

Nuclear Legislation in **OECD and NEA Countries**

Regulatory and Institutional
Framework for Nuclear Activities



Switzerland

Switzerland

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I. General regulatory regime

1. Introduction

It was in 1946 that the peaceful use of nuclear energy was first regulated by the Swiss Confederation in the form of a Federal Order, dated 18 December 1946, encouraging research in the field of nuclear energy.

Given the complexity of the issues raised by the use of nuclear technology and the fact that large sums of money are required to put it into effect, the federal parliament in June 1957 authorised an amendment to the Constitution (corresponds to the current Article 90 of the Constitution of 18 April 1999) so that nuclear legislation should fall within the sole jurisdiction of the Confederation, and this was approved in a referendum and by all cantons in November 1957. Cantons, therefore, are not responsible for questions related to nuclear safety and have a residual jurisdiction only with regard to the licensing of nuclear installations (building permits, mining legislation, fire permits, water samples and use, etc.). This division of jurisdiction between federal and cantonal authorities was sanctioned at federal tribunal level in decisions of 18 August 1973 and 23 March 1977.

In Switzerland, the development and use of nuclear energy is not a state monopoly, and a large role is left to private industry. The first commercial nuclear power plant was brought into service in 1969. Many local authorities, however, have a direct or indirect interest in the operation of nuclear installations. There are at present five nuclear power reactors located on four sites with a total net capacity of 3 238 MWe: Beznau-1 and Beznau-2 are located at Döttingen, Goesgen is at Soleure, Leibstadt in Aargau and Muehleberg at Bern. Nuclear energy represents almost 40% of the electricity annually produced in the country. In addition, Switzerland operates three nuclear research reactors located at the Department of Physics of the University of Bale, the Laboratory for Reactor Physics and Systems Behaviour (LRS) at the École Polytechnique Fédérale de Lausanne (EPFL) and the Paul-Scherrer Institute (PSI).

It should also be noted that referenda on nuclear energy were held on 22 and 23 September 1990. The Swiss population and the cantons had to take a decision on three questions of major importance for the country's energy policy: a public motion, as set out in the Constitution, calling for the progressive and final abandonment of nuclear energy (rejected by a 52.9% majority); a public motion calling for a ten-year moratorium on the construction of all new nuclear power plants accepted by a 54.6% majority); and a government proposal to amend the Constitution in order to give the Confederation authority to promote energy savings (accepted by a 71% majority). The cantons unanimously accepted the constitutional article on energy, while a majority of cantons decided in favour of the moratorium and against abandonment. Following a further referendum held on 18 May 2003, the population and the cantons rejected two popular constitutional initiatives called "Moratorium Plus" (*"Moratoire Plus"*) and "Phase-out Nuclear" (*"Sortir du nucléaire"*). On the same day, the Swiss population accepted the new Act on Nuclear Energy of 21 March 2003, presented by the government as a counter-proposal to the two initiatives.

This act entered into force on 1 February 2005, at the same time as its implementing ordinance, therewith replacing the former 1959 Atomic Act as amended, the Federal Order of 1978 as well as the implementing Ordinance of 18 January 1984 amended on several occasions. The Swiss atomic legislation needed to be amended in order to centralise some elements contained in several ordinances of the Federal Council (decommissioning of nuclear installations, disposal of radioactive waste and financing of such activities) and to introduce new elements (obligations to be complied with by operators of nuclear installations, adaptation of licensing procedures and reprocessing of radioactive waste). The new act maintains the nuclear energy option: the construction of new nuclear plants will remain possible, as long as the most recent technology is used. However, a decision in principle of the parliament will be necessary in respect of new nuclear installations which will also be subject to an optional referendum (see general authorisation procedure under Section 4).

2. Mining regime

There are no special mining regulations in Switzerland relating to nuclear ores.

Nuclear ores (uranium and thorium) are not considered as nuclear materials within the meaning of the Nuclear Energy Ordinance of 10 December 2004 [Article 1(2)(a)].

3. Radioactive substances, nuclear fuel and equipment

The Act of 21 March 2003 simplifies the categories of radioactive substances. In this context, "nuclear fuel" does not exist as a distinct category any more. In addition to "nuclear waste", the act identifies the three following sub-categories within the general category of "nuclear goods" (Article 3):

- nuclear materials, which means substances which may be used to produce energy by means of nuclear fission processes;
- components and equipment intended or required for the use of nuclear energy;
- the technology necessary for the development, production or use of the goods cited in the first two paragraphs.

Nuclear materials are further specified in the Nuclear Energy Ordinance. According to Article 1 Paragraph 1 nuclear materials are the following source materials: uranium containing the mixture of isotopes occurring in nature; uranium depleted in the isotope 235; thorium; any other material containing the foregoing materials in whatsoever form. In addition the following special fissionable materials are considered nuclear materials: plutonium 239; uranium 233; uranium 235; enriched uranium which means uranium containing the isotopes 235 or 233 or both in an amount such that the abundance ratio of the sum of these isotopes is greater than the ratio of the isotope 235 to the isotopes occurring in nature; any other material containing the foregoing materials in whatsoever form.

In accordance with Paragraph 2 the following are not considered as nuclear materials: uranium and thorium ores; source materials that are not used to produce energy by means of nuclear fission processes, namely source materials meant for the analysis and measurement, shielding or the production of industrial products, as well as these products themselves; special fissionable materials up to the amount of 15g.

Radioactive substances that do not fall under the Nuclear Energy Act are governed by the Radiation Protection Act of 22 March 1991 (RPA; SR 814.50).

a) Nuclear fuels

According to Article 13 of the Nuclear Energy Ordinance of 10 December 2004, the handling of nuclear materials and the storage and transport of nuclear fuels are subject to licensing by the Swiss Federal Office of Energy ("SFOE"). According to Article 3(j) of the Nuclear Energy Act of 21 March 2003 (hereinafter referred to as the "act"; SR 732.1) handling means research, development, production, storage, transport, import, export, transit and brokerage.

The SFOE grants licences based on the technical advice of the Swiss Federal Nuclear Safety Inspection ("IFSN"). It is also the IFSN which certifies that the international regulations on the transport of dangerous goods have been complied with. Any export of sensitive nuclear materials, equipment and technology is considered in light of the Nuclear Suppliers Group ("NSG") guidelines on nuclear transfers, subject to the provisions relating to the transfer of nuclear technology; applications are to be submitted to the SFOE and the State Secretariat of Economy.

The handling of nuclear fuels is subject to supervision by the Confederation, to which end the Confederation or any bodies designated by it may take all necessary steps to protect humans and the environment against the risks of nuclear energy. In practice, supervision is mainly carried out by the IFSN.

The Nuclear Energy Act establishes a ten-year moratorium on the reprocessing of spent nuclear fuel as from 1 July 2006. The ten-year moratorium may be extended for a further period of ten years by the parliament (Articles 9 and 106, paragraph 4).

b) Radioactive substances and equipment generating ionising radiation

The Radiation Protection Ordinance of 22 June 1994 ("RPO"; SR 814.501) contains provisions regulating substances, objects and waste with a level of activity, concentration, contamination, dose rate or mass in excess of the values listed in the annex. The licensing authorities are the Federal Office of Public Health ("FOPH") and in certain cases the IFSN.

The IFSN grants licences for: activities performed in nuclear installations, for transport and export/import of radioactive substances from and to nuclear installations as well as for tests using radioactive substances in the framework of preparatory measures as defined in Article 35 of the Nuclear Energy Act (Article 127 of the RPO).

The FOPH is the competent licensing authority in all other cases.

A licence is required for the handling of radioactive substances or of equipment or objects containing such substances, for the manufacture, marketing, construction, or use of installations or equipment capable of emitting ionizing radiation and for the application of radiation or radioactive substances to the human body (Article 28 of the RPA).

A licence must also be obtained by anyone who, in an enterprise subject to licensing, employs persons who are exposed to radiation in the course of their duties in accordance with the Radiation Protection Act or the Atomic Energy Act. Licences are not required for: work with radioactive substances the activity of which does not exceed a given threshold per day; the use of radioactive substances authorised under Article 128 of the ordinance; the sale, use, storage, transportation, disposal, import, export or transit of ready-made watches containing radioactive substances if they satisfy the requirements of ISO 3157 and 4168 and watch components containing luminescent radioactive paint. Equipment and radioactive sources may be authorised for general use by the Federal Office of Public Health if the following conditions are satisfied:

- design features ensure that persons are not exposed to radiation or contaminated in an inadmissible fashion;
- provision is made for the disposal, in the same manner as radioactive waste, of any radioactive source as necessary after use; and
- the ambient dose rate at a distance of ten centimetres from the surface does not exceed one microsievert per hour.

Applications must be submitted, along with the necessary documentation, to the competent licensing authority. The authority issuing the licence (for a maximum period of ten years) communicates its decision to the canton concerned, to the supervisory authority and, in the case of enterprises subject to labour legislation, to the competent Federal Labour Inspectorate.

The Nuclear Energy Act of 21 March 2003 establishes a licensing regime for persons handling nuclear materials. The licensing authority and the licensing procedure are set out by the Federal Council. The licence is limited in time and is subject to licensing conditions (Article 6 *et seq.* of the Nuclear Energy Act). In particular, the competent authority checks whether the required financial cover for nuclear third party liability is provided.

The licence holder is subject to certain obligations. In particular, he/she shall notify the supervisory authorities of activities or special occurrences which could endanger nuclear security or

safety. He/she shall also check stock and keep accounts (Article 11 of the Nuclear Energy Act). The Nuclear Energy Act provides for penal provisions which, generally speaking, are applicable to persons who intentionally infringe provisions laid down in the field of nuclear energy (Article 88 *et seq.*). This includes breaches of security and safety measures, offences relating to nuclear materials or radioactive waste, breach of the obligations imposed by a nuclear installation licence, breach of confidentiality, relinquishing possession of nuclear materials or radioactive waste.

4. Nuclear installations

a) Licensing and inspection, including nuclear safety

The Nuclear Energy Act of 21 March 2003 (SR 732.1) establishes a licensing process for nuclear power plants consisting of three stages: the general authorisation (decision in principle) procedure, the construction authorisation and the operating authorisation procedure. As to Swiss legislation the concerns of the cantons and concerned entities and persons are being considered in the decision-making process of all three stages. However, the authorisation of the canton in which a nuclear site is to be located is not required. The Confederation is the sole entity responsible for granting licences.

It is relevant to note that, at the international level, Switzerland ratified the 1994 Convention on Nuclear Safety on 12 September 1996.

Granting of general licences

The Federal Council is the body which decides upon applications for general licences (Article 12 of the Nuclear Energy Act). The application shall be sent to the Swiss Federal Office of Energy ("SFOE"), which is responsible for leading the general licence procedure. As a first step, the Swiss Federal Nuclear Safety Inspectorate ("IFSN") prepares a technical expertise as regards to the application, relating in particular to the protection of man and the environment and the disposal of radioactive waste. After having invited the cantons and specialised services of the Confederation to give their opinions regarding the application and the expertise, a public enquiry must be opened and published, in which everybody is entitled to submit comments. The cantons, specialised services and authors of the expertise are then given the possibility to give their view on these comments. Finally the Federal Council takes its decision on the application. The decision is then submitted to the Federal Assembly for approval [Article 48(2) of the Nuclear Energy Act]. Resolutions by the Federal Assembly concerning the approval of general licences are subject to optional referendum (Paragraph 4). Accordingly the Swiss citizens entitled to vote will have the last word to say.

In accordance with Article 44 of the Nuclear Energy Act the canton in which the installation is to be located, as well as the cantons in the immediate proximity will be specially engaged in the preparation of the general licence decision of the Federal Council.

General licences are granted provided the following conditions are met:

- the protection of man and the environment can be ensured;
- there is no other ground for refusing it under federal legislation, in particular as regards environmental protection;
- there is a plan for decommissioning or for an observation phase and a plan for closing the installation;
- radioactive waste produced shall be disposed of;
- Switzerland's external security is not affected;
- there is nothing in any international undertaking by Switzerland to oppose it;
- as regards deep geological repositories, geological studies confirm that the site is a suitable one.

The general licence determines the site to be selected for the installation, the licence holder, the purpose of the installation, the general outline of the project, the maximal exposure limit of persons to radiation in proximity to the installation, and, in the case of a deep waste repository, the criteria for deciding that a proposed site is unsuitable, and a provisional protection area [Article 14(1) of the Nuclear Energy Act].

Granting of construction and operating licences

Under the Nuclear Energy Act of 21 March 2003, Articles 15 and 19, these licences are granted by the Federal Department of the Environment, Transport, Energy and Communications (*Département fédérale de l'Environnement, des Transports, de l'Énergie et de la Communication* – DETEC).

The applications considered by the SFOE are sent to the cantons concerned for their opinion (Act of 21 March 2003, Article 53). The construction and operating licence procedure also includes a publication of the application, with the possibility for concerned persons to oppose the application. The decision can be appealed before the Federal Administrative Court and at a later stage before the Federal Supreme Court.

If DETEC issues a licence contrary to the opinion of the canton in which the installation is to be located, the latter shall have a right of appeal against this decision, however no licence granted by the canton is required [Article 49(3) of the Nuclear Energy Act]. The Nuclear Energy Act differs therefore from the former Act of 23 December 1959 on the Peaceful Uses of Atomic Energy and Protection against Radiation, which provides that canton authorities are competent for granting licences in relation to the regulations of installation construction, fire brigade (fire-fighting) and water police (use of cooling water), Article 4(3).

The applicant shall have a right of expropriation in order to construct, operate and decommission a nuclear installation requiring a general licence, as well as to proceed with geological studies which require a licence, construct the service facilities and prepare sites for the storage or recycling of digging, excavation or demolition materials which are in direct use to the installation (Article 51 of the Nuclear Energy Act).

Technical advisory and supervisory bodies

The Swiss Federal Office of Energy ("SFOE") is responsible for implementing licensing procedures for nuclear installations. Based on the documentation supplied with the application for a licence, in particular the safety analysis report, the Swiss Federal Nuclear Safety Inspectorate ("IFSN") delivers a comprehensive safety assessment report. The Swiss Federal Nuclear Safety Commission (KNS) can give its opinion on the safety assessment report (Article 71 of the Nuclear Energy Act as amended and its Ordinance of 12 November 2008 on the Federal Nuclear Safety Commission). On the basis of these documents, the Federal Council takes, among other criteria, a decision as to the licence.

Nuclear installations are supervised by the Confederation (Article 70 of the Nuclear Energy Act). To this end, the Federal Council and the bodies designated by it shall establish measures and monitor the implementation of such measures in order to protect humans and the environment and to insure nuclear safety and security. In practice, it is the IFSN which carries out most technical inspections of installations although the IFSN may call on experts from outside the federal administration.

Collection of fees

Under Chapter 8 of the Nuclear Energy Act, the operator carries all fees and expenses for the granting, transfer, modification or withdrawal of licences, as well as for the establishment of an expertise, surveillance activities and controls.

Decommissioning of nuclear installations and management of radioactive waste

According to Article 31 of the Nuclear Energy Act, the producers of radioactive waste are required to cover the costs of managing their wastes. Current expenditure arising while the nuclear power

plants are still in operation, including the costs of conditioning operational waste at the power plants, reprocessing of spent fuel, operating centralised waste treatment facilities, research carried out by Nagra and constructing interim storage facilities, are covered directly by the producers on an annual basis.

To meet the expenses of the decommissioning and dismantling of nuclear installations which are no longer in operation and of the disposal of the resulting waste, a fund for the decommissioning of nuclear installations was set up on 5 December 1983 under the responsibility of the Federal Council (Ordinance of 5 December 1983, Article 1, replaced and supplemented by the Ordinance of 7 December 2007 on the Decommissioning Fund and the Waste Disposal Fund), to collect the necessary payments from the operators of nuclear installations. Chapter 7 of the Nuclear Energy Act contains more detailed provisions on the topic: the decommissioning fund shall ensure the financing of the decommissioning and dismantling of nuclear installations withdrawn from service, and that of the disposal of the waste produced thereby (decommissioning costs), whereas the waste disposal fund shall ensure the financing of the disposal of radioactive operating waste and spent fuel assemblies, after withdrawal from service of nuclear installations (disposal costs).

The waste disposal fund was set up on 6 March 2000 under the responsibility of the Federal Council (Ordinance of 6 March 2000, Article 1, supplemented by the Ordinance of 7 December 2007 on the Decommissioning Fund and the Waste Disposal Fund). This fund was established to collect the contributions from the operators of nuclear installations for the payments of costs arising after the decommissioning of the nuclear plants. The fund provides provisions to cover costs of the disposal of radioactive waste after the decommissioning, the construction of the necessary repositories to store the waste (including the deep geological disposals), 50 years monitoring after the closure of the deep geological disposals, the transport, the insurance and the administration.

Each fund has legal personality and is managed by an administrative board acting as the directing body (Article 81 of the Nuclear Energy Act). A board shall establish the amount of the contributions paid by each contributor to the fund it manages, and the amount of the payments made by the latter. Operators pay annual contributions, the amount of which is fixed in accordance with the anticipated cost of decommissioning and dismantling the installation. On 1 February 2008, the Ordinance of 7 December 2007 on the Decommissioning Fund and the Waste Disposal Fund entered into force. This outlines a new theoretical duration (of fifty years) for the exploitation of the nuclear plants. This duration influences the calculation of the contributions that the operators of nuclear plants have to pay.

b) Protection of the environment against radiation effects

The Federal Office of Public Health ("FOPH") is responsible for the constant monitoring of ionizing radiation and radioactivity in the environment (air, precipitation, water, soil and plants). The FOPH collaborates with the cantons on the survey of radioactivity in the food chain. The FOPH establishes each year a sampling and measuring programme in collaboration with other federal authorities (IFSN, CENAL, SUVA) and the cantons. All laboratories and authorities which participate to the monitoring programme deliver the results they obtained in this frame to the FOPH. On the basis of these results it establishes and publishes each year a report on the environmental radioactivity and on the radiation doses to which the Swiss population is exposed. The Federal Council is regularly informed of the monitoring results.

c) Emergency response

On 17 October 2007, the Federal Council adopted the Ordinance relating to the Federal Emergency Organisation on Radioactivity ("EOR"), which replaced the previous Ordinance of 15 April 1987. The 2007 Ordinance determines the competent authorities for such emergency response, as well as their responsibilities and describes the tasks to be performed in the event of a hazard being caused by a nuclear installation (Article 1). The situation in Europe resulting from the Chernobyl accident highlighted the need to set up an organisation in Switzerland to co-ordinate the measures to be taken by the different public services concerned so as to achieve optimum results. Accordingly, the ordinance lists a number of bodies in which these services are represented, lays down the

conditions for their involvement and provides for a co-ordinated network to enable an appropriate response to be made to an increase in radioactivity (Articles 5 to 16).

The Ordinance of 28 November 1983 on emergency measures for protection of the population in the neighbourhood of nuclear installations is also applicable.

The Ordinance relating to the Federal Emergency Organisation on Radioactivity and the Ordinance on emergency measures for protection of the population in the neighbourhood of nuclear installations are currently under revision.

In the event of an alarming increase in radioactivity, the emergency organisation monitors developments and proposes or recommends the measures required. At the head of this organisation is the Director of the Federal Office for Civil Protection and is answerable to the Federal Council (Article 12 of the Ordinance of 17 October 2007). Among other resources at the disposal of the organisation is the National Alarm Centre which is responsible for alerting the authorities and the population (Ordinance of 17 October 2007 on the National Alarm Centre – VNAZ).

For this purpose, the Federal Department of the Environment, Transport, Energy and Communications must, in consultation with the Federal Department of the Interior and the cantons concerned, define two zones around each installation. Zone 1 covers the area in which a serious incident occurring in the installation could give rise to a hazard for the population requiring rapid protection measures. Zone II, immediately beyond Zone I, covers an area with a 20 kilometre radius (with the nuclear installation at its centre) divided into sectors (Ordinance of 28 November 1983, Article 2).

The distribution of iodine tablets to the population is provided for in an Ordinance of 1 July 1992, revised on 1 February 2008. These tablets are to be used in the event of an accident leading to the emission of radioactive particles representing a potential danger to the public (Article 1). The so called pharmacy of the army (*Pharmacie de l'armée*) is responsible for organising the supply so as to enable the appropriate bodies to distribute the tablets according to defined geographical criteria within three areas and to build up sufficient reserves (Article 2). In Area 1, tablets are given as a preventive measure and in sufficient quantities to all persons regularly in the area (Article 3). Moreover, the ordinance imposes on cantons and communes an obligation to build up sufficient stocks and prescribes storage conditions which are identical to those for medicines (Articles 6 and 7). Operators of nuclear installations participate with the Swiss Confederation in financing the costs generated by these operations (Article 13).

At the international level, Switzerland ratified both the 1986 Convention on Early Notification of a Nuclear Accident and the 1986 Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency on 31 May 1988.

5. Trade in nuclear materials and equipment

The Swiss Confederation has committed itself internationally to co-operate in the fight against the proliferation of nuclear weapons. It ratified the 1968 Treaty on the Non-Proliferation of Nuclear Weapons (NPT) on 9 March 1977, and in the same year became a member of the Nuclear Suppliers Group (NSG), a group of the main states involved in the export of nuclear items. The Ordinance of 25 June 1997 (control of goods) includes the "trigger list" and the list of "dual use goods" as specified in the NSG Guidelines (IAEA Document INFCIRC/254) and requires export licences for nuclear material, equipment and technology according to the same guidelines. Switzerland is also member, since its establishment, of the Zangger Committee, a group of states involved in the technical definition of Article III of the NPT. Switzerland follows procedures contained in the Zangger Committee's guidelines (IAEA Document INFCIRC/209).

The granting of licences for the export of sensitive nuclear equipment and materials is assessed by the competent federal authorities in light of the NSG Guidelines and of internal

legislation. The “non-proliferation of nuclear weapons” is one of the licensing criteria laid down by the act (partial revision of 9 October 1986 of the Act of 23 December 1959, Article 5.1).

The Nuclear Energy Act provides that, notwithstanding the licensing regime, the Federal Council or the authority designated by it may prohibit or impose conditions on the import, export, transit or brokerage of nuclear goods to ensure non-proliferation of nuclear weapons. Likewise, the Federal Council may provide that no licence shall be granted in relation to certain states or groups of states (Article 8).

Following the Control of Goods Ordinance of 25 June 1997 the export of nuclear material, equipment and technology is to be authorised by the Trade Division of the Federal Department of Economy (DFE). At the same time, the Federal Office of Energy (“SFOE”) has to authorise the use, trade, transport, import and export of nuclear material. Export and trade of nuclear technology requires also authorisation by the SFOE.

Switzerland has legal instruments to implement UN and other international sanctions to third parties.

Switzerland concluded bilateral agreements with France, Sweden, Canada, China, USA and the Russian Federation in the realm of co-operation in the peaceful uses of nuclear energy.

Swiss nuclear legislation does not include any regulation dealing specifically with nuclear industrial property. Accordingly, the ordinary law on patents applies in the nuclear field.

6. Radiation protection

In general, radiation protection measures taken by the Confederation are based on the recommendations of the International Commission on Radiological Protection (ICRP) and on the joint standards of international bodies (IAEA, NEA, ILO, WHO).

Aware for many years of the need to carry out a total revision of the Federal Act of 23 December 1959 on the Peaceful Uses of Atomic Energy and Protection against Radiation, the Federal Council decided in August 1982 to separate the field of radiation protection from that of the use of nuclear energy and asked the Department of the Interior to prepare a draft bill on radiation protection (Message relating to a Bill on Radiation Protection of 17 February 1988). The proposed bill covers the whole field of radiation protection the objective being to protect man and his environment against the hazards caused by ionizing radiation, but the Chapter on “Licences and Supervision” does not cover activities (nuclear installations) subject to licensing under the Nuclear Energy Act.

The Radiation Protection Act of 22 March 1991 (“RPA”; SR 814.50) is a framework act designed to protect man and the environment against the dangers arising from ionizing radiation. It applies to all activities, installations, events and situations which could present a radiation hazard and in particular to the use of radioactive substances and equipment, installations and objects containing such substances or capable of emitting ionizing radiation. The act lays down the broad principles of protection against radiation and gives the Federal Council power to promulgate detailed implementing regulations which can thus be adapted rapidly to keep pace with scientific and technological progress. The comprehensive revision of the Radiation Protection Ordinance is an example of such adaptation.

The new Radiation Protection Ordinance of 22 June 1994 (“RPO”; SR 814.501) is based largely on the recommendations of the International Commission on Radiological Protection (ICRP). Increased protection is afforded to persons exposed to radiation in the course of their work and to the public, especially to unborn children. Dose limits and derived guideline levels have been reduced and brought into line with the new ICRP recommendations.

The ordinance introduces new rules concerning the maintenance, modernisation and control of medical X-ray equipment. Routine controls are to be carried out by private firms which means that controls will be more frequent than before.

Limits and guideline levels have been introduced for concentrations of radon in housing, temporary accommodation and the workplace. The cantons are the competent executive authorities in this connection. Measures to decrease levels will be imposed having regard to the seriousness of each case and the financial implications involved.

Lastly, the transport of radioactive substances has for the first time been made subject to licensing. In order to obtain a licence, companies transporting radioactive substances, whether on their own account or on behalf of others, must now prove that they have the technical know-how required and a suitable quality assurance programme.

Both the Act and the Ordinance on Radiation Protection entered into force on 1 October 1994.

The Federal Department of the Interior (*Département fédéral de l'Intérieur* – “DFI”) and the Federal Department of the Environment, Transport, Energy and Communications (“DETEC”) are responsible for implementing regulations in the field of radiation protection. They concentrate particularly on the protection of persons, and thus are concerned with health risks which may affect certain groups of people – workers or patients – or the population as a whole, when exposed to ionizing radiation. Those who, in their work, handle radioactive substances or use radiation-producing equipment are required to have received adequate radiation protection training.

The Federal Commission for Protection against Radiation (*Commission fédérale de la protection contre les radiations* – “CPR”) gives advice on matters concerning radiation protection to the Federal Council, the DFI, the DETEC, interested services and the Swiss National Accident Insurance Office (*Caisse nationale suisse d'assurance en cas d'accidents* – “CAN”).

It gives its opinion, *inter alia*, on:

- the interpretation and evaluation of international recommendations concerning radiation protection with a view to their application in Switzerland;
- the preparation and development of standard principles for applying radiation protection requirements.

The competent authorities for granting licences to use ionizing radiation are the Federal Office of Public Health (“FOPH”) and, for activities carried on in nuclear installations, tests involving radioactive substances in the framework of preparatory measures within the meaning of Article 35 of the Nuclear Energy Act and the import, export and transport from an to nuclear facilities of radioactive substances the Swiss Federal Nuclear Safety Inspectorate (“IFSN”).

The FOPH, the CNA and the IFSN are responsible for supervising the protection of persons and the neighbourhood. The FOPH exercises control over companies in which the primary concern is to protect the public, in particular, medical companies and research and training institutes in higher education establishments. The CNA exercises control over firms in which the primary concern is protection of workers, in particular, industrial firms and small businesses. The IFSN supervises nuclear installations and the transport of nuclear goods as well as preparatory measures within the meaning of Article 35 of the Nuclear Energy Act.

7. Radioactive Waste Management

Legal framework

The Nuclear Energy Act and the Nuclear Energy Ordinance of 10 December 2004 (“NEO”; SR 732.11) provide comprehensive regulation on all aspects of radioactive waste management.

They entered into force on 1 February 2005, replacing the Atomic Act of 23 December 1959. Whoever operates or decommissions a nuclear installation is responsible, at his own cost, for the safe disposal of radioactive waste arising from the installation (Article 31 of the Nuclear Energy Act). This duty of disposal is fulfilled according to Article 31 paragraph 2 when the waste has been emplaced in a geological repository and the financial means are secured for a monitoring phase and subsequent closure of the facility or when the waste has been emplaced in a foreign disposal facility.

The Nuclear Energy Act stipulates that the radioactive waste produced in Switzerland must be disposed of within Switzerland. The importation and exportation of radioactive waste are authorised if the transaction occurs between states which have permitted the importation and/or the exportation of such a waste. In both cases the receiving facility has to comply with the state of the art science and technology at the international level.

The waste producers are also required to prepare a waste management programme. This is reviewed by the federal authorities and approved by the Federal Council. The waste producers have to provide information on the radioactive waste for disposal, the required geological repositories and their design concepts, the allocation of waste to the repositories, the time plan for implementing the repositories and the financing of waste management activities.

The Nuclear Energy Act also regulates the licensing procedure. Licences for geological investigations in potential siting regions, a general licence, and licences for construction, operation and closure of the repositories are required.

The Nuclear Energy Act does not specify the procedure to be followed for selecting sites for geological repositories. According to Article 5 of the ordinance, the federal government has to specify the objectives and requirements applying to disposal of waste in geological repositories in a sectoral plan. This includes, in particular, the site selection process for repositories for all waste categories. The site selection process represents an important basis for the waste management programme; the programme depends to a large extent on the configuration of the selection process as specified in the sectoral plan and, according to the act, has to be modified periodically to meet changing conditions. The ordinance contains a list of the fundamental safety requirements to be met by a deep geological repository, e.g. sufficient volume of suitable host rock, favourable hydrological conditions, long-term geological stability. The monitoring and recoverability of stored radioactive waste must be guaranteed until the repository has been definitively sealed.

The main aspects of financing the decommissioning of nuclear installations and the disposal of radioactive waste and spent fuel are regulated in the Nuclear Energy Act, with the details being contained in the Ordinance of 7 December 2007 on the waste management fund and decommissioning fund for nuclear installations. These two independent funds are fed by annual contributions from the facility operators. The decommissioning fund was established in 1984 and, at the end of 2008, the accumulated fund capital was CHF 1 069 million. The waste disposal fund was established in 2001 and had an accumulated capital of CHF 2 308 million at the end of 2008.

It is relevant to note that, at the international level, Switzerland has ratified the 1997 Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

Waste categories

The NEO defines three waste categories:

- The high-level waste comprises fission products from nuclear power plants.
- The alphatoxic waste refers to waste material with a high content of alpha emitters.
- The low- and intermediate-level waste comprises operational waste material from nuclear power plants (e.g. protective clothing, machines, rinsing water), waste arising from the

decommissioning of nuclear power plants, and waste from the healthcare sector, industry and research (including the dismantling and decommissioning of research facilities).

The Nuclear Energy Act stipulates that the use of radioactive matter must result in as little waste material as possible. All waste material that is produced despite this minimisation requirement first has to be conditioned (i.e. brought into a stable state) and packed in suitable receptacles (concrete containers, steel safety tanks), and then has to be transferred to interim storage facilities until such time as deep geological repositories are available.

The management (handling and storage) of radioactive waste is governed by the provisions of the Nuclear Energy Act and the Nuclear Energy Ordinance, both of which entered into force on 1 February 2005. Further, the management of radioactive waste originating from medicine, industry and research is governed by the Radiological Protection Act and the Radiological Protection Ordinance both of which came into effect on 1 October 2004.

Division of responsibilities for the management of radioactive waste

The federal government is responsible for providing the legal framework, and its supervisory authorities are responsible for the supervision of nuclear power plants and the disposal of radioactive waste.

The Swiss Federal Office of Energy ("SFOE") participates in the organisation and implementation of the various licensing procedures and prepares decision-making bases for the responsible federal department and the Federal Council. Licences and permits required for the construction of nuclear facilities and deep geological repositories, as well as for carrying out geological studies, are issued by the Federal Council.

The Swiss Federal Office of Public Health ("FOPH"), which is answerable to the Swiss Federal Department of Home Affairs ("FDHA"), is responsible for waste produced from the healthcare sector, industry and research. It issues the necessary licences and permits, supervises the involved facilities and ensures compliance with radiation protection regulations. It is also responsible for measuring levels of radioactivity in the environment.

The Nuclear Energy Act explicitly states that the supervisory authorities are independent of technical directives and requests formal independence of the licensing authorities. With the Federal Nuclear Safety Inspectorate Act the Swiss supervisory authorities (HSK and the nuclear security section of SFOE) were separated from SFOE and converted into an institution under public law, the Swiss Federal Nuclear Safety Inspectorate ("IFSN"). The new act became effective on 1 January 2009. Along with this transition, the former Federal Commission for the Safety of Nuclear Installations was replaced by the Nuclear Safety Commission ("KNS"). The tasks of this new, more streamlined Commission focus on fundamental issues of nuclear safety.

The KNS examines fundamental issues relating to nuclear safety and may submit statements of position to the Federal Council and the Federal Department of the Environment, Transport, Energy and Communications DETEC concerning safety assessments of the IFSN.

A Confederation working group on radioactive waste management ("AGNEB") was set up by the Federal Council on 15 February 1978. This group is responsible for following the work carried out in this sector by other bodies and for preparing the technical elements necessary for making an evaluation and which will serve as an aid to the DETEC when taking decisions in this field. It ensures that the Confederation respects the time limits prescribed for licensing procedures and reports once a year to the Department.

The parties who produce radioactive waste are required to provide a safe means of its disposal and to bear the associated costs. For this purpose, in 1972, the producers of radioactive waste, including the Confederation, formed a private company – the National Corporation for the Disposal of Radioactive Waste (Nagra) – which has the task of managing the radioactive waste for which waste producers are responsible.

As a federal government body specialising in geology, the Commission for Radioactive Waste Disposal ("CRW") advises the SFOE and the IFSN on geological aspects of radioactive waste disposal and comments on scientific reports of the Nagra.

Disposal of waste, storage and waste management programme

The disposal of radioactive waste is based on a concept defined by an expert group. Following a long observation phase, the underground repository of radioactive waste is sealed and placed under the authority of the state. Until the repository is sealed, costs are covered by nuclear operators, who shall therefore submit to the government a waste disposal plan including a schedule, as well as technical aspects of the different disposal stages and a financial plan.

All radioactive waste is to be disposed of in repositories located in suitable deep geological formations. Switzerland's disposal concept foresees two deep geological repositories: one for low- and intermediate-level waste and one for high-level waste. For both waste categories it would also be possible to construct and operate two deep geological repositories at the same site, as long as this is technically feasible and safety can be guaranteed. Because of the necessary cooling time prior to disposal, the repository for SF/HLW will not be needed for several decades.

Since no repository is available as yet, all radioactive wastes are transferred to interim storage facilities. Each nuclear power plant has interim storage capacity for its own operational waste and some of its spent fuel. The radioactive waste from medicine, industry and research is stored at the federal interim storage facility (BZL). A centralised interim storage facility (called ZWILAG) for all types of radioactive waste, particularly for vitrified high-level reprocessing waste and spent fuel, is also in operation.

To comply with the legislation, the waste producers must submit a waste management programme to the government and update it on a regular basis. On 2 April 2008 the Federal Council announced that the waste management programme had to be submitted together with the proposals for siting areas for deep geological repositories. The waste management programme was thus submitted to the Federal Department of the Environment, Transport, Energy and Communications ("DETEC") on 17 October 2008. It entails information on the radioactive waste for disposal, the required geological repositories and their design concepts, the allocation of waste to the repositories, the time plan for implementing the repositories and the financing of waste management activities.

Search of suitable sites for deep geological disposals

The Nuclear Energy Act does not specify the procedure to be followed for selecting sites for geological repositories. According to Article 5 of the ordinance, the federal government has to specify the objectives and requirements applying to disposal of waste in geological repositories in a sectoral plan.

Concepts and sectoral plans are spatial planning tools implemented in accordance with the Swiss Federal Spatial Planning Act. They permit comprehensive planning and co-ordination of federal government activities that have an impact on area planning, while taking the defined spatial development of the country into account.

Applicable legislation calls for a demonstration of the fundamental feasibility of disposing of radioactive waste in a specific geological layer. The National Co-operative for the Disposal of Nuclear Waste ("Nagra") has demonstrated the feasibility for the disposal of both low- and intermediate-level ("L/ILW") as well as high-level waste ("HLW"), and the Federal Council has given its approval in both cases. The requirement of a demonstration of feasibility was already stipulated in the Federal Resolution concerning the Atomic Energy Act of 1978.

The Federal Council adopted the conceptual part of the "Deep Geological Repository" sectoral plan on 2 April 2008, in which the objectives of the federal government are defined, together with the various procedures and criteria according to which the site selection procedure for all waste categories is to be carried out in Switzerland. Here the long-term safety of human beings and

protection of the environment are of the highest priority. The division of responsibilities is also entailed in this sectoral plan.

The SFOE is managing this procedure leading in around ten years to the designation of sites for each waste category. The procedure allows a co-ordination of a broad range of actors and is divided in three stages. Regarding this site selection process for deep geological repositories, on 17 October 2008 Nagra submitted its proposals for suitable geological siting areas for the repositories for HLW and L/ILW to the SFOE. IFSN has reviewed Nagra's entire documentation and concluded that the procedure followed by Nagra in preparing the proposals for the geological siting regions was transparent and reproducible.

As a conclusion, IFSN approves the following six geological siting areas proposed for L/ILW: Bözberg (canton of Aargau), Jura-Südfuss (canton of Solothurn and canton of Aargau), North of Lägeren (canton of Zurich and canton of Aargau), Südranden (canton of Schaffhausen), Zürcher Weinland (canton of Zurich and canton of Thurgau) and Wellenberg (canton of Nidwalden and canton of Obwalden). All these sites have clay-rich sediments as potential host rocks. These include the Opalinus clay, the Brauner Dogger, the Effingen Beds, and the marl formations of the Helveticum.

IFSN also approves the three geological siting areas proposed for HLW: Bözberg, North of Lägeren and Zürcher Weinland. All the potential HLW sites have Opalinus clay as host rock. IFSN's review will be commented by the Nuclear Safety Commission ("KNS").

After a broad consultation, which is planned for the second half of 2010, the federal government is expected to decide on these potential sites in 2011. The sectoral plan procedure will lead to the designation of one site for each category of waste within ten years. The waste producers finally submit applications for a general licence (one each for HLW and L/ILW or one for a combined repository).

Parliament's decision concerning the government's approval of the general licence for deep geological repositories is expected around 2017/2019. Parliamentary decision is subject to an optional national referendum.

The general licence, which fixes the site and the general outline of the project, also determines the storage capacity and the categories of waste as well as the structure of the underground or surface installations. Before granting a licence, the Federal Council consults the local communities concerned and the services of the Confederation specialised in the field.

8. Non-proliferation and physical protection

There is no legislation dealing specifically with nuclear security in Switzerland. However, special provisions have been included in the Nuclear Energy Act of 21 March 2003.

General licences for nuclear installations and licences to handle nuclear materials shall be granted provided that this would not be in breach of any international commitment and that Switzerland's external security is not affected [Articles 7(e) and 13.1(e), (f) of the Nuclear Energy Act].

According to Article 13 paragraph 2 of the Nuclear Energy Act, only a company limited by shares, a co-operative or public law entity can apply for a general licence. If the applicant is a foreign company, it must have a branch registered in the commercial register in Switzerland. The Federal Council may refuse to grant a general licence to a company formed in accordance with the laws of a foreign country if the country in which the company concerned is domiciled does not grant reciprocal rights, insofar as the decision of the Federal Council does not conflict with any existing international commitments.

The licensing procedure for a new nuclear power plant consists of two further stages, the construction and operating licence procedure. According to Article 16(2)(a) and Article 20(1)(b) of the Nuclear Energy Act, the requirements set out for the general licence procedures, i.e. amongst others the above mentioned requirements must be met in order to obtain a construction or operating licence.

Furthermore, according to Article 106(3), the same criteria [i.e. amongst others Article 13(2)] apply in case of a transfer of an operating licence for an existing nuclear power plant to a foreign company.

The Nuclear Energy Act grants wide powers of investigation to the nuclear supervisory authorities (Articles 72 *et seq.*). The latter shall inform the public of the state of nuclear installations and of the situation relating to nuclear materials and radioactive waste; in addition they may not process personal sensitive data (Articles 74 *et seq.*).

Generally speaking, all licences required by the Nuclear Energy Act are granted provided the protection of man and the environment is ensured (Articles 7, 13, 16 and 20). Moreover, a licence to handle nuclear articles shall be granted provided that there are no grounds for refusing it relating to the non-proliferation of nuclear weapons, in particular international control measures supported by Switzerland, even if not formally binding in international law.

It should be noted that, at the international level, Switzerland ratified the 1968 Treaty on the Non-Proliferation of Nuclear Weapons, on 9 March 1977, the 1996 Comprehensive Nuclear Test Ban Treaty, on 1 October 1999 and the 1980 Convention on the Physical Protection of Nuclear Materials.

Switzerland ratified the comprehensive safeguards agreement with the IAEA (entry into force on 6 September 1978) and its additional protocol (entry into force on 1 February 2005).

Switzerland has also joined several initiatives and conventions regarding security and physical protection of nuclear material and equipment.

Switzerland joined the Global Initiative to Combat Nuclear Terrorism in 2007. This adhesion complemented a number of steps that Switzerland has taken in recent years to combat terrorism.

Switzerland has signed all the 16 UN conventions and protocols related to counter-terrorism, among them, the International Convention for the Suppression of Acts of Nuclear Terrorism and the Amendments to the Convention on the Physical Protection of Nuclear Material.

Lately a number of new national measures are being implemented to improve the protection of the population against the threat from weapons of mass destruction (WMD).

9. Transport

The transport of radioactive or fissile materials in Switzerland is governed by a number of different regulations, each dealing with a particular form of transport. In general, these instruments implement the international regulations in this field in Switzerland.

Thus, for road transport, the basic text is the Federal Council Ordinance of 29 September 2002 (as revised on 1 January 2009), relating to the transport of dangerous goods by road ("SDR"). The ordinance provides that foreign vehicles which do not fully satisfy the technical norms which it prescribes shall nevertheless be allowed into Switzerland provided that the transport operation meets the standards laid down in the European Agreement of 30 September 1957 (as revised on 1 January 2009) concerning the International Carriage of Dangerous Goods by Road ("ADR").

For transport by rail, the legislation in force is contained in the Regulations concerning transport by rail and by cable cars, known as the Transport Regulations, of 3 December 1996 (as revised on 1 January 2009) Annex I of which incorporates the International Regulations concerning the Carriage of Dangerous Goods by Rail ("RID"). This annex is itself entitled the Swiss International Regulations concerning the Carriage of Dangerous Goods by Rail ("RID/RSD").

The transport of radioactive or fissile materials by inland waterway is governed by the above-mentioned transport regulations, RID/RSD, and if on the Rhine, is subject to the Regulations for the Transport of Dangerous Goods on the River Rhine ("ADNR") of 26 September 2002 (as revised on 1 January 2009).

The Air Transport Regulations of 17 August 2005 (as revised 30 August 2005) apply to the transport by air of radioactive or fissile materials authorised by the Federal Office of Civil Aviation ("FOCA"), unless the transport is subject to the 1999 Montreal Convention concerning international carriage by air. The Nuclear Energy Act prohibits the transport of nuclear materials containing plutonium in Swiss air space.

The Federal Department of the Environment, Transport, Energy and Communications is responsible for transport operations by road, rail and inland waterway. This Department has the task, along with the other bodies concerned, of drawing up regulations in the field of the transport of radioactive or fissile materials. In the case of air transport, the FOCA may impose additional requirements to be observed during transport operations, as long as these do not contradict the regulations laid down in this field by IATA Dangerous Goods Regulations, DGR Edition 2005. As for sea transport, the relevant international regulations, IMDG-Code Edition 2006, are applied directly.

10. Nuclear Third Party Liability

Provisions relating to nuclear third party liability were originally contained in the Federal Act of 23 December 1959. These provisions were completed on 13 June and 19 December 1960 respectively by a Federal Council Ordinance and Order. This legislation, whose purpose was to regulate the operation of the fund for delayed atomic damage provided for under Article 19 of the 1959 Federal Act has since been repealed.

Since 1983, nuclear liability has been governed by separate legislation – Act on Nuclear Third Party Liability of 18 March 1983 ("LRCN"; SR 732.44) and Ordinance of 5 December 1983 ("ORCN"; SR 732.441) – which is still in force to date. This act abides by two basic principles, namely that of strict liability and that of the channelling of liability to the operator of a nuclear installation. On the other hand, Act of 18 March 1983 rejects the principle of the limitation of third party liability in amount and foresees a minimum amount of coverage. The Federal Council is obliged under this act to increase the minimum amount covered by private insurance once the insurance market offers higher cover on acceptable terms. Accordingly, on 4 December 2000, the government further amended Ordinance of 5 December 1983 on Nuclear Third Party Liability, which had already been amended in December 1985, in October 1990 and in December 1996. The general situation on the insurance market changed dramatically after the events of 11 September 2001. The Swiss National Insurance Pool decided to modify private policies covering nuclear installations on Swiss territory and to limit the cover for damage due to potential terrorist acts. This modification to private policies led to an amendment of the ordinance in 29 November 2002.

Liability for nuclear damage is covered as follows:

- by private insurance up to Swiss francs ("CHF") 1 billion for each nuclear installation (CHF 50 million for each operation involving the transport of nuclear goods across Switzerland; LRCN, Article 11; ORCN, Article 3); this amount may be limited to CHF 500 million for damage caused by a terrorist act [ORCN, Article 4(1)(a^{bis})];
- by federal insurance up to the amount of CHF 1 billion when the damage exceeds the amount covered by private insurance, or is excluded therefrom (LRCN, Article 12);
- by all the assets of the person liable;

- according to a special procedure with regard to “large scale damages”.

The amendment of 19 November 1997 of the ORCN, which entered into force on 1 January 1998, modified the method of calculating federal nuclear third party liability insurance premiums to be paid by liable persons. As of 1 January 1998, these amounts are fixed in Swiss francs rather than as a percentage of the premiums collected by private insurers for third party liability coverage.

The fund for delayed atomic damage has been transformed into a fund for nuclear damage. Fees are levied from nuclear operators and holders of transport licences so as to cover the contributions made by the Confederation (Articles 14 and 15 of the LRCN). The fund is not a separate legal entity but is financially independent.

The Nuclear Energy Act has amended the provisions of the LRCN related to deep repositories: it provides that, where damage is caused by a deep geological repository which is no longer governed by nuclear energy legislation, the Confederation shall cover nuclear damage out of general funds and up to CHF 1 billion.

Switzerland has signed the 1960 Paris Convention on Third Party Liability in the Field of Nuclear Energy and the 1963 Brussels Supplementary Convention but has not ratified them. On 14 December 1992, the Federal Council decided not to ratify the Paris Convention and the Brussels Supplementary Convention in the near future, on the grounds that Switzerland had adopted relatively recently an Act on Nuclear Third Party Liability dated 18 March 1983 and that certain provisions adopted differed from those of the Paris Convention. However, Switzerland continued to follow with great interest international developments in the field of nuclear third party liability and participated in the discussions carried out in this field. On 12 February 2004, it signed the 2004 Protocols to amend the Paris Convention and the Brussels Convention. On 13 June 2008, both Conventions as well as the revised Act on Nuclear Third Party Liability were approved by the Swiss Parliament. Consequently, the Paris and Brussels Conventions were ratified on 9 March 2009 and on 11 March 2009 respectively. This Act on Nuclear Third Party Liability will not enter into force before the 2004 Protocols of the Paris and Brussels Convention have entered into force themselves. Meanwhile, preparations for a revised Ordinance on Nuclear Third Party Liability are under way.

11. Environmental Protection

The main purpose of the Nuclear Energy Act of 21 March 2003 is to protect humans and the environment against the risks of nuclear energy (Article 1). When using nuclear energy, humans and the environment must be protected against the danger due to ionizing radiation [Article 4(1)]. Therefore, there are several regulations which attend to environmental protection within the framework of the appropriate legislation: A licence may only be issued if the protection of humans and the environment is assured [Articles 7(a), 13(1)(a), 16(1)(a) and 20(1)(c)]. Upon other terms, the general licence shall specify the maximum permissible exposure to radiation for people in the vicinity of the installation [Article 14(1)(e)]. The operating licence shall specify notably the measures for environmental surveillance [Article 21(1)(d)]. Radioactive waste shall be managed in such a manner as to ensure the permanent protection of humans and the environment [Article 30(3)].

According to these principles the application procedure stipulates that the federal office in particular shall obtain the necessary expert reports on protection of humans and the environment [Article 43(1)(a)]. Before taking any decision on the planning, construction or modification of installations, an authority must assess their impact on the environment at the earliest possible stage [Article 10a paragraph 1 of the Swiss Environmental Protection Act (“EPA”)]. Therefore anyone who wishes to plan, construct or modify an installation must submit an environmental impact report to the competent authority (Article 10b paragraph 1 of the EPA). In order to prepare for the report, a preliminary investigation is carried out (Article 10b paragraph 3 of the EPA). The environmental protection agencies assess the preliminary investigation and the report and propose the measures required to the competent decision-making authority (Article 10c of the EPA). As

Switzerland has signed and ratified the Espoo Convention on Environmental Impact Assessment in a Transboundary Context, the regulation of this convention is, where appropriate, also applicable. Furthermore Switzerland has also signed the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters. Ratification process of this convention is still ongoing.

II. Institutional framework

Since 24 November 1957, when Article 24 quinquies (now Article 90 of the amended Swiss Constitution which entered into force on 18 April 1999) was inserted into the Swiss Constitution, nuclear energy has been declared to be the responsibility of the federal legislature. Thus the Confederation is responsible for granting licences for nuclear transports and nuclear facilities. It also supervises all nuclear activities (Article 72 of the Nuclear Energy Act of 21 March 2003). The Confederation also plays an important role in the field of research and the training of nuclear specialists (Article 86 of the Nuclear Energy Act).

The Federal Council has the necessary regulatory and administrative powers to adopt the regulations required for the development of the use of nuclear energy and for radiation protection. The Federal Department of the Environment, Transport, Energy and Communications, and the Federal Department of the Interior are responsible for implementing the provisions adopted by the Federal Council in the field of the use of atomic energy and the field of protection against ionizing radiation, respectively. The Federal Nuclear Safety Inspectorate is the supervisory authority for nuclear safety and security.

Apart from the federal departments and the specialised services of the Confederation, the public sector is also represented by a public scientific research centre, the Paul-Scherrer Institute.

1. Regulatory and Supervisory Authorities

a) Federal Council

The Federal Council, which represents the executive branch of government in Switzerland at federal level, plays an important role in the nuclear institutional framework.

First, the Federal Council assists in the development of regulations in the atomic energy field and ensures their implementation (Article 101 of the Nuclear Energy Act). The Federal Council sets up the necessary administrative bodies and the commissions responsible for questions relating to the use of nuclear energy and to radiation protection (Articles 6, 24, 32, 70, 71 and 81). More particularly, the Federal Council has the power to broaden the category of activities for which a preliminary licence is required (Article 6). The Federal Council or the authority designated by it may make exceptions to the licensing regime by taking special measures against specific destination states. It may waive the rules on licences (Article 8). Furthermore, the Federal Council lays down the minimum requirements which specialised staff of nuclear installations and the surveillance team have to meet (Articles 22 and 23). He also lays down the criteria applicable to protection zones (Article 40).

On an administrative level, the Federal Council is responsible for examining and deciding upon applications for preliminary general licences for nuclear installations, prior to construction and operating licences (Article 12). Since the entry into force of the Nuclear Energy Act of 21 March 2003 the Federal Council is no longer the competent authority for granting construction and operating licences. According to Article 15 and 19 of the Nuclear Energy Act, the Federal Department for the Environment, Transport, Energy and Communications ("DETEC") is now in charge for decision making in this regard. The DETEC is also the competent licensing authority for taking preparatory steps for the setting up of a radioactive waste repository (Article 35). However, the act provides that the Federal Council may exclude from the licensing regime studies which involve only minor prejudice.

The Federal Council may order the precautionary shutdown of nuclear power plants in extraordinary situations (Article 25). Extraordinary situations mean the cases of threat of war or other power-political threat.

The Federal Council may promote applied research regarding the peaceful use of nuclear energy. He may also contribute to international organisations and participate in international projects in connection with the peaceful use of nuclear energy (Article 86 and 87 of the Nuclear Energy Act).

b) Federal Assembly

The Federal Assembly, Switzerland's parliament, is involved in the nuclear field by approving the Federal Council's decisions as to general licences for nuclear installations (Articles 48 and 67 of the Nuclear Energy Act). The Nuclear Energy Act provides that, if the Federal Council refuses to grant a general licence and the Federal Assembly does not approve this decision, it shall instruct the Federal Council to grant the general licence with any requirements decided by it and to submit to it a new decision for approval. The decision of the Federal Assembly regarding the approval of a general licence shall be subject to referendum (Article 48 of the Nuclear Energy Act).

The Assembly is also competent in respect of third party liability and insurance (Nuclear Third Party Liability Act of 18 March 1983, Article 29). Thus, in the case of large scale damages, the Federal Assembly is empowered to draw up indemnification rules determining the general principles of compensation for victims. A special independent body may be set up by the Federal Assembly to ensure that these principles are applied.

The Nuclear Energy Act requires that the Federal Council regularly informs the Federal Assembly of the progress of the programme prepared by the persons responsible for disposing of radioactive waste (Article 32).

c) Federal Department of the Environment, Transport, Energy and Communications (DETEC)

The general task of the Federal Department of the Environment, Transport, Energy and Communications ("DETEC") is to prepare legislation related to the use of nuclear energy.

The DETEC is also the competent authority to grant construction and operating licences (Articles 15 and 19 of the Nuclear Energy Act), as well as licences for geological studies carried out in a possible location in order to gather information about the feasibility of constructing a deep geological repository (Article 35). The licences granted by the DETEC can be revoked anytime if the prerequisites for granting are not, or not anymore, fulfilled (Article 67).

d) Federal Office of Energy (SFOE)

According to Article 9 of Ordinance on the Organisation of the DETEC of 6 December 1999 the Federal Office of Energy ("SFOE") is the specialised service for the security of energy supply and the use of energy. Regarding the use of nuclear energy the office is engaged in ensuring high-security standards. The SFOE supports the DETEC in preparing the national legislation in the field of nuclear energy as well as, in conjunction with the Federal Department of Foreign Affairs, international nuclear treaties, and to ensure that national and international regulations are properly implemented. The Office also prepares the decisions taken by the Swiss Federal Council and the DETEC regarding nuclear energy. For example, applications for a general licence shall be sent to the OFEN, which checks the application file and decides whether an expertise is necessary (Articles 42 and 43 of the Nuclear Energy Act). It is additionally the competent authority for licensing the transport of nuclear materials and radioactive waste (Nuclear Energy Ordinance of 10 December 2004, Articles 13 and 14).

e) Swiss Federal Nuclear Safety Inspectorate (IFSN)

The Swiss Federal Nuclear Safety Inspectorate (Inspection fédérale de la sécurité nucléaire – "IFSN") is the supervisory authority for nuclear safety and security. The IFSN emerged from the former principal nuclear safety division (Division principale de la sécurité des installations nucléaires – DSN) of the SFOE. With Act of 22 June 2007 on the Swiss Federal Nuclear Safety Inspectorate (IFSNG; SR 732.2) the DSN was separated from the SFOE and transformed into an institution under public law endowed with its own legal personality. The IFSN is administratively

attached to the DETEC (Article 14a OV-UVEK; SR 172.217.1). However, it is vested with operational, institutional and financial independence (Article 1 und 18 IFSNG). The creation of an independent supervisory authority brings Switzerland *de facto* and *de jure* in full compliance with the Convention on Nuclear Safety (Article 8 paragraph 2) and the Swiss Nuclear Energy Act [Article 70(2) of the Nuclear Energy Act]. The IFSN management, consisting of the director and the division heads, is responsible for the current operations. It reports to the IFSN Board, a strategic management board, which is elected by the Federal Council. The IFSN Board is accountable to the Federal Council, to whom it must submit an annual report.

The IFSN is the competent authority for supervising nuclear facilities with respect to radiation protection and nuclear safety at all stages of the life cycle. Since 2008, the IFSN is also the competent authority with regard to physical protection. The IFSN has three main functions:

- specifies the detailed safety requirements in regulatory guidelines;
- reviews licence applications;
- supervises the nuclear facilities, the preparations for the disposal of radioactive waste and the transport of radioactive material from and to nuclear facilities.

The IFSN also has certain licensing competences according to the radiation protection legislation; in addition, it grants permits for modifications that do not significantly deviate from a construction or operating licence.

f) Federal Department of Home Affairs (FDHA)

As regards nuclear matters, the Federal Department of Home Affairs ("FDHA") has been given regulatory and administrative powers in the area of radiation protection. It is also competent with regard to nuclear research questions and co-ordinates activities with the universities and federal *Écoles Polytechniques* [see Section 3(a) – Paul-Scherrer Institute].

With regard to its regulatory powers, the FDHA has a general responsibility for radiation protection questions. It has the task of laying down the necessary rules for applying measures enacted by the Federal Council for protection against ionizing radiation. In particular, the FDHA, with the assistance of the DETEC, and after consulting the competent supervisory bodies, lays down guidelines for supervisory activities to be carried out in the radiation protection field.

In addition, the FDHA, in agreement with the Federal Commission for Radiological Protection and Monitoring of the Radioactivity in the Environment, lays down guidelines on measures to be adopted for the protection of persons exposed to radiation for medical purposes. With regard to foodstuffs, the FDHA determines the maximum concentrations of radionuclides which may be incorporated in food products.

Moreover, the FDHA determines the training programme, the method of examination, and rights in relation to the training and advanced courses offered by the Confederation in the field of radiation protection. Courses given by private institutions must first be approved by the Federal Department, or the competent supervisory body, if they are to benefit from subsidies which will be fixed by the FDHA. In any event, in order to use radioactive materials or equipment generating ionizing radiation in a professional context, it is necessary to have completed training recognised by the Department or the competent supervisory body. By reason of its administrative powers, the FDHA, with the assistance of the DETEC, co-ordinates the activities of nuclear bodies involved in radiation protection.

The FDHA also has the power to impose any necessary measures with regard to the medical supervision of persons exposed to ionizing radiation at work.

In the radioactive waste management field, the FDHA ensures the disposal by the Paul-Scherrer Institute of radioactive waste other than that coming from electricity-producing nuclear installations and facilities for the reprocessing of spent fuel.

g) Federal Office of Public Health (FOPH)

Through its Radiation Protection Division, the Federal Office of Public Health (FOPH) enjoys wide administrative and supervisory powers in the field of protection against radiation.

i) Administrative powers

The Office is the competent authority for the granting or revocation of licences for the production, use, possession, disposal, import and export of radioactive substances and for nuclear equipment, whether used for industrial, scientific, medical or agricultural purposes, with the exception of nuclear installations, nuclear fuel and radioactive waste (residues). If, however, a negative response is given by the Swiss National Accident Insurance Office (*Caisse nationale Suisse d'assurance en cas d'accidents* – "CAN"), which considers applications from bodies subject to the Federal Act on Accident Insurance, then the Federal Office is bound by this opinion. Persons possessing radioactive substances or equipment emitting ionizing radiation for which no licence is required because the quantity or activity of the nuclear material concerned is below a given threshold, must make a declaration to the federal office. Persons manufacturing or trading in such substances or equipment which are not freely available or are for restricted use, must submit an annual report to the federal office on their activities. The office may allow certain types of radioactive substances and equipment emitting ionizing radiation or containing radioactive substances to be used generally or for specific purposes. The FOPH grants the necessary licence for the restricted use of substances and equipment, and receives the declarations of persons possessing substances or equipment available for general use, unless it waives such formalities.

The FOPH, in consultation with a panel of experts representing various interests, is also the competent authority for approving radioactive substances intended to be used for medical purposes. It must authorise any work involving unsealed radioactive sources which a company wishes to carry out outside its own premises.

ii) Supervisory powers

An expert designated by the FOPH checks those parts of equipment used for radiotherapy which determine the radiation dose given, every time the equipment is modified in such a way that this dose could be affected and in any event at least once a year (Radiation Protection Ordinance of 22 June 1994, Article 74, paragraph 4). The licence holder keeps a record of the results of these verifications. The federal office may require that equipment used for diagnosis be checked annually over a period of four weeks in normal working conditions. A record is kept of the number and location of radiographic and radiosopic examinations carried out during this period, as well as of the conditions under which they took place.

In general, the office advises the FDHA and the DETEC on the guidelines to be adopted with regard to the carrying out of inspections.

The FOPH supervises enterprises in which the primary concern is protection of the public, while the Swiss National Accident Insurance Office supervises those in which the primary concern is protection of workers.

The IFSN on the other hand is responsible for inspecting the safety of nuclear installations. The FOPH and the SFOE, each in its own sphere, control the import and export of radioactive substances as well as equipment and objects containing such substances.

iii) Other powers

The Radiation Protection Division of the FOPH is responsible for the collection and dispatch of radioactive waste from industrial, research, and medical activities. It sends a circular to listed waste producers to inform them that waste will be collected from the centre which has been assigned to them. The office works in co-operation with the Paul-Scherrer Institute with respect to the collection and conditioning of this waste. The office represents the central administration responsible for collecting radioactive waste other than that from nuclear installations, within the National Co-operative for the Disposal of Radioactive Waste ("Nagra").

The office also organises, along with other federal services and non-governmental organisations, training and advanced courses in radiation protection. It is responsible for the payment of subsidies allocated by the Confederation to private institutions organising such courses.

h) State Secretariat for Education and Research (SER)

The State Secretariat for Education and Research ("SER") is part of the FDHA. It co-ordinates research activities carried out in university circles, the private sector and by government authorities. It represents the government in bodies carrying out fundamental and applied research. It also deals with research into thermal nuclear fusion, and high and medium-energy nuclear physics.

i) Other authorities

Other federal departments are called on to regulate questions falling within the nuclear energy field, and in particular: the Federal Department of Justice and Police, for the transport by road of dangerous goods, and in relation to public protection measures; the Federal Department of Foreign Affairs and the Federal Economics Department for the export of nuclear materials of particular significance; the Department of Defence, Civil Protection and Sport for radiation protection on behalf of the army; and the Federal Finance Department with respect to legislation on nuclear measurement units.

2. Advisory Bodies

a) Swiss Federal Nuclear Safety Commission (KNS)

In the context of the reorganisation of the nuclear regulatory body Article 71 of the Nuclear Energy Act of 21 March 2003 was also amended, to replace by 1 January 2008 the former Federal Commission for the Safety of Nuclear Installations (German acronym: "KSA") with the new Swiss Federal Nuclear Safety Commission (German acronym: "KNS").

In its bill for restructuring the nuclear regulatory body the Federal Council has referred to the completely independent organisational structure of the new IFSN, including its supervisory board (IFSN-board). The Federal Council had therefore proposed to do without an independent advisory body and eliminate Article 71 of the Nuclear Energy Act of 21 March 2003. In the parliamentary legislation process, however, Article 71 of the Nuclear Energy Act was reintroduced and amended to provide for an independent advisory body with reduced number of members and reduced scope of duties.

i) Legal status

The Swiss Federal Nuclear Safety Commission (*Commission fédérale de sécurité nucléaire*) is stipulated in Article 71 of the Nuclear Energy Act of 21 March 2003, as amended on 22 June 2007 and entered into force on 1 January 2008. The obligations and the organisation of the Commission are further detailed in the Ordinance on the Swiss Federal Nuclear Safety Commission of 12 November 2008, entered into force on 1 January 2009.

The Commission acts as an advisory body to the Federal Council, the Federal Department of the Environment, Transport, Energy and Communications ("DETEC") as well as the Swiss Federal Nuclear Safety Inspectorate ("IFSN") and delivers an annual report to the DETEC.

ii) Responsibilities

The Commission's functions are outlined in the Nuclear Energy Act. According to Article 71, the Commission studies fundamental nuclear safety issues and supports legislative work in the context of nuclear safety. The Commission can give to the Federal Council or the DETEC an opinion on the safety assessment reports by the regulatory body. The Commission also gives its opinion on safety issues, as requested by the Federal Council, the DETEC or the Federal Office of Energy ("SFOE").

The duties of the Commission are further detailed in the Ordinance of 12 November 2008:

- State of the art and research (Article 2):
The Commission is keeping track of the state of the art of science and technology, in particular in the field of nuclear safety. It can propose relevant research that could be carried out in Switzerland or recommend participation in foreign or international research projects.
- Basic nuclear safety issues (Article 3):
The Commission is dealing with basic nuclear safety issues in particular in the fields of the technical safety of installations, the impact of organisational and human factors on nuclear safety, the disposal of radioactive waste, the assessment of nuclear safety as well as the regulation and surveillance of nuclear installations. The Commission may recommend measures to enhance nuclear safety. It may also give its opinion on specific issues raised by IFSN.
- Rule-making (Article 4):
The Commission is involved in the drafting of acts and ordinances in the field of nuclear safety. It may comment on the directives of the regulatory bodies. The Commission may recommend adopting or amending regulations for Swiss nuclear installations.
- Opinions (Article 5):
The Commission may give its opinion on the safety assessment reports by the regulatory body in the licensing procedures for a general licence, construction licence or operating licence; it may also give its opinion on other safety assessments by the regulatory body. In doing so the Commission may cover only selected aspects of safety; it includes, however, a statement on the adequacy of the measures taken to protect man and environment.

The Commission does not cover security issues. Radiation protection issues are assigned to the Federal Commission for Protection against Radiation and Monitoring of Radioactivity.

On an annual basis the Commission has to submit a work plan and a report on its activities to the DETEC. The annual report is being published. In current practice and all statements in the context of licensing or rule-making procedures are published on the website the Commission

iii) Structure

The Swiss Federal Nuclear Safety Commission comprises five to seven members. Members of the Commission have expert knowledge in relevant fields of science and technology. Candidates for members, including the chairperson, are nominated by the DETEC and appointed by the Federal Council. The Commission can submit proposals for candidates to the DETEC.

Societal positions in favour of nuclear energy as well as critical positions must be represented in the Commission. Persons who are in a connection with operators of nuclear installations shall not represent the majority of members. Members of the Commission serve in a private capacity and do not represent any organisation or company. Members are not bound by any instructions and may not nominate a substitute to take their place.

If necessary, the Commission may, with permission of the SFOE, call in external experts (Article 10 of the ordinance). Also, specific issues may be dealt with in temporary expert committees to prepare for decision-making in the Commission.

Necessary information is provided to the Commission by the regulatory bodies. Should the information not be available to them, the Commission is entitled to collect such information directly from the holder of, or applicant for, a licence. The Commission's work is confidential and an obligation of professional secrecy is imposed on experts. If a person, beyond his or her assignment

in the Commission, is directly involved in a subject matter or is in connection with a party involved in a subject matter, he or she shall stay out.

The Commission can take decisions in meetings on a simple majority basis (with casting vote by the chairperson), if at least two-thirds of its members are present. Alternatively decisions can be taken via correspondence on a qualified majority basis of at least two-thirds of the members.

The Commission is supported by a secretariat. Commission and secretariat are administratively attached to the SFOE.

b) Federal Commission for Radiological Protection and Monitoring of the Radioactivity in the Environment

The Federal Commission for Radiological Protection and Monitoring of the Radioactivity in the Environment is attached to the FDHA.

i) Responsibilities

The Commission is responsible for giving general advice to the FDHA on questions relating to the protection of the population against hazards from ionizing radiation. Thus, the Commission is consulted in particular on the changes or additions to be made to maximum permissible dose definitions for persons exposed to radiation and on guideline activity levels and surface contamination in the environment.

If there are medical grounds for removing, whether temporarily or permanently, a person occupationally exposed to ionizing radiation from his workplace, the FDHA must ask for the Federal Commission's opinion on the matter.

Guidelines relating to requirements for the protection of patients exposed to radiation for medical examination purposes are adopted by the FDHA.

ii) Structure

Members of the Federal Commission come from university and medical circles and from the administration.

c) Federal Emergency Organisation on Radioactivity

In the event of a dangerous increase in radioactivity, a Federal Emergency Organisation on Radioactivity (EOR) is called upon to follow developments in the situation and to propose or recommend appropriate protection measures. The organisation is headed by a Steering Committee on Radioactivity (LAR) which is under the aegis of the Federal Department of Defence, Civil Protection and Sport (DDPS). The Steering Committee has at its disposal an alarm post, a monitoring centre and other resources such as the National Alarm Centre.

Members of the LAR include representatives from federal departments, government services, the cantons and directors of the different federal offices and other bodies. LAR also has at its disposal various federal commissions.

3. Public and semi-public agencies

a) Paul-Scherrer Institute (PSI)

PSI is a multi-disciplinary research centre for natural sciences and technology. PSI collaborates with national and international universities, other research institutions and industry in the areas of solid-state research and materials sciences, particle physics, life sciences, energy research and energy related environmental research. PSI employs about 1 300 members of staff, making it the largest of the national research institutions – and the only one of its kind within Switzerland.

i) Legal status

The PSI is part of the ETH-Domain which covers the two Swiss Federal Institutes of Technology, ETH Zurich and EPF Lausanne, run by the Swiss Federation and four national research institutes, one of the PSI. PSI is a Confederation research establishment governed by public law.

ii) Responsibilities

The Paul-Scherrer Institute is entrusted with research activities in the following fields:

- physics of condensed matter and materials sciences;
- radiochemistry, structural biology and radiation medicine;
- elementary particle physics;
- nuclear energy (especially relating to nuclear safety and radioactive waste disposal);
- non-nuclear energy and energy related environmental sciences.

PSI is one of the world's leading user laboratories for the national and international scientific community. It develops, builds and operates complex large-scale research facilities that impose particularly high requirements in terms of knowledge, experience and professionalism. PSI plays also an important role in education and training. About 300 PhD students perform a doctoral thesis at PSI and about 70 PSI scientists teach at Swiss universities, at the ETH Zurich and Lausanne or at one of the universities of applied sciences.

The Institute also provides various services to the government and to other public bodies and the industry, also in the fields of nuclear safety, radioactive waste disposal and environmental protection in relation to energy use. The PSI advises federal bodies, in particular the Swiss nuclear safety authorities and carries out research on their behalf. It also provides support to the Swiss authorities responsible for radiation protection.

Lastly, the Institute collaborates with the international scientific community in preparing joint research and development programmes.

iii) Structure

The PSI belongs to the domain of the Swiss Federal Institutes of Technology (ETH Domain), which consists of the two technical universities ETH Zurich and ETH Lausanne and of four national research centres, the largest of them the PSI. It is divided into six research departments and two technical support departments, one of them operating the large scale research facilities, in particular the synchrotron light source, the proton accelerators and the spallation neutron source.

The ETH-Board is the strategic management and supervisory body of the ETH Domain. It defines the strategy of the **domain sets boundary conditions** and formulates the performance agreements for the six ETH institutions. The ETH Domain receives annually a global budget, which is distributed to the institutions of the domain, by taking into account strategic issues, national duties and the performance of the six institutions in the past years.

iv) Financing

PSI is about 80 percent government funded (by annual global budget; about CHF 240 million for 2009), the other 20 percent by third party contributions (research contracts with industry, funding organisations, donations and sponsoring). Scientific services are charged by full costs.

b) Fund for the decommissioning of nuclear installations and for the waste disposal*i) Legal status*

Provision was made in the former Federal Order of 6 October 1978 concerning the Atomic Energy Act for the setting up of a fund for financing the decommissioning and dismantling of nuclear

installations no longer in service. This fund was set up on 1 January 1984 and is managed under the supervision of the Federal Council. It has been given its own legal personality and has its headquarters in Bern.

Chapter 7 of the Nuclear Energy Act of 21 March 2003 contains more specific provisions: it separates the decommissioning fund from the waste disposal fund, both of which still report to the Federal Council and have legal personality.

The Ordinance of 7 December 2007 on the Decommissioning Fund and the Waste Disposal Fund defines costs the funds have to cover, the requirements concerning the payments, the investments politic, the currency, the accountability, the provisions before the decommissioning of the nuclear power plants, the organisation and the monitoring of the funds.

ii) Responsibilities

The fund for financing the decommissioning and dismantling of nuclear installations no longer in service was set up to cover costs arising from the decommissioning and dismantling of nuclear installations no longer in use and from the management of the waste produced.

The decommissioning fund established by the Nuclear Energy Act shall ensure the financing of the decommissioning and dismantling of nuclear installations withdrawn from service, and that of the disposal of the waste produced thereby (decommissioning costs). The waste disposal fund shall ensure the financing of the disposal of radioactive operating waste and of spent fuel assemblies, after withdrawal from service of nuclear installations, disposal costs (Article 77 of the Nuclear Energy Act).

iii) Structure

Each fund established by the Nuclear Energy Act must be administered by a board acting as a directing body and nominated by the Federal Council (Article 81).

The Ordinance of 7 December 2007 on the Decommissioning Fund and the Waste Disposal Fund defines the structure of the funds. This structure outlines a board, a secretariat and an auditing body. The members of the commission and of the auditing body are nominated by the Federal Council. The funds are administered by a Commission with a maximum of nine members. The nuclear power plants operator may require a maximum of the half of the seats of the Commission.

iv) Financing

The resources of the fund for financing the decommissioning and dismantling of nuclear installations no longer in service are constituted by the contributions paid by the owners of nuclear installations subject to the Ordinance of 7 December 2007 on the Decommissioning Fund and the Waste Disposal Fund. Every five years, the Commission of the fund fixes the annual amount due by each owner.

The boards administering the funds established by the Nuclear Energy Act shall set the amount of contributions to be paid by each contributor to the funds.

c) National Co-operative for the Disposal of Radioactive Waste (Nagra)

i) Legal status

The National Co-operative for the Disposal of Radioactive Waste ("Nagra") is a private co-operative company set up in 1972 by the waste producers (the Confederation and five electricity companies), to undertake, at national level, the planning and implementation of final disposal solutions for the various categories of radioactive waste.

ii) Responsibilities

Nagra is responsible for the disposal of all types of radioactive waste. This includes in particular the preparation of proposals and licence applications (within the framework of the sectoral plan “deep geological repositories” and according to the nuclear energy law) as well as the construction, operation and closure of the repositories. Its tasks include the following:

- Characterisation and ongoing inventorying of radioactive wastes as a basis for planning disposal projects; checking waste specifications as part of the waste disposal certification procedures and as a service to the members of Nagra.
- Acquisition and evaluation of geological data required for site selection, safety assessment and disposal projects.
- Project studies providing input for designing repository installations and engineered barriers, and for planning operating procedures.
- Ongoing analysis of results and data within the context of performance assessment and evaluation of information with a view to licensing procedure requirements.
- Development of databases and fine-tuning of the methods used to evaluate disposal system behaviour; verification and validation of the data and models used in performance assessment.
- Active participation in international collaborative projects, with the aim of co-ordinating and optimising planning and development activities as well as maintaining contact with similar organisations in foreign countries.
- Fulfilling responsibilities in terms of communication and information requirements, in particular keeping the public informed on the current status of disposal programmes and proposals for management solutions.
- Providing expert services to third parties.

Every five years, Nagra has to compile the waste management programme on behalf of the waste producers as stipulated by nuclear energy legislation. Nagra also periodically updates the cost estimates for final disposal that serve as a basis for the annual contributions paid by the nuclear power plant operators to the waste management and decommissioning fund.

iii) Structure

All Swiss producers of waste of nuclear origin, including the Confederation, are members of Nagra. The Confederation participates on two counts: first, as a producer of waste from research reactors and from the processing of radioactive materials and secondly, as the collector of waste produced in the fields of industry, research, medicine and education.

The Board of Directors of Nagra is composed of persons from the FDHA and from industry circles concerned with the disposal of radioactive waste. Particular responsibility for studying the technical and safety aspects of waste processing has been given to a technical commission made up of specialists in the nuclear energy field. To accomplish its task, the commission may call upon external experts.

iv) Financing

Nagra is a non-profit making co-operative organisation. Expenses are paid by the members. The cost of radioactive waste disposal is borne entirely by the producers of the waste concerned.

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

The OECD is a unique forum where the governments of 31 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.

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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, Republic of Korea, the Slovak Republic, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The European Commission 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 programme 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.

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