noted that the way the radiation protection requirements have been integrated in this sector varied greatly according to the departments and specialities. Progress must be made in the harmonisation of professional practices to optimise the doses delivered to patients.

Nuclear medicine

ASN carried out 19 inspections in 2011. Three events relating to leaks of radioactive effluents were notified to ASN. These three events had no consequences on either worker radiation protection, the public or the environment.

Computed tomography (CT)

ASN carried out 64 inspections in 2011, 48 of them during a specific inspection campaign devoted to examining the patient radiation protection organisation implemented in the departments. This allowed the organisation of patient radiation protection in the computed tomography centres in the Ile-de-France region to be fully appraised. It reveals that, although the majority of the centres inspected know the regulations in force and have initiated measures to satisfy them, the organisation of patient radiation protection must be improved so that the optimisation principle can be even better applied. Potential avenues for improvement include adaptation of the protocols to the patient's morphology and periodically optimising the doses delivered to the patients.

Lastly, ASN drew up one violation report against a centre that had failed to register and ask for authorisations for its radiology devices.

1|2 Assessment of radiation protection in the industrial and research sectors

ASN continues its regulation and monitoring actions further to the incidents that occurred in 2010, particularly the tritium contamination incident at Saint-Maur-des-Fossés, where the CEA (alternative energies and atomic energy commission) is conducting clean-out operations.

ASN has moreover drawn up a violation report and issued formal notice to a property surveyor who had declared a non-existent place for the storage of its devices for detecting lead in paint.

1|3 Assessment of radiation protection of the public and the environment: management of waste contaminated by radionuclides and management of polluted sites and soils

In the framework of its duties to inform the public and monitor radiation protection with regard to the management of polluted sites and land, ASN oversaw and inspected the clean-out worksites of the Charvet site on Ile-Saint-Denis (*département* 93), the Curie Institute site in Arcueil (*département* 94) and the former Marie Curie school site in Nogent-sur-Marne (*département* 94).

The Radium Diagnostic operation has been launched in Ile-de-France since 21 September 2010. The government decided to perform the diagnostics free of charge in order to detect, and where applicable treat, any legacy radium pollution. This operation, which is placed under the responsibility of the *Préfet* of the Ile-de-France region, the *Préfet* of Paris, and is coordinated by ASN, concerns 84 sites in Ile-de-France.

By the end of 2011, 146 diagnostics had been carried out on twelve sites. They found 130 premises free of pollution and detected traces of radium on fifteen premises.

For the occupants and owners of the polluted premises, personalised assistance is being provided to apply the necessary precautionary measures and start the rehabilitation works - paid for by the State. The rehabilitation work is in the final phase on two of the premises, about to be started on five, and in the preparation phase on the remaining eight premises.

The measured levels of activity are low and the exposure does not present a health risk for the occupants.

2 Additional information

2|1 ASN's action in the overseas *départements* and territories

ASN carried out two inspection campaigns representing 26 inspections in the overseas *départements*, as it does each year. ASN considers that assimilation of the radiation protection requirements overseas is on average the same as in the metropolitan facilities.

Seminar on "radiotherapy in Ile-de-France and the Overseas *départements*" – 17 May 2011

ASN continued its cooperative work with French Polynesia during 2011. Two inspectors thus carried out a two-week assignment in French Polynesia, where they visited eleven facilities and gave training courses. ASN also continued giving its support to the Polynesian authorities in order to develop the regulatory framework governing nuclear activities in Polynesia.

2|2 International action by the Paris division

ASN took on a trainee from the Romanian nuclear safety authority for four days in 2011. The trainee participated in division's activities, which including three inspections in radiotherapy, interventional radiology and computed tomography. These inspections provide an opportunity to discuss the inspection and regulation practices of the two authorities.

2|3 Public information actions in 2011

ASN held a press conference in the Hauts-de-Seine *département* to give a run-down of its regional activity.

2|4 Monitoring of organisations approved for radiation protection technical checks

In 2011, ASN renewed the approvals of six organisations approved for conducting radiation protection technical checks. The audits carried out for this purpose confirmed the conformity of these organisations with the provisions of decision no.2010-DC-0191 of 22 July 2010 setting the conditions and modes of approval of the organisations mentioned in Article R. 1333-95 of the public health code.

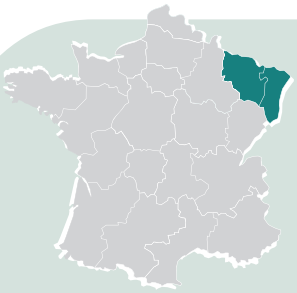
ASN also carried out seven unannounced supervisory checks during the interventions of these organisations, which on the whole were found to be satisfactory.

2|5 Outlook

ASN will continue its regulation and monitoring actions in 2012, particularly in radiotherapy, nuclear medicine and medical imaging departments, along with its public information initiatives. One event on the agenda is a seminar on dose optimisation intended for interventional radiology professionals.

Lastly, ASN will continue its action in the management of sites and land polluted by radioactive substances.

STRASBOURG



11 THE STATE OF NUCLEAR SAFETY AND RADIATION PROTECTION IN THE ALSACE AND LORRAINE REGIONS REGULATED BY THE **STRASBOURG** DIVISION

The Strasbourg division regulates nuclear safety and radiation protection in the 6 *départements* of the Alsace and Lorraine regions.
As at 31 December 2011 the workforce of the Strasbourg division stood at 16 officers: 1 regional head, 2 deputies, 10 inspectors and 3 administrative officers, under the authority of an ASN regional representative.

The installations to regulate in the Alsace and Lorraine regions comprise:
– the NPPs at Fessenheim (2 reactors of 900 MWe) and Cattenom (4 reactors of 1,300 MWe);
– 9 external radiotherapy departments;
– 3 brachytherapy departments;
– 14 nuclear medicine departments;
– about 50 interventional radiology departments;
– about 76 CT scanners;
– 4,000 medical and dental radiodiagnostic devices;
– 200 industrial research establishments;
– 2 cyclotrons producing fluorine 18.

ASN carried out 152 inspections in 2011: 44 inspections on the nuclear sites of Fessenheim and Cattenom (with post-Fukushima inspections on both these sites); 4 inspections in the transport of radioactive substances; 102 inspections in small-scale nuclear activities.

ASN also conducted 7 labour inspections in the nuclear power plants.

In 2011, 5 significant events of level 1 on the INES scale were declared by the licensees of EDF nuclear installations in the Centre region, and 4 significant events of level 1 were notified by the licensees of the Ile-de-France nuclear sites.

In the small-scale nuclear activities in these regions, 6 significant events of level 1 on the ASN-SFRO scale were notified by radiotherapy departments, and 2 events rated level 1 and 2 respectively on the INES scale were notified for industrial activities.

In the framework of its regulation duties, ASN submitted two violation reports to the public prosecutor's department and issued formal notice to comply to two establishments.

1 Assessment by domain

1|1 Assessment of BNI nuclear safety

Fessenheim NPP

ASN considers that the Fessenheim plant's performance in nuclear safety, environmental protection and radiation protection is satisfactory.

ASN notes progress in the maintenance of the facilities and the monitoring of outside contractors in 2011, which was a particularly busy year, with the third 10-year inspection of reactor 2 and a concomitant shutdown of reactor 1, among other things. The licensee took into account experience feedback from the previous shutdowns.

ASN notes that many items of equipment have been replaced to improve the condition of the facilities. Compliance with the technical requirements issued by ASN further to the third 10-year inspection of reactor 1 will help raise the level of safety so that continuation of operation of this reactor for another 10 years can be envisaged.

On the other hand, ASN considers that worker radiation protection is not improving, despite a proposed plan of action further to its findings of 2010. The licensee has not sufficiently learnt the lessons from the previous years.

Cattenom NPP

ASN considers on the whole that Cattenom NPP's performance in nuclear safety, environmental protection and radiation protection is satisfactory. More particularly, ASN considers that worker radiation protection is improving thanks to the measures taken by the site, and notably due to strong involvement of the risk prevention department.

ASN considers that the site is well prepared for emergency situations. The on-site inspection conducted by ASN from 2 to 5 August 2011 in the context of Fukushima experience feedback found management of the mobile emergency equipment to be satisfactory, and the concrete situation simulations showed good forward planning on the part of those involved.

In November 2011, the International Atomic Energy Agency (IAEA) conducted an assessment of safety in operation (Operational Safety Review Team - OSART - mission) at the Cattenom NPP, the second on the site following that of 1994, and confirmed ASN's judgement of it.

1|2 Assessment of radiation protection in the medical field

Computed tomography (CT)

EIn 2011, ASN began stepping up the inspections of medical imaging departments possessing a CT scanner. The reason behind this is that CT examinations represent a significant source of exposure to ionising radiation in the French population. Faced with this fact, and without calling into question the irrefutable medical benefits of this activity, the Strasbourg

ASN inspection at the Fessenheim NPP – September 2011

division - through its contacts with the medical institutions - has undertaken actions aiming to acquire better insight into the conditions of use of CT scanners and identify ways of reducing the doses delivered during the examinations. Three departments were thus inspected in Alsace-Lorraine in 2011, and twenty authorisations were delivered.

ASN notes that patient radiation protection is a growing concern in medical imaging departments. It reveals that, although the majority of the centres inspected know the regulations in force and have initiated measures to satisfy them, only half of the centres have set up a process of optimisation and periodic monitoring of the doses received by patients and involving a medical physicist.

ASN has also noted with satisfaction that patient and worker radiation protection is a criterion taken into account by the imaging departments when choosing new equipment. Furthermore, ASN notes that certain examinations that could be performed using a magnetic resonance imaging (MRI) scanner instead of the CT scanner, are not, because too few MRI scanners are available.

Interventional radiology

The inspections conducted in the medical departments carrying out interventional radiology procedures have confirmed the progressive implementation of in-house and external quality checks. They have also confirmed the improvement in personnel training. ASN nevertheless considers that there is still progress to be made in the optimisation of radiation protection, particularly in the operating theatre: this can be achieved by having better knowledge of the devices, more detailed tracking of dosimetric information, and frequent involvement of medical physicists.

In Octobre 2011, ASN conducted an inspection in four departments of the Strasbourg CHU (university hospital centre) to verify that the action plan decided further to the event notified by the interventional neuroradiology department in March 2009, had been implemented in all the departments. This inspection confirmed that this action plan is indeed implemented and positions the CHU among the most advanced French medical centres in terms of patient radiation protection.

Radiotherapy

In 2011, ASN inspected all of the nine radiotherapy departments in Alsace and Lorraine.

These inspections confirmed that the departments have continued implementing a quality assurance and risk management system, in accordance with the new regulatory requirements defined by the ASN. Nevertheless, the implementation deadlines set by the ASN decision are not always met and the risk analyses and formalising of practices are not all of the same standard.

1|3 Assessment of radiation protection in the industrial and research sectors

Industrial radiography

On account of the high risks it represents, industrial radiology is a high priority for ASN. In order to verify that work is performed under satisfactory conditions of safety, ASN performs numerous unannounced inspections, particularly at night, on the work sites involving outside NDT contractors. In 2011, the thirteen inspections conducted in this respect confirmed that the companies generally comply with the radiation protection regulations, particularly the dosimetric monitoring of the personnel. ASN moreover notes progress in the implementation of safety zoning and in work site preparation. Vigilance must nevertheless be maintained with this type of high risk activity.

Level 2 gamma radiography incident at Rambervillers

On 22 September 2011, ASN was alerted of an incident that occurred in Rambervillers (*département* 88), involving a radiographic inspection device used for inspecting welds on a pipe. A metal part fell onto the flexible hose of the gamma radiography device, preventing the radioactive source from retracting to its safety position inside the device. ASN immediately sent two inspectors to the site, who checked that the safety perimeter was properly monitored and ensured that the neighbouring population had been duly informed. The incident analysis revealed that the operator attempted to free the source manually under conditions that did not comply with radiation protection rules. Even though the dose received by the operator was within the regulatory limits, this analysis led ASN to rate this event at level 2 on the INES scale.

An intervention carried out on 24 November 2011 by the device manufacturer using a specifically developed tool enabled the source to be put back inside the device in its safety position. The long time lapse before this intervention shows the need to put in place the material and organisational means for managing malfunctions of such devices.

1|4 Other actions of the Strasbourg division in small-scale nuclear activities

Large-scale inspection operation in the Vosges département

ASN carried out a large-scale radiation protection inspection campaign in the Vosges from 6 to 8 June 2011. A team of 5 inspectors performed a total of 47 inspections, mostly unannounced. These inspections reveal that while the industrial sector complies with the regulations virtually in full, action is required in the other sectors, especially dental surgeries and, to a lesser extent, veterinary practices, to restore regulatory compliance.

Management of polluted sites and land

In 2011, ASN continued its monitoring of polluted sites and land, including an unannounced inspection during the clean-out work in a laboratory of Strasbourg University contaminated due to the storage of a collection of samples of radioactive uraniferous ores.

Monitoring of approved organisations

The year 2011 was marked by intensive monitoring of the organisations responsible for the external radiation protection checks. These organisations, approved by ASN, are subject to unannounced inspections when performing their services, audits of their head office organisation, and examination of their procedures as part of the approval application.

In 2011, the ASN Strasbourg division conducted eight inspections on approved organisations.

1|5 Assessment of nuclear safety and radiation protection in the transport of radioactive materials

In 2011, ASN carried out four inspections concerning the transport of radioactive materials and monitored the safety of transport from France to Germany of containers of vitrified radioactive waste originating from the reprocessing of spent German fuel on the La Hague site. ASN verified that the packages were duly approved and that the dose rate around the convoy did not exceed regulatory limits. The Strasbourg division of ASN assisted the defence zone *Préfet* in the zone command post.

2 Additional information

2|1 International action by the Strasbourg division

In the framework of the bilateral exchanges with its German, Luxembourgois and Swiss counterparts, the Strasbourg division of ASN took part in more than 10 cross-inspections in nuclear power plants and medical or industrial establishments, either as a guest in foreign countries, or as host to foreign counterparts.

A Franco-German working group compared the significant events notification criteria between France and Germany. The comparison showed that the notification criteria are specific to each country, even if the INES severity scale is the same.

A similar study was initiated in 2011 between France and Switzerland.

In the framework of the targeted post-Fukushima inspections, the Strasbourg division inspectors were accompanied at Cattenom by observers from Luxembourg and Germany, and at Fessenheim by Swiss observers. In return the Swiss safety authority invited ASN to participate in post-Fukushima inspections in the Swiss NPPs. Without waiting for the peer reviews of the 1st half of 2012, the Swiss authority involved the Strasbourg division in the monitoring of the stress tests engaged by the European Commission as of November 2011.

In 2011 the Strasbourg division met the German locally elected officials to present the opinion of ASN on the continuation of operation of the Fessenheim NPP reactor 1.

Lastly, the Strasbourg division hosted a trainee from the Romanian safety authority in charge of radiation protection for one week, and two Israeli observers during inspections in the medical field.

2|2 Public information actions in 2011

In 2011, ASN held two press conferences in Strasbourg and Metz on the state of nuclear safety and radiation protection.

ASN took part in various meetings of the CLIs of Fessenheim and Cattenom. During these meetings, ASN presented its assessment of the situation of the nuclear facilities concerned, and the control of the activities around the basic nuclear installations. It also presented the procedure for the complementary safety assessments it had required as part of the initial experience feedback from the Fukushima accident.

ASN also invited the CLIs on several occasions to come and observe the inspections performed in the EDF facilities as part of the initial experience feedback from the Fukushima accident. The numerous observers from the CLIs were thus able to get a clearer picture of the ASN's activities and the relations between the licensee and the ASN during the on-the-ground inspections. They were subsequently able to share their impressions at the plenary meetings of the CLIs.

Press conference of the ASN Strasbourg division on 9 June 2011