5 THE KEY ISSUES FOR REGULATION OF EXISTING INSTALLATIONS

A large number of nuclear installations are located in France, which is home to the world's second largest population of nuclear power plants and fuel cycle installations, as well as numerous research facilities. Regulation of them by ASN is an activity which, although enjoying the benefits of considerable experience feedback, requires constantly rising levels of investment in order to ensure that nuclear safety and radiation protection progress.

Plant ageing

One of the leading issues surrounding regulation of existing installations that is of greatest concern, is the question of ageing. This naturally concerns nuclear power plants, even if those in France are still relatively young, because internationally, only the Chinese power plant population is younger. The 900 MWe reactors, whose average age was 26 in December 2007, are thus more particularly concerned. However, ageing also affects many research facilities, primarily operated by CEA, as some of them have been in operation for more than 40 years. The French situation is comparable to that of other countries with a developed nuclear power generating industry. ASN's role is to ensure that the licensees take account of the ageing phenomena in a manner consistent with their general operating and maintenance strategy.

Decommissioning of nuclear installations

The issue of decommissioning of nuclear installations that have been shut down is a subject of vital importance for ASN, which is devoting ever-rising levels of investment to it. The aim for ASN is to ensure on the one hand that the licensees adopt the solution of immediate decommissioning of their installations which are no longer in operation, to avoid a situation in which all the knowledge of these installations gradually becomes lost, and on the other, that the licensee strategies are consistent in taking account of nuclear safety and radiation protection constraints. ASN is also investing heavily in reviewing the financing dossiers for the decommissioning and radioactive waste management costs, that the licensees are submitting to the Government pursuant to article 20 of the 28 June 2006 Act on the sustainable management of radioactive materials and wastes. ASN will also focus on clarifying the French position with regard to the decommissioning and delicensing of nuclear installations.

Organisational and human factors

In addition, ASN is devoting a large and growing part of its regulatory activities to issues related to organisational and human factors (FOH). Regulation concerns all the conditions surrounding human intervention, in terms of efficiency and safety. The organisations therefore have a crucial role to play in creating and guaranteeing the conditions favourable to improved human performance. With regard to FOH, ASN's actions concern analysis of the organisation in place at the licensees, so that they can fully assume their operational responsibility. ASN does not therefore stipulate a standard organisation or training programme for the persons in charge of operation. ASN also ensures that human and organisational lines of defence are in place, applying the principle of defence in depth. Finally, ASN checks the robustness of the experience feedback arrangements set up by the licensees, particularly to ensure that it does not focus on the individuals concerned.

ASN inspection at the Belleville-sur-Loire nuclear power plant (Cher) in 2007

The nuclear installations periodic safety review

The principle of a safety review every 10 years for all nuclear installations is a key requirement of the TSN Act. Even if this arrangement was already applied to nuclear power plants and the main fuel cycle and research installations, what is new for the other installations is its systematic application and the frequency specified by the Act, constituting a significant workload for ASN, IRSN and the licensees concerned. The periodic safety reviews have two main goals: a conformity review designed to compare the level of safety in the installations with their initial safety reference system in order to identify any deterioration over the course of time, as well as any faults or weaknesses in the safety analysis, plus a safety review which consists in comparing the safety of the installations with the very latest safety standards, in order to further improve the level of safety.

Ensuring that the existing nuclear installations enjoy a constantly improving level of safety is a permanent concern for ASN and one that compels it, and IRSN, to devote ever-greater resources.

6 Nuclear safety and radiation protection research

The purpose of nuclear safety and radiation protection research, whether fundamental or applied, is to advance the protection of workers, patients, the public and the environment against the hazards linked to nuclear activities. The goal is to enable the stakeholders (licensees or those responsible for nuclear activities, ASN and its technical support bodies) to take decisions or issue opinions that are well-founded from a scientific perspective. It aims to provides answers to questions concerning risk assessment (for example, what is the effect on man of small doses of radioactivity), to look further at areas that are supposedly already well-known (for example, research into serious accidents on pressurised water reactors has revealed unexpected physical phenomena), or to validate the changes wished for by the licensees (for example, boosting the performance of nuclear fuel). It also enables a high level of expertise to be maintained in these fields.

This research is therefore anything but abstract. ASN is one of the users of the products of this research and in this respect intends to express its requirements and wishes to be kept informed of the results obtained.

ASN's role in the governance of public research into nuclear safety and radiation protection

The international peer review conducted under the aegis of the IAEA (IRSS mission), which ASN requested for itself in November 2006, recommended that ASN become more involved in the research field[1]. By way of comparison, the main foreign nuclear safety authorities, whether or not they have an integrated technical support body, are involved in one way or another in defining the nuclear safety and radiation protection research programmes.

Because it has an overview of the decisions to be taken and the resulting needs in terms of building up knowledge, ASN can intervene to assess the pertinence of research programmes to support public nuclear safety and radiation protection policies. Regulation work, ASN decisions and progress arising from research are all closely linked and as a result of its inspections, ASN is in a position to identify areas where greater knowledge is required: safety or radiation protection problems which are slow or hard to resolve owing to an absence of international consensus, problems identified by foreign nuclear safety authorities, decisions to be taken in the medium or long term, areas requiring risk reduction.

Furthermore, the fact of being aware of the latest research results and of which issues are as yet unresolved, means that ASN knows how far, in technical terms, a licensee can be pressured to implement safety or radiation protection improvements. Therefore, the fact that ASN is informed of research work being conducted and the latest results obtained will contribute to enhancing the pertinence of its regulatory efforts.

Following a meeting of the atomic energy committee on 22 November 2007, Jean-Louis Borloo and Valérie Pécresse stated that they wanted to see ASN informed of the progress and results of research into nuclear safety and radiation protection. They also encouraged ASN to make known its stance on the objectives of the public research programmes in this field. Finally, they decided to set up a research steering committee linked to IRSN board, on which ASN will be a member.

The ASN role concerning research conducted by those responsible for nuclear activities

A large part of nuclear safety and radiation protection research is conducted by those responsible for nuclear activities, or the licensees, and ASN is therefore involved at several levels.

ASN monitors the increased financial effort devoted to research by the licensees.

ASN in particular asked EDF to send it an annual statement of the budget and workforce assigned to nuclear safety and radiation protection research, so that it could examine the corresponding trends, as in a competitive context, the licensees could be tempted to reduce spending on areas in which this reduction has no short-term effects, such as research. ASN also aims to examine the priorities assigned to the various research topics and check that the effort remains balanced.

ASN requests influence the licensees' research programmes.

The regulation carried out by ASN, in particular its review of the dossiers submitted in support of authorisation applications or during the periodic safety reviews, naturally leads it to ask the licensees to carry out research work and to assess the results as elements of future safety demonstrations. In so doing, ASN helps guide the direction taken by this research. One illustration is the regulatory requirements stipulated in the authorisation decrees for the La Hague plants, which obliged AREVA to carry out research into improving the waste treatment and packaging techniques and reduce the volume of waste.

More specifically with regard to the 4th generation reactors, ASN is initiating work to define the safety objectives to be

1. One of the recommendations of this review was the following: ASN should look at ways of developing its contribution to nuclear safety and radiation protection research, as well as its monitoring of this research.

Use of unsealed radioactive sources for research (tracing operation)

taken into account, which could influence research on this subject.

What ASN expects from the nuclear safety and radiation protection research players

ASN attaches importance to IRSN continuing to conduct research tailored to the needs of regulating nuclear safety and radiation protection.

It is important that research into nuclear safety and radiation protection be conducted not only by the licensees so that – via IRSN – ASN has access to knowledge independently of them. ASN expects IRSN, its main technical support body, to continue to carry out research work tailored to the needs of regulating nuclear safety and radiation protection, such as that aiming to improve risk assessment or improve the preparation prior to expert assessment work, in order to construct a technically sound foundation for the positions it adopts. In this way, interpretation of the experiments conducted by IRSN led to rediscovery of the risk of clogging of nuclear reactor sumps. ASN aims to become involved in determining the direction of this work.

IRSN can of course carry out other research work for other purposes, on which ASN will bring no influence to bear.

ASN considers that it is the responsibility of industry and the licensees of nuclear activities to conduct nuclear safety and radiation protection research.

It is important for the licensees to make a significant contribution to the nuclear safety and radiation protection research effort and use the results: it is their responsibility to seek to increase the safety of their installations, and to be able to propose improvements in this direction. The research conducted into radiation protection by those responsible for nuclear activities has enabled progress to be made in many fields, for example dosimetry, protective equipment and medical systems.

ASN observes with satisfaction that there are still a number of driving forces behind research into nuclear safety and radiation protection:

– the development of new "products": new medical imaging appliances, new radiopharmaceuticals, new nuclear reactors, and so on. For example, the EPR reactor led to the development of new technical solutions, some of which could be employed on the existing reactors when the ten-yearly periodic safety reviews are conducted (management of steam generator tube rupture accident);
– the desire of the licensees to improve the performance of their tools. The work done in this direction in certain

cases helps move safety forwards, for example by revealing weaknesses in the calculation methods hitherto used;
– the incorporation of experience feedback from incidents, which for example generated research into the flooding risk or modelling of oil slick drift.

Improved coordination of the stakeholders should give each one an overview of ongoing research programmes, thus promoting resource optimisation.

Many organisations are carrying out research into nuclear safety and radiation protection: IRSN and the licensees, already mentioned, but also CEA, CNRS, INSERM, Universities, engineering colleges, and so on.

In a context in which optimum use has to be made of the research budgets of the licensees and the public authorities, ASN underlines the benefits of good coordination between the organisations involved in research, in order to identify the work that could be conducted together. This coordination could be made easier by the fact that each organisation is aware of the research programmes being carried out by the others. In France there is at present no procedure that provides an overview of the research being done into nuclear safety and radiation protection and that stipulates periodic opportunities to discuss it.

Conclusion

ASN approves the recent decisions taken by the Government with regard to governance of public research, which are in line with its own concerns. It will be striving to set up an internal organisation enabling it as of 2008 to issue an opinion on research objectives and ensure that requirements in terms of supervision, regulation and decision-making are correctly incorporated into the definition of the research programmes. ASN involvement on this subject will thus be more in line with international practices. Within the framework of the WENRA association, ASN also intends to initiate a joint approach to research by the European safety authorities.