



GC

International Atomic Energy Agency
GENERAL CONFERENCE

GC(41)/INF/5/Add. 1

18 September 1997

GENERAL Distr.

Original: ENGLISH

Forty-first regular session
Item 13 of the provisional agenda
(GC(41)/1)

**MEASURES TO STRENGTHEN INTERNATIONAL CO-OPERATION
IN NUCLEAR, RADIATION AND WASTE SAFETY**

THE NUCLEAR SAFETY REVIEW 1997

Part II of the Agency's Nuclear Safety Review 1997 (GC(41)/INF/5, Annex 2) and the Attachment to that document present information on significant achievements, developments and issues related to **nuclear, radiation and waste safety** in a number of Member States. Information relating to two further Member States — Cuba and France — is contained in the Attachment hereto.

NUCLEAR, RADIATION AND WASTE SAFETY IN MEMBER STATES

CUBA

Legislation and regulatory documents

During the year, work has proceeded on the draft nuclear decree-law. It was submitted to the Government for approval by the rest of the national bodies concerned and subsequent transmission through the constitutional procedures. This draft contains, inter alia, nuclear safety principles, criteria and general objectives and has been based on national experience and good international practices.

In addition, the following legislation entered into force: Decree No. 208 of 28 May 1996 establishing the National System of Accounting for and Control of Nuclear Material, and Resolution No. 62 of 12 June 1996, which put into effect the Regulations on the Accounting for and Control of Nuclear Material.

Scientific and technical events

The second workshop on nuclear and radiation safety was held at the end of 1996. A regional training course was also held, under the auspices of the IAEA, on the notification, registration, licensing and control of radiation sources. Both events were attended by large numbers of specialists from Spain and Latin America (Argentina, Brazil, Costa Rica, Guatemala, Mexico, Panama, Paraguay, Peru, Spain, Uruguay and Venezuela).

Nuclear safety

Since September 1992, work on the Juragua nuclear power plant, which is being built in the centre of Cuba, has been temporarily suspended owing to economic difficulties affecting its completion. Work has been carried out since then to maintain the plant, including measures to improve the storage conditions of the basic equipment, which has gradually been transferred to the reactor building to be sited as planned.

Recently, important safety-significant equipment was received; its supply contract provides for the necessary measures to guarantee its maintenance for a period of two years.

Radiation safety

During 1996, special attention continued to be given to the adaptation and adoption of the provisions of the International Basic Safety Standards published in IAEA Safety Series No. 115. The national safety regulations are at the discussion and approval stage, and are expected to enter into force in 1997.

Special attention is being given to the medical exposure requirements laid down in the International Basic Safety Standards. In that connection, work is being carried out to improve the safety culture of medical and paramedical personnel to limit patient exposure in accordance with the recommendations of those Standards.

Computerized safety analysis techniques and their importance in regulatory decision-making

Some years ago a safety assessment section was established within the regulatory body to support the latter's regulatory decision-making by using the available computer techniques. Recently, an important code was acquired and a specialist received training in its use.

Multilateral or bilateral agreements

There is a nuclear and radiation safety co-operation agreement between the Ministry of Science, Technology and the Environment, on behalf of the Republic of Cuba, and the Secretariat of Energy of Mexico. Cuba's regulatory body is open to the signing of other similar agreements.

Cuba is in the final stages of the technical co-operation project CUB/9/008 "Nuclear Power Plant Safety Assessment" with the IAEA and for the 1997-1998 period will embark on CUB/9/011 related to the licensing of the Juragua nuclear power plant.

FRANCE

No really alarming events occurred in France in the course of 1996. The main features of the year were as follows.

Power reactor safety

The repetition of incidents on PWRs — such as the sticking open of containment isolation valves, the slackening or corrosion of tie rods providing earthquake resistance of the reactor pits and, in particular, various instances of control rod assemblies jamming — ought to be mentioned. The two latter types of incident have been classed at level 2 on the INES scale. All these incidents point to the need to improve further the design or maintenance of important systems for the safety of installations.

Another problem is the lack of knowledge and records of certain older installations on the part of the present operators; the incident which occurred at the Chinon irradiated material workshop — where the accidental breach of an uncharted pipe led to water entering a storage well for radioactive products — illustrates this type of problem.

The surveillance of existing nuclear installations, in particular the 55 PWRs, constituted an important part of the activity of the Safety Authority (DSIN: Directorate of Nuclear Installation Safety) in 1996.

The evolution of the two fast reactors remains a matter of particular interest. PHENIX is still shut down following the conclusion of its 49th operating cycle, awaiting justificatory evidence which could persuade the safety authority to authorize the extension of its operation for a new 10-year period, as requested by the operator. SUPERPHENIX operated normally in 1996 within the power limits authorized by the DSIN (up to 90% of rated power) with a few minor incidents. A scientific commission (independent of the operator and the Safety Authority) has expounded the conditions under which SUPERPHENIX could be used effectively as a research tool; the reactor was shut down at the end of December for scheduled maintenance lasting several months.

Nuclear fuel and its conditions of use have been the subject of much study covering the whole cycle from fabrication and the transport of fresh fuel (UO₂ or MOX), through use

in the reactor (problems of high burnup and spent fuel storage in ponds), to its ultimate fate (reprocessing or possibly direct storage). These studies are aimed at verifying the soundness of the present arrangements and the developments foreseen or envisaged in the short and medium term.

1996 also saw the launch of the new N4 1450 MW(e) reactor series. The first reactor of this series, CHOOZ B1, has overcome its commissioning difficulties; after replacement of the guide tubes of the control rod assemblies — which were giving an excessive rod drop time — with guide tubes of the 1300 MW(e) reactor model, trouble was encountered with the primary coolant pumps producing an excessive flow rate during trials at 30% rated power, which could have consequences for reactor safety. Although satisfactory results were obtained subsequently when the power was raised, the studies of this phenomenon have not yet been concluded. Apart from that, a primary pump casing intended for the Civaux 2 reactor had to be rejected because of unsatisfactory behaviour during hydraulic tests. Altogether these mishaps threaten to delay commissioning of the whole reactor series.

The nuclear power industry has also devoted a large part of its activity to preparing for the future. The most important item here is undoubtedly the development of the Franco-German EPR reactor. In 1996 the detailed pre-project was submitted by the designers for examination from the safety point of view and this work should be completed by the beginning of 1998.

Ageing of nuclear installations

The ageing of nuclear installations and their adaptation to new safety requirements are the subject of particularly intensive study.

The operator Electricité de France (EDF) hopes to prolong the life of its nuclear power stations to 40 years or more; the Safety Authority has asked EDF to provide the necessary justifications. A re-evaluation of safety has just begun for the reactors of the 900 MW(e) series which will shortly reach the date for their second 10-year inspection.

As regards installations other than power reactors, one may cite the case of the plutonium technology workshop at Cadarache, which has failed to meet the new seismic standards and which will therefore have to be shut down shortly after the year 2000, or the case of certain ponds at La Hague, constructed at the end of the 1970s for the interim storage

of spent fuel prior to reprocessing, where for similar reasons the thermal capacity has had to be reduced compared with the initial design.

Safety of radioactive waste management

Future tasks also include dealing with the problem of radioactive waste management. In 1996 the following work was undertaken in this field:

- Studies on very low level waste, for which a specialized storage concept has been defined, based in particular on the responsibility of waste producers and traceability;
- Studies on high level waste, for which the National Agency for Radioactive Waste Management (ANDRA) has submitted three requests for authorization to build and operate underground laboratories which were due to be the subject of public inquiries at the beginning of 1997. The research undertaken in these laboratories should enable conclusions to be drawn as to the suitability of these three sites.

In parallel with the above, two other lines of study provided for by the Law of 30 December 1991 — conditioning, interim surface storage and transmutation — have also been pursued under the supervision of the National Evaluation Commission created for this purpose.

As far as low and medium level radioactive waste is concerned, the Centre de l'Aube disposal facility has operated satisfactorily.

In the waste field one may also note the commencement in 1996 of the procedure for closure of the Centre de la Manche disposal facility designed for low and short lived medium level radioactive waste; after a public inquiry and expert assessment by a special committee appointed for that purpose, it was decided to modify some of the methods for covering and monitoring the facility which will entail another new public inquiry in 1997, while a Standing Surveillance Committee was established at the end of 1996 by decree of the Prefect of La Manche.

Finally, 1996 saw the establishment at Codolet near Marcoule of CENTRACO, a new nuclear facility intended for decontaminating, treating and conditioning low level radioactive waste.

Dismantling of nuclear installations

The future will also see preparations for dismantling nuclear installations — in particular those of industrial scale when they come to the end of their working life — and the management of the large volumes of waste resulting therefrom.

The Safety Authority has always looked forward to a full scale demonstration of the feasibility and the actual cost of a dismantling operation. That is why, in the decree authorizing the partial dismantling of the 80 MW(e) Brennilis EL4 reactor at Monts d'Arrée, it has included the obligation for the operator to present within three years an accelerated final dismantling study.

Preparation for management of an emergency

The future also involves studying possible accidents and preparing for a possible nuclear emergency.

The emergency exercises regularly organized by the Safety Authority have been continued in 1996, focusing more and more on operations involving populations in the field (sheltering or evacuation of part of the population concerned). These exercises have been well perceived by the public who have thereby felt themselves more involved.

These exercises have served to demonstrate in particular the difficulty of distributing, immediately after a possible accident, stable iodine tablets designed to protect the thyroid in the event of radioactive releases, in accordance with the procedure established in France. It was therefore decided to distribute these tablets in advance to the populations most concerned; this distribution was started on a pilot scale around four nuclear power stations at the end of 1996, and will be extended in 1997 to all installations justifying it.

Human factors

A large proportion of the actions undertaken in the field of nuclear safety relate to equipment and the improvement of its reliability; it is necessary to continue in that direction. However, it is also necessary to appreciate the importance of organizations and the behaviour of people, particularly as regards the following elements:

- In-depth analysis of operating experience;

- Training at all levels;
- Rigour in the execution and control of actions concerning the safety of installations, in particular as regards achieving a balance between safety and availability;
- Communication between different services and hierarchical levels;
- Taking account of ergonomics in the design of equipment and of constraints associated with this equipment in the preparation of routine operating procedures; and
- Linkage between management, testing and operating procedures and the competence of personnel.

Evolution of the Safety Authority and enterprises in the nuclear sector

In 1996 the Safety Authority also undertook a number of studies and actions with regard to its functions and its organization, while at the same time monitoring carefully the reorganizations taking place in large enterprises in the nuclear sector (EDF, FRAMATOME) and trying to assess their impact on safety.

All these long term actions are under way and will be continued in 1997. They affect not only the Safety Authority and its technical support services but also the operators, and indeed all the people working to improve safety.

Co-operative actions

The year 1996 was particularly rich for France in regard to international relations linked with safety. Apart from very active participation in the work of international organizations (IAEA, OECD) and the European Union, as well as the continuation of the usual bilateral relations, one may note the entry into force of the International Convention on Nuclear Safety, which concerns power reactors, and substantial involvement in the preparation of the future convention on the safety of spent fuel and radioactive waste management.

In 1996 the Safety Authority also inaugurated exchanges of inspectors with their counterparts abroad. 1997 will see the transition to long term exchanges, whereby inspectors

will be sent abroad for a period of the order of three years, and also an increase in exchanges with bordering countries.

Conclusion

That then is the history of nuclear safety in France for 1996. The year has been rich in events and several actions launched in previous years are beginning to bear fruit. While monitoring safety vigilantly from day to day, the French Nuclear Safety Authority will continue to pursue long term projects during 1997, in which decisions will need to be taken in the wake of public inquiries on important projects like the construction of underground laboratories for studying radioactive waste storage or the review of authorization decrees for certain nuclear sites.