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Nuclear Legislation in OECD Countries

Regulatory and
Institutional Framework
for Nuclear Activities

Korea



Korea

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I. General regulatory regime

1. Introduction

Korea's principal nuclear energy legislation (Framework Act No. 483 of 11 March 1958 on Atomic Energy) dates back to 1958 but has been amended many times. In 1982, a significant revision of the original act, with a view to consolidating all existing legislation in the nuclear field, was adopted by the Korean Parliament (Act No. 3549 of 1 April 1982). In 1986, another amendment was made (Act No. 3850 of 12 May 1986), whose main aim was to provide the legal basis for the establishment of a nuclear waste management fund. In 1995, Parliament decided to promote the establishment of an integrated nuclear promotion plan (Act No. 4940 of 5 January 1995).^{*} This plan, to be adopted every five years, defines the future orientations of the utilisation of nuclear energy, including measures in the field of safety [Article 8(2) bis].

A further amendment (Act No. 5233) was made on 30 December 1996. The main provisions of the amendment are as follows:

- the establishment of the Atomic Energy Safety Commission (Article 5);
- the establishment of the atomic energy fund for research & development [Article 3(2)];
- the opening of the public hearing procedures [Article 104(5)].

Korea's subsequent nuclear legislation consists particularly of:

- Presidential Decree No. 10927 of 30 September 1982, as amended in 1989 (Decree No. 12729 of 16 June 1989), which consolidated eleven previous decrees covering all aspects of the peaceful use of nuclear energy and
- Ordinance No. 275 of 13 April 1983 of the Prime Minister, also revised (Ordinance No. 356 of 4 January 1990), which implemented the basic 1982 Act and the aforementioned Presidential Decree.

The purpose of the 1982 Act, as stated in Article 1, is to help improve the people's welfare and standard of living and to ensure the protection and safety of the public against radiation hazards, by encouraging scientific progress and industrial development of activities related to the production and use of nuclear energy.

From an institutional standpoint, the Minister of Education, Science and Technology is responsible for nuclear safety and regulation. The Minister of Knowledge Economy is in charge of construction and operation of nuclear power plants and nuclear waste disposal facilities.

* The 20 nuclear power plants currently operating in the Republic of Korea ("Korea") provide 27.7% of the country's total electricity production, or about 144 254 GWh(e) in 2008. In addition, Korea has scheduled a major nuclear infrastructure programme to be implemented over the next 15 years: 16 new nuclear units will be built by 2015.

Also of significance is the Atomic Energy Commission. Its powers and structure have been substantially changed over the years, reflecting the many amendments to the 1958 Framework Act since its adoption. On a general basis, the Commission advises the government on nuclear issues and sets broad guidelines for the peaceful use of nuclear energy in Korea. However, through the amendment introduced by the Act of 30 December 1996, the Commission was divided into two sub-commissions: the Atomic Energy Commission and the Atomic Energy Safety Commission.

The latest amendment to the Atomic Energy Act was done in 2008 and its main purpose is to establish a basic plan concerning the management of radioactive waste (Article 7, Act No.9016 of 28 March 2008).

2. Mining regime

Originally, the 1958 Atomic Energy Act contained a specific provision (Article 17) regarding the mining regime. It stipulated that the regime for mining radioactive ores had to be defined by a separate act. As a result a general Mining Act covering all ores was adopted in 1982 and Article 3 in particular deals with mining activities related to uranium and thorium. As a consequence, the 1958 Atomic Energy Act as revised contains no provisions dealing with prospecting and mining activities.

3. Radioactive substances, nuclear fuel and equipment

Procedures for the possession and use of nuclear materials and radioisotopes are set out in Act No. 3549 of 1 April 1982, as amended in 1995, 1996, 1999 and 2008. Additional provisions are contained in Presidential Decree No. 10927 of 30 September 1982 [as amended in 1989, 1995 and 2008 (Decree No. 21214)] and in Ordinance No. 275 of 13 April 1983 (as amended in 1990 and 2008).

Section 2 of Chapter VI of the 1982 Act deals with the use of nuclear materials. According to Article 2 of the act, the term "nuclear materials" encompasses both nuclear fuel materials and source materials. Depending on the nature of the nuclear materials in question there are two parallel, but separate, procedures to be established. Thus, the use or possession of nuclear fuel materials requires a licence (1982 Act, Article 57), whereas source materials need only be reported (Article 64).

Any person intending to possess or use nuclear fuel materials must therefore obtain a licence from the Minister of Education, Science and Technology (Article 57) in accordance with the provisions of the Presidential Decree. Before issuing such a licence the Minister is required to ensure that (Article 58):

- the applicant has the technical capability to use and to possess nuclear fuel materials;
- nothing about the site, infrastructure or equipment of the installation concerned or the storage and disposal facilities for nuclear fuels shall preclude preventive measures being taken in the event of a risk of radioactive contamination and
- the proposed activities do not pose a danger to human health, property and the environment.

The Minister of Education, Science and Technology may, at any time, revoke a licence or take similar action (such as suspension of the licence or repair of the installation) if he considers that the requirements of the licence, as provided for in Article 58, have not been met or if these activities are likely to jeopardise public safety or that they are not in line with the existing technical standards (2008 Act, as amended, Article 60).

Any person planning to use source materials must submit the notification thereof to the Minister. Plans for their use must satisfy the technical standards set by Presidential Decree No. 21214 of 2008 [Act of 1982, as revised, Article 64(1)] and must be approved. If the proposed methods are deemed inappropriate, the above mentioned Minister may order that they be corrected or that additional measures be taken [Act of 1982, Article 64(3)].

Decree No. 21214 exempts certain cases:

- Article 172 lists the fuels which, because of their type or quantity, do not require a licence;
- Article 172 also exempts from the notification procedure source materials whose radioactivity is less than 0.002 μ Ci/g and uranium or thorium used in quantities below 900 grams.

Licensing applications and official notifications must contain detailed information on the applicant's identity and address, the nature and quantity of the substances used or possessed, the purpose and methods for their use and technical details regarding the location, structure and equipment of the facilities where the substances are to be used. In the case of nuclear fuels, additional information is required on methods of storing or reprocessing spent fuels (Ordinance of the Prime Minister No. 275 of 13 April 1983, as amended in 1990, Article 68 and 75).

The use or sale of radioactive isotopes or radiation generating devices generally requires a licence from the Minister of Education, Science and Technology (1982 Act, Article 65 as amended in 2008) which is granted on three conditions (Article 66):

- that the location and structure of the installation complies with the technical standards established by the 1982 Presidential Decree as amended in 1989 and 2008;
- that neither the radioisotopes, the contaminated materials nor the ionising radiation generating devices pose a threat of radioactive contamination;
- that non-destructive testing by radioisotopes or radiation generating devices conform, not only to the above-mentioned two conditions, but also to the technical standards established by the Presidential Decree.

In addition, the 1982 Act stipulates the grounds for the revocation or suspension of licences (Article 68), the mandatory technical standards (Article 71) etc. The details of these procedures are set out in the 1982 Presidential Decree and the Prime Minister's 1983 Ordinance, both as amended.

With regard to sealed radioisotopic sources or ionising radiation-generating devices, the 1982 Act stipulates that if the quantities or capacities involved are below the limits set by the Prime Minister's Ordinance, their use need only be reported (Article 65).

4. Nuclear installations

a) Licensing and inspection, including nuclear safety

i) Construction and operation

Chapter IV of Act No. 9016 of 2008, as amended, deals with the regime for the construction and operation of nuclear reactors and related facilities. According to Article 9 of Presidential Decree No. 21214 of 2008, "related facilities" means:

- nuclear reactor coolant system facilities;

- instrumentation and control system facilities;
- processing and storage facilities for nuclear fuel materials;
- radioactive waste disposal facilities;
- radiation control facilities;
- nuclear reactor containment facilities;
- nuclear reactor safety system facilities;
- other facilities which are concerned with the safety of nuclear reactors as specified by the Minister of Education, Science and Technology.

The construction of a reactor and related facilities requires prior licensing by the Minister of Education, Science and Technology (Article 11). Applications for construction permits must supply information on the applicant's identity, the chosen site and the intended purposes of the reactor or the installation, as well as technical construction specifications etc. [Ordinance of Ministry of Education, Science and Technology 02-2110-3643 of 2008, Chapter 3, Section 1 (Articles 6 to 22)].

Technical files are examined by the Korean Institute for Nuclear Safety (KINS), which in turn submits an evaluation of the construction project to the above-mentioned Minister. The KINS report must be approved by the Nuclear Safety Commission before the Minister may issue a construction permit (Decree No.21214 of 2008, Article 22).

Accordingly, construction on any given site may commence only with the Minister's written approval (2008 Act, Article 11). Furthermore, the Minister is required to ensure that:

- the applicant possesses the technical and professional capability needed to complete the task without danger;
- the chosen site and the installation's structure and equipment comply with the technical standards laid down in Presidential Decree No. 21214 of 2008 so as not to impair the protection of persons and property against ionising radiation;
- the proposed construction involves no danger of environmental pollution; applicants are also required to provide ministerial authorities with an environmental impact study [see Article 4(b) "Protection of the environment against radiation effects", *infra*].

Lastly, before construction may get under way, the prospective builder must also notify the Minister of the intended plans and construction methods (2008 Act, Article 12 bis). Article 7 of the 2008 Ordinance stipulates the minimum requirements.

Grounds for the revocation of a construction permit are set out in Article 17 of the 2008 Act. These are, *inter alia*, the discovery of illegalities in the preliminary stages of the application process, unjustified failure to carry out construction work during a period exceeding that established by Presidential Decree No. 21214 of 2008 and, more generally, the violation of standards prescribed by the Framework Act.

The procedure for obtaining an operating licence for a nuclear reactor and related facilities is quite similar to the above-mentioned procedure for the pre-construction phase. While certain conditions, including those relating to the operator's technical and professional capability and to environmental protection, are the same the prospective operator must supply additional information on the reactor's operating capacity and its compliance with the technical standards specified by Presidential Decree (2008 Act, Article 22).

Any nuclear power plant owner must appoint a person who holds an operator's licence to supervise the reactor's operation (Article 29). Persons eligible to perform this function must possess an operator's licence attesting to their past experience in another installation and/or a technical training degree. Operators' licences are issued directly by the Ministry of Education, Science and Technology.

The choice of operator is left to the owner's discretion. Notwithstanding, the Minister may order an operator's removal if it turns out that the person has not fulfilled his duties in an appropriate manner (Article 30).

Inspections must be carried out, both during the pre-operational phase (2008 Decree Article 27) and after operations have begun (Article 42). The purpose of such inspections, which are performed by specialised officers of the Ministry, is to make sure that the operation of a reactor, as well as the safety measures, comply with the technical standards set by current regulations.

The grounds for revoking an operating licence are very similar to the ones for revoking a construction permit (2008 Act, Article 24). Once an operating licence has been revoked, the reactor owner must surrender any nuclear fuel, ensure that the radioactive contamination caused by the materials used is as low as possible and dispose of the spent fuel generated during operations (Decree No. 14797 of 1995, Article 40).

Lastly, Ordinance of Ministry of Education, Science and Technology 02-2110-3643 of 2008 also deals with situations that require the competent authorities to be notified. These include notification of replacement of the licensee (Article 17), notification of discontinuance of operations (Article 22), notification of decommissioning of a reactor (Article 23) etc.

ii) Decommissioning

The 1995 Amendment to the Atomic Energy Act contains provisions concerning the safety of decommissioning operations for power reactors and other fuel cycle facilities. Their owners must, in particular, submit in advance a decommissioning plan for approval by the competent authorities.

b) Protection of the environment against radiation effects

The concept of an environmental impact study appears for the first time in the 1982 Amendment of the Atomic Energy Framework Act. While Article 11 considers the impact study an essential component of the material to be submitted by applicants for construction permits, full details of such studies are defined by Ordinance of Ministry of Education, Science and Technology 02-2110-3643 of 2008.

In the pre-operational phase, detailed information on the installation and the state of its surrounding environment (natural, social and economic) is required (2008 Ordinance, Article 7). This information includes:

- an evaluation of the environmental impact of the construction and operation of the proposed installation;
- the type of measures to be taken in order to minimise environmental impact and ecological monitoring systems;
- an estimate of the consequences of an accident on the surrounding area.

Thereafter, operators are required to protect the environment from any dangers that their installations may represent. Accordingly, studies on the state of the environment must be carried out periodically and the results are submitted to the Minister of Education, Science and Technology

if there is a real risk of radioactive contamination of the environment. In such a situation, the Minister orders the operator to take all necessary steps to preserve the environment.

c) Emergency response

Article 98 of the 2008 Act provides the basis for emergency procedures. Accordingly, the operator is required to take the appropriate safety measures without delay in the case of:

- a major risk of a nuclear accident due to an earthquake, fire or any other type of catastrophe;
- failure of nuclear related facilities; or
- a danger of radioactive contamination.

Article 301 of the 2008 Decree suggests the most appropriate emergency measures, depending on the nature of the danger.

Furthermore, in an emergency, the exposure of workers to ionising radiation must be kept to a minimum by reducing the duration of such exposure. Exposure thresholds are set by the Minister of Education, Science and Technology. In addition, operators must promptly notify the Minister of the nature of the accident as well as the safety measures that have been taken. In turn, the Minister may order a suspension of use of certain nuclear equipment, the disposal of radioactive materials, adoption of measures to reduce the effects of contamination or any other preventive measures he considers necessary (2008 Act, Article 98).

Each reactor must be equipped with a series of alarms and monitoring mechanisms, including, *inter alia*, a warning system for operating problems, an emergency cut-off system and various systems to monitor the chain reaction.

Furthermore, at international level, Korea acceded to the 1986 Conventions on Early Notification of a Nuclear Accident and on Assistance in the Case of a Nuclear Accident or Radiological Emergency respectively on 8 June 1990.

5. Trade in nuclear materials and equipment

Import and export procedures for nuclear reactors and related facilities, nuclear fuel materials and radioisotopes must be determined by the Minister of Education, Science and Technology, in agreement with the Minister of Knowledge Economy (2008 Act, Article 106). In accordance with Article 106 of the 2008 Act, detailed procedures for custom clearance of nuclear materials and radioisotopes are provided for in the "Unified Public Notice" issued by the Ministry of Knowledge Economy.

The legal basis of export and import control of nuclear materials and equipment for the prevention of nuclear proliferation is the Foreign Trade Act (Act. No. 9221 of 2008). The Ministry of Knowledge Economy is responsible for the implementation of this act. Article 19 of the act sets forth the regulations related to export control of strategic goods including nuclear materials and equipment. The "Public Notice for the export and import of strategic goods" under the Foreign Trade Act provides the control list, control area, licensing procedures and government agencies which are responsible for the licensing of specific items.

The Technology Development and Promotion Act (Act No. 9369 of 2009) is also used to control the export of nuclear-related technology. The act is implemented by the Ministry of Education, Science and Technology and the Ministry of Knowledge Economy.

The Korean Government revised the Public Notice under the Foreign Trade Act to adhere to the guidelines of the Nuclear Suppliers Group (NSG). The new Public Notice came into force on

1 October 1995, before Korea joined the NSG and the Zangger Committee (see Article 32 of Presidential Decree No. 21104 of 2008).

The export and re-export of nuclear items are subject to the approval of the relevant governmental agency. Nuclear items on the control list of NSG Part I and related technology are subject to the approval for the Ministry of Education, Science and Technology before their export or import. In the case of dual use items, the Ministry of Knowledge Economy gives the approval of export and import. The Ministry of Education, Science and Technology must consult with the Ministry of Knowledge Economy when approving the export and import of nuclear related technology.

Any person who has obtained export approval in an unlawful manner and any person who has exported nuclear materials and equipment without permission is subject to imprisonment for not more than seven years or to a fine ranging up to five times the price of the goods concerned (Foreign Trade Act, Article 53). This article also applies in the case of export which has taken place without prior licensing.

6. Radiation protection

The Atomic Energy Act of 1982, as amended lays the foundations for the radiation protection regime (Article 97). It requires nuclear operators to take the necessary action to prevent and control the effects of radioactivity on human health. New provisions were incorporated into the Framework Act in 1995 concerning in particular a radiation dosimetry system which was intended to ensure greater reliability in the management of radiation exposure of workers [Article 90(4)]. Also, the ALARA (as low as reasonably achievable) principle was incorporated into the act in 1995. This principle has been used in implementing radiation safety programmes.

a) Protection of workers

The relevant decree stipulates that, following the use of radioactive materials, a nuclear operator must assess exposure to radiation and the level of contamination within the installation and the area under surveillance. Since the purpose of this monitoring is to avoid jeopardising the health of workers and of other people with access to the areas at risk, regular monitoring is necessary, especially in the radiation areas which are listed in a relevant ordinance.

The same decree also provides that workers and all other persons having access to areas at risk shall undergo periodic compulsory medical examinations. These examinations shall consist of consultations with specialists (to describe working conditions and the symptoms experienced) as well as strictly medical series. The results of these examinations must be noted and kept permanently in each worker's file whilst the medical files of former employees must be submitted to the Minister of Education, Science and Technology or handed over to specialised institutions designated by the aforementioned Minister.

b) Protection of the public

General information on the protection of the public can be found in Article 96 of the Framework Act and Act on Safeguards and Physical Protection of Nuclear Installations (Act No. 6823 of 2003 amended as Act No. 8852 of 2008). These provisions call for the establishment of an exclusion area around a reactor, related facilities or a nuclear fuel cycle facility. The purpose is to protect human health, property and the general public from the hazards of ionising radiation. A presidential decree may order and determine restrictions of access or residence of the public in the exclusion area [Article 96(2) and (3) of the Framework Act].

More specific provisions on radiation safety control for the public are dealt with in Notice No. 94(7) of the Minister of Education, Science and Technology [Notice of 29 February 1984,

revised on 9 September 1996]. This notice establishes the maximum permissible concentration of radiation in air and water and radiation exposure dose limits for the human body.

7. Radioactive waste management

In 1996, the Korean Government decided to change the administrative system for radioactive waste management. The Korean Electric Power Corporation (KEPCO) is now in charge of radioactive waste management, which was previously under the competence of the Korean Atomic Energy Research Institute (KAERI).

In 2006, the Korean Government approved the plan to build low to medium level radioactive waste facilities so relevant legislations were needed. Consequently two acts were adopted: Act on the Management of Radioactive Wastes (Act No. 9016 of 28 March 2008) and Special Financial Assistance Act for the region where the disposal facilities for low to medium level radioactive wastes will be constructed (Act No. 9401). The aim of the act is to unify radioactive waste laws and codes and to apply systematic and effective policies in this area.

The act consists of six chapters on general rules, policy making, the management of radioactive waste, co-operation in this field, the creation of funds for the financing of radioactive waste management projects and a final chapter with supplementary rules. Based on the act, on 2 January 2009, the Korean Radioactive Waste Management Corporation (KRMC) was established as an independent government agency for the safe and more efficient management of radioactive waste generated in Korea. It will be in charge of the construction and operation of a disposal facility for low-level and intermediate-level radioactive waste, the management of spent nuclear fuel and research-related activities.

Radioactive waste management operations consist of the following:

- treatment and disposal of radioactive waste;
- transport and disposal of radioactive waste resulting from the shutdown or decommissioning of nuclear installations;
- packaging, transport and interim storage of spent fuel;
- site selection, purchase, construction and operation of permanent disposal facilities or interim storage facilities for radioactive waste and spent fuel;
- research, development and analysis related to radioactive waste management;
- establishing basic plan for management of radioactive waste and
- creating a Korean Agency for Management of Radioactive Waste and eventual management fund.

Korea is a party to the 1972 London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter. Also in 2002, Korea ratified the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

8. Non-Proliferation and physical protection

Korea ratified the 1968 Treaty on the Non-Proliferation of Nuclear Weapons (NPT) on 23 April 1975, the 1979 Convention on the Physical Protection of Nuclear Materials on 7 April 1982 and the 1996 Comprehensive Nuclear-Test-Ban Treaty on 24 September 1999. In connection with the NPT, the safeguards agreement between Korea and the IAEA has been in force since 14 November 1975, and the government established a state system for the accounting and control

of nuclear materials (SSAC) at the Ministry of Science and Technology, immediately after the safeguards agreement entered into force.

Matters concerning safeguards and physical protection of nuclear materials were provided for in the Atomic Energy Act together with subsidiary legislation. However, since 2003 these matters are regulated by a separate legislation, the Act on Safeguards and Physical Protection of Nuclear Installations (Act No.6823 of 2003 amended as Act No. 8852 of 2008). According to this act, the government should establish the measures concerning physical protection of nuclear materials and nuclear installations (Article 3). For that purpose, the Council for Physical Protection of Nuclear Installations is created under the auspices of the Minister of Education, Science and Technology (Article 5).

The state inspection system provided in the Atomic Energy Act has unique features. Each nuclear facility must prepare an "accounting and control and physical protection procedure" and submit it to the government for approval (Article 103). The purpose of the state inspection is to determine whether or not the nuclear facility is being operated according to the approved procedures. On safeguards and physical protection matters, all detailed regulations are to be provided for in notices of the Minister of Education, Science and Technology.

In addition to the international framework referred to in the opening paragraph, the Republic of Korea and the Democratic People's Republic of Korea (DPRK) concluded an agreement in which both countries pledge to refrain from producing, possessing or using nuclear weapons (31 December 1991). This bilateral agreement and the resulting sectoral non-proliferation pact call for the creation of a Commission to participate in the inspection of both countries' nuclear installations in order to verify the absence of weapons of any sort. However, following the DPRK's nuclear weapon tests in October 2006 and May 2009 and its activities related to its ballistic missile programme, the bilateral agreement between South-North Korea falls into desuetude.

9. Transport

Regulations relating to the transport of radioactive materials are set forth in Articles 86 *et seq.* of the 2008 Atomic Energy Act as amended.

Any nuclear operator planning to transport radioactive materials etc. outside the workplace must notify the Minister of Education, Science and Technology accordingly (Article 86). The notification must include a series of documents listed in Articles 90 *et seq.* of the Ordinance of Ministry of Education, Science and Technology 02-2110-3643 of 2008. The Minister, after examining an application, may request that any information he deems unclear or inadequate be corrected or supplemented [Decree No. 21214 of 2008, Article 235(2)]. In addition, operators must submit the radioactive materials to be transported for inspection by officers of the Ministry in order to verify whether a transport licence may in fact be issued (Decree No. 21214 of 2008, Article 237). Packages for the transport of radioactive materials are to be inspected and certified by officers of the Ministry in order to ensure a higher level of safety in the transport of radioactive materials.

Transport by rail, road, sea or air as well as the packaging of transported materials, must comply with the technical standards established by ministerial decree (Act of 1982, Article 87). The packaging conditions are laid down in a decree:

- Radioactive materials must be sealed within a container labelled to indicate the nature and quantity of the contents.
- Handling must be simple and safe.

- Steps must be taken to ensure that changes in temperature or pressure do not cause a container to break.
- Preventive measures must be taken against any leakage or chemical or electrical reaction arising from contact between packaging and the radioactive materials contained therein etc.

These requirements do not apply to the transport of low-level materials listed in Article 91 of the 2008 Ordinance.

The regime described above applies to the transport of radioactive materials only. There is a separate transport procedure for source materials and yet another for radioisotopes. Nevertheless, an analysis of these provisions reveals a clear similarity among the various modes of transport.

Source materials must be placed in appropriate containers that provide total insulation. Each container must be labelled to indicate the nature and quantity of its contents. In addition, source materials must be packaged in such a way as to absorb and neutralise the radiation they emit. The radiation given off at the surface of the container must not exceed certain levels fixed by Directive concerning technical criteria on radioactive safety management.

The procedure for transporting radioisotopes and materials contaminated by radioisotopes is established in the above mentioned directive. Transport must be carried out in special containers, except for cases in which:

- measures to prevent the leakage and dispersion of radiation are taken prior to transport or
- preventive action to reduce the danger of radiation has been formally approved by the Minister of Education, Science and Technology.

Ionising radiation levels at the surface of containers must not exceed the thresholds imposed by the Minister and the weight of substances transported must not compromise minimal safety measures. Further information on precautions to be taken prior to and during transport is also set out in the directive mentioned above.

10. Nuclear third party liability

Korean legislation on nuclear third party liability is to be found in two basic acts: Act No. 2094 of 24 January 1969 on compensation for nuclear damage and Act No. 2764 of 7 April 1975 on indemnification agreements for the compensation of nuclear damage. The purpose of the latter is to cover the nuclear accidents which happen during the normal operation and which are not covered by the first act. These acts are amended consecutively, i.e. in 1975, 1982, 1986, 2001 and 2008.

Act No. 2094 current Act No. 8852 on Compensation for Nuclear Damage covers the nuclear damage caused by the operation of reactors, processing and reprocessing activities and the use of nuclear fuels as well as the transport, storage and disposal of nuclear fuels or of items contaminated therefrom (Article 2). More detailed provisions regarding this legislation were introduced by Presidential Decree No. 5396 of 3 December 1970, which was in turn amended consecutively and the latest is Presidential Decree No. 21214 of 2008. The most important amendment to this act was done in 2001 by the adoption of the Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage in 1997. Even though Korea is not a party to this convention, the Korean government modernised its legislations by introducing the major features of the protocol, e.g. it set the liability amount at 300 million SDR, extended the definition of nuclear damage etc.

This act holds operators liable for nuclear damage caused by an activity listed in Article 2. This liability is strict and exclusive. In the event nuclear materials are transported between operators, the consignor is liable for any damage, unless the operators involved have agreed otherwise (Article 3 paragraph 2). The act nevertheless provides for exemptions from liability under special circumstances such as an act of armed conflicts, hostilities, civil war or insurrection (Article 3 paragraph 1).

The act sets the operator's liability at not less than 300 million SDRs for each nuclear incident (Article 3 bis). It also stipulates a possibility of intervention by the government when an extraordinary nuclear accident occurs so the total compensation amount increases (Article 14). The operator is required to take out insurance or some other form of financial security of an amount that varies according to the category and power of the installation involved (Article 5). Unless an operator has constituted a deposit to cover his obligation to provide compensation for nuclear damage, he must, in addition to his insurance policy, have concluded an indemnification agreement with the government to provide for such compensation (Article 7). Under such agreements, the government agrees to bear the cost of all compensation due under the act, up to the maximum financial security an operator is required to maintain, in so far as this security is not covered by the operator's insurance [Article 9(1)]. This article is a legal base of Act No. 2764 of 7 April 1975 on indemnification agreements for the compensation of nuclear damage. This act was supplemented by Presidential Decree No. 7755 of 22 August 1975. The act and Presidential Decree were amended consecutively, last time in 2008 (Act No. 8852 and Presidential Decree No. 20740).

In addition, the indemnification agreement also makes the government responsible for compensating nuclear damage caused by earthquakes, natural disasters such as tidal waves, floods, storms or lightning, or if unavoidable circumstances prevent a claim from being filed within the dates between which the relevant insurance contract is valid [Act No.8852 of 2008 Article 4(2); and Decree No. 20740 of 2008 Article 2(2)].

As regards international aspects, it should be pointed out that Korea is currently not a party to any of the conventions on nuclear third party liability.

II. Institutional framework

Korean legislation has been extensively revised since the Framework Act was adopted in 1958 and it brought about a gradual but significant administrative re-structuring. As a result, most nuclear related bodies have been substantially transformed in both their form and their powers. An example of this is the former Atomic Energy Office established on 21 January 1959 under the Framework Act. It was dissolved in 1973 and re-convened as the "Nuclear Energy Bureau" under the auspices of the Ministry of Science and Technology with significantly reduced responsibilities.

Currently in Korea, nuclear-related activities are organised and supervised by the Atomic Energy Commission, the Ministry of Education, Science and Technology or the Ministry of Knowledge Economy as the case may be. In some cases joint action is required.

The two Ministries are made up of specialised departments and technical bodies of a public or semi-public nature, which deal with topical issues. In the area of research, the Korean Atomic Energy Research Institute (KAERI) plays a predominant role.

1. Regulatory and supervisory authorities

a) *Minister of Education, Science and Technology, including the Nuclear Energy Bureau*

Generally speaking, the Minister of Education, Science and Technology ensures the enforcement of nuclear legislation, as embodied in the Framework Act, save where jurisdiction is expressly conferred on the Minister of Knowledge Economy or the Atomic Energy Commission. However, some functions require joint action.

The Minister of Education, Science and Technology is in charge of:

- establishing basic policies for the promotion of science and technology programmes;
- co-ordinating the ministers responsible for establishing policies related to nuclear technology;
- establishing training programmes for highly qualified scientists and engineers;
- financially supporting national research centres and subsidiary scientific institutes within the government; and
- promoting international technical co-operation and securing a desirable environment for scientific and technical progress.

In performing these tasks the Minister receives technical support from several bodies, including the Korean Atomic Energy Research Institute (KAERI) and the Korean Institute for Nuclear Safety (KINS) (see below Article 2 "Advisory Bodies").

Nuclear Energy Bureau

i) Legal status

The origins of the Nuclear Energy Bureau date back to Korea's first law relating to atomic energy in the late 1950s. Until 1973, the Bureau was continuously involved in the nuclear decision-making process, but its role was re-defined by Act No. 2437 of 15 January 1973. Today, the Nuclear Energy Bureau is part of the Minister of Education, Science and Technology.

ii) Responsibilities

The Nuclear Energy Bureau consists of four divisions and their functions are described below. The Nuclear Safety Officer assists and advises the Director-General of the Nuclear Energy Bureau on nuclear safety and radiation activities.

The *Nuclear Policy Division* is responsible for:

- definition of basic policy for the use and development of nuclear energy as well as its short and long-term objectives;
- collection and dissemination of information on nuclear energy;
- provision of staff support for the Atomic Energy Commission;
- drafting and amendment of the Atomic Energy Act and its related decrees;
- establishment of a system for promotion of nuclear activities;

- operating the national and international safeguards system;
- performing export and import control of nuclear items on the trigger list; and
- checking and inspecting the physical protection of nuclear materials.

The *Atomic Energy International Co-operation Division* is responsible for:

- establishment and management of the international co-operation policy;
- operation of bilateral nuclear joint committees;
- implementation of bilateral and international nuclear energy co-operation agreements;
- co-operation with the International Atomic Energy Agency and the OECD Nuclear Energy Agency; and
- preparing eventual mutual inspections between North and South Korea in the framework of the Joint Declaration on the Denuclearisation of the Korean Peninsula.

The *Nuclear Safety Division* is responsible for:

- licensing the production, construction, ownership, control, management and operation of nuclear reactors and installations;
- licensing the acquisition, production, import and export, possession, control and management of nuclear material and nuclear fuel cycle facilities;
- management of nuclear safety regulatory affairs;
- regulatory review of design and construction methods;
- verification and inspection of nuclear installations, nuclear reactor performance tests including pre-operational tests, start-up tests and nuclear reactor operation; and
- analysis and assessment of operational safety-related events.

The *Radiation Safety Division* is responsible for:

- licensing and supervision of the use of radioisotopes and industrial X-ray apparatus;
- control of the transport and disposal of radioactive materials;
- assessment of the effects of nuclear activities on the natural habitat near the installations;
- licensing of holders of radioactive materials; and
- establishment and co-ordination of radiological emergency measures and of physical protection of nuclear facilities.

b) Minister of Knowledge Economy

The task of the Minister of Knowledge Economy is to propose general policy with regard to energy production and the utilisation of resources, in accordance with the recommendations of the Atomic

Energy Commission. This action takes the form of a series of activities intended chiefly to conserve resources and ensure that energy is used rationally. More specifically, the minister defines basic policy with respect to programmes for the development of nuclear energy and supervises the electricity generation of nuclear power plants.

Special attention must be given to the Electric Power Office, which includes a Nuclear Power Division. The functions of this division include the following:

- establishment of basic policies for nuclear power plant development;
- supervisory control of nuclear power plant construction and operation;
- control of supply and demand of nuclear fuel; and
- co-ordination of matters related to radioactive waste and spent fuel treatment.

In addition, the Ministry exercises control over a large number of energy-related bodies, including the Korean Gas Company, the Korean Electric Power Corporation and the Korean Oil Company as well as the Institute of Energy Economics and the Institute of Energy and Resources.

2. Advisory bodies

a) Atomic Energy Commission

Created by Act No. 483 of 11 March 1958 [Article 4(2)], the Atomic Energy Commission was initially responsible directly to the President of the Republic of Korea. When the Ministry of Science and Technology was created in 1967, the Commission's chairperson was awarded to the new Minister, then to the Vice Prime Minister. From 1994 until 1999, this function was assured by the Deputy Prime Minister of Finance and Economic Planning (Article 5). Since 1999, this function has been assured by the Prime Minister.

Over the years, there has been some shifting of responsibilities and a number of changes. An important change to the structure of the Commission was introduced by Act No. 5233 of 30 December 1996. The Commission was divided into two separate commissions. One is the Atomic Energy Commission whose functions were reduced and the other is the Nuclear Safety Commission which took responsibility for those functions which are no longer to be performed by the Atomic Energy Commission. The Atomic Energy Commission is required to deliberate and decide upon a series of important issues concerning government policies pertaining to the peaceful use of nuclear energy. Its principle activities include the following:

- planning general policy on the peaceful uses of nuclear energy;
- co-ordination of the competent administrative bodies;
- estimation and allocation of expenditures of bodies competent in the field of nuclear energy;
- promotion of research activities in the use of nuclear energy;
- training of researchers and engineers;
- measures concerning radioactive waste management;
- other matters that are deemed important and suggested to the Commission by its chairperson.

The Atomic Energy Commission is responsible to the Prime Minister and has seven to eleven members including its chairperson, who is the Prime Minister. The remaining members of the Commission are the Minister of Strategy and Finance, the Minister of Education, Science and Technology, the Minister of Knowledge Economy and other members recommended by the chairperson, in particular from industry, universities and research institutes.

In addition, the Atomic Energy Commission established a special committee, the Atomic Energy Utilisation and Development Committee.

b) Nuclear Safety Commission

The Nuclear Safety Commission is established under the Minister of Education, Science and Technology. It is in charge of significant decisions on the safety of nuclear energy. Its main activities include the following:

- co-ordination of nuclear energy safety management;
- regulation of nuclear materials and reactors;
- protection of hazards which may be caused by exposure to radioactivity in the course of nuclear energy utilisation;
- promotion of experimentation and research activities concerning safety control of nuclear energy;
- training of researchers and engineers in the field of nuclear energy safety management;
- management of radioactive waste and preventive measures against radioactive risks;
- other matters that are deemed important and suggested to the Commission by its chairperson.

The Nuclear Safety Commission is composed of seven to nine members including its chairperson, who is the Minister of Education, Science and Technology.

3. Public and semi-public agencies

a) Korean Atomic Energy Research Institute (KAERI)

i) Legal status

The Korean Atomic Energy Research Institute (KAERI) is a government-funded corporate body responsible for research and development of the peaceful applications of nuclear energy.

In 1973, the Atomic Energy Research Institute, the Radiological Research Institute and the Radiation Research Institute in Agriculture were merged into one and became the present KAERI, a corporate body, according to the KAERI Establishment Act (Act No. 2443 of 15 January 1973). Currently, KAERI is also subject to the Act concerning Establishment, Operation and Development of Research Institute in the Field of Science and Technology to which government contributes financially (Act No.8852 of 29 February 2008).

ii) Responsibilities

KAERI is the national nuclear research, development and training institute established to promote the peaceful uses of nuclear energy, to advise the Minister of Education, Science and Technology

with the aim of contributing to national economic development and the enhancement of public welfare and to carry out integrated research and development activities in the nuclear field. It is also involved in developing nuclear technology and improving systems for safety and protection against ionising radiation.

In 1994, the Technology Centre for Nuclear Control (TCNC) was established within KAERI in order to deal with national inspections for accounting and control of nuclear materials in all facilities covered by IAEA safeguards. This Centre plays a key role in demonstrating Korea's nuclear transparency in the world nuclear community.

iii) Structure

KAERI is operated by the Board of Trustees whose members are from, *inter alia*, the government, nuclear-related industries and academic circles.

The president is responsible for the management of the institute. Amongst those who report to the president are the vice presidents for basic research, advanced reactor development, nuclear fuel cycle research and development and the Directors for the HANARO Centre (a research reactor used for training, research and isotope production), the Technology Centre for Nuclear Control (TCNC) and the Nuclear Training Centre.

In addition, KAERI operates the Korean Cancer Centre Hospital (KCCH) in Seoul as an affiliated organisation.

b) Korean Institute for Nuclear Safety (KINS)

i) Legal status

Act No. 4195 of 14 February 1990 provides for the Korean Institute of Nuclear Safety's autonomy from KAERI, to which it was previously attached. At present, the institute is directly answerable to the Minister of Education, Science and Technology.

ii) Responsibilities

The institute is responsible for assisting the government in its licensing and regulating activities with particular attention to protection of public health and the environment.

It is generally responsible for the following activities related to nuclear safety:

- safety review and evaluation of nuclear installations;
- inspection of nuclear installations;
- research and development of regulatory and technical standards;
- regulation of radioisotopes and ionising radiation sources; and
- technical support for development of regulatory policy.

iii) Structure

KINS is made up of seven technical divisions: the planning division, the nuclear licensing division, the nuclear regulatory inspection division, the radiation safety division, the research and safety development division, the nuclear safety technology division and the administration division.

c) Korean Electric Power Company (KEPCO)

Korea's nuclear industry is built around the national power company KEPCO which is the country's exclusive generator, distributor and carrier of electricity. It was the owner and operator of all nuclear power plants in Korea until 2001 when KHNP was established.

KEPCO is a state-owned company which is currently answerable to the Minister of Knowledge Economy.

KEPCO is responsible in particular for:

- development of electric power resources and research in related industries;
- power generation, transmission and distribution and research in related industries;
- investment in, and contribution to, the businesses mentioned above and other projects to which the government is committed;
- training of personnel by the KEPCO Training Centre and the technical schools operated by KEPCO; and
- testing services for electrical equipment.

d) Korea Hydro & Nuclear Power (KHNP)

Korea Hydro & Nuclear Power (KHNP) is a subsidiary of KEPCO. It was established in 2001 as part of a general restructuring at KEPCO. Currently KHNP operates all nuclear power plants and hydroelectric plants in Korea. At present, 20 power plants are in operation and five reactors under construction.

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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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 Commission of the European Communities also takes part in the work of the Agency.

The mission of the NEA is:

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

Specific areas of competence of the NEA include safety and regulation of nuclear activities, radioactive waste management, radiological protection, nuclear science, economic and technical analyses of the nuclear fuel cycle, nuclear law and liability, and public information.

The NEA Data Bank provides nuclear data and computer program services for participating countries. In these and related tasks, the NEA works in close collaboration with the International Atomic Energy Agency in Vienna, with which it has a Co-operation Agreement, as well as with other international organisations in the nuclear field.

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