Australia
Austria
Belgium
Canada
Czech Republic
Denmark
Finland
France
Germany
Greece
Hungary
Iceland
Ireland
Italy
Japan
Korea
Luxembourg
Mexico
Netherlands
New Zealand
Norway
Poland
Portugal
Slovak Republic
Spain
Sweden
Switzerland
Turkey
United Kingdom
United States

NUCLEAR LEGISLATION IN OECD COUNTRIES

Regulatory and Institutional Framework for Nuclear Activities

France

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

The OECD is a unique forum where the governments of 30 democracies work together to address the economic, social and environmental challenges of globalisation. The OECD is also at the forefront of efforts to understand and to help governments respond to new developments and concerns, such as corporate governance, the information economy and the challenges of an ageing population. The Organisation provides a setting where governments can compare policy experiences, seek answers to common problems, identify good practice and work to co-ordinate domestic and international policies.

The OECD member countries are: Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The Commission of the European Communities takes part in the work of the OECD.

OECD Publishing disseminates widely the results of the Organisation's statistics gathering and research on economic, social and environmental issues, as well as the conventions, guidelines and standards agreed by its members.

* * *

This work is published on the responsibility of the Secretary-General of the OECD. The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Organisation or of the governments of its member countries.

NUCLEAR ENERGY AGENCY

The OECD Nuclear Energy Agency (NEA) was established on 1st February 1958 under the name of the OEEC European Nuclear Energy Agency. It received its present designation on 20th April 1972, when Japan became its first non-European full member. NEA membership today consists of 28 OECD member countries: Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Luxembourg, Mexico, the Netherlands, Norway, Portugal, the Republic of Korea, the Slovak Republic, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The Commission of the European Communities also takes part in the work of the Agency.

The mission of the NEA is:

- to assist its member countries in maintaining and further developing, through international co-operation, the scientific, technological and legal bases required for a safe, environmentally friendly and economical use of nuclear energy for peaceful purposes, as well as
- to provide authoritative assessments and to forge common understandings on key issues as input to government decisions on nuclear energy policy and to broader OECD policy analyses in areas such as energy and sustainable development.

Specific areas of competence of the NEA include safety and regulation of nuclear activities, radioactive waste management, radiological protection, nuclear science, economic and technical analyses of the nuclear fuel cycle, nuclear law and liability, and public information. The NEA Data Bank provides nuclear data and computer program services for participating countries.

In these and related tasks, the NEA works in close collaboration with the International Atomic Energy Agency in Vienna, with which it has a Co-operation Agreement, as well as with other international organisations in the nuclear field.

FRANCE

This chapter was last revised in 2003 and is correct as of that date.

The NEA Secretariat is currently revising this chapter in close consultation with the national authorities and plans to issue a new version in the near future.

ISSN 1727-3854

FRANCE

I. GENERAL REGULATORY REGIME

1. Introduction

France possesses a highly developed electro-nuclear programme; its 59 operational nuclear reactors located at 20 sites had a total installed capacity of 63.3 GWe in 2002. These reactors supplied 416.5 TWh of electricity, which amounted to 77.9% of the total electricity generated in France. *Électricité de France* (EDF), a state-owned supplier of electricity, owns the vast majority of the commercial reactors, however Electrabel has a stake in a few of them. With the exception of one Phenix (233 MWe) fast breeder reactor, all of the operational power reactors are PWR of three standard types: there are 34 reactors with a gross capacity of 900 MWe, 20 with a gross capacity of 1300 MWe and four with a gross capacity of 1450 MWe. France's gas-cooled reactors are shut down and are being decommissioned.

The Atomic Energy Commission (*Commissariat à l'Énergie Atomique* – CEA) owns the 31 research reactors in France; 15 are operating; 11 are shut down and five have been decommissioned. One planned research reactor, the Jules Horowitz project, calls for a 100 MWe tank-in-pool type reactor. The principal operating research reactors are the PHENIX 233 MWe fast breeder reactor, the SCARABEE 100 MWe and OSIRIS 70 MWe pool reactors and the HFR 58.3 MWe heavy water reactor.

The national policy in France is to reprocess spent fuel so as to recover uranium and plutonium for re-use and to reduce the volume of high-level wastes for disposal. High-level waste is currently vitrified and stored pending the development of a final deep repository. In 1996 the National Agency for Radioactive Waste Management (*Agence nationale pour la gestion des déchets radioactifs* – ANDRA), selected three sites on which it could eventually build long-term disposal facilities. There is an active near-surface low-level waste disposal facility at the *Centre de l'Aube* and one that ceased operation in 1994 at the *Centre de la Manche*. On 14 August 2003, ANDRA opened the world's first centre dedicated to the disposal of very-low-level waste.

Cogéma (*Compagnie Générale des Matières Nucléaires*), a state-owned company, is the world's biggest supplier of uranium. It provides almost half of the nuclear power plants worldwide from its uranium mines in Canada, the United States, Niger, Senegal, Gabon, Australia and France. Cogéma owns a majority share (51.5%) of Eurodif, which owns the world's largest uranium enrichment plant and supplies one-third of the world's total enriched nuclear fuel.

Nuclear legislation in France does not derive from any one general framework act. It has developed in successive stages in line with technological advances and growth in the atomic energy field.

Many of the legal provisions governing nuclear activities in France are, therefore, to be found in the general legislation such as the environmental protection legislation, the Act on Water, the Act on Air and the Rational Use of Energy, the Act on the Control of Atmospheric Pollution and Odours (Acts which form part of the Environment Code since 18 September 2000), the Public Health Code and the Labour Code.

Nevertheless, parliament has adopted a number of specific nuclear acts. Examples include Act No. 68-943 of 30 October 1968, as amended, laying down special rules as to third party liability in the field of nuclear energy (different from the ordinary French law on third party liability), Act No. 52-844 of 19 July 1952, now part of the Public Health Code, specifying licensing requirements for the use of radioelements, Act No. 80-572 of 25 July 1980, as amended, on the protection and control of nuclear materials and Act No. 91-1381 concerning research on radioactive waste management [Sections L.542-1 *et seq.* of the Environment Code].

Although French nuclear law is characterised by its variety of sources, as in other countries where nuclear energy has developed, the original features of this legislation derive chiefly from international recommendations or regulations. For example, radiation protection standards are derived from the Recommendations of the International Commission on Radiological Protection (ICRP) and directives issued by the European Union. Likewise, the French Act of 1968 on the liability of nuclear operators is directly derived from the Paris Convention of 29 July 1960.

French nuclear legislation began to develop from the time the Atomic Energy Commission (*Commissariat à l'énergie atomique* – CEA), a public establishment set up by the state in 1945 [Ordinance No. 45-2563 of 18 October 1945, as amended], which formerly reported directly to the Prime Minister, no longer held a monopoly for nuclear activities. This corresponded with the period when nuclear energy applications were entering the industrialisation stage, thus requiring the involvement of other electricity-generating and industrial fuel cycle operators. This development had several landmarks: in 1963, a system for licensing and controlling major nuclear installations was introduced, making central government responsible for decisions taken to ensure the safety of the population and workers. Prior to this, procedures concerning the licensing and control of industrial activities had been dealt with by the prefect for each *département*. In 1973, this system was expanded to cover the development of the nuclear power programme, and the role of the state authorities was clearly defined at that time. Finally, Decree No. 66-450 of 20 June 1966, as amended, implemented Euratom Directives into French radiation protection legislation.

In the course of the 1980s, the legal texts establishing the CEA were amended so as to strengthen its interministerial status and to back up the Atomic Energy Committee, which acts as a select interministerial committee on nuclear energy matters, by a tripartite Board of Administration including staff representatives.

The CEA is answerable to the Minister for Industry. The main task of the CEA was laid down in September 1992 by the state authorities: to concentrate on developing the control of the atom for purposes of energy, health, defence and industry, while remaining attentive to the requests made by its partners in industry and research.

An important reform was introduced in 2001, strengthening the institutional arrangements with respect to security, monitoring and environmental health warnings. The French Agency for Environmental Health Safety (*Agence française de sécurité sanitaire environnementale* – AFSSE) and the Institute for Radiation Protection and Nuclear Safety (*Institut de radioprotection et de la sûreté nucléaire* – IRSN) were both set up. The IRSN was created by merging the Office for Protection against Ionising Radiation (*Office de protection contre les rayonnements ionisants* – OPRI) and the

Institute for Protection and Nuclear Safety (*Institut de protection et de sûreté nucléaire* – IPSN), forming a new public utility company (an EPIC – *établissement public à caractère industriel et commercial*).

2. Mining Regime

French nuclear mining legislation is governed by the Mining Code and its implementing legislation. The code contains few specific provisions on nuclear substances [Decree No. 56-838 of 16 August 1956 laying down the Mining Code, as amended by Act No. 70-1 of 2 January 1970, partially repealed, Act No. 77-620 of 16 June 1977, as amended, and Act No. 99-245 of 30 March 1999]. Here, as with other substances, the French state does not hold a monopoly for prospecting and mining.

Decree No. 95-427 of 19 April 1995, as amended, on mining concessions contains all the rules relating to the issue, amendment and relinquishing of mining concessions, while underlying rules concerning prospecting continue to be incorporated – without modification – into the Mining Code. A special procedure has been laid down for the issue and control of mining concessions for substances of use in nuclear energy, whereby the Atomic Energy Committee must give its opinion before the application is sent to the General Mining Board (*Conseil général des mines*). After a procedure involving a public inquiry, the decision is taken by the minister responsible for mining.

Act No. 93-3 of 4 January 1993 concerning quarries made general amendments to the Mining Code and to Act No. 76-663 of 19 July 1976, as amended, relating to installations classified for environmental protection purposes [Sections L.511-1 *et seq.* of the Environment Code]. It specifies that the start-up of installations (defined by decree of the Council of State), presenting a significant risk of pollution or accident, or of quarries and waste storage facilities, whether after an initial licence or after a licence for a change of operator, is subject to the provision of financial guarantees [Act No. 93-3, Section 4(2)]. A Departmental Quarries Commission is set up in each *Département* [Section 16(2)]. This Commission studies applications for licences to operate quarries, and issues a reasoned opinion thereon.

3. Radioactive Substances and Nuclear Equipment

Neither natural nor artificial radioelements are dealt with in one single instrument. They are governed by different pieces of legislation, some of which are grouped under the Public Health Code depending on the activities for which they are used.

For example, radioelements are:

- included in Table A of toxic products in the regulations on the import, trade, possession and use of poisonous substances [Decree of 9 November 1937, as amended];
- covered, as radioactive materials (Class VII), by the general regulations concerning the carriage of dangerous substances [Order of 15 April 1945, partially repealed];
- covered by Sections L.511-1 *et seq.* of the Environment Code, which apply to premises where they are handled;

- referred to in the mining regulations of 1959 [Decree No. 59-285 of 27 January 1959, as amended] and in Act No. 61-842 of 2 August 1961, as amended, on the Control of Atmospheric Pollution and Odours;

- subject to Decree No. 2002-460 of 4 April 2002 relating to protection against ionising radiation and to other radiation protection legislation.

The Public Health Code foresaw a special regime for naturally occurring radioelements [Sections L.44(1) to (3)], but it has never been put in place due to the failure to implement legislation pursuant to Section 44(1).

New provisions concerning the protection of the public were introduced into the Public Health Code by Ordinance No. 2001-270 and Decree No. 2002-460 relating to the general protection of persons against the dangers of ionising radiation. A reform has been carried out of the general licensing and notification regime for medical and research applications. This concerns the manufacture, possession, distribution (including import and export) and use of radionuclides, or products or devices containing them, and the use of X-ray machines. The new rules replace the system which had been set up under the auspices of the Interministerial Commission for Artificial Radioelements (*Commission interministérielle des radioéléments artificiel* – CIREA), abolished by the decree.

4. Nuclear Installations

a) Licensing and inspection, including nuclear safety

The basic instruments currently in force were adopted pursuant to Act No. 61-482 of 2 August 1961 on the Control of Atmospheric Pollution and Odours, which expressly provides that decrees will regulate the establishment, operation and supervision of nuclear installations [Section 8].

France approved the 1994 Convention on Nuclear Safety on 13 September 1999.

Lastly, Section 2 of Act No. 95-101 of 2 February 1995 [Section L.121-1 *et seq.* of the Environment Code] on Strengthening Environmental Protection, as amended, established a Commission for public discussion. This Commission itself is not the medium through which the discussions are organised, but its opinion is sought on the opportuneness of holding such discussions. Decree No. 96-388 of 10 May 1996, as amended, relating to consultations with the public and with those involved in decision-making, defines the operation of this Commission and sets out the conditions and terms for public discussion. The result of these texts is that, with regard to nuclear matters, a public discussion may be organised in the event of the establishment of a major nuclear installation on a new site, if this installation will produce electricity or if it constitutes an investment of more than 2 billion French francs (FRF) (EUR 304 898 034).

Nuclear installations are divided into three main categories: major nuclear installations (*installations nucléaires de base* – INB), major nuclear installations classified as secret (*Installations nucléaires de base secrètes* – INBS) and the other nuclear installations which are classified for environmental protection purposes (*Installation classé pour la protection de l'environnement* – ICPE). Technical criteria are used to classify installations in one of these categories.

i) Major nuclear installations (INB)

Implementing the Act of 2 August 1961, Decree No. 63-1228 of 11 December 1963 on nuclear installations (as amended in 1973, 1985, 1990 and 1993) lays down the criteria governing major nuclear installations (*installations nucléaires de base* – INB).

Major nuclear installations include:

- nuclear reactors, except for those forming part of a means of transport;
- particle accelerators (whose characteristics are defined by order) [Order of 27 April 1982];
- plants used for preparing, manufacturing or converting radioactive substances, and in particular for manufacturing nuclear fuels, separating isotopes, reprocessing spent fuel or processing waste (whose characteristics are defined by order) [Order of 11 March 1996];
- facilities for storing, stockpiling or using radioactive substances, including waste (whose characteristics are defined by order) [Order of 11 March 1996].

The Order of 11 March 1996 takes into account the regrouping of radioelements which resulted from Decree No. 88-521 of 18 April 1988 on the general principles for protection against ionising radiation. In substance, the new thresholds are the same as the old ones. The minimum activity thresholds of major nuclear installations and the maximum activity thresholds of installations classified for environmental protection purposes have been fixed so that depending on the activity or nature of the substances used, one or other of the two administrative systems is applicable.

Under the 1963 Decree, as amended, a licensing decree based on a report by the Minister for Industry is required for the establishment of major nuclear installations. This decree is issued following an inquiry procedure at central and local government levels.

Licensing applications are sent to the General Directorate for Nuclear Safety and Radiation Protection (*Direction générale de la sûreté nucléaire et de la radioprotection* – DGSNR) – answerable to the Ministers for Industry, the Environment and Health – which conducts the inquiry. The DGSNR informs the ministers concerned and submits the preliminary safety report supplied by the operator to the appropriate standing group of safety experts, which is assisted by the Institute for Radiation Protection and Nuclear Safety (*Institut de radioprotection et de sûreté nucléaire* – IRSN).

At the same time, the prefect concerned opens the public inquiry into the application, except where the installation has already been the subject of an inquiry prior to a declaration that the installation is in the public interest, and it has not undergone any changes.

The public inquiry opens as soon as the application is filed, and is widely publicised with organised discussion of opposing viewpoints, principally on the impact study. In fact, important major nuclear installations, such as *Électricité de France* (EDF) power plants, are subject to the declaration of public interest procedure, which is carried out by means of a public interest inquiry which follows the same rules as public inquiries. This procedure leads to a decree declaring the installation to be of public interest; however this decree does not exempt the future operator from compliance with the licensing procedure for establishment of the nuclear installation by decree.

In all cases, the procedure laid down in Act No. 83-630 of 12 July 1983 [Sections L.123-1 *et seq.*], as amended, on the Democratisation of Public Inquiries and Protection of the Environment must be followed. This act provides for a public inquiry procedure for projects likely to affect the environment (inquiry to last at least a month, appointment of an inquiry commissioner by the chairperson of the Administrative Tribunal, etc.). A Circular of 27 September 1985 defines the workings of the various decrees adopted in implementation of the 1983 Act (not all of which relate to the nuclear field):

- Decree No. 85-449 of 23 April 1985, as amended, provides that the procedure applies to major nuclear installations governed by Decree No. 63-1128 of 11 December 1963, and defines the thresholds and criteria involved. The classification of the major nuclear installations contained in the Annex of the Decree of 23 April 1985 was modified by Decree No. 96-198 of 11 March 1996 to bring it into line with the revised classification for the installations classified for environmental protection purposes;

- Two other decrees deal with amendments to the provisions adopted in implementation of the Mining Code [Decree No. 85-448], and the conditions for safeguarding national defence secrets [Decree No. 85-693], respectively.

The purpose of these decrees is to ensure that the provisions relating to public inquiries are incorporated within the existing procedures.

The Circular of 27 September 1985 also defines the scope of the Act of 12 July 1983, together with certain arrangements for the holding of the inquiry procedure.

Once the standing group has given its opinion, the results of the inquiry have been received and the ministers consulted have submitted their comments, the DGSNR prepares a draft licensing decree and sends it for opinion to the Interministerial Commission for Major Nuclear Installations and to the Minister for Health for approval before submitting it to the Prime Minister for signature. If approval is not given by the Minister for Health within three months, the decree may be adopted in the Council of Ministers.

The decree authorising construction fixes the perimeter of the installation, the conditions imposed on the operator and details of the commissioning procedure. Under the Ministerial Instruction of 27 March 1973, the start-up of a major nuclear installation is subject to approval by the Ministers for Industry and Research of the final safety report and the general operating rules.

The amendments to the 1963 Decree affected by Decree No. 90-78 of 19 January 1990 relate to the licensing procedure and are designed to harmonise the 1963 Decree with Act No. 87-565 of 22 July 1987, as amended, on the Organisation of Public Safety Measures, Forestry Protection against Fire and the Prevention of Major Risks. It provides that henceforth, licence applications must also be forwarded to the Minister for the Environment accompanied by a document describing, on the basis of the preliminary safety report, the measures necessary to address the particular risks which the installation presents and limit the consequences of any possible accident. As far as major nuclear installations are concerned, this document constitutes a risk analysis within the meaning of the Act of 1987. Licence applications must also specify the measures to be applied for dismantling the installation.

Decree No. 93-816 of 12 May 1993 amends the 1963 Decree as regards the licensing procedure for nuclear installations. The public inquiry procedure may now be extended by a further month (i.e. a

total of three months maximum) by decree adopted following a report by the Ministers responsible for energy and for major technological risks.

Major nuclear installations are inspected by specialised nuclear energy inspectors who report to the Minister for Industry [Decree No. 63-1128 of 11 December 1963, as amended]. Safety is monitored by the DGSNR, with the technical back-up of the Institute for Radiation Protection and Nuclear Safety (IRSN). The IRSN is the expert body responsible for ensuring protection of the public in this field.

The Order and Circular of 10 August 1984 concern the design quality, construction and operation of major nuclear installations. Operators must ensure that the quality of the structures, equipment and operating conditions are commensurate with the importance of their functions from the viewpoint of the safety of the installation concerned [Order of 10 August 1984, Sections 1 and 2]. They must also exercise control over all suppliers of equipment and services. The order prescribes the general principles to be applied for organising quality control, while the purpose of the circular is to explain further the provisions of the order.

These provisions were completed by the adoption on 31 December 1999 of an order establishing the general technical regulations designed to warn against and limit any inconveniences or external risks resulting from the operation of major nuclear installations.

This order was adopted in implementation of Section 10 *bis* of the Decree of 11 December 1963 on nuclear installations, which provides that "the general technical regulations governing the safety of major nuclear installations shall be adopted by order of the Minister for Industrial and Scientific Development". It establishes the general technical regulations designed to warn against and limit any inconveniences and risks in relation to the general condition of the neighbourhood, public health, safety or hygiene, agriculture, protection of nature and the environment, and the conservation of sites and monuments, which may result from the operation of major nuclear installations (INB) and major nuclear installations classified as secret (INBS).

This order does not cover installations classified for environmental protection purposes situated within the perimeter of major nuclear installations; for such installations, the requirements established pursuant to Sections 7, 10 or 10(1) of the Act of 10 July 1976 apply.

The main provisions of this order relate to the following areas:

- noises and vibrations;
- prevention of atmospheric pollution;
- prevention of water pollution;
- management of waste;
- prevention of other risks, in particular fire and nuclear risks.

The order establishes transitional provisions for existing installations, to which the provisions of this text will apply two years after its publication.

ii) Major nuclear installations classified as secret (INBS)

Major nuclear installations classified as secret (*installations nucléaires de base classées secrètes* – INBS) by decision of the Prime Minister, upon proposal of the Minister for Defence and the Minister for Industry, are not subject to the provisions of the 1963 Decree, as amended.

Until 2001, they were regulated by Decree No. 99-873 of 11 October 1999. This was replaced by Decree No. 2001-592 on the safety and radiation protection of defence-related nuclear installations and activities. This decree lays down the legal framework governing the safety of defence-related nuclear installations and activities. The technical criteria for defining INBS are the same as those for major civilian nuclear installations [Decree of 11 December 1963, Section 2]. Major nuclear installations are classified as secret when special protection is justified against nuclear proliferation, malicious intent or the disclosure of classified information [Section 6]. The construction of an INBS is subject to a licence, issued after obtaining the opinion of the Special Commission for major nuclear installations classified as secret, set up by Decree No. 2001-417 of 11 May 2001 [Section 8], as amended.

INBS are subject to licensing, surveillance and inspection, as laid down by Decree No. 2001-592, completed by an Order of 27 July 2001. A delegate for the nuclear safety and radiation protection of defence-related activities and installations is responsible for proposing to the Minister for Defence and the Minister for Industry, nuclear safety regulations applying to defence-related nuclear installations and activities, and for ensuring enforcement by means of inspections. The delegate also has authority to investigate applications for a licence to establish a major nuclear installation classified as secret, and to take all necessary measures to prevent nuclear accidents, and limit the consequences of any that do occur.

The surveillance of major nuclear installations classified as secret is carried out under the responsibility of the nuclear weapons' inspector, who directs the work of the inspectors made available to the delegate by the Minister for Defence and the Minister for Industry, in particular. These ministers set up information boards, by order, with the task of informing the public about the impact of nuclear activities on health and the environment.

Major nuclear installations classified as secret are subject to a regime of licensing, control and inspection, widely based on the Decree of 11 December 1963 (with the exception of measures related to information of the public). This regime is primarily implemented by the High Commissioner for Atomic Energy and under his authority. It should be noted that the supervision of discharge of effluents and the management of waste is carried out without prejudice to the supervision exercised by the bodies competent in the field of ionising radiation protection.

Decree No. 2000-571 of 26 June 2000 extends the provisions of Decree No. 88-622 of 6 May 1988 on emergency plans, to INBS, which must draw up a special action plan (*Plan particulière d'intervention* – PP1).

iii) Non-major nuclear installations

Nuclear installations other than major ones are subject to the general regime for installations classified for environmental protection purposes (*installations classées pour la protection de l'environnement* – ICPE) as established by Act No. 76-663 of 19 July 1976 [Section L.511-1 *et seq.* of the Environment Code], which provides that a notification or licence is required for their construction,

depending on the scale of the potential pollution or risk involved. These installations are under the jurisdiction of the Minister for the Environment.

Licences are issued by the prefect following a public inquiry and consultation of the local government bodies concerned. Where hazards are likely to affect several *départements* or regions, the construction licence is granted by the Minister for the Environment, if necessary after obtaining the opinion of the Higher Council for Classified Installations (*Conseil supérieur des installations classées*).

Decree No. 77-1133 of 21 September 1977, which implemented the abovementioned Act of 19 July 1976, has been modified on several occasions. The last modification, introduced by Decree No. 96-18 of 5 January 1996, takes into account certain provisions of Act No. 92-3 of 3 January 1992 on Water, as amended [Sections L.210-1 *et seq.* of the Environment Code], and of the Act of 2 February 1995 relating to Strengthening Environmental Protection [Section L.121-1 of the Environment Code]. The 1977 Decree applies to all installations subject to the 1976 Act, but does not apply to installations belonging to government departments or agencies. Decree No. 86-1289 of 19 December 1986 amended the provisions governing installations subject to licensing, adding specifications as to the procedure; no changes were made, on the other hand, in respect of installations subject to notification.

Generally speaking, nuclear installations also require planning permission; for facilities intended for the production, transfer, distribution or storage of energy, including those using nuclear materials, planning permission is issued by the state [Town Planning Code/Act of 7 January 1983, as amended], unlike the situation under the ordinary law, when this task is given to the local mayor.

Decree No. 96-197 of 11 March 1996 modifies headings 385 *bis* to six, and in doing so modifies the categorisation of installations classified for the purposes of the protection of the environment in relation to radioactive substances. This revision aims to make the headings of categories classifying installations for the protection of the environment more consistent with those of the radiation protection regulations. It provides, notably, that the classification of radionuclides by reference to their radiotoxicity will now result in there being four groups, rather than three as envisaged previously. In the same way, the classification of nuclear installations was modified by Decree No. 96-198 of 11 March 1996.

Lastly, as concerns provisions relating to the prevention of serious accidents involving the hazardous substances or preparations found in certain categories of installation classified for environmental purposes and subject to licensing, a Circular of 10 May 2000 clarifies the new provisions introduced by Directive 96/82/EC of 9 December 1996 on the control of major-accident hazards involving dangerous substances (Seveso II Directive) and concerning the policy of preventing serious accidents and the safety management system, risk assessments, recourse to a third party expert, urban planning and an inventory of establishments.

b) Emergency response

In 1994, the International Nuclear Event Scale (INES), used by the International Atomic Energy Agency (IAEA) to measure the severity of nuclear incidents and accidents, was adopted. This scale ranges from 1 to 7, in the same manner as that used to measure the severity of earthquakes: the more serious the accident, the higher the figure. It is intended to facilitate agreement and understanding both within the nuclear industry and for the general public.

Act No. 87-565 of 22 July 1987 on the Organisation of Public Safety Measures, Forestry Protection against Fire and the Prevention of Major Risks, clarifies the previous system for organising assistance and emergency response, and introduces a new right to information about major risks. The act thus deals with the conditions for preparing preventive action and for implementing necessary measures in case of major risks or disasters. The preparation and organisation of assistance are determined within the framework of ORSEC and emergency plans.

Nuclear-related risks are included amongst technological risks. The act provides that the public has a right to be informed about the risks to which they are exposed and about the preventive measures concerning them. Operators for whose installations a special action plan (*plan particulier d'intervention* – PPI) has been drawn up (see below), must help in providing the public with general information about measures taken in the vicinity of such installations. The Minister for the Interior draws up preventive measures and co-ordinates the assistance provided by the state, regional authorities and public bodies for France as a whole [Section 6].

Two Decrees have been adopted in implementation of the Act of 22 July 1987: the first of these is Decree No. 88-622 of 6 May 1988 on emergency plans. This decree, as amended, contains provisions concerning emergency plans, including the category entitled "special action plans" (PPIs). An Order of 30 November 2001 lays down the obligations of nuclear operators with regard to emergency warning procedures. Emergency plans are prepared by prefects in liaison with the competent authorities, services and agencies, and adopted by them [Section 1]. Each emergency plan details the risks in relation to which it has been drawn up, specifies the intervention procedures and defines the tasks of government services, public agencies, regional authorities, etc. [Section 2]. The area covered by the emergency warning arrangements is defined, in light of the risk assessment, by the Prefect of the PPI who first consults the relevant administrative authority responsible for monitoring nuclear safety on the basis of risk assessment. A PPI must be prepared for all nuclear sites including at least one nuclear installation and meeting certain criteria, for example facilities for producing radioactive materials for military use and facilities for manufacturing, assembling or activating elements incorporating radioactive materials for military use [Decree No. 2000-571].

The PPI includes a description of the installation concerned, a list of the communes on whose territory it applies, the measures for protecting and informing the public and diagrams for evacuation of local populations, including information on alternative accommodation [Section 7]. Also listed are the emergency measures for neighbouring populations to be taken by the operator before action is taken by or on behalf of the police authorities. Once a PPI has been finalised [Section 8], it is immediately brought to the attention of the mayors concerned and of the operator. A notice is placed in local or regional newspapers indicating the area to which it applies and places where it may be consulted [Section 9]. The operator is obliged to set up and maintain channels of communication to inform local populations about emergency warning procedures. The operator must be able to launch these procedures from his nuclear installation in the circumstances defined by the Prefect in the PPI. The Order of 21 February 2002 specifies the information destined for the populations living in the area covered by the plan that must be given in the documents prepared by the operators of installations or works for which a PPI is necessary. These information documents must be prepared within three months of the start-up of new installations. This time limit is increased to two years (before 27 February 2004) for already existing installations in relation to which the information arrangements do not comply with the provisions of the order.

The second of these instruments adopted in implementation of the 1987 Act is Decree No. 90-918 of 11 October 1990, as amended, on the exercise of the right to information on major risks. This decree specifies the content and type of information to which persons likely to be exposed to major risks must have access, in accordance with the Act of 22 July 1987. Its provisions apply in

particular to communes for which a PPI has been prepared [Section 2]. The mayor prepares an information document containing a list of the preventive measures he has taken in respect of the risk on the territory of the commune concerned. The public is informed of the existence of this report by posters put up in the town hall, specifying that it may be freely consulted on the spot [Sections 3 and 6].

At the international level, France approved the 1986 Conventions on Early Notification of a Nuclear Accident and on Assistance in the Case of a Nuclear Accident or Radiological Emergency on 6 March 1989.

5. Trade in Nuclear Materials and Equipment

a) General provisions

Trade in nuclear techniques, materials and equipment is a highly sensitive area, and France has developed complex regulations in this respect. These aim on the one hand to establish strict control over the movement of materials and ensure the safety of these materials and of the establishments in which they are held (see Section 8 "Non-Proliferation and Physical Protection" *infra*), and on the other hand, to control exports and imports.

The export and import of nuclear materials and equipment involve general policy decisions taken at the highest level. Thus, the Council for Foreign Nuclear Policy, which was created in 1976 and is chaired by the president of the republic, defines the different aspects of policy to be followed in respect of exports.

The French authorities exercise very strict control over the import and export of sensitive products, substances, materials and equipment. In this context, lists of sensitive products are published in the Official Journal in the form of a notice supplementing existing provisions, and are regularly updated: Notice of 12 August 1988 to exporters concerning products it is prohibited to export, supplementing and updating the provisions of the initial Notice published on 24 November 1964; Notice of 29 November 1990 to importers and exporters relating to the products and technology subject to final destination control, etc.

Act No. 80-572 of 25 July 1980 on the Protection and Control of Nuclear Material is the basic item of legislation in this field, and has been supplemented by Act No. 89-434 of 30 June 1989. It provides that the import, export, manufacture, possession, transfer, use and transport of nuclear materials are subject to prior licensing and control [Section 2]. Decree No. 81-512 of 12 May 1981 on the protection and control of nuclear materials, Chapter II of which deals with import and export licences, was adopted in implementation of the act.

More generally, France has adopted the IAEA system of safeguards to ensure that the nuclear equipment it exports is not used for military purposes. Act No. 92-574 of 1 July 1992 authorised the accession of France to the 1968 Treaty on the Non-Proliferation of Nuclear Weapons, which was approved on 2 August 1992.

The export of dual-use goods and technology – i.e. products, including software and technology, which can be used for both civilian and military purposes, including all products which may be used both for non-explosive purposes and in some way for the manufacture of nuclear weapons or other explosive nuclear devices – is subject to regulation. The provisions applicable are set out in Decree No. 2001-1192 of 13 December 2001, adopted pursuant to Council Regulation (EC) No. 1334/2000 of

22 June 2000 setting up a Community regime for controlling the export of dual-use products and technology through customs procedures. Persons importing dual-use goods, listed in Annex I of the Council Regulation and coming from a non-EU country, can now apply for an international import certificate thus enabling their foreign supplier to obtain an export licence from his national authorities. This certificate is issued by the minister in charge of customs in accordance with the provisions laid down by order. Two Orders of 13 December 2001 specify the formalities to be completed by persons exporting dual-use goods to third countries or transferring them to Member States of the European Union, as well as the formalities for obtaining and using international import certificates and delivery verification certificates.

b) Patents

In France, nuclear industrial property is subject to the normal legal rules set out in the Industrial Property Code [Act No. 92-597 of 1 July 1992, partially repealed].

The only nuclear legislation which deals with invention patents is Decree No. 72-1158 of 14 December 1972 relating to the Atomic Energy Commission (*Commissariat à l'énergie atomique* – CEA), which states that invention patents arising from CEA activities are to be filed in its name [Section 7]. Inventors may receive an award, details of which are determined by the administrator general, having regard to the opinion of the Atomic Energy Committee or in accordance with rules approved by it.

Special provisions exist for inventions relating to national defence or economic development, including those involving nuclear techniques. The state may, by decree, wholly or partially expropriate patents in return for payments to the inventor. Likewise, it may *ex officio* grant licences to certain bodies for patents related to national defence.

The French Nuclear Patent Management Company (BREVATOME), set up in 1958, is responsible for bringing together and managing French nuclear patents. For non-patentable knowledge, BREVATOME has organised know-how transfer through consultancy or co-operation agreements both for systems and for components. Manufacturing secrecy is protected by including clauses on classified information, secrecy or non-transfer of rights in these contracts, termed succession clauses.

6. Radiation Protection

a) Protection of workers

French legislation concerning the radiation protection of workers was substantially overhauled in 2003.

The main instrument in force is now Decree No. 2003-296 of 31 March 2003 on the protection of workers against the dangers of ionising radiation. This Decree completes the implementation into French law of Council Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation. The new provisions have been incorporated into the Labour Code in Book II, Title III, Chapter I, Section VIII. The following decrees, which previously governed the radiation protection of workers, have been partly or totally repealed:

- Decree No. 66-450 of 20 June 1966, as amended, on general principles for protection against ionising radiation (which laid down the basic principles applicable to workers and the public);

- Decree No. 75-306 of 28 April 1975, as amended, on the protection of workers in major nuclear installations;

- Decree No. 86-1103 of 2 October 1986, as amended, concerning the protection of workers against the hazards of radiation.

Decree No. 2003-296 provides that the head of the establishment is obliged to take the general, administrative and technical measures (in particular, as regards the organisation of work and working conditions) required to prevent work accidents and occupational illness which could be caused by exposure to ionising radiation.

It reaffirms the principle that individual and collective occupational exposure to ionising radiation must be kept as low as reasonably possible and lowers the annual effective dose limit for workers exposed from 50 mSv to 20 mSv. For a period of two years from the date of entry into force of the decree, the maximum total effective dose received by external and internal exposure is set at 35 mSv a year and must not exceed 100 mSv over five consecutive years as from the same date.

In addition, the decree contains a set of technical rules for fitting out places of work (delineating supervised and controlled areas and posting warning signs, technical control of sources and devices emitting ionising radiation, protective and warning measures as well as the measuring instruments used, etc.).

Workers exposed to ionising radiation are classified in two categories depending on the dose they might receive (effective annual dose above or below 6 mSv). These workers are given radiation protection training, and are also monitored by dosimeters measuring their individual external and internal exposure. Operational monitoring is also carried out by dosimeters for workers carrying out activities in controlled areas (who might receive an effective annual dose exceeding 6 mSv). The nominative operational dosimetric results are sent to the head of the establishment.

In addition, the decree sets out details concerning the medical supervision of exposed workers, the rules on abnormal work situations, the functional organisation of radiation protection (designation and tasks of a person qualified in radiation protection, the role of the different authorities such as the occupational physician and the Institute for Radiation Protection and Nuclear Safety) as well as the rules applicable in the event of occupational exposure linked to natural radioactivity.

Decree No. 2003-295, adopted on 31 March 2003, specifies the conditions under which staff and authorised persons should intervene in the event of an emergency resulting from nuclear installation failure. It implements Directive 96/29/Euratom into French law and incorporates new provisions in the Public Health Code in Book I, Title I, Chapter V-I, Section 7. A radiological emergency is defined as an incident or accident which could lead to an emission of radioactive materials or a level of radioactivity which could affect public health. The decree provides that in the event of a radiological emergency, the person in charge of nuclear activity must take the measures for which he is responsible in relation to nuclear and radiological safety, implement, where appropriate, the internal emergency plan and immediately inform the competent authorities. The prefect directs emergency assistance operations and informs the public.

The decree introduces a two-group classification for those intervening: the first group comprises the personnel forming special technical, medical or health intervention teams, constituted in advance to cope with radiological emergencies. This group is subject to radiological monitoring and medical aptitude tests, and should not receive an effective dose of more than 100 mSv. This limit is set at 300 mSv when action is required to protect persons. The second group is made up of individuals who do not belong to the special teams but who intervene as part of their functions. The effective dose limit for such persons is set at 10 mSv.

Several orders have been adopted in implementation of Decree No. 86-1103 of 2 October 1986, in particular:

- the Order of 1 June 1990 defining methods of control pursuant to Decree No. 86-1103 of 2 October 1986 on the Protection of Workers against the Dangers of Ionising Radiation;

- the Order of 1 October 1990 setting out conditions and methods of accreditation of bodies responsible for carrying out controls in relation to the protection of workers against the dangers of ionising radiation and the characteristics of the licence described in Section 29 of Decree No. 86-1103 of 2 October 1986;

- the Order of 2 October 1990 establishing rules on the frequency of controls on sealed sources, installations of electrical apparatus which emits ionising radiation and the protective measures set out in Decree No. 86-1103 of 2 October 1986 on the Protection of Workers against the Dangers of Ionising Radiation.

Two orders were adopted on 23 March 1999. The first of these orders, which establishes rules governing the external dosimetry of radiation workers, specifies that the control of dose equivalents received by workers in Category A, or those who work in a controlled zone and are subject to a risk of external exposure, is carried out using individual dosimeters which measure the exposure in real time (operational dosimetry) and at predetermined times (passive dosimetry). It repeals the Order of 19 April 1968 establishing the conditions for use of individual dosimeters designed to monitor dose equivalents, which was adopted pursuant to the now-repealed Decree of 15 March 1967. The technical modes of implementation of the dosimetry, particularly operational, as well as the transfer of the data involved, are set out in an annex. The second order, which lays down rules concerning the accreditation by OPRI (IRSN) of persons qualified in radiation protection, defines the method of accreditation of "persons qualified in radiation protection or from the service responsible for radiation protection" who have access to the individual results of the exposure of particular workers subject to this control, over a reference period which shall not be longer than the last 12 months.

An Order of 12 May 1998 amending the Order of 8 October 1990, as amended, establishes a list of tasks which may not be performed by workers on fixed-term work contracts or by employees of a temporary employment agency. It further provides that such workers may not carry out activities in zones where the hourly dose rate is likely to be higher than 2 millisieverts.

The rules for the calculation and the transmission of statistical data on exposure to ionising radiation of personnel working in mines producing radioactive substances were laid down by an Order of 15 January 1990. This order provides that operators mining radioactive substances must establish each year statistical data on exposure of mining personnel to ionising radiation [Section 1]. Once completed, the tables should be sent to the regional director for industry and research as well as to OPRI (IRSN). The transmission of this data to OPRI (IRSN) is, however, unconnected with the communication of data which that board centralises, uses and maintains, in implementation of Decree No. 66-450 of 20 June 1966, as amended in 1988.

Decree No. 90-222 of 9 March 1990, as amended, completing the general regulations on extractive industries introduced by Decree No. 80-331 of 7 May 1980, as amended, implements Council Directive 80/836/Euratom, of 15 July 1980, as amended, into French law. This decree inserts in the abovementioned general regulations, Part 2 relating to environmental protection. Part 1, concerning the protection of workers, was introduced by Decree No. 86-1103 of 2 October 1986. The provisions of the 1990 Decree apply to surface facilities and workings of radioactive substances. They determine the annual admissible exposure limits to ionising radiation [Sections 5 to 7], and the monitoring of releases and of the environment [Sections 11 to 16]. It also specifies that work must be conducted in such a way as to ensure that its radiological impact on the environment is as low as possible [Section 3].

Lastly, the Order of 15 October 1992, on the qualifications of persons licensed to use unsealed sources for medical purposes, amended the previous provisions of the Order of 26 March 1974 on the topic, and added further conditions. Thus, users of such sources must henceforth hold the diploma of additional specialised studies in nuclear medicine as established by the Order of 26 July 1983, as amended, or the diploma of specialised studies in nuclear medicine as established by the Order of 23 May 1990, as amended, which sets out the list of diplomas for specialised medical studies, or the diploma of additional specialised radiopharmaceutical and radiobiological studies as established by Order of 29 April 1988, as amended.

It is primarily the responsibility of the specialised services of the Ministry for Health, in particular OPRI (IRSN), to determine the conditions which must be met by nuclear activities in order to comply with radiation protection standards and to ensure that public health is not endangered.

b) Protection of the public

The general protection of the public against the dangers of ionising radiation is governed at European level by Council Directive 96/29/Euratom of 13 May 1996 setting out the basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation, and Directive 97/43/Euratom of the Council of 30 June 1997 on Health Protection of Individuals against the Dangers of Ionising Radiation in relation to Medical Exposures. These directives were implemented into French law by Ordinance No. 2001-270 of 28 March 2001, Decree No. 2002-460 of 4 April 2002, Decree No. 2003-270 of 24 March 2003 and Decree No. 2003-295 of 31 March 2003.

Ordinance No. 2001-270 addresses all activities involving a risk of the exposure of persons to ionising radiation, whether for medical, industrial or research purposes. It introduces into the Public Health Code the fundamental principles of radiation protection, namely justification, optimisation and dose limitation. Provisions regarding prohibitions and authorisations in regard to the use of ionising radiation are brought up to date and completed by a new system of criminal sanctions. Moreover, the rules for managing radionuclides are made stricter and take account of exposure to natural radiation.

Decree No. 2002-460 of 4 April 2002 redefines the basic standards for the health protection of the general public and workers in the context of the implementation of Directive 96/29/Euratom. It redrafts Chapter V-1 of Title I of Book I, and repeals Chapter II of Title III of Book V of the Public Health Code. It also takes account of the reform of the control and expertise bodies effected in the nuclear field by the establishment, on 22 February 2002, of the Institute for Radiation Protection and Nuclear Safety (IRSN) and the General Directorate for Nuclear Safety and Radiation Protection (DGSNR).

As regards the general measures for protecting the public against ionising radiation, the decree confirms the lower annual effective dose limit for members of the public, adopted by Decree No. 2001-215 of 8 March 2001, which is now fixed at 1 mSv a year.

A national network for collecting environmental radioactivity measurements has been set up. It is administered by the IRSN which has also been given responsibility for the national inventory of ionising radiation sources. This network gathers the various results of the environmental analyses imposed by law, and those carried out by the different services of the state and statutory bodies, regional authorities and associations which so request. These results are made available to the public.

The decree extends the provisions on banning the intentional addition of radioactive substances to consumer goods, and lays down the principle of prior authorisation for any planned release of liquid or gaseous effluents and of waste contaminated by radionuclides from nuclear activities with the exception of installations subject to special regulations. Waste and effluents produced by hospitals are included.

Provisions concerning exposure to natural ionising radiation are extended to all professional activities using materials naturally containing radionuclides which are not used for their radioactive properties but which could lead to exposure such as to endanger the health of workers and the public. The monitoring of exposure to radon will be reinforced in establishments open to the public.

In addition, the decree provides for a reform of the general licensing and notification regime for medical and research applications which was previously regulated by Section L.1333-4 of the Public Health Code. This applies to the manufacture, possession, distribution – including import and export – and the use of radionuclides and products and devices containing them, and to the use of X-ray machines. These provisions replace the regime which had been placed under the responsibility of the Interministerial Commission for Artificial Radioelements, abolished since publication of this Decree.

Lastly, in accordance with Section L.1333-4 of the Public Health Code, licences issued to industries falling under the Mining Code, major nuclear installations (INB), major nuclear installations classified as secret (INBS) and installations classified for environmental protection purposes (ICPE), serve as a licence for radiation protection purposes.

Decree No. 2003-270, adopted on 24 March 2003, implements into French law Council Directive 97/43/Euratom of 30 June 1997 on the health protection of individuals against the dangers of ionising radiation in relation to medical exposures, and incorporates new provisions in the Public Health Code [Book I, Title I, Chapter V-I, Section 6].

The health protection of individuals against the dangers of ionising radiation in relation to medical exposures is strengthened by the decree which lays down general principles such as the principle of the justification of exposures to ionising radiation and the principle of optimisation of such exposures. These provisions apply to persons exposed to ionising radiation for medical purposes, whether diagnosis or therapy, or as part of occupational medical supervision or organised screening for a specific illness. Persons participating voluntarily in biomedical research programmes are also covered, as are persons exposed during medical/legal procedures.

The decree provides for the introduction of practical support measures (reference levels, quality assurance). Guides for prescribing and carrying out acts and examinations involving exposure to ionising radiation and containing specific information for acts concerning children, pregnant women and nursing mothers, will be issued by the Minister for Health.

Training in radiation protection for persons authorised to use ionising radiation is given by accredited bodies.

Decree No. 2001-1097 of 16 November 2001 implements into French law Directives 1999/2/EC and 1999/3/EC of 22 February 1999 on the approximation of the laws of the Member States concerning foods and food ingredients treated with ionising radiation and establishing a Community list of foodstuffs and ingredients treated in this way.

7. Radioactive Waste Management

a) General Regulations

Under Act No. 75-633 of 15 July 1975, as amended, on Waste Disposal and the Recycling of Materials [Sections L.541-1 *et seq.* of the Environment Code], "waste" means any residue from production, processing or use, any substance, material, product or more generally any personal property abandoned or which its owner intends to abandon.

Section L.541-1 of the Environment Code also provides that waste is ultimately anything, "whether resulting from waste processing or not, which cannot, given the technical and economic circumstances of the time, be processed further, notably by extracting anything of value or reducing its polluting or hazardous nature." Section L.541-2 of the Environment Code requires any producer or possessor of waste to dispose of it in such a way as to avoid any harmful effects. Start-up of a waste storage facility is subject to the provision of financial guarantees by the owner or operator of the facility.

b) Radioactive Waste Regulations

Waste is packaged in a form preventing dispersal and the hazards of irradiation. The integrity of the package is calculated having regard to the nature of the waste and the concentration and half-life of the radionuclides present.

Radioactive waste management in France is based on the fundamental principle of safety, consisting of isolating the waste from the environment for as long as it represents a hazard.

Activities relating to radioactive waste require an official licence and are subject in particular to environmental protection and public health legislation as well as to the Labour Code.

Any nuclear installation, whether producing radioactive waste incidentally or intended for managing or storing such waste, requires a construction licence. Depending on the level of activity of the radioactive substances or waste produced or handled in the installation, the licence will be issued under Sections L.511-1 *et seq.* of the Environment Code or under Decree No. 63-1228 of 11 December 1963 relating to major nuclear installations. Licences are accompanied by technical conditions.

On 30 December 1991, Act No. 91-1381 relating to Research on Radioactive Waste Management [Sections L.542-1 *et seq.* of the Environment Code] was adopted. The act provides that in the management of high-level long-lived radioactive waste, consideration should be given to protecting nature, the environment and health, account being taken of the rights of future generations [Section 1]. The act establishes a programme of work and research in this respect.

Act No. 91-1381 also specifies the conditions for the construction and operation of underground laboratories for the study of deep geological formations in which high-level long-lived radioactive waste might be stored or kept [Sections 6 to 12].

The act also provides that within a maximum period of 15 years from its adoption, the government must submit to parliament an overall assessment of the research undertaken together with a bill authorising, where necessary, the establishment of a storage facility for high-level long-lived radioactive waste, and laying down the obligations attaching to such facility [Section 4].

Furthermore, the Act of 30 December 1991 establishes the National Radioactive Waste Management Agency (*Agence nationale pour la gestion des déchets radioactifs* – ANDRA) and defines its statute and duties.

Several Decrees have been adopted in implementation of the 1991 Act. These are as follows:

- Decree No. 92-1366 of 29 December 1992 concerning public interest groups set up under Section 12 of the act, which determines the conditions for creating public interest groups which may be constituted to provide assistance and to manage equipment for installing and operating each laboratory;

- Decree No. 92-1391 of 30 December 1992 on the National Radioactive Waste Management Agency;

- Decree No. 93-940 of 16 July 1993 deals with the construction and operating licence for underground laboratories for the study of the appropriateness of deep geological formations for the storage of radioactive waste [in this respect, by Decree of 3 August 1999, ANDRA was licensed to install and operate, on the territory of the Bure Commune (Meuse), an underground laboratory designed to study deep geological formations where radioactive waste could be stored];

- Decree No. 99-686 of 3 August 1999 implementing Section 14 of the 1991 Act, providing for the establishment, at the site of each underground laboratory, of a local information and monitoring committee;

- Decree No. 99-687 of 3 August 1999 implementing Section 6 of the 1991 Act, providing for the establishment of a collegiate mission responsible for organising preliminary consultations before a choice is made in relation to one or more granite sites where the initial work leading to the establishment of an underground laboratory could be carried out.

The Ministers for Industry, Research, Health, and the Environment all play a vital role in drawing up a coherent waste management policy and supervising waste-producing installations.

At the international level, France ratified the 1972 London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter on 3 February 1977.

c) Discharge of effluents

Decree No. 95-540 of 4 May 1995 on liquid and gaseous discharges and on sampling of water from major nuclear installations establishes the procedure to be applied for liquid and gaseous

discharges from major nuclear installations and from installations classified for purposes of environmental protection within the perimeter of a major nuclear installation.

Liquid radioactive effluent releases from major nuclear installations are subject to licensing, according to the classification contained in the Annex to Decree No. 93-743 of 29 March 1993. Gaseous radioactive effluent releases into the atmosphere are also subject to licensing when they are likely to cause atmospheric pollution or release odours as defined in Act No. 61-842 of 1961.

Radioactive releases from installations classified for purposes of environmental protection, within the perimeter of a major nuclear installation, are subject to the same procedure.

Decree No. 95-540 lays down two separate procedures depending on whether an activity is subject to licensing or to notification. Licensing applications as well as notifications must be sent to both the Minister for Industry and the Minister for the Environment. Furthermore, the licensing procedure provides for prior consultation of the Minister for Health and the Minister responsible for public safety. The licence is granted after public inquiry by joint order of the Ministers for Industry, for the Environment and for Health.

Under the decree, the monitoring of radioactive effluents is carried out under the authority of the Minister for Health. When he notes any irregularities, he informs the prefect and the head of the establishment concerned accordingly. The Ministers for Industry and for the Environment are also informed of the event.

A Circular of 20 May 1998 was adopted in order to establish the procedural requirements for licence applications. As regards notification, a receipt is provided to the sender of the notification by the competent ministers [Section 16].

The regime defined by the Decree of 4 May 1995 was complemented by an Order of 26 November 1999 laying down the general technical requirements related to the limits and modes of sampling and releases subject to licence, carried out by major nuclear installations. These requirements concern:

- limits and technical requirements of water sampling and liquid and gaseous releases;
- means of analysing, measuring and controlling licensed activities, as well as the monitoring of their impact on the environment;
- information of state authorities on sampling and releases carried out and their impact on the environment;
- controls carried out by the IRSN and state services; and
- public information.

Individual licence orders shall comply with these general requirements as a minimum. They may include more stringent requirements.

These new requirements apply to licences for sampling and discharges from major nuclear installations and classified installations within their perimeter, as well as to changes introduced into such licences after 5 January 2001.

The General Directorate for Nuclear Safety and Radiation Protection, established by Decree No. 2002-255 of 22 February 2002, is responsible for monitoring liquid and gaseous effluents as well as waste from major nuclear installations.

8. Non-Proliferation and Physical Protection

France has undertaken, notably through its ratification on 2 August 1998 of the 1968 Treaty on the Non-Proliferation of Nuclear Weapons, not to encourage the proliferation of nuclear weapons. France also ratified the 1996 Comprehensive Nuclear Test Ban Treaty on 6 April 1998. This instrument is not yet in force. To this end, it has adopted measures to prevent and control the dissemination of nuclear materials and techniques.

The marketing of materials is regulated by Act No. 80-572 of 25 July 1980 on the Protection and Control of Nuclear Materials (already referred to in Section 5 "Trade in Nuclear Materials and Equipment" *supra*). It deals essentially with the safety of nuclear materials, and with protection against any theft, diversion or loss. "Nuclear materials" are defined as those containing fusible, fissile or fertile elements (plutonium, uranium, thorium, deuterium, tritium, lithium), excluding ores.

The act is based on a system of licensing and control in respect of the possession, import, export and transport of nuclear materials, the physical protection measures depending on the category to which the materials belong (these categories are in line with those contained in international agreements concerning the physical protection of nuclear materials).

Licences are issued by the Minister for Industry after consultation with the Minister for the Interior, and possibly the Minister for Foreign Affairs where nuclear materials are to be imported or exported, and with the Commission for the Protection of the Carriage of Nuclear Materials, where transport is involved, these authorities having 15 days in which to give their opinion. Should there be no reply, their opinion is assumed to be favourable.

Where the quantities of nuclear materials are below certain defined thresholds, a simple notification to the Minister for Industry is sufficient.

Licence holders are obliged:

- to keep accounts and records of nuclear materials;
- to ensure the physical protection of nuclear materials and of installations, buildings or facilities containing such materials;
- to ensure the protection of nuclear materials during transport.

The purpose of these regulations is to be able to obtain prompt information on quantities and location of materials and to protect against any risk of loss, theft, damage, dispersal, etc., regardless of the nature of the events leading to such risk (accident or deliberate interference).

The enforcement of these regulations is carried out by officials sworn to secrecy and appointed by the Minister for Industry, who is backed up by the Institute for Radiation Protection and Nuclear Safety (*Institut de Radioprotection et de Sûreté Nucléaire* – IRSN) on technical control aspects. The Minister thus checks records and accounts concerning nuclear materials drawn up by the possessor himself or stipulated by the Minister. Likewise, he receives prior notice of transport operations and

approves, jointly with the Minister for the Interior, the conditions of carriage on the basis of an opinion from the Commission for the Protection of the Carriage of Nuclear Materials.

The Minister for Industry must be notified as soon as possible of any theft, loss or misappropriation of nuclear materials. Failure to notify is a criminal offence.

An Order of 14 March 1984 lays down measures for the follow-up, control and physical protection of nuclear materials subject to a notification requirement. This order was promulgated in implementation of the above-mentioned Act of 25 July 1980 and of Decree No. 81-512 of 12 May 1981. Notifications must be sent to the IRSN which centralises the information and where necessary, prescribes the conditions to be complied with by the holder of the materials, in implementation of the order.

The 1980 Act was amended by Act No. 89-434 of 30 June 1989, adopted at the same time as the Act approving the 1979 Convention on the Physical Protection of Nuclear Material [Act No. 89-433 of 30 June 1989], which was approved by France on 6 September 1991. The purpose of this act was to bring French law into line with the Convention and to extend the jurisdiction of French criminal courts to cover relevant offences committed abroad.

Compliance with the legislation on the protection and control of nuclear materials in no way exempts the parties concerned from complying with the other regulations in force (radiation protection, carriage of dangerous goods, classified information, etc.).

Research and work on protection are carried out by the IRSN, at the request of the ministerial departments concerned.

9. Transport

The basic law on transport is contained in Act No. 42-263 of 5 February 1942 relating to the Carriage of Dangerous Materials by Rail, Road or Inland Waterway.

The act outlines the general legal framework, leaving detailed provisions to subsequent orders [Section 1] such as the Order of 15 April 1945 approving the regulations on the carriage of dangerous goods by rail, road and inland waterway. These provisions also apply to the transport and handling of dangerous materials in ports.

The 1945 Order has been supplemented and amended on several occasions, including:

- as regards radioactive materials, by an Order of 24 June 1974 relating to the carriage and handling of dangerous materials: transport of radioactive materials, Class VII(b);

- various orders adopted in 1985 relating to the transport and handling of dangerous materials, and laying down certain technical requirements (labelling and warning signs, safety notices, alphabetical listings, etc.). These were followed by an additional order bearing the same name and dated 5 November 1986, introducing wider-ranging amendments. Under this order, it is now possible, by means of ministerial instructions, to define specific measures for implementing the 1945 Regulations concerning defence-related hazardous materials; and nuclear materials in Categories I and II (with the exception of spent fuel) as defined in the Table annexed to the Decree of 12 May 1981 on the protection and control of nuclear materials;

- lastly, the specific requirements under the 1945 Order for the overland transport of dangerous materials (road transport) were almost all repealed by the Order of 15 September 1992, as amended, [Section 1]. The provisions covering both overland transport and at least one of the other two modes of transport no longer apply to road transport, except for Appendix 6 which concerns flexible lead and equipment for pumping hydrocarbons. The repealed provisions have been replaced by provisions annexed to the 1992 Order, and include [Section 2]: Annex A concerning materials and their mode of transport; Annex B concerning transport equipment and transport; and an alphabetical list of the materials concerned. Radioactive materials are covered by both Annexes.

Sea transport is governed by the Order of 12 July 1954, as amended, regulating the carriage of dangerous goods by sea. Furthermore, an instruction on measures to be taken by the state authorities in case of an accident during the maritime transport of radioactive materials was adopted on 7 September 1989. This instruction, entitled "*Plan Nucmar*", defines the general principles for the organisation of measures to be taken by the state authorities in case of an accident occurring during the civilian maritime transport of radioactive materials (Class VII), entailing or possibly entailing damage which could affect the health of man or the maritime environment. The plan applies to any accident occurring within French territorial waters and beyond them when the coast and related interests are endangered, and provides for the formulation of specialised Nucmar emergency plans.

Air transport is governed by an Order of 31 July 1987 concerning protection and control of nuclear materials transported by air.

Consignments through the post are governed by an Order of 22 March 2001 designed to protect workers handling and delivering post, and the environment, from the risks presented by radioactive materials. The international transport of radioactive materials by post is prohibited. Radioactive materials can be accepted for national transport by post subject to the provisions of the ADR (transport of dangerous goods by road), the RID (transport of dangerous goods by rail) and OPSI (technical conditions for operating aircraft by a public air transport company) except for the transport document requirements. Postal consignments of radioactive materials which may be sent by post must be made by a person accredited by the competent authority in a depot it has specially designated for this purpose. Persons already accredited under the previous Order of 18 August 1972, now repealed, are authorised to continue sending consignments provided they comply with the provisions of the new order within a year of its publication. Pursuant to Act No. 80-572 of 25 July 1980 on the Protection and Control of Nuclear Materials [Section 1], Decree No. 81-512 of 12 May 1981 establishes a licensing procedure for the carriage of nuclear materials, whereby a licence is issued by the Minister for Industry following consultation with the Minister of the Interior and the Commission for the Protection of the Carriage of Nuclear Materials. The technical requirements for transport operations are set out in the Order of 26 March 1982 on the protection and control of nuclear materials in the course of carriage, as amended, *inter alia*, by an Order of 12 June 1986. This latter order contains specific provisions on sub-contracting the transport of spent fuel and nuclear materials in Category III (the category requiring the least stringent physical protection controls as provided for by the Decree of 12 May 1981). Thus, carriers of fuel and materials in that category may sub-contract their transport, provided that the sub-contractors concerned are approved by the Minister for Industry [Section 8].

Three orders have been adopted pursuant to the following items of legislation: the Act of 25 July 1980, the Decree of 12 May 1981 and the Order of 26 March 1982.

The Order of 12 June 1986 relates to the protection and control of spent fuel and nuclear materials carried by rail. As for the Order of 31 July 1987, it relates to the protection and control of

nuclear materials carried by air, while the Order of 17 November 1988 concerns the protection and control of nuclear materials carried by sea. These orders detail the conditions to be complied with by the approved carrier, namely the French carrier or foreign licence-holder as provided for by the above-mentioned Act of 25 July 1980. The approved carrier must in particular communicate certain information (planned dates, times and places of departure and arrival, nature and quantity of the nuclear materials) to the Transport Operational Service (*Échelon opérationnel des transports* – EOT), of the IRSN, the Civilian Protection Directorate of the Ministry of the Interior and to the consignee. Other provisions describe the conditions for transporting the materials and fuels covered by the said Orders, the protection measures to be applied during transport and the conditions for monitoring transport.

In the case of transport by rail, road or inland waterway, the National Civil Protection Service is kept informed of consignments of materials in nuclear safety Categories I, II and III [Orders of 12 July 1954, 22 August 1957 and 24 June 1974, as amended]. The IRSN is kept informed of contamination checks which must be carried out on vehicles specialising in the carriage of radioactive materials. Approval certificates and licences for carriage by sea are granted by the minister responsible for shipping. The Navigation Inspectorate issues licences for the shipping of nuclear cargoes. For air transport, licences are issued by the Secretary-General for Civil and Commercial Aviation. Such licences are not required for air freight operators complying with the recommendations of the International Air Transport Association (IATA).

In general, French legislation on the physical protection of radioactive materials is based on the 1973 Recommendations of the IAEA. Transport safety is based on the definition of criteria for classifying materials in accordance with certain risks (radiotoxicity, dispersal, criticality) and for selecting appropriate packaging.

As regards international transport, France has adhered to the International Regulations concerning the Carriage of Dangerous Goods by Rail (RID) [Decree No. 67-880 of 20 September 1967 and the Order of 5 June 2001 which, repealing the previous orders, implements into French law the 2001 amendment of the regulations concerning the international carriage of dangerous goods by rail]. France is also party to the European Agreement concerning the international carriage of dangerous goods by road (ADR) [Decree No. 60-794 of 22 June 1960 and Order of 5 December 1996, as amended]. An Order of 1 June 2001 implements into French law the 2001 amendment of the ADR Agreement which completely restructures the agreement, and modifies the special national provisions which France wanted to keep. France has also adhered to the regulation on the carriage of dangerous substances on the Rhine (ADNR) [Decree No. 96-1056 of 3 December 1996].

Since the adoption of Decree No. 97-715 of 11 June 1997, the Minister for the Environment and the Minister for Industry jointly exercise responsibility for the drafting and implementation of nuclear safety policy, including aspects related to the transport of radioactive and fissile materials for civil purposes.

10. Nuclear Third Party Liability

French law on nuclear third party liability is based on the 1960 Paris Convention and the 1963 Brussels Supplementary Convention which France ratified on 9 March 1966 and 30 March 1966, respectively. French legislation supplements the provisions of these Conventions as regards matters under the jurisdiction of national governments. Act No. 90-397 of 11 May 1990 authorised ratification of the two Protocols of 16 November 1982 amending the Paris Convention and the Brussels Supplementary Convention, published in Decree No. 91-27 of 4 January 1991. Ratification took place

on 6 July 1990. Furthermore, France ratified the 1971 Convention relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material on 2 February 1973.

Act No. 68-943 of 30 October 1968, as amended by Act No. 90-488 of 16 June 1990, sets out measures left to the initiative of the Contracting Parties by the Paris and Brussels Conventions. It governs the third party liability of the operators of land-based nuclear installations. Its main provisions concern:

- the liability amount of the operators of nuclear installations which is fixed at FRF 600 million (EUR 91 469 410.34); this amount is reduced to FRF 150 million (EUR 22 867 352.99) when only low-risk installations are operated on the same site. Decree No. 91-355 of 12 April 1991, adopted in implementation of the 1968 Act, as amended by the Act of 16 June 1990, lays down the definition of low-risk installations;

- the operator's maximum liability amount which is fixed at FRF 150 million (EUR 22 867 352.99) for transport of radioactive substances regulated by the Paris Convention;

- compensation of damage in excess of the operator's liability amount: this compensation is paid by the state out of public funds under the conditions and within the limits specified in the Brussels Supplementary Convention [namely 300 million Special Drawing Rights (SDR)];

- compensation of nuclear damage caused by military installations, which is assumed by the state in the same manner as other installations;

- the competent national court: jurisdiction is attributed to the *Tribunal de Grande Instance* of Paris.

Decree No. 73-322 of 15 March 1973, as amended, on insurance and re-insurance of exceptional and nuclear risks, empowers the Central Re-Insurance Fund to cover, with state guarantee, the risks for which operators of land-based and mobile nuclear installations are liable and regarding which provision is made for state intervention.

Act No. 68-1045 of 29 November 1968 deals with the third party liability of the operators of nuclear ships. It was supplemented by Decree No. 69-690 of 19 June 1969. The liability regime is based on that of the Act of 30 October 1968, as amended. Another Act No. 88-1093 of 1 December 1988 lays down the liability rules for the operators of such ships assigned to public service. In the event of nuclear damage caused outside French territory, the amount of liability is determined by the law of the state on whose territory or within whose territorial waters the damage was caused. Should there be no limit under the legislation of this state, responsibility is then unlimited.

II. INSTITUTIONAL FRAMEWORK

After World War II, the French government, which was then led by General de Gaulle, felt that there was a pressing need at national and international level to take steps to enable France to hold its own in the field of atomic energy research.

As a result, the Prime Minister was made personally responsible for atomic energy, and a specialised agency – the Atomic Energy Commission (*Commissariat à l'énergie atomique* – CEA) was set up directly under his authority for this purpose. Responsibility for atomic energy was later entrusted to a minister. Since 1969, this task has been carried out by the Minister for Industry.

When nuclear energy entered the industrial stage, it was necessary to reorganise existing structures. While defining their respective roles, it was decided to link up the Atomic Energy Commission (which remained the specialised agency for research and development, becoming the holding company for an industrial group specifically concerned with fuel cycle activities) and *Électricité de France* (EDF) (which, with a monopoly for the distribution of electricity, became the chief nuclear operator, with responsibility for constructing and operating nuclear power plants).

At the same time, it was decided to establish clear boundaries between the authorities responsible for supervising nuclear activities and operators.

In view of the implications of nuclear energy, the main ministries play an active role in their respective fields of jurisdiction and are involved in licensing and control procedures for nuclear activities, while numerous interministerial committees provide the necessary co-ordination between the various authorities.

1. Regulatory and Supervisory Authorities

a) President of the Republic

The president of the republic is the guarantor of national independence, territorial integrity and observance of treaties.

Since it is vital to control exports of nuclear materials and equipment with a view to preventing the proliferation of nuclear weapons, the Council for Foreign Nuclear Policy has been set up. It is chaired by the president of the republic [Decree No. 76-845 of 1 September 1976].

Council for Foreign Nuclear Policy

The Council was set up in 1976 to define the major principles of French foreign nuclear policy, especially with regard to the export of sensitive nuclear technology, equipment and products [Decree No. 76-845 of 1 September 1976, as amended by Decree No. 81-822 of 4 September 1981, Section 1].

The Council, chaired by the president of the republic, includes, in addition to the Prime Minister, the ministers for industry, research, foreign affairs and defence, as well as the administrator-general of the Atomic Energy Commission. Other ministers and certain senior civil

servants or military officials may be invited to participate in the Council's work on matters falling within their field.

The secretary-general of the office of the president of the republic handles secretariat duties for the Council.

b) Prime Minister

The Prime Minister plays a leading role in the adoption of important decisions at governmental level and is also the chairperson of the specialised committees in the field of nuclear energy.

Interministerial Committee for Nuclear or Radiological Emergencies (CICNR)

Decree No. 2003-865 of 8 September 2003, creating the Interministerial Committee for Nuclear or Radiological Emergencies (*Comité interministériel aux crises nucléaires ou radiologiques* – CICNR), makes changes to the general rules for organising and implementing nuclear safety. The CICNR in fact replaces the Interministerial Committee for Nuclear Safety (CISN), set up by Decree No. 75-713 of 4 August 1975, which is abolished by the above-mentioned Decree of 8 September 2003.

The CISN, placed under the authority of the Prime Minister, had wide-ranging duties with regard to nuclear safety. It was, in particular, responsible for co-ordinating measures to ensure the protection of persons and property against any hazards arising from the creation, operation or shut down of nuclear installations or the storage, transport, use or processing of radioactive substances. The CISN's duties did not cover nuclear installations intended exclusively for defence purposes and classified as secret. This is not, however, the case for the CICNR, which is competent to monitor defence-related nuclear issues.

The task of the CICNR is to propose to the Prime Minister the measures to be taken "in the event of an accident occurring in a major nuclear installation, a major nuclear installation classified as secret, during the transport of nuclear or radioactive materials concerning the civilian sector or defence or any military nuclear system, and in the event of an attack or threatened attack having or potentially having nuclear or radiological consequences" [Section 1 of the Decree].

The CICNR may therefore meet, at the request of the Prime Minister, if a nuclear or radiological emergency has arisen concerning the civilian or defence sectors, but also in a preventative manner, should there be the threat of an attack.

The CICNR brings together around the Prime Minister the Ministers for Foreign Affairs, Defence, the Environment, Industry, the Interior, Health and Transport. The Secretary-General for National Defence handles secretariat duties for the Committee.

Other government services or establishments, as well as the nuclear operators concerned may be invited to CICNR meetings. However, at the request of the Prime Minister, the CICNR may be convened on a select basis.

The Secretary-General for National Defence plays a key role in the organisation set up by the Decree of 8 September 2003. In conjunction with the ministries and services concerned, his main task [Section 2 of the Decree] is to co-ordinate, plan and ensure the coherence of any measures to help

prevent the situations referred to in Section 1 of the decree, and of the means of action implemented in the event of a nuclear or radiological emergency.

The Decree of 8 September 2003 also provides that the Secretary-General for National Defence should be informed without delay of any accident, attack or threat of a nuclear or radiological nature. He then prepares a report for the President of the Republic and the Prime Minister.

The decree provides that the ministries, establishments, advisory bodies and nuclear operators concerned shall if necessary assist the Secretary-General for National Defence in carrying out the abovementioned tasks.

Secretary-General for National Defence

The Secretary-General assists the Prime Minister in his duties relating to overall defence matters. He handles secretariat duties for defence boards and committees. He thus co-ordinates nuclear safety matters connected with defence installations.

Interministerial Technical Committee for Matters Relating to the Application of the Treaty Establishing the European Atomic Energy Community

Chaired either by the Prime Minister or the minister responsible for atomic energy, this Committee (*Comité technique interministériel pour les questions relatives à l'application du Traité instituant la Communauté européenne de l'énergie atomique*) examines and implements directives and decisions connected with Euratom, under the authority of the Interministerial Committee for European Economic Co-operation Matters [Decree No. 58-344 of 3 April 1958].

The CEA provides secretariat facilities. The Interministerial Technical Committee is responsible for drawing up directives defining the French government's position within the various bodies set up under the Euratom Treaty, and ensures that Community legislation is implemented.

Atomic Energy Committee

The existence of this Committee is mentioned here merely for the record, since it was set up under the CEA Statute and will therefore be dealt with later, in the section on the CEA.

The reform introduced by the Decree of 24 August 1982 amending the Decrees of 29 September 1970 and 14 December 1972 on the CEA means that the Atomic Energy Committee is now basically a select interministerial committee for this specific field.

The Committee is chaired by the Prime Minister or by a minister delegated by the Prime Minister for this purpose. It has 12 *ex officio* members, namely the Administrator-General of the CEA, the Army Chief of Staff, the Secretary-General of the Ministry for Foreign Affairs, the Delegate-General for Weaponry, the Secretary-General for Administration of the Ministry for Defence, the Director-General for Energy and Raw Materials, the Director-General for the Information Technology Industry and the Post Office, the Budget Director, the Director-General for Nuclear Safety and Radiation Protection, the Director of Research, the Director of Technology and the Chairperson of the Management Board of the National Scientific Research Centre, a person of standing selected by the Prime Minister, a person of standing selected by the Minister for the Environment, and three

experts in science and industry, one of whom acts as High Commissioner [Decree No. 2000-599 of 29 June 2000].

Apart from its CEA duties (deciding CEA programmes, adopting the CEA budget, and approving share acquisitions and sales), the Atomic Energy Committee may be asked to look into general nuclear policy matters.

c) Minister for Industry

The Minister for Industry is responsible for keeping abreast of all industrial or energy applications in the nuclear field. He is jointly responsible with the Minister for the Environment for drawing up and implementing nuclear safety policy, including the transport of radioactive and fissile materials for peaceful uses [Decree No. 97-710 of 11 June 1997 on the duties of the Minister for Economy, Finance and Industry]. The Prime Minister may request him to chair the Atomic Energy Committee of the CEA.

The main directorates of the Ministry for Industry involved in the nuclear energy field are the following [Decree No. 93-1272 of 1 December 1993 as amended; Decree No. 97-710 of 11 June 1997 on the duties of the Minister for Economy, Finance and Industry, Decree No. 2002-255 of 22 February 2002].

As regards industrial activities, nuclear energy is one of the responsibilities of the General Directorate for Energy and Raw Materials (*Direction générale de l'énergie et des matières premières* – DGEMP), which draws up and implements government policy in regard to energy and raw materials [Decree No. 93-1272 of 1 December 1993 on the organisation of the central administration of the Ministry for Industry, Post and Telecommunications and Foreign Trade, as amended]. It now includes the Directorate for Energy and Mineral Resources and the Directorate for Energy Demand and Markets.

The DGEMP, on behalf of the Minister for Energy, is the supervisory authority for all the public establishments and enterprises falling within its jurisdiction, including the Atomic Energy Commission (CEA), the National Agency for the Management of Radioactive Waste (ANDRA) and the Institute for Radiation Protection and Nuclear Safety (IRSN). The DGEMP is also responsible, within its jurisdiction and on behalf of the Minister, for relations with other countries and international authorities. It helps formulate the position of the French government and takes part in the negotiation of international agreements.

The tasks of the DGEMP are:

- to formulate and implement the policy designed to ensure the security of the supply of energy and raw materials, in economically competitive conditions, as well as government decisions concerning the civilian nuclear sector, subject to the powers of the authorities responsible for nuclear safety and radiation protection;

- to propose all measures helping to develop policy concerning the nuclear industry in France and abroad;

- to help monitor exports of sensitive materials and nuclear equipment, co-ordinate the preparatory work for the transport of waste from foreign spent fuel reprocessing, and

draft regulations concerning in particular third party liability and nuclear non-proliferation.

Pursuant to Decree No. 2002-255 of 22 February 2002, a General Directorate for Nuclear Safety and Radiation Protection (*Direction Générale de la Sûreté Nucléaire et de la Radioprotection* – DGSNR) was created within the Ministry of Economy, Finance and Industry. This Directorate combines the tasks of the former Directorate for the Safety of Nuclear Installations (DSIN) of the State Secretary for Industry, the Radiation Office of the General Directorate for Health, and the section of the Office for Protection against Ionising Radiation (OPRI) responsible for monitoring radiation protection. It is placed under the authority of the Ministers for Industry, the Environment and Health.

The task of the DGSNR is to formulate, propose and implement government nuclear safety policy, except as regards defence-related nuclear installations and activities, and in matters of radiation protection. To perform its mission, it must in particular:

- prepare and implement all measures concerning the safety of major nuclear installations and of the transport of radioactive and fissile materials for peaceful uses;
- prepare and implement, in liaison with the other competent services, all measures designed to prevent or limit the health risks related to exposure to ionising radiation;
- organise safety inspections of major nuclear installations and, in conjunction with the competent services of the Minister for Transport, of the transport of radioactive and fissile materials for peaceful uses;
- organise the radiation protection inspections provided for by the Public Health Code;
- organise the permanent monitoring of radiation protection, notably the radiological monitoring of the environment throughout the country;
- monitor releases of gaseous and liquid waste, and waste from major nuclear installations;
- gather all relevant information in the field of nuclear safety and radiation protection and on the measures taken in this field in France and abroad, and circulate such information to the services concerned;
- help to inform the public about issues relating to nuclear safety and radiation protection.

Consequently, the DGSNR prepares technical regulations concerning nuclear safety, and arranges and carries out inspections of nuclear installations. In order to carry out its tasks, the DGSNR relies on the resources of the Minister for Industry in regard to nuclear safety, i.e. principally:

- standing groups of experts, which examine technical problems arising in regard to nuclear safety and the construction, commissioning, operation and shut down of nuclear installations;
- the IRSN, which looks into the technical aspects of safety matters and acts as *rapporteur* to the standing groups;
- the Higher Council for Nuclear Safety and Information.

Owing to the size of the French nuclear programme, the state authorities have decided to decentralise supervision of nuclear installations to the regional directorates for research and industry. These provide the natural link between operators and local authorities. Within the main regional directorates whose areas contain nuclear installations, special nuclear divisions have been set up in order to play a key role in the supervision of such installations.

Regarding the safety of nuclear materials, the senior defence official under the Minister for Industry assists the Minister in his defence duties [Decree No. 93-1272 of 1 December 1993 on the organisation of the central administration of the Ministry for Industry, Post and Telecommunications and Foreign Trade]. He is also responsible for security matters concerning the protection and transport of such materials. To this end, he chairs the Commission for the Protection of the Carriage of Nuclear Materials, which is consulted in the course of the licensing procedure for the transport of nuclear materials. This Commission also helps to draw up regulations relating to the physical protection and control of nuclear materials during transport.

A Nuclear Engineering Terminology and Neology Commission under the Minister for Industry has also been set up [Order of 23 May 1997]. This Commission is responsible for drawing up an inventory of the gaps in French nuclear engineering vocabulary, taking into account user needs, for proposing the necessary terms and for monitoring the harmonisation of terms between French-speaking countries.

Lastly, the Minister for Industry, working in conjunction with the Minister for Defence, formulates policy regarding the safety of defence-related nuclear installations and activities [Decree No. 2001-592 of 5 July 2001].

d) Minister for the Environment

The Minister for the Environment has two major functions in the nuclear field:

- installations classified for environmental protection purposes are under his jurisdiction; in this respect he chairs the Higher Council for Classified Installations [Decree No. 76-323 of 29 December 1976];

- he plays a leading role in pollution and water control and is responsible for the water agencies.

He is co-signatory of the decrees which authorise the establishment of major nuclear installations. Lastly, the environmental impact studies accompanying licensing applications for nuclear installations are submitted to him.

The Minister for the Environment, together with the Minister for Industry and the Minister for Research, is also the supervisory authority for the National Radioactive Waste Management Agency [Decree No. 93-787 of 8 April 1993, Section 3(6)].

In relation to nuclear safety, the Minister for the Environment exercises, jointly with the Minister for Industry, responsibilities in respect of the definition and implementation of nuclear safety policy, including transport of radioactive and fissile materials for peaceful purposes; moreover, he exercises authority, in conjunction with the Minister for Industry and the Minister for Health, over the General Directorate for Nuclear Safety and Radiation Protection.

e) Minister for Research

The Minister for Research is responsible for proposing and implementing government policy in the field of research and technology, in conjunction with the other ministers concerned. He is also responsible for technical and technological instruction in higher education establishments.

If necessary, he may call on the services of the General Directorate for Industry and the General Administrative Directorate of the Ministry for Industry, and the regional directorates for industry and research.

He may, if so requested by the Prime Minister, chair the Atomic Energy Committee of the CEA.

As far as research activities are concerned, including nuclear research, funds for public bodies carrying out technological research and development activities come out of the budget of the Minister for Research.

The Scientific and Technical Unit advises the Minister on scientific and technical aspects of matters for which he is responsible.

The Directorate for Technology is responsible for developing means to use to best advantage the results of public research and technical cooperation with industry, to participate in the setting up of research and technological development programmes financed by the European Union and to follow their implementation.

The Directorate for Research draws up policy relating to research, training by research and scientific employment and ensures its implementation. Moreover, those research bodies which do not report to the Directorate for Technology come under its jurisdiction. This Directorate is also responsible for preparing the budget for civilian research and technological development, and its co-ordination.

f) Minister for Health

The Minister for Health is responsible for protecting the health of the population. Decree No. 2002-986 of 12 July 2002 defines his/her responsibilities in this field. The Minister for Health has authority over the General Directorate for Health and the General Directorate for Nuclear Safety and Radiation Protection. The IRSN also reports to this Minister.

The French Agency for the safety of health products (*Agence française de sécurité sanitaire des produits de santé* – AFSSAPS) also reports to the Minister for Health. AFSSAPS is in particular responsible for issuing licences for the manufacture, possession, distribution, import and export of radionuclides and for testing ionising radiation emitting devices for medical use.

All licences to establish a major nuclear installation must be approved by the Minister for Health.

g) Minister for Employment

The Minister for Employment has powers in the field of the safety, health and welfare of employees directly exposed to ionising radiation at work.

As mentioned above, he receives support from the IRSN. He is also assisted by the Industrial Health Commission which gives opinions on all legislation concerning occupational health and safety. At local level, he has *département* labour offices. Labour inspectors are responsible for checking compliance with the legislation within firms.

h) Minister for the Interior

The Department of Defence and Public Safety

The Department of Defence and Public Safety (*Direction de la défense et de la sécurité civiles*) assists the Minister for the Interior in the exercise of his duties in relation to the preparation and implementation of defence measures within his own services as well as in other state services under his responsibility. The Defence and Public Safety Director, a senior civil servant in the defence field, has authority over all the departments and services of the Ministry for the Interior for the exercise of his duties in this field.

The duties of the Defence and Public Safety Director are as follows:

- he provides a permanent link with the Secretary-General for Defence, prefects, chiefs of staff, the general Inspectorate for national operational defence as well as with senior civil servants in the defence field within different ministerial departments;
- he performs secretariat duties and organises the operations of the Standing Commission on Defence;
- he assists the Minister or represents him in the commissions, committees, working groups and meetings dealing with defence issues both at interministerial level and within the various ministries concerned;
- he co-ordinates the preparation and, where necessary, the implementation of defence plans, exercises and measures under the responsibility of the Minister for the Interior;
- he is responsible for implementing the provisions relating to defence security and secrecy protection.

Under the authority of the Defence and Public Safety Director, the services of the Department of Defence and Public Safety include:

- Unit for Defence and Maintenance of National Services;
- Inspectorate for Public Safety;
- Sub-Directorate for Administration and Modernisation;
- Sub-Directorate for Preventive Measures and the Protection of the Population;
- Sub-Directorate for Emergency Services and the Fire Brigade;
- Sub-Directorate for Emergency Organisation and Civil Defence.

The Defence and Public Safety Director has ultimate authority over the military personnel of public safety services.

In the exercise of his tasks of defence and public safety, the Defence and Public Safety Director is assisted by members of personnel on secondment from central administration, the permanent professional staff of the police force and professionals from other services under the authority of the Ministry for the Interior. Military personnel may be seconded from the Ministry for Defence.

Act No. 87-565 of 22 July 1987 on the Organisation of Public Safety Measures, Forestry Protection against Fire and the Prevention of Major Risks states that public safety measures aim to prevent all types of risk and to protect persons, property and the environment against accidents, disasters and catastrophes [Section 1].

The preparation of preventive measures and the implementation of measures necessary to deal with major risks and catastrophes are addressed in the emergency plans, including the "Orsec plans".

The Minister for the Interior must intervene in order to organise emergency services in the event of an incident or to deal with any terrorist action.

Central Office for the Prevention of Illicit Trading in Weapons, Ammunition, Explosives and Nuclear, Biological and Chemical Materials

This Office (*Office central pour la répression du trafic des armes, des munitions, des produits explosifs et des matières nucléaires, biologiques et chimiques*) was set up within the Ministries for the Interior and for the Environment (General Directorate for the National Police Force, Central Directorate for Criminal Investigation) [Decree No. 82-1050 of 13 December 1982].

It has the twofold task of preventing and prosecuting unlawful acts or offences concerning the possession of nuclear materials.

i) Minister for Transport and Housing

The Interministerial Commission for the Carriage of Dangerous Goods (*Commission interministérielle du transport des matières dangereuses*) was set up in 1941 to help develop regulations for the carriage of dangerous materials by rail, road, inland waterway or air and for the handling of these materials in seaports [Decree No. 95-1029 of 13 September 1995 on the Interministerial Commission for the Carriage of Dangerous Goods, Orders of 15 April 1945 approving the Regulations on carriage of dangerous or infectious goods and 11 October 1948, Regulations of 1952 for the carriage of dangerous goods by sea]. Under transport Regulations, nuclear materials form part of the Commission's responsibilities [Class VII(b)]. The Commission has a membership of 50 and holds four plenary sessions per year.

The transport of dangerous goods by sea is dealt with by a commission under the authority of the General Directorate for Shipping. As far as air transport is concerned, IATA rules apply and therefore a Commission has not been set up.

j) Minister for Defence

The Minister for Defence is responsible for the safety and radiation protection of defence-related nuclear installations and activities. These include major nuclear installations classified as secret as well as weapons systems and nuclear-powered ships (military nuclear systems), defence-related nuclear experimental sites and installations, and the transport of fissile or radioactive materials for military use.

He has joint powers with the Minister for Industry to formulate and implement safety policy for defence-related nuclear installations and activities.

A delegate for the nuclear safety and radiation protection of defence-related activities and installations is appointed by decree on the joint proposal of the Minister for Defence and the Minister for Industry, for a renewable period of five years [Decree No. 2001-592 of 5 July 2001]. He is responsible for proposing to the Minister for Defence and the Minister for Industry, nuclear safety regulations applying to defence-related nuclear installations and activities, proposing technical measures to protect against ionising radiation in relation to the same installations or activities, and investigating licensing applications for the establishment of a major nuclear installation classified as secret and for the development of new types of military nuclear systems.

The Nuclear Weapons Inspectorate, the organisation and functioning of which are laid down in Decree No. 2002-702, is headed by a nuclear weapons inspector, and is placed under the direct authority of the President of the Republic. The task of the Inspectorate is to enforce application of the measures to ensure government control of nuclear weapons so as to guarantee that the head of state is able to unleash such weapons at any time, and also that weapons are not used without legitimate government authority [Section 3].

The Weapons Delegate-General, the Chief of Staff of the Navy, the Chief of Staff of the Air Force and the Director of Service with national jurisdiction (DCN) share responsibility for using military nuclear systems and major nuclear installations classified as secret falling within the jurisdiction of the Minister for Defence [Order of 27 July 2001]. These responsibilities are shared by:

- the authorities responsible for analysis, who define general organisational principles with a view to reaching and maintaining the level of safety defined by the Minister for Defence for military nuclear systems, major nuclear installations classified as secret or the transport of related fuel elements, help define safety and radiation protection rules and co-ordinate, at central level, the measures to be taken to prevent accidents, the action to be taken in the event of such accidents and the radiological monitoring of the environment;

- the authorities responsible for implementation, who organise the material and human resources required, apply the rules and obligations relating to nuclear security and ensure their application by subordinate authorities;

- territorial military authorities, who co-ordinate the measures taken on the one hand by force commanders of bases and military nuclear systems, directors of establishments and those in charge of major nuclear installations classified as secret, individual installations or the transport of fuel elements, and on the other hand by the competent government services in the fields of the prevention of accidents or incidents and of the radiological monitoring of the environment.

Each of these authorities organises an internal control carried out by an "inspector of nuclear security measures", who reports to them directly.

A Council for Nuclear Defence in the field of defence-related nuclear activities (*Conseil de l'exploitation nucléaire de la défense pour les activités nucléaires intéressant la défense* – CEND) has been set up under the Minister for Defence [Order of 13 March 2002]. The task of the CEND is to ensure the coherence of the measures taken by the Ministry for Defence in relation to the requirements of nuclear security and operational, industrial and financial imperatives. It also gives opinions and recommendations with regard to these measures. The CEND is chaired by the chief of staff of the army.

2. Specialised Committees or Boards

In the previous section on the powers of the main ministries concerned with nuclear activities, the roles of the Interministerial Committee for Nuclear or Radiological Emergencies, the Council for Foreign Nuclear Policy, the Interministerial Technical Committee for Matters Relating to the Implementation of the Euratom Treaty, and the Interministerial Commission for the Transport of Dangerous Materials have already been described. The following is a brief description of the Interministerial Commission for Major Nuclear Installations, the Special Commission for Major Nuclear Installations classified as Secret and the Higher Council for Nuclear Safety and Information. It may be noted that the Interministerial Commission for Artificial Radioelements (CIREA), set up in 1952, was abolished by Ordinance No. 2001-270 of 28 March 2001.

a) Interministerial Commission for Major Nuclear Installations (CIINB)

This Commission (*Commission interministérielle des installations nucléaires de base* – CIINB) is asked for its opinion on licensing applications for establishing or modernising major nuclear installations and on specific provisions applicable to such installations. It is also consulted and makes proposals regarding the preparation and application of regulations relating to such installations [Decree No. 63-1228 of 11 December 1963, as amended by Decree No. 73-405 of 27 March 1973, Section 8]. Draft legislation on the safety and protection of workers is submitted to it.

The chairperson is a Counsellor of State, and the vice-chairperson, the CEA High Commissioner [Section 7].

It has 29 full and 29 deputy members appointed for five years by order of the Prime Minister and representing the various ministries and bodies concerned.

A permanent secretary is appointed by the Prime Minister on the proposal of the Minister for Industry, and is entitled to vote [Section 9]. On the basis of the licensing applications for establishing nuclear installations received by him, he draws up the reports to be considered by the Commission.

When investigating a specific matter, the CIINB may call on experts from the scientific and technical fields.

The Commission holds at least one meeting a year at the request of its chairperson. Voting is by majority of the members present. If the votes are split equally, the chairperson has the casting vote.

The Commission has set up a select group within its structure, i.e. the Permanent Section, consisting of the chairperson, the vice-chairperson and the permanent secretary together with nine representatives of ministerial departments concerned, co-opted by the chairperson. The Permanent Section gives an opinion on licensing applications in cases of minor importance.

b) Special Commission for Major Nuclear Installations classified as Secret

The Special Commission for Major Nuclear Installations classified as Secret was set up by the Decree of 11 October 1999 [Section 4], as amended. The Commission has been given the same powers as the Interministerial Commission for Major Nuclear Installations. It is asked to give an opinion on licensing applications for the establishment or modernisation of major nuclear installations classified as secret, and on the particular requirements applying to such installations.

The composition of the Commission is laid down by the Decree of 11 May 2001. Members of the Commission are appointed for a maximum period of five years.

c) Higher Council for Nuclear Safety and Information

Created on 13 March 1973 under a slightly different name by Decree No. 73-278 and placed under the authority of the Minister for Industry, this Council (*Conseil supérieur de la sûreté et de l'information nucléaires*) was given its current name in 1987 along with new powers [Decree No. 87-137 of 2 March 1987 on the Higher Council for Nuclear Safety and Information].

The composition of the Council was broadened in order to include members belonging neither to the government nor to public services. At present, its members include the heads of ministerial departments and specialised agencies, members of parliament, experts, representatives of trade unions and nature conservation and environmental protection associations.

The Council's activities cover [Section 1]:

- all matters relating to nuclear safety, defined as "all technical measures taken at the design, construction and operating stages to ensure normal operation, prevent incidents or reduce the impact of any incidents that might occur";

- all matters concerning the information of the public and the media and related to the safety of nuclear installations, or concerning information of the public in the event of an incident or accident occurring in a nuclear installation.

On the request of the Minister for Industry or if it deems it necessary, the Council may set up expert working groups to study specific scientific questions or to promote information [Section 4].

The Council has power to make recommendations on ways of improving nuclear safety.

3. Public and Semi-Public Agencies

a) Atomic Energy Commission (CEA)

In 1945, the provisional government of the republic presided by Général de Gaulle, foreseeing the potential applications of nuclear energy and their impact in economic, financial, political and military areas, became aware of the need to allow the state to take the initiative in the nuclear field. An Ordinance of 18 October 1945 created the Atomic Energy Commission (*Commissariat à l'énergie atomique* – CEA) [Ordinance No. 45-2563 of 18 October 1945, Corrigendum of 3 December 1945, as amended by Act No. 47-1497 of 13 August 1947 Allowing the Levy of Taxes, Duties, State Proceeds and Revenue, Establishing the General Budget for 1947 and on Miscellaneous Financial Provisions, Decree No. 70-878 of 29 September 1970, as amended, on the Atomic Energy Commission and Decree No. 78-662 of 22 June 1978 on the Atomic Energy Commission].

Decree No. 70-878 of 29 September 1970, as amended by Decree No. 82-734 of 24 August 1982, and Decree No. 74-584 of 14 June 1974 also concern the CEA.

i) Legal status

The CEA was given the status of a public scientific, technical and industrial establishment. It is an administratively and financially independent legal entity.

Following the Decree of 29 September 1970 reorganising the CEA, and the resulting creation of subsidiary companies (such as TECHNICATOME in 1972 and COGEMA in 1976), the CEA continues itself to carry out tasks in the field of fundamental and applied research, nuclear safety and military applications. In addition, through the intermediary of a holding company, it is a shareholder (sometimes majority, sometimes minority) in private law companies, and the companies in which it, directly or indirectly, owns more than 50% of the capital, form the CEA group.

The CEA is responsible for its own financial management and for submission of accounts in accordance with normal trade practice. In other words, it operates largely as a private enterprise [Decree No. 72-1158 of 4 February 1972, Section 8]. What is more, by derogation from the Decrees of 25 and 30 October 1935 and from the Ordinance of 13 November 1944, the CEA is exempt from the *a priori* financial control applicable to state-owned independent public establishments. It is audited by an *ad hoc* audit team consisting of four officials belonging to each of the main state auditing bodies.

Originally answerable to the President of the provisional government and then to the President of the Council and afterwards to the Prime Minister, the CEA has since 1969 been placed under the authority of the Minister for Industry.

ii) Responsibilities

The CEA's duties, as defined in the 1970 Decree and subsequently confirmed, can be classified under the following main headings:

Fundamental research: the CEA conducts scientific research into the nature of matter (atomic physics and particle physics) and applies the research opportunities offered by atomic or nuclear phenomena to a wide variety of fields such as biology, chemistry and astrophysics.

As regards nuclear legislation, under the General Secretariat of the Interministerial Committee for Nuclear Safety, the CEA helps to draw up regulations concerning the safety of nuclear materials both on-site and during transport.

The CEA works in co-operation with other fundamental research laboratories, both French – in particular the CNRS and its National Institute for Nuclear Physics and Particle Physics (IN2P3), the National Institute for Health and Medical Research (INSERM) – and foreign or international laboratories (the Max Planck Institute, the University of Heidelberg, the Danish Space Research Institute, the DESY Laboratory in Hamburg, and the CERN in Geneva).

The National Institute for Nuclear Science and Technology (*Institut national des sciences et techniques nucléaires* – INSTN), set up in 1956 [Decree No. 56-614 of 18 June 1956], is a higher education establishment specialised in nuclear science with its headquarters at Saclay and supervised both by the Minister for Research and the Minister for Industry [Decrees No. 58-602 of 11 July 1958, No. 58-1045 of 30 October 1958, No. 66-266 of 26 April 1966 and No. 79-276 of 2 April 1979].

Through the INSTN, the CEA provides scientific training for top engineers and physicists in the field of atomic energy.

Protection and nuclear safety: By virtue of Act No. 2001-398 of 9 May 2001, the Institute for Protection and Nuclear Safety, created in 1976 and responsible, on behalf of the CEA, for the protection of persons and property against the effects of nuclear energy, was merged with the Office for Protection against Ionising Radiation into a single industrial and commercial public establishment, namely the Institute for Radiation Protection and Nuclear Safety (IRSN – see description above).

Nuclear materials: the CEA ensures that users receive adequate supplies. It is empowered to prospect, produce, store and transport nuclear raw materials either directly or through enterprises in which it is a shareholder. Since it was set up in 1976, the CEA's fully-owned subsidiary COGEMA, which specialises in all kinds of activities concerning the nuclear fuel cycle, has been responsible for industrial and commercial operations in that area.

Nuclear energy applications: to maintain and improve the reliability and safety of electronuclear facilities, on which France depends for its power supplies, the CEA provides technical support to the nuclear industry and to *Électricité de France* (EDF) for the development of new reactor fuels and fuel cycle processes.

Non-nuclear programmes: in accordance with government directives, the CEA has, on the basis of Decree No. 70-878 of 29 September 1970, developed a diversification policy in conjunction with the subsidiaries set up over the years, in order to promote research and development activities in the non-nuclear field.

Having acquired technological know-how through its work on nuclear energy, the CEA applies this knowledge to other sectors, thus meeting demand from industry or from public and private research bodies. It is involved in a wide variety of fields: electronics, components, scientific apparatus, biological and medical engineering, mechanical engineering, metallurgy, environmental protection, oceanology and radioelements in fields allied to the nuclear sector. Decree No. 82-734 of 24 August 1982 confirms this approach under which the CEA, through its various activities, contributes to the technological development of the regions.

Military applications: in national defence, the CEA is responsible for producing nuclear explosive devices and warheads as well as propulsion reactors for nuclear submarines. Matters relating to the carrying out of nuclear arms programmes are examined by a joint Defence-CEA Committee.

A joint Armed Forces-CEA Commission on Nuclear Security has been set up to report to the government authorities, and give its opinion on the security of weapons systems, nuclear-propelled ships and related equipment, from the design stage until withdrawal from service [Order of 3 July 1989 regulating the powers and organisation of the said Commission, Section 1]. However, the Commission is not empowered to monitor nuclear materials used for defence purposes [Section 11].

Information and the dissemination of know-how: in line with its primary involvement with nuclear activities, the CEA follows scientific, technical and economic developments in the nuclear field abroad, and takes an active part in the life of the scientific community in France and in other countries. The CEA is responsible for advising the government, especially in the course of the negotiation of international agreements.

iii) Structure

The CEA Statute provides for a number of central bodies.

Atomic Energy Committee

Under the chairmanship of the Prime Minister or a minister delegated to this effect by the latter, this Committee is composed of:

- the Administrator-General;
- the Army Chief of Staff;
- the Secretary-General of the Ministry for Foreign Affairs;
- the Delegate-General for Weaponry;
- the Secretary-General for Administration of the Ministry for Defence;
- the Director-General for Energy and Raw Materials;
- the Director-General for the Information Technology Industry and the Post Office;
- the Budget Director;
- the Director-General for Nuclear Safety and Radiation Protection;
- the Director of Research;
- the Director of Technology;
- the Chairperson of the Management Board of the National Scientific Research Centre (CNRS);

- a person of standing selected by the Prime Minister;
- a person of standing selected by the Minister for the Environment;
- three experts in the scientific and industrial fields, one of them acting as High Commissioner.

The High Commissioner and the non-*ex officio* members are appointed for three years by decree of the Council of Ministers [Decree No. 76-951 of 19 October 1976].

The Atomic Energy Committee acts as a select interministerial committee in the nuclear field [Decree No. 72-1158 of 14 December 1972]. It also draws up the research and work programme of the CEA, approves the CEA budget and authorises share acquisitions and transfers.

The Committee must meet at least once a month. It is usually convened by its chairperson but in exceptional cases by the Administrator-General. Decisions are taken by majority vote of the members present, with the chairperson holding the casting vote if the votes are split equally.

Management Board

Under Decree No. 82-734 of 24 August 1982, some of the functions of the Atomic Energy Committee relating to management and general organisation, staff employment, adoption of the budget, the acquisition and transfer of shareholdings and the authorisation of loans were transferred to a tripartite Management Board.

Chaired by the Administrator-General, the Board is composed of 18 members including government representatives, representatives of the staff of the CEA and its subsidiaries, and leading experts. Appointments are for a period of five years. The Management Board meets at least six times a year [Decree of 13 April 1984].

Administrator-General

The Administrator-General acts as head of the CEA. He is appointed by Decree of the Council of Ministers for a period of five years [Decree No. 70-878 of 29 September 1970, Section 4].

He has full powers to act within the terms of reference of the CEA, which he represents, except for powers delegated to the Atomic Energy Committee and the Management Board [Decree No. 72-1158 of 14 December 1972, Section 5]. He may delegate all or part of his powers to the High Commissioner or to one or more heads of department.

The Administrator-General may appoint a deputy.

High Commissioner

The High Commissioner is the technical and scientific adviser to the Administrator-General on CEA technical and scientific policy [Decree No. 70-878 of 29 September 1970, Section 5].

Selected from among leading scientists on the Atomic Energy Committee, he is consulted on all protection matters and may be given responsibilities in education.

The High Commissioner chairs a Scientific Board which assists him in the exercise of his duties [Decree of the Council of Ministers No. 82-734 of 24 August 1982 on the Atomic Energy Commission]. Apart from persons appointed on proposals of the Administrator-General and of ministers, the Scientific Board includes staff representatives appointed after consultation with the trade unions.

Under the Decree of 11 October 1999 [Section 2], supplemented by the Decree of 17 July 2000, delegating signatory powers to the High Commissioner, the latter is appointed safety authority for all major nuclear installations falling within the jurisdiction of either the Minister for Defence or the Minister for Industry.

iv) Financing

The activities of the CEA are financed mainly by civilian or military grants from the government budget. Government grants are used to cover expenditure in applied research, nuclear power generation, the reprocessing of spent fuel and the manufacture of weapons. Furthermore, the industrial and commercial activities of CEA subsidiaries produce their own income. This outside income derives in particular from technical work and services, research contracts, sales of radioelements and energy, and fees for industrial property licences.

b) Électricité de France (EDF)

Under the Act of 8 April 1946 nationalising the production, transport, distribution and marketing of electricity, an industrial and commercial public establishment, *Électricité de France* (EDF) was made responsible for these activities.

EDF also produces nearly all the electricity distributed through the national grid. As such, EDF is the operator of almost all French nuclear power plants except for the fast breeders in service today.

In accordance with Decree No. 70-878 of 29 September 1970 [Section 2(5)], the CEA co-operates with EDF in the research sector and in the supply of nuclear fuels [Agreement of April 1967 and annexed Protocol of March 1968]. This co-operation consists of permanent exchanges of information, and the heads of the two bodies have adopted the practice of consulting one another on major issues.

EDF is run by a president appointed by decree of the Council of Ministers. It has a management board composed of 14 members appointed by decree following an opinion by the Minister for Industry, and a chairperson appointed by decree of the Council of Ministers.

c) National Radioactive Waste Management Agency (ANDRA)

Initially, ANDRA (*Agence nationale pour la gestion des déchets radioactifs*), created within the CEA by Order of 7 November 1979, had no independent legal personality but did enjoy a certain budgetary autonomy. It was responsible for the long-term management of radioactive waste.

Act No. 91-1381 of 30 December 1991 on Research into Radioactive Waste Management [Section L.542-12 of the Environment Code] replaced the former Agency by a new body with the same name. Decree No. 92-1391 of 30 December 1992, in implementation of the 1991 Act, laid down the new ANDRA statute, its new administrative structure and various other provisions relating to its operation.

i) Legal status

ANDRA is an industrial and commercial public establishment under the joint authority of the Minister for the Environment, the Minister for Industry and the Minister for Research (Section L.542-12 of the Environment Code).

ii) Responsibilities

ANDRA thus carries out the duties entrusted to it by Section L.542-12 of the Environment Code and by Section 1 of Decree No. 92-1391 of 30 December 1992. It is therefore responsible for operations concerning the long-term management of radioactive waste, and in particular for the following activities:

- in co-operation with the CEA, helping to define and contributing towards research and development programmes concerning the long-term management of radioactive waste;
- ensuring the management of long-term storage centres either directly or through the intermediary of a third party acting on its behalf;
- designing, selecting the site for and constructing new storage centres in the light of long-term forecasts for waste production and management, and carrying out all studies required for this purpose, in particular the construction and operation of underground laboratories to study deep geological formations;
- defining, in compliance with the safety rules, specifications for the treatment and storage of radioactive waste;
- recording the state and location of all radioactive waste on French territory.

Each year, ANDRA must submit to its ministerial supervisory authorities a report reviewing the work achieved and to be achieved. The Agency must also submit, no later than 31 December 2005 and after obtaining the opinion of the Scientific Board, a report analysing the results achieved together with, if appropriate, a project for an underground storage site for high-level, long-lived radioactive waste [Decree No. 92-1391 of 30 December 1992, Section 1].

iii) Structure

ANDRA is administered by a Director-General, a management board, a financial committee and a Scientific Board.

The Management Board of the Agency includes [Section 2]:

- a member of parliament or a senator appointed by the Parliamentary Office for the Evaluation of Scientific and Technological Policies;
- six government representatives, appointed on proposal of the Ministers for Energy, Research, the Environment, the Budget, Defence, and Health, respectively;
- five persons of standing representing economic circles concerned by the work of the Agency, one of whom should be proposed by the Minister for Health;
- two persons of standing, qualified in fields within the competence of the Agency, one of whom should be proposed by the Minister for the Environment; and
- seven representatives of the staff of the Agency.

The members of the Board are appointed for a term of five years.

The chairperson of the Management Board is selected from among its members, and appointed by decree following a joint report by the ministers responsible for the Agency.

The Management Board meets at least three times a year. Decisions are adopted by a majority of votes of the members present or represented. The Management Board settles the affairs of the Agency (general functioning, programme of work, forecasts of income and expenditure, loans, acquisitions, conclusion of contracts, etc.).

The Director-General for Energy and Raw Materials is the Government Commissioner for the Agency and acts as an intermediary between ANDRA and the government.

The Director-General of the Agency is appointed on the proposal of the chairperson of the Board by decree made following a report by the ministers responsible. He manages the services of the Agency, prepares the meetings of the Management Board and implements its decisions.

As for the Financial Committee, it is consulted on the conditions and price-levels for the services of ANDRA, and its investment programmes. For its part, the Scientific Board gives opinions on the research and development programmes carried out by the Agency.

iv) Financing

The resources of ANDRA include in particular:

- remuneration for services rendered;
- subsidies from the state, local governments and any other public or private, national or international bodies;
- proceeds from loans, etc.

The Agency is subject to economic and financial control by the government as provided by the Decrees of 29 August 1953 and 26 May 1955. Control of the financial management is carried out by a government auditor.

d) Institute for Radiation Protection and Nuclear Safety (IRSN)

The Institute for Radiation Protection and Nuclear Safety (*Institut de Radioprotection et de Sûreté Nucléaire* – IRSN) was set up by Act No. 2001-398 of 9 May 2001, the purpose of which was to strengthen existing institutional arrangements with regard to health and environmental safety, monitoring and warnings. Decree No. 2002-254 of 22 February 2002 lays down the structure and tasks of the IRSN.

i) Legal status

The IRSN is a state-owned industrial and commercial public establishment. It is placed under the joint authority of the Ministers for Defence, the Environment, Research and Health. The IRSN brings together the former Institute for Protection and Nuclear Safety (IPSN) and the Office for Protection against Ionising Radiation (OPRI).

ii) Responsibilities

The IRSN performs expertise and research tasks in the fields of nuclear safety, the safety of the transport of radioactive and fissile materials, the protection of man and the environment against ionising radiation, the protection and control of nuclear materials and the protection of nuclear installations and the transport of radioactive and fissile materials against acts of malicious intent.

In order to carry out its tasks, the IRSN:

- conducts expertises, research and work, in particular in relation to analyses, measurements or doses, for public or private bodies, whether French or foreign;
- defines research programmes which it carries out itself or contracts out to other French or foreign research agencies with a view to maintaining and developing the expertise required in its fields of activity;
- helps to give radiation protection training to health workers and persons exposed at work;
- provides technical back-up to the General Directorate for Nuclear Safety and Radiation Protection, to the Delegate for nuclear safety and radiation protection for defence-related activities and installations, and to public authorities and services which so request;
- in the event of an accident or incident involving ionising radiation sources, proposes to the General Directorate for Nuclear Safety and Radiation Protection or the delegate for nuclear safety and radiation protection for defence-related activities and installations, technical, health and medical measures to ensure the protection of the population, workers and the environment, and to re-establish the security of installations;
- help in permanent monitoring as regards radiation protection, in particular by participating in the radiological monitoring of the environment and by managing and using dosimetric data on workers exposed to ionising radiation and managing the inventory of ionising radiation sources.

iii) Structure

The IRSN is administered by a Director-General, a Management Board, a Directorate for Nuclear Defence Expertise, a Scientific Board and an Advisory Commission on Markets.

The Management Board comprises:

- ten state representatives appointed by decree;
- six experts in the fields of activity of the Institute including a member of parliament or a senator who is a member of the Parliamentary Office for assessing scientific and technological policy and proposed by that Office;
- eight representatives of the staff of the Institute, elected in accordance with the conditions and procedures laid down in Chapter (ii) of Title II of the Act of 26 July 1983 and by the Decree of 26 December 1983.

The members of the Management Board are appointed for a period of five years. The Board meets at least four times a year as convened by its chairperson. Decisions are taken by a majority of votes of the members present or represented.

The Director-General of the IRSN is appointed on the proposal of the chairperson of the Management Board, by decree adopted following a report by the ministers responsible.

The Scientific Board is composed of 12 scientific or technical experts appointed for five years by the joint order of the ministers responsible. The Board gives its opinion on the programme of work of the IRSN and monitors the research programmes decided by the Institute after ensuring their relevance. It assesses the results obtained and may make recommendations about the orientation of the Institute's work.

iv) Financing

The financial resources of the IRSN include in particular:

- subsidies from the state, and public or private, national or international bodies;
- proceeds from sales of publications;
- income from patents and inventions;
- income from the Institute's property and real estate, and the proceeds from disposing of them.

e) French Agency for Environmental Health Safety (AFSSE)

The French Agency for Environmental Health Safety (*Agence française de sécurité sanitaire et environnementale* – AFSSE) was set up by Act No. 2001-398 of 9 May 2001, the purpose of which was to strengthen existing institutional arrangements with regard to environmental health safety, monitoring and warnings. Decree No. 2002-299 of 1 March 2002 lays down the structure and

organisation of the Agency. The regulations concerning the Agency have been incorporated into the Public Health Code.

The task of the Agency is to ensure health safety in the field of the environment, to evaluate environment-related health risks and to provide the government with the expertise and scientific and technical support required for the formulation and implementation of legislation and regulations.

The AFSSE is an administrative public establishment. It comprises a Management Board composed of 24 members appointed for a three-year period by joint order of the Minister for Health and the Minister for the Environment. The Management Board is headed by a chairperson, assisted by a vice-chair, both also appointed for a period of three years. The Agency also includes a director-general appointed for three years and a Scientific Board which helps define national research policy with regard to health and environmental safety.

f) National Institute for Nuclear Physics and Particle Physics (IN2P3)

Within the National Centre for Scientific Research (*Centre national de la recherche scientifique* – CNRS), the Institute includes experts on nuclear physics and on particle physics [Decree No. 84-667 of 17 July 1984, Section 3]. Its purpose is to prepare and co-ordinate research in the fields of nuclear physics and particle physics.

IN2P3 carries out its duties within bodies placed under the supervision of the Minister for Research, except for the CEA [Section 1].

The Institute is headed by a director appointed by order of the Minister for Research after an opinion by the Director-General of the CNRS and the Director-General of Higher Education and Research at the Ministry for Research. He is assisted by an administrative deputy director and by one or more scientific deputy directors appointed by the Director-General of the CNRS on a proposal by the Director of the Institute, after obtaining the opinion of the Director-General for Higher Education and Research with the Ministry for Research.

The Director of IN2P3 is, in addition, assisted by a Management Board and a Scientific Board.

The Management Board is composed of 16 members including the CNRS Director-General, who acts as chairperson, members appointed from among ministerial representatives and leading scientists. It holds meetings at least twice a year, and on one such occasion it examines the budget. The Institute's budget is separate from that of the CNRS but is approved and amended in the same way as that of the CNRS. The Management Board decides on applications from laboratories and research centres to work in association with the Institute. In general, it fulfils the usual functions of management boards of public establishments.

The Scientific Board is consulted on the drawing up of research programmes, preparation of the plan and equipment programmes. It meets at least twice a year, and comprises representatives from different scientific bodies together with scientists and heads of laboratories, whether independent or associated with the Institute.