

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

NUCLEAR LEGISLATION IN OECD COUNTRIES

Regulatory and Institutional Framework for Nuclear Activities

United Kingdom

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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

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

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

* * *

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

NUCLEAR ENERGY AGENCY

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

The mission of the NEA is:

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

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

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

© OECD 2003

No reproduction, copy, transmission or translation of this publication may be made without written permission. Applications should be sent to OECD Publishing: rights@oecd.org or by fax (+33-1) 45 24 13 91. Permission to photocopy a portion of this work should be addressed to the Centre Français d'exploitation du droit de Copie, 20 rue des Grands Augustins, 75006 Paris, France (contact@cfcopies.com).

UNITED KINGDOM

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

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

UNITED KINGDOM

I. GENERAL REGULATORY REGIME	5
1. Introduction	5
2. Mining Regime.....	5
3. Radioactive Substances	5
4. Nuclear Installations.....	6
a) <i>Licensing and inspection, including nuclear safety</i>	6
b) <i>Protection of the environment against radiation effects</i>	9
c) <i>Emergency response</i>	9
5. Trade in Nuclear Materials and Equipment.....	10
6. Radiation Protection	12
7. Radioactive Waste Management	13
8. Non-Proliferation and Physical Protection	14
9. Transport	17
10. Nuclear Third Party Liability	19
II. INSTITUTIONAL FRAMEWORK	20
1. Regulatory and Supervisory Authorities	22
a) <i>Department of Trade and Industry (DTI)</i>	22
b) <i>Secretary of State for Environment, Food and Rural Affairs and the Secretary of State for Health</i>	23
c) <i>Secretary of State for Transport</i>	23
d) <i>Secretary of State for Education</i>	24
2. Advisory Bodies	24
a) <i>Medical Research Council (MRC)</i>	24
b) <i>Nuclear Safety Advisory Committee</i>	24
c) <i>Radioactive Waste Management Advisory Committee</i>	25
3. Public and Semi-Public Agencies.....	25
a) <i>United Kingdom Atomic Energy Authority (UKAEA)</i>	25
b) <i>Health and Safety Commission and Executive (HSC/HSE)</i>	27
c) <i>National Radiological Protection Board (NRPB)</i>	29
d) <i>Environment Agencies</i>	30
e) <i>British Nuclear Fuels plc. (BNFL)</i>	31
f) <i>Amersham International plc</i>	32
g) <i>The National Nuclear Corporation Ltd. (NNC)</i>	33
h) <i>United Kingdom Nirex Ltd</i>	33
i) <i>Magnox Electric plc</i>	35
j) <i>British Energy Generation Ltd</i>	35
k) <i>Scottish Electricity Generator Companies</i>	36
l) <i>British Energy Generation (UK) Ltd</i>	36
m) <i>Regional Electricity Companies in England and Wales</i>	36

I. GENERAL REGULATORY REGIME

1. Introduction

There are at present 27 operational nuclear power units with a total capacity of 12.3 GWe at 11 sites in the United Kingdom. Nuclear energy generates approximately 23% of the country's annual electricity production. A low-level waste disposal site is operated by British Nuclear Fuel (BNFL) at Drigg in Cumbria and the United Kingdom Atomic Energy Authority operates another disposal facility for low-level waste at Dounreay. There is also one research reactor in operation. A mixed oxide (MOX) fuel fabrication plant is in operation at Sellafield. This manufactures MOX fuel from uranium and plutonium separated from spent fuel, which is mainly processed at BNFL's Thermal Oxide Reprocessing Plant (THORP), also located at Sellafield.

In the United Kingdom, the legislation dealing specifically with nuclear energy dates from 1946, in step with the development of the uses of this type of energy for peaceful purposes [Atomic Energy Act 1946]. In discussing nuclear legislation, a division is sometimes made between laws and regulations primarily directed at the protection of people, such as the Radioactive Substances Act 1993, the Health and Safety at Work etc. Act 1974, the Ionising Radiations Regulations 1999 and legislation dealing with nuclear installations, primarily concerned with licensing and controlling the safe operation of nuclear plants and also dealing with third party liability for nuclear damage, such as the Nuclear Installations Act 1965 as amended.

The purpose of this part is to provide an overall picture of the law governing all civil nuclear activities in the United Kingdom. The following part will deal in greater detail with the institutional framework for such activities.

2. Mining Regime

There are no mining activities connected with uranium extraction in the United Kingdom. However, the Secretary of State (in practice the Secretary of State for Trade and Industry) is empowered to search for and work minerals and may authorise other persons to do the same on his behalf [Atomic Energy Act 1946, Section 6]. He is also empowered to provide for the compulsory vesting of the right to work minerals either in himself or in the United Kingdom Atomic Energy Authority (UKAEA) [Section 7], and may compulsorily acquire certain minerals, and plants designed or adapted for the production or use of atomic energy or research [Section 8].

3. Radioactive Substances

The keeping and use of radioactive material and accumulation and disposal of radioactive waste are controlled mainly by the Radioactive Substances Act 1993 ("RSA 1993"). As a result of the Environment Act 1995, enforcement of RSA 1993 is the responsibility of the Environment Agency in

England and Wales and the Scottish Environment Protection Agency in Scotland. In Northern Ireland enforcement is carried out by the Environment and Heritage Service through its Industrial Pollution and Radiochemical Inspectorate (IPRI), an agency within the Department of the Environment for Northern Ireland.

RSA 1993 regulates, by way of compulsory registration with the relevant Environment Agency, the keeping and use of radioactive material on any premises, and similar control is exercised on mobile radioactive apparatus [Sections 6 to 12]. It lays down general provisions for registration of users of radioactive material for the purposes of an undertaking carried on by them. It states certain exemptions from registration including premises covered by a nuclear site licence, and states that the Secretary of State (in Scotland, the Scottish Ministers) may grant further exemptions from registration through specific orders. These cover such things as gaseous tritium light devices [S.I. 1985, No. 1047], radioluminous articles [S.I. 1985, No. 1048], testing instruments [S.I. 1985, No. 1049] and certain substances of low activity [S.I. 1986, No. 1002].

The relevant Environment Agency is:

- for England and Wales, the Environment Agency;
- for Scotland, the Scottish Environment Protection Agency; and
- for Northern Ireland, the Industrial Pollution and Radiochemical Inspectorate (IPRI).

Accumulation of radioactive waste on non-nuclear sites is regulated under the act. Accumulation of radioactive waste on nuclear licensed sites is regulated by means of the nuclear licensing regime provided by the Nuclear Installations Act 1965.

The RSA also requires the authorisation by the relevant Environment Agency of disposals of radioactive waste from both nuclear and non-nuclear sites [Section 13].

In the public sector of education, radioactive substances with an activity in excess of 100 becquerels per gram may not be used in the course of instruction without the approval of the Secretary of State for Education in England and Wales, and Scottish ministers in Scotland. There is a similar restriction on the use of an apparatus (other than a television set or similar apparatus) in which electrons are accelerated by a potential difference of 5 kilovolts or more [in England and Wales: Education Reform Act 1988, Section 218(1)(e); The Education (Schools and Further and Higher Education) Regulations 1989, S.I. 1989, No. 351, Regulation 7; Education Act 1993, Sections 172(6), 189(2) and 301(6); The Education (Special Needs) (Approval of Independent Schools) Regulations 1994, Schedule 1, Section 7, S.I. 1994, No. 651. In relation to Scotland: the Dangerous Materials and Apparatus (Educational Establishments) (Scotland) Regulations 1984, S.I. 1984, No. 668, made under Section 19(a) of the Education (Scotland) Act 1980. In relation to Northern Ireland: the Ionising Radiations Regulations 2000].

4. Nuclear Installations

a) Licensing and inspection, including nuclear safety

The Nuclear Installations Act 1965, as amended, and the Nuclear Installations Regulations 1971 made under the act [S.I. 1971, No. 381] govern the construction and operation of nuclear installations

in the United Kingdom, and health protection at such installations is regulated by the Health and Safety at Work etc. Act 1974.

The competent authority for the licensing of nuclear installations is the Health and Safety Executive (HSE), which is responsible through the Health and Safety Commission (HSC) to the Secretary of State for Trade and Industry for civil nuclear safety questions [Nuclear Installations Act 1965, Section 1, as amended by S.I. 1974, No. 2056, and Regulations made thereunder, and Sections 10 to 12 of the Health and Safety at Work etc. Act 1974].

The Nuclear Installations Inspectorate (NII), part of the Nuclear Safety Directorate of the HSE, ensures that all statutory safety requirements relevant to nuclear installations are complied with. Its nuclear installation inspectors are appointed by the HSE and have the necessary powers to enforce the relevant legislation. The purpose of inspections is to verify that the requirements of the nuclear site licence are met throughout the construction, commissioning and operating period of the nuclear installation and its decommissioning. They also provide checks on the effectiveness of the safety measures taken by the licensee.

The Nuclear Installations Act 1965 makes provision for the licensing of nuclear installations by means of a nuclear site licence which sanctions the use of a particular site for a specific reactor type or plant. Previously, nuclear installations operated by the UKAEA were not subject to the licensing system of the 1965 Act. By Ministerial directive, the UKAEA was required to maintain equivalent standards to those imposed on other nuclear operators. However, the Nuclear Installations Act 1965 (Repeal and Modification) Regulations 1990 removed the UKAEA's exemption from licensing [S.I. 1990, No. 1918].

The 1971 Regulations prescribe as licensable various classes of installation in the nuclear field where nuclear hazards could arise. Sections 1, 3 to 6, 22 and 24(a) of, and Schedule 2 to, the 1965 Act are listed in Schedule 1 of the Health and Safety at Work etc. Act 1974 and are thus relevant statutory provisions within the meaning of Part 1 of that act.

The 1965 Act [Section 1] provides that no nuclear reactor (other than one comprised in a means of transport) or nuclear installation of a kind prescribed by regulations (currently the 1971 Regulations) may be installed or operated on a site unless a nuclear site licence has been granted by the HSE in respect of that site.

The installations prescribed by the 1971 Regulations [Regulation 3] are:

- an installation manufacturing fuel elements for the production of atomic energy from enriched uranium, plutonium or any alloy or chemical compound containing them;
- an installation used for producing alloys or chemical compounds from enriched uranium or plutonium or for producing enriched uranium or plutonium from any alloy or chemical compound containing them;
- an installation for the incorporation of enriched uranium or plutonium, or any alloy or chemical compound containing them, in devices designed for subsequent irradiation in a reactor or to form part of a nuclear assembly;
- an installation comprising a nuclear assembly for the production of neutrons, which contains enriched uranium, plutonium or any alloy or chemical compound of them and in

which a controlled chain reaction can be maintained with an additional source of neutrons;

- an installation for processing irradiated nuclear fuel;
- an installation for the storage of fuel elements, irradiated nuclear fuel or bulk quantities of other radioactive matter produced or irradiated in the course of producing or using nuclear fuel;
- an installation involved in the extraction of plutonium or uranium by the treatment of irradiated material, or in the enrichment of uranium;
- an installation for the production of radioisotopes from nuclear material.

A licence may be granted only to a corporate body [Nuclear Installations Act 1965, Section 3(1)]. It is not transferable and is granted in respect of a specific site [Sections 3(1) and 1(1)]. The licence enables the corporate body (the licensee) to install and operate a nuclear installation of a kind prescribed by regulations, or a nuclear reactor, on the site specified in the licence. Conditions attached to the licence provide the necessary checks and controls to be exercised during the design, construction, commissioning and operational stages of the installation as well as the decommissioning stages; these conditions may include, *inter alia*, provisions for [Section 4(1)]:

- securing the maintenance of an efficient system for detecting and recording the presence and intensity of ionising radiations emitted from anything on the site or from anything discharged on or from the site;
- regulating the design, siting, construction, installation, operation, modification, maintenance and decommissioning of any plant or installation on the site.

In addition to licensing requirements under the 1965 Act, the applicant for a nuclear site licence for a nuclear power plant requires the consent of the Secretary of State (in practice, the Secretary of State for Trade and Industry) under Section 36 of the Electricity Act 1989.

Under the Electricity Act 1989, the Secretary of State may, with the approval of the Treasury, make grants or loans for the decommissioning of nuclear installations licensed under the Nuclear Installations Act 1965 [Schedule 12].

The Secretary of State for Trade and Industry may exempt from the licensing requirements of Section 1 of the 1965 Act any installation described in Regulation 3 of the 1971 Regulations which he considers as not being a relevant installation [1971 Regulations, Regulation 4].

Finally, the 1965 Act provides that a permit granted by the UKAEA or a government department is required in addition to a nuclear site licence (where that is required) for the use of any site by any person other than the UKAEA or a government department, for any treatment of irradiated material involving the extraction of plutonium or uranium or for the enrichment of uranium. Permits granted by the UKAEA are limited to work for the purpose of research and development [Section 2(1A) as inserted by Section 17 of the Atomic Energy Authority Act 1971].

It is relevant to note that at the international level the United Kingdom ratified the 1994 Convention on Nuclear Safety on 17 January 1996.

b) *Protection of the environment against radiation effects*

In the United Kingdom, environmental protection provisions with respect to the harmful effects of radiation are not embodied in a single piece of legislation but are set out in several different texts dealing with health and safety, nuclear site licensing, pollution from radioactive waste and dumping at sea (environmental protection in the context of radioactive waste and dumping are dealt with under Section 7 “Radioactive Waste Management”, *infra*).

The Environment Act 1995 created the Environment Agency in England and Wales and the Scottish Environment Protection Agency in Scotland. These Agencies enforce environmental protection legislation and specifically, with respect to radioactivity, are the enforcement organisations for the Radioactive Substances Act 1993 (RSA 1993). In Northern Ireland the Industrial Pollution and Radiochemical Inspectorate is the enforcement organisation for the Radioactive Substances Act 1993.

The RSA 1993 deals primarily with the control of radioactive waste. All authorisations under the RSA 1993 for nuclear licensed sites include a clause to apply the best practicable means with respect to minimising quantities and volumes of waste disposed of. The Environment Agencies have a duty to apply the provisions of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora when exercising their powers under the RSA.

The Health and Safety at Work etc. Act 1974 provides [Section 5] that it is the duty of persons having control of premises of a kind prescribed by regulations to use the best practicable means to prevent the emission of noxious substances into the atmosphere and for rendering harmless substances so emitted. The premises prescribed include these in which any ore or material containing uranium is treated for the production of uranium, or in which any specific compounds of uranium are manufactured or used, or in which uranium or its compounds are manufactured or fashioned by methods giving rise to dust or fume, other than licensed nuclear sites of nuclear reactors (or facilities for the processing of irradiated fuel therefrom) for the purposes of removing fission products [The Health and Safety (Emissions into the Atmosphere) Regulations 1983, S.I. 1983, No. 943]. Section 1(1)(d) of the 1974 Act was, however, repealed, with effect from 1 April 1996 in relation to England and Wales. In Northern Ireland, Industrial Pollution Control (Northern Ireland) Order 1997 applies.

For nuclear installations, the Nuclear Installations Inspectorate attaches standard conditions to the nuclear site licence covering radioactive waste disposal, provisions relating to leaking and escape of radioactive material and radioactive waste.

c) *Emergency response*

Before 2001, the Nuclear Installations Act 1965 and the Ionising Radiations Regulations 1985 included provision for the making, implementation and testing of adequate arrangements to deal with nuclear emergencies by way of conditions attached to a nuclear site licence. The Radiation (Emergency Preparedness and Public Information) Regulations (REPPPIR) came into force on 20 September 2001 and implement Title IX, Section 1 (intervention in case of emergency) of Council Directive 96/29/Euratom of 13 May 1996 laying down basic standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation. They also amended the Ionising Radiations Regulations 1999.

The Ionising Regulations 1999 apply to any work with ionising radiation, which involves having on any premises, or transporting by rail, or transferring through public places radioactive substances in

quantities exceeding specified thresholds. The competent authority for the purposes of the regulations is the Health and Safety Executive. The regulations contain provisions on hazard identification and risk evaluation, emergency plans and public information.

The operator or carrier is required to make an assessment as to hazard identification and risk evaluation before radiation work is carried out for the first time, and where the assessment reveals a radiation risk, to take all reasonably practicable steps to prevent a radiation accident or limit its consequences. The operator or carrier must also submit a report of each assessment made to the HSE.

Where it is reasonably foreseeable that a radiation emergency might arise that could have off-site consequences, the operator or carrier shall prepare an adequate emergency plan designed to secure the restriction of exposure to radiation and the health and safety of persons who may be affected by such emergencies. Furthermore, the local authority in whose area premises carrying out work with radiation are situated shall prepare an off-site emergency plan. The regulations also require the operator, the carrier and the local authority to review, revise and test emergency plans at suitable intervals.

Sections 16 and 17 of the regulations specify the duties of the operator or carrier in respect of the content and type of information which must be provided to the public prior to or in the event of a radiation emergency.

The Secretary of State for Trade and Industry is responsible for co-ordinating the framework for nuclear emergency plans in Great Britain. The Secretary of State for Northern Ireland is responsible for co-ordination of nuclear emergency planning in Northern Ireland and the 2001 Regulations do not apply here. Under an agreement with the Secretary of State for Trade and Industry, the Scottish Executive undertakes those functions relating to civil nuclear emergencies in Scotland.

The Radiation (Emergency Preparedness and Public Information) Regulations (Northern Ireland) 2001 [S.R. 2001, No. 436] apply in Northern Ireland. These regulations were made by the Department of Enterprise, Trade and Investment on 20 December 2001 and came into force on 4 February 2002.

The First Minister and Deputy First Minister within the Northern Ireland Assembly have overall responsibility for the implementation in Northern Ireland of emergency measures under the United Kingdom National Response Plan for dealing with a nuclear accident in peacetime. The Department of the Environment, Northern Ireland, however, is designated as the lead Department in responding to emergencies of this nature. If the Northern Ireland Assembly is suspended for any period, the Secretary of State is responsible for the implementation of emergency measures under the United Kingdom National Response Plan.

On 9 February 1990, the United Kingdom ratified 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.

5. Trade in Nuclear Materials and Equipment

The keeping or use of radioactive substances is controlled under the Radioactive Substances Act 1993, and the Medicines Act 1968. Certain provisions of these acts do not apply, however, to nuclear installations licensed under the Nuclear Installations Act 1965, namely, reactors, fuel fabrication and reprocessing plants and fuel enrichment plants, including those which hold plutonium

extraction permits under Section 2 of the 1965 Act and are bodies corporate within the meaning of Schedule 1 to the act, and those which are designated companies under Section 19 of the Atomic Energy Authority Act 1971. Those are companies established in connection with the Agreement on the gas centrifuge process, Urenco Ltd. and CENTEC which are subject to security provisions (see below under Section 8 “Non-Proliferation and Physical Protection”).

The Medicines Act 1968 is mainly the concern of the Secretary of State for Health and deals, *inter alia*, with the keeping and use of radioactive apparatus and substances for medicinal and therapeutic purposes. The Radioactive Substances Act 1993 is mainly the concern of the Secretary of State for the Environment, Transport and the Regions in England and Wales, the Scottish Ministers in Scotland and the Department of the Environment for Northern Ireland in relation to Northern Ireland. The act deals with the use and keeping of such substances from the point of view of public and environmental protection and control of radioactive waste.

The Medicines Act 1968 introduces a comprehensive system of licensing for medical products. This system includes subordinate instruments which relate to trade in and use of such products [S.I. 1978, No. 1004; S.I. 1978, No. 1006; S.I. 1995, No. 2147].

As regards exports, a licence is required for the export of dual-use goods, including nuclear material and equipment. Exportation of such goods from the United Kingdom is controlled by Council Regulation (EC) No. 3381/94 [EC OJ No. 367, 31 December 1994, p. 1] and associated Council Decision 94/942/CFSP [EC OJ No. 367, 31 December 1994, p. 8] as amended, which are directly applicable in Member States. However, licensing powers, penalties, enforcement and certain optional provisions of the EC Regulation, together with certain purely national controls, are given effect in the United Kingdom by the Dual-Use and Related Goods (Export Control) Regulations 1994 [S.I. 1994, No. 272] made under Section 2(2) of the European Communities Act 1972. Export controls are imposed for a variety of reasons, including non-proliferation policy and international treaty obligations and commitments, and these are matters that are taken into account in considering licence applications. The Secretary of State may grant licences and Community licences; a Community licence is an authorisation granted by a competent authority for the export of dual-use goods from the European Community.

The import of goods including nuclear materials and equipment into the United Kingdom is controlled by the Import, Export and Customs Powers (Defence) Act 1939. Section 1 of the act, as amended by the Secretary of State for Trade and Industry Order 1970, empowers the Secretary of State to make by Order such provision as he thinks expedient for prohibiting or regulating in all cases or any specified classes of cases the importation into the United Kingdom of all goods or goods of any specified description.

The Import of Goods (Control) Order 1954 prohibits all goods (other than most goods from the Channel Islands) from being imported into the United Kingdom except under a licence granted by the Secretary of State. The granting of licences is carried out by the Import Licensing Branch of the Department of Trade and Industry. Under the 1954 Order the Secretary of State from time to time grants an Open General Import Licence (OGIL), the effect of which is to permit the importation into the United Kingdom of all goods except those specified in the Schedule. Each OGIL revokes the previous one. The current OGIL was granted on 4 December 1987 and has been frequently amended. The effect of the 1954 Order and the current OGIL is that an individual licence is required for the importation into the United Kingdom of certain nuclear materials.

Controls on the import, export and supply and delivery of goods are also contained in Orders in Council made under the United Nations Act 1946 to give effect to United Nation trade sanctions. Orders exist in relation to Iraq, Libya, Serbia and Montenegro, Haiti, Liberia, Somalia, and Rwanda.

Council Regulation (Euratom) No. 1493/93 controls transboundary movements of radioactive sealed sources and radioactive waste between Member States of the European Union. The shipment of radioactive waste between Member States of the European Union, or into or out of the European Union, is also subject to Directive 92/3/Euratom, which has been implemented in the United Kingdom by the Transfrontier Shipment of Radioactive Waste Regulations 1993.

6. Radiation Protection

The protection of workers and the public against the hazards of ionising radiation is governed by several enactments and instruments, including the Ionising Radiations Regulations 1999 [S.I. 1999, No. 3232] [in Northern Ireland S.R. 2000, No. 355], the Radioactive Substances Act 1993, the Health and Safety at Work, etc. Order 1978, as well as the Medicines Act 1968 under which instruments have been made [e.g., the Medicines (Radioactive Substances) Order 1978, S.I. 1978, No. 1004; the Medicines (Administration of Radioactive Substance) Regulations 1978, S.I. 1978, No. 1006; the latter Regulations were made under both the Medicines Act and the European Communities Act 1972].

The Medicines (Administration of Radioactive Substances) Regulations 1978 now implement Article 5(a) of Council Directive 80/836/Euratom, which requires a system of prior authorisation of those persons who are to administer radioactive substances to persons for the purposes of diagnosis, treatment or research.

The competent authority for the protection of workers and the public from the industrial use of ionising radiation is the Health and Safety Executive (HSE) [Health and Safety at Work etc. Act 1974, Section 11]. The safety of workers in nuclear installations is also governed by the Ionising Radiations Regulations 1985. The HSE is responsible through the Health and Safety Commission to the Secretary of State in the Department for Work and Pensions for radiological protection questions. The relevant Environment Agency (see Section 3 above, “Radioactive Material”) has responsibility for regulation of the use of radioactive materials and disposal of radioactive waste; in doing so the Agencies have regard to United Kingdom government policy for public and environmental protection. The Health Ministers (i.e. those responsible for health in England, Scotland, Wales and Northern Ireland) are the authorities with overall responsibility for all aspects of health protection.

The Health and Safety at Work Act 1974 [or the Health and Safety at Work (Northern Ireland) Order 1978] provides generally for health, safety and welfare in connection with work, including the nuclear field.

The Ionising Radiations Regulations 1999 are the principal instrument implementing the provisions of Council Directive 96/29/Euratom, laying down the basic safety standards for health protection of the general public and workers against the dangers of ionising radiation. Other legislation which contributes to implementation includes: the Radioactive Substances Act 1993 and associated orders; and the Radiation (Emergency Preparedness and Public Information) Regulations (REPPPIR) adopted on 20 September 2001. REPPPIR implement the emergency preparedness provisions of the Directive (see Section 4(c) *supra* “Emergency Response”) for sites capable of having emergencies with off-site consequences. The Ionising Radiations Regulations 1999 also implement Council

Directive 90/641/Euratom of 4 December 1990 on the operational protection of outside workers exposed to the risk of ionising radiation during their activities in controlled areas.

The HSE has produced a range of supporting guidance on prior authorisation, outside workers, pregnant and breast-feeding workers, monitoring equipment and equipment used for medical purposes, most of which is available on its website.¹

7. Radioactive Waste Management

The Radioactive Substances Act 1993 governs the disposal and accumulation of radioactive waste in the United Kingdom [Sections 13 and 14]. The disposal of radioactive waste may not be undertaken without an authorisation granted by the relevant Environment Agency (see Section 3 “Radioactive Material” *supra*) [Sections 16 and 47(1)]. The accumulation of radioactive waste may not be undertaken without an authorisation by the relevant Environment Agency [Section 16(2)], except in the case of nuclear licensed sites, which are covered by separate legislation.

The Secretary of State for Defence has responsibility for the disposal of radioactive waste at Ministry of Defence sites, but the Agencies have agreements with Ministry of Defence establishments that they administratively apply the requirements of the Radioactive Substances Act 1993. However, Ministry of Defence sites operated by civilian contractors, for example, naval dockyards at Devonport and Rosyth and the Atomic Weapons Establishment, are regulated under the terms of the 1993 Act.

The Electricity Act 1989 provides that the Secretary of State (in practice the Secretary of State for Trade and Industry) may, with the approval of the Treasury, make grants or loans for the storage or reprocessing of nuclear fuel, the treatment, storage or disposal of radioactive waste or the decommissioning of any nuclear installation [Schedule 12].

Part II of the Environmental Protection Act 1990 relates to the disposal and recovery of waste on land. While Part II of the act does not apply to radioactive waste within the meaning of the Radioactive Substances Act 1993, Section 78 of this act empowers the Secretary of State (in Scotland the Scottish Ministers) to make regulations providing for appropriate provisions of Part II to have effect (with or without modifications) for the purposes of dealing with radioactive waste.

Previously, waste on land was subject to the provisions of Part I of the Control of Pollution Act 1974. Section 30(5) of that act contained a regulation-making power similar to that now found in Section 78 of the 1990 Act.

At present, radioactive waste which, apart from its radioactivity, is dangerous or difficult to dispose of (“special waste”), is controlled by the Control of Pollution (Special Waste) Regulations 1980 [S.I. 1980, No. 1709]. However, these regulations were replaced from 1 September 1996 by the Special Waste Regulations 1996. The 1996 Regulations continue to ensure that any waste which may possess hazardous properties in addition to its radioactivity remains subject to stringent controls over its movement.

Part II.A of the Environmental Protection Act 1990 (inserted by the Environment Act 1995) relates to (non-radioactively) contaminated land. Section 78 (YC) empowers the Secretary of State, in Scotland the Scottish Ministers, to make regulations providing for appropriate provisions of Part II.A to have effect (with or without modification) to radioactively contaminated land.

1. www.hse.gov.uk

As regards the pollution of water, for the purposes of Part II of the Control of Pollution Act 1974 (pollution of water), the power under Section 30(5) was applied by Section 56(6). The Control of Pollution (Radioactive Waste) Regulations 1976 [S.I. 1976, No. 959] made under Section 30(5) [as applied by Section 56(6)] of the 1974 Act provide that Sections 43 and 44 of the 1974 Act (control of discharges of trade effluent into public sewers in England and Wales) have effect in relation to radioactive waste although no account is to be taken in exercising the controls under those sections of any radioactivity possessed by any effluent, as its radioactivity is taken into account in exercising controls under the Radioactive Substances Act 1993 (note that Sections 43 and 44 of the 1974 Act have been repealed, and have been replaced by provisions to be found in Chapter III of Part IV of, and Schedule 8 to, the Water Industry Act 1991).

In addition, in relation to England and Wales, Section 98(2) of the Water Resources Act 1991 confers power for the Secretary of State to make regulations applying, with or without modifications, the provisions of Part III of the 1991 Act (which aim to prevent or control the pollution of water) in relation to radioactive waste. The Control of Pollution (Radioactive Waste) Regulations 1989 [S.I. 1989, No. 1158], made under Section 123 of the Water Act 1989, have effect as if made under Section 98(2) of the 1991 Act [see Section 2(2) of, and Schedule 2 to, the Water Consolidation (Consequential Provisions) Act 1991]. These regulations provide for Chapter I of Part III of the Water Act 1989, and now [by virtue of paragraph 1(3) of Schedule 2 to the Water Consolidation (Consequential Provisions) Act 1991] the corresponding provisions in Part III of the Water Resources Act 1991, to have effect in relation to any radioactive waste, although no account is to be taken of any radioactivity possessed by it (see now Section 40 of the Radioactive Substances Act 1993).

The Control of Pollution (Radioactive Waste) (Scotland) Regulations 1991 apply the provisions of the Control of Pollution Act 1974 to radioactive waste in Scotland. Again, no account is taken of any radioactivity possessed by the waste.

The Dumping at Sea Act 1974, now replaced by the Food and Environment Protection Act 1985 (FEPA), enabled the United Kingdom to ratify the 1972 Oslo Convention on Prevention of Marine Pollution by Dumping from Ships and Aircraft, and the 1972 London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter ratified on 17 November 1975. The United Kingdom also ratified the 1996 Protocol to the 1972 London Convention. The FEPA provides that substances and articles may not be dumped at sea from a British ship or aircraft without a licence [Section 5]. There is no definition of “substances” and “articles” and thus radioactive substances are not excluded from the prohibition under Section 5. In 1994, the UK government accepted a complete ban on deep ocean disposal of intermediate-level waste and low-level waste, which had been adopted at the Consultative Meeting of the London Convention in 1993.

The Environment Act 1995 places general duties on the Environment Agencies which may impinge on their enforcement of the Radioactive Substances Act 1993. These include a duty to consider sustainable development, cost and benefits of any actions, special consideration of rural communities, as well as general consideration for protection of the environment.

Government policy in the United Kingdom was last set out in the White Paper, “Review of Radioactive Waste Management Policy: Final Conclusions” [Cm. 2919] (currently under review).

8. Non-Proliferation and Physical Protection

The Atomic Energy Act 1946 [Section 4] and the Nuclear Installations Act 1965, as amended by the Atomic Energy Authority Act 1971 [Schedule 1], confer wide powers on the Secretary of State (in

practice the Secretary of State for Trade and Industry) to prevent any improper use of fissionable materials.

The United Kingdom ratified the 1968 Treaty on the Non-Proliferation of Nuclear Weapons (NPT) on 27 November 1968. The Nuclear Safeguards and Electricity (Finance) Act 1978 gives effect to the agreement of 6 September 1976 for the application of safeguards in the United Kingdom in relation to the NPT [Agreement between the United Kingdom, the European Atomic Energy Community and the International Atomic Energy Agency (IAEA) – published by the IAEA as INFCIRC/263, October 1978]. The safeguards measures provided for in the Nuclear Safeguards and Electricity (Finance) Act are in addition to, and complement, those of Chapter VII of the Euratom Treaty. These Euratom safeguards require that operators of nuclear installations in the United Kingdom provide the European Commission with information on the installations and their receipts, shipments and holdings of nuclear material. The reporting requirements are, at present, amplified in Commission Regulation (Euratom) No. 3227/76 as amended. The Euratom Treaty also includes powers for the Commission to inspect the installations, nuclear material and records concerned, and thus ensure that the information provided by operators is correct and that material is present as reported. The Commission may, if necessary, impose sanctions in the event of infringement of the Treaty safeguards obligations.

The Nuclear Safeguards Act, adopted on 25 May 2000, implements the 1998 Additional Protocol to the 1976 safeguards agreement [INFCIRC/263]. The additional protocol includes measures that contribute to increasing the IAEA's capability to detect undeclared nuclear activities in Non Nuclear Weapon States (NNWS), or which would improve the effectiveness or efficiency of safeguards at facilities in the United Kingdom. This means that the United Kingdom must provide the IAEA with information (and associated access) when relevant nuclear activities are conducted in co-operation with a NNWS. Under the Nuclear Safeguards Act, the Secretary of State may serve notice on any person requiring him to provide information for the purposes of the Additional Protocol. The act also secures the exercise of the IAEA's rights, in particular of the Agency inspector, under the Additional Protocol. The Secretary of State may make regulations aiming to identify persons who are in possession of information referred to in the Additional Protocol.

Furthermore, the United Kingdom ratified the 1996 Comprehensive Nuclear Test Ban Treaty on 6 April 1998.

As regards the physical protection of nuclear material, the Official Secrets Acts 1911-1920 make provision for the security of certain Crown property by declaring that certain activities in relation to any such property shall be a criminal offence. They also provide that certain activities by Crown servants and those who have contact with the Crown shall be offences.

Section 3(c) of the 1911 Act provides that particular premises may be declared by order to be prohibited places for the purpose of the act. Section 6(3) of the Atomic Energy Authority Act 1954 brings any place belonging to or used for the purposes of the UKAEA within the definition of places which may be declared by order to be prohibited places. The current Order, made in 1994, declares two of the Authority's premises, Harwell and Windscale, to be such prohibited places [S.I. 1994, No. 968].

Further provision is made by Section 2 of the Nuclear Installations Act 1965, as amended by Section 17 of the Atomic Energy Authority Act 1971. This allows the Secretary of State to make orders applying Schedule 1 to the 1965 Act (added by the 1971 Act) to any premises in respect of which a permit under Section 2 of the act has been granted for purposes other than research or

development only. In particular, paragraph 3 of the Schedule brings any such site within the definition of places which may be declared to be prohibited places.

Section 19 of the 1971 Act [as amended by Section 16(4) of and Schedule 2 to the Official Secrets Act 1989] further provides that paragraphs 4 to 6 of the Schedule shall apply to any company registered in the United Kingdom and formed for the purposes of the Treaty of Almelo (relating to the gas centrifuge enrichment process).

These paragraphs have the additional effect of extending the powers of special constables in relation to those premises and allowing the Secretary of State to give directions for the security and safety of the site and restricting the termination of employment on certain grounds.

Orders have been made applying Schedule 1 to the 1965 Act to British Nuclear Fuels plc. (BNFL) and Urenco (Capenhurst) Ltd. [S.I. 1971, No. 569 and 1993, No. 687], declaring certain premises of the Atomic Energy Authority (UKAEA) and BNFL to be prohibited places [S.I. 1994, No. 968] and designating Urenco Ltd. and CENTEC Centrifuge Techniques Ltd, formed to implement the Almelo Treaty on the gas centrifuge enrichment process, as companies to which stringent security measures apply for the purpose of Section 19 of the 1971 Act [S.I. 1971, No. 1434; S.I. 1973, No. 17].

The Nuclear Material Offences Act 1983 enabled the United Kingdom to ratify the 1979 Convention on the Physical Protection of Nuclear Material on 6 September 1991. The act extends throughout the United Kingdom.

The scope of certain specified offences of a serious nature is extended so as to make it an offence in the United Kingdom to commit certain acts outside the United Kingdom in relation to, or by means of, nuclear material [Section 1].

It is an offence to receive, hold, or deal with nuclear material with the intention of doing any act which is a specified offence (offences against the person), or being reckless as to whether another person would do such an act; or to make threats that he or another person will do such an act by means of nuclear material, intending that the person to whom the threat is made shall fear that it will be carried out.

The act provides that the new offences are extraditable offences under the Extradition Act 1870 and specifies that, where there is no extradition arrangement with a state which is a Party to the Physical Protection Convention, an Order in Council may be made under the 1870 Act applying that act, as though the Convention itself constituted an extradition arrangement with that state [Section 5].

Nuclear material is defined by reference to the definition in the Convention [Schedule].

The security of nuclear generating stations, and laboratories for the examination of irradiated nuclear fuel by or on behalf of the operator of the generating station, is controlled by the Nuclear Generating Stations (Security) Regulations 1996 [S.I. 1996, No. 665], which were made under the Health and Safety at Work etc. Act 1974, and which came into force on 1 April 1996. They apply to generating stations and laboratories which are nuclear installations requiring a licence under Section 1 of the Nuclear Installations Act 1965.

The regulations require the operator to ensure that, at all times while any nuclear fuel is on-site, or in transit to or from a site, the site is subject to a security regime which conforms to a description (“security plan”) of the security standards, procedures and arrangements adopted by the operator for the protection of the site. Before carrying out any work of alteration or extension to any construction

which is part of the generating station or laboratory, the operator must also satisfy the Secretary of State that the security regime to which the site will be subject in the course of the work and thereafter will conform to an approved security plan. The operator is also required to take all reasonable steps to secure that no nuclear fuel is transported to or from the site except in accordance with an approved security plan.

In addition, the regulations require the operator to comply with any directions given by the Secretary of State requiring the operator to adopt certain standards, procedures or arrangements specified in such directions. The operator is also required to have security assessments carried out periodically by a person approved by the Secretary of State, and to have a similar assessment carried out before bringing nuclear fuel for the first time onto the site or onto any newly altered or extended part of the generating station or laboratory.

The regulations cease to apply to a site when there ceases to be any nuclear fuel kept or proposed to be kept on the site, and cease to apply to an operator when the operator's "period of responsibility" under the 1965 Act comes to an end.

The Secretary of State for Trade and Industry is responsible for the enforcement of the regulations, in order to protect the civil nuclear industry against the threats of terrorism and the dangers of nuclear proliferation. The Department of Trade and Industry's Office for Civil Nuclear Security (OCNS) regulates security arrangements for the protection of nuclear material and proliferation-sensitive technology within the civil nuclear industry on behalf of the Secretary of State for Trade and Industry. OCNS exercises statutory powers granted to the Secretary of State for Trade and Industry under the Atomic Energy Act 1954, the Nuclear Installations Act 1965 and the Nuclear Generating Stations (Security) Regulations 1996. One of its specific tasks is to set out security requirements for nuclear sites regarding the use, storage and transport of special nuclear materials.

These provisions are completed by the Anti-terrorism Crime and Security Act 2001, a response to the events of 11 September 2001, which came into force on 14 December 2001. A number of the provisions of this act aim to reinforce the security of the nuclear industry.

For this purpose, it extends the jurisdiction of the United Kingdom Atomic Energy Authority's Constabulary, to enable it to exercise its powers on all licensed nuclear sites [Section 76]. Under Section 77 of the act, the Secretary of State is empowered to make regulations for the purposes of ensuring the security of nuclear sites and nuclear material, which will form the basis of a comprehensive nuclear security regime. Before making the regulations the Secretary of State shall consult the Health and Safety Commission and such other persons as considered appropriate. He/she has also the power to make regulations prohibiting the disclosure of information about the enrichment of uranium [Section 80].

Finally, a new criminal offence is established in respect of the disclosure of information which might prejudice the security of nuclear sites or nuclear material [Section 79].

9. Transport

The transport of radioactive materials is governed by different regulations, depending on the mode of transport used. Essentially however, all the regulations reflect the International Atomic Energy Agency's recommended Regulations on the Safe Transport of Radioactive Materials [TS-R-1] which are revised regularly.

The Secretary of State for Transport is the competent authority for road and rail transport in Great Britain, and air and sea transport in the United Kingdom. The Department of the Environment, Northern Ireland is responsible for road transport and the Department of Enterprise, Trade and Investment is responsible for rail transport in Northern Ireland.

The Radioactive Material (Road Transport) Act 1991 regulates the transport of radioactive materials by road, replacing Sections 5 and 7 of the Radioactive Substances 1948 Act (the 1948 Act has now been repealed). The act clarifies and extends the Secretary of State's power to make regulations regarding, *inter alia*, the design, packaging, labelling, transport of packages of radioactive materials [Section 2], and to enforce such regulations. He may also appoint inspectors to enforce the regulations [Section 1]. This only covers Great Britain.

The equivalent legislation in Northern Ireland is the Radioactive Material (Road Transport) (Northern Ireland) Order 1992 [S.I. 1992, No. 234 (N.I. 2)].

The national regulations governing transport, by mode of transport, are as follows:

- *Roads in Great Britain* – The Radioactive Material (Road Transport) (Great Britain) Regulations 2002 [S.I. 2002, No. 1093]. They are enforced by the Department for Transport (DfT).
- *Driver Training in Great Britain* – The Carriage of Dangerous Goods by Road (Driver Training) Regulations 1996 (amended in 1999) [S.I. 1996, No. 2094]. They are enforced jointly by DfT and the Health and Safety Executive (HSE).
- *Roads in Northern Ireland* – The Radioactive Substances (Road Transport) (Northern Ireland) Order 1992; The Radioactive Substances (Carriage by Road) Regulations (Northern Ireland) 1983 [S.R. 1983, No. 344]. The Radioactive Substances (Carriage by Road) (Amendment) Regulations (Northern Ireland) 1986 [S.R. 1986, No. 61]. They are enforced by the Department of the Environment, Northern Ireland.
- *Driver Training in Northern Ireland* – The Carriage of Dangerous Goods by Road (Driver Training) Regulations (Northern Ireland) 1997 [S.R. 1997, No. 249]. Amendment Regulations have been made and are the Carriage of Dangerous Goods (Amendment) Regulations (Northern Ireland) 2002 [S.R. 2002, No. 34]. These are the same as the Great Britain requirements and are enforced by the Department of the Environment, Northern Ireland and the Department of Enterprise, Trade and Investment.
- *Rail in Great Britain* – The Packaging, Labelling and Carriage of Radioactive Material by Rail Regulations 2002 [S.I. 2002, No. 2099]. They are enforced jointly by the HSE and DfT.
- *Rail in Northern Ireland* – The Packaging, Labelling and Carriage of Radioactive Material by Rail Regulations (Northern Ireland) 1998 [S.R. 1998, No. 132] [“RAMRail(NI)”]. They are enforced by the Department of Enterprise, Trade and Investment.
- *Sea* – The Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations 1997 [S.I. 1997, No. 2367]; Merchant Shipping Notice No. M1755(M), “The Carriage of Dangerous Goods and Marine Pollutants in Packaged Form”. Amendment

30-00 to the International Maritime Dangerous Goods Code (IMDG Code). They are enforced by the Maritime and Coastguard Safety Agency, an agency of DfT.

- *Air* – The Air Navigation (No. 2) Order 2000 [S.I. 2000, No. 1562]; The Air Navigation (Dangerous Goods) Regulations 1994 [S.I. 1994, No. 3187 and Amendments 2001 S.I. 2001, No. 918]. These implement the International Civil Aviation Organisation's Technical Instructions for the Safe Transport of Dangerous Goods by Air (Class 7) into UK legislation. They are enforced by the Civil Aviation Authority.
- *Ports* – The Dangerous Substances in Harbour Areas Regulations 1987 [S.I. 1987, No. 37]. They are enforced by the HSE.
- *Inland Waterways* – There are no statutory regulations in the United Kingdom, but British Waterways applies provisions of the IMDG Code by way of its conditions of acceptance for carriage.

In the case of international transport of radioactive materials, the United Kingdom has ratified the following international agreements:

- *Roads in Europe* – European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) (Class 7); and
- *Rail in Europe* – Convention concerning the International Carriage by Rail (COTIF) Appendix B, Uniform rules concerning the contract for the International Carriage of Goods by Rail (CIM) Annex 1, Regulations concerning the International Carriage of Dangerous Goods by Rail (RID) (Class 7).

These are now part of UK law via the statutory instruments listed above for road and rail.

The United Kingdom is also a member of the International Maritime Organisation and the International Civil Aviation Organisation.

10. Nuclear Third Party Liability

The basic legislation on nuclear third party liability in the United Kingdom is contained in the Nuclear Installations Act 1965, which implements the provisions of the 1960 Convention on Third Party Liability in the Field of Nuclear Energy ratified by the United Kingdom on 23 February 1966 and the 1963 Brussels Convention Supplementary to the Paris Convention, ratified on 24 March 1966.

The Nuclear Installations Act 1965 was amended by the Energy Act 1983. Part II of the 1983 Act is concerned with nuclear installations and has for its main purpose the amendment of the third party liability provisions of the Nuclear Installations Act 1965 to give effect to the provisions of the two 1982 Protocols to amend the above-mentioned Paris and Brussels Conventions. The provisions of Part II of the 1983 Act increase the sums available to meet claims for nuclear damage.

The 1983 Act [Section 27] amended Section 16 of the 1965 Act to increase the liability limit for operators of licensed sites from British pounds (GBP) 5 million to GBP 20 million per incident. The lower limit of GBP 5 million is retained in the case of certain small prescribed sites (see below). The act also provided for these two limits to be increased by order to avoid the need for further primary legislation if the liability limits in the Paris Convention are increased. Thus the operator's liability has

been increased by order from GBP 20 million to GBP 140 million (a little above 150 million Special Drawing Rights – SDRs) as from 1 April 1994 [S.I. 1994, No. 909]. Any such order requires approval by a resolution of the House of Commons before it is made.

The 1965 Act [Section 18] was further amended by the Energy Act 1983 [Section 28] to increase the total amount of funds available to meet claims from GBP 43 million to the pound sterling equivalent of SDRs 300 million. The amount may be increased by order with approval of the Treasury [Section 18(1B)]. Another amendment has been made to express in SDRs, in place of sterling, the minimum amount which must be left available (in an incident involving nuclear material in course of carriage) for general claims as opposed to claims in respect of damage to the means of transport. The minimum is set at SDRs 5 million which may be increased by order with the approval of the Treasury [Section 21(1) and (1A)].

The Nuclear Installations (Prescribed Sites) Regulations 1983 [S.I. 1983, No. 919] prescribe the sites, licensees of which are subject to a lower limit of liability under Section 16(1) of the Nuclear Installations Act 1965, as amended by the Energy Act 1983. Essentially, the sites prescribed are the sites of small installations [Regulation 3]. They are prescribed by reference to the type and designed thermal output of any nuclear reactor with its associated fuel, and by reference to the activity of other radionuclides which may also be present [Regulations 3 and 4]. The regulations provide for cases where nuclear material of different levels of activity is present, as well as for overall limits of mass for fissile material [Regulation 3(3) and (5)].

Under the 1965 Act as amended [Section 7], nuclear site licensees are under an absolute duty, and are liable for breach of this duty, to ensure that no occurrences involving nuclear matter on their sites cause personal injury or damage to property and are under a similar duty as regards ionising radiation emitted on their sites. The damage must be physical damage to tangible property; it does not include pure economic loss or damage to incorporeal property or property rights [Case law: *Merlin v BNFL* (1990) 3WLA 393]. The same duty lies upon the UKAEA and the Crown [Sections 8 and 9]. This duty on the UKAEA applies whether or not a nuclear site licence has been granted in respect of the site [S.I. 1990, No. 1918]. Moreover, the Congenital Disabilities (Civil Liability) Act 1976 [Sections 3 and 4] provides that if a child is born disabled as the result of an injury to either parent caused by a breach of such a duty, the child's disabilities are to be regarded for the purposes of the 1965 Act as injuries caused on the same occasion as those caused to the parent.

The Nuclear Installations Act 1965 [Section 19] was also amended by the Atomic Energy Act 1989 [Section 4(1)] to modify the definition of "cover period" so as to prevent the grant of a new nuclear site licence from bringing the current cover period to an end where the new licence is in effect, a continuation of the old licence with amendments [Section 19(2B) of the 1965 Act]. This is relevant to a nuclear operator's obligation to provide insurance cover not only for the current period but also for any cover period which ended in the last ten years.

II. INSTITUTIONAL FRAMEWORK

Nuclear legislation was introduced in the United Kingdom with the Atomic Energy Act 1946 [Section 1]. Responsibility for the development and control of nuclear activities was originally

entrusted to the Minister for Supply and further detailed in the Radioactive Substances Act 1948, with provision made for the appropriate minister to make regulations to prevent injury to health from ionising radiations and to secure the safe disposal of radioactive waste. In parallel with the development of nuclear energy, this responsibility was successively transferred to the Lord President of the Council in 1953, to the Prime Minister in 1957, to the Minister for Science in 1959, to the Secretary of State for Education and Science in 1964, and to the Minister for Technology in 1965.

Between 1970 and 1974, these duties were discharged by the Secretary of State for Trade and Industry, from 1974 to 1992 by the Secretary of State for Energy, and since 1992 by the Secretary of State for Trade and Industry once more, though responsibility for the control of radioactive material and radioactive waste lies with the Secretary of State for the Environment, Transport and the Regions and the Scottish ministers in Scotland.

Following a review of governmental functions in 1970, a reorganisation of central government took place with a view to improving the efficiency of government. This entailed changes both in methods of operation between government departments and within the departments themselves and, consequently, had a direct effect on the general regime governing nuclear activities.

As a consequence of this review certain functions in the nuclear field, formerly discharged by several ministers, were unified. In particular, the Department of Trade and Industry was formed to take over the responsibilities for general industrial policy which were previously divided between the Board of Trade and the Ministry of Technology. The Secretary of State for Trade and Industry was given responsibility for atomic energy and most of the related functions under the Atomic Energy Act 1946, the Atomic Energy Authority Act 1954 and the Nuclear Installations Act 1965. Between 1974 and 1992, these functions were exercised by the Secretary of State for Energy. Since the abolition of that office in 1992, however, they have returned to the Secretary of State for Trade and Industry.

Major changes were made in those parts of the government machine dealing with the environment. In particular, the Ministries of Housing and Local Government, of Public Building and Works and Transport were merged into a Department of the Environment, under a Secretary of State for the Environment, with responsibility for questions involving protection against the hazards of ionising radiation, radioactive substances and waste. The Department of Transport was separated from the Department of the Environment in 1976. In 1997, the Departments of Transport and the Environment were reunited to form the Department of the Environment, Transport and the Regions.

The United Kingdom Atomic Energy Authority (UKAEA) was set up by the Atomic Energy Authority Act 1954 as the statutory body responsible for the general development of nuclear energy in the United Kingdom, subject to the Secretary of State's overall duty in this respect; since 1989 it has been reorganised, and now operates commercially as AEA Technology, and is further discussed below.

The Health and Safety Commission (HSC) and the Health and Safety Executive (HSE) were established by the Health and Safety at Work etc. Act 1974 as bodies corporate, generally responsible, *inter alia*, for the regulation of hazardous activities, including risks arising from work with ionising radiations where these hazards arise from work-related activities.

1. Regulatory and Supervisory Authorities

No single authority has overall responsibility for nuclear energy in the United Kingdom. While the Secretaries of State for Trade and Industry and for the Environment, Transport and the Regions are competent for the development and the environmental protection aspects of nuclear energy respectively, they share those powers with other ministers when nuclear questions come within the latter's sphere of competence. In Scotland, Wales and Northern Ireland, in many cases the functions carried out by different ministers in England are exercised by the relevant ministers for these countries (this should be assumed to be the case in the following text unless otherwise stated).

a) Department of Trade and Industry (DTI)

i) Secretary of State for Trade and Industry

Under the Atomic Energy Act 1946, the Secretary of State (in practice, the Secretary of State for Trade and Industry) has a duty to promote and control the development of atomic energy [Section 1]. He may make orders (though no such order has been made) which, except under his licence (a) prohibit the acquisition, production, treatment, possession, use, disposal, export or import of (i) uranium, thorium, plutonium or neptunium or their compounds or any other prescribed substance used for the production or use of atomic energy or for related research or (ii) any plant for the production or use of atomic energy or related research, or (b) prohibit the working of any specified minerals from which any of the above substances can be obtained [Section 10]. The act also gives the Secretary of State powers to obtain information on materials, plant and processes; to authorise the entry and inspection of certain premises; to search for and to authorise other persons to search for certain minerals; and to acquire compulsorily substances, minerals and plant which are for the production or use of atomic energy or research into related matters, and rights under contracts relating to the production or use of atomic energy or related research [Sections 4, 5, 6, 8 and 9].

The Atomic Energy Authority Act 1954 which set up the United Kingdom Atomic Energy Authority (UKAEA) provides that the Secretary of State has the general duty of ensuring that the UKAEA attach proper degrees of importance to the various applications of atomic energy, and may give directions to the Authority [Sections 1 and 3]. He exercises general control over it and appoints the chairperson and members of the Authority and lays before parliament an annual report on its activities.

Pursuant to the provisions of the Anti-terrorism, Crime and Security Act adopted on 14 December 2001, the Secretary of State has the power to make regulations for the purposes of ensuring the security of nuclear sites and nuclear material. These are briefly described in Part I, paragraph 8 above.

The Secretary of State also has responsibility for ensuring that the United Kingdom continues to meet its international non-proliferation obligations. These include nuclear safeguards obligations as set out in the Euratom Treaty and in safeguards agreements with Euratom and the IAEA.

As already mentioned, the Electricity Act 1989 (which re-organised the electricity industry in the United Kingdom – for further details see below) provides that the consent of the Secretary of State for Trade and Industry is required for the construction, extension or operation of a generating station (including a nuclear generating station) [Section 36].

Also, the Import, Export and Customs Powers (Defence) Act 1939 [Section 1] empowers the Secretary of State by order to make such provisions as he may think expedient for prohibiting or regulating the import of goods. So far as the importation of nuclear materials are concerned, under the provisions currently in force [Import of Goods (Control) Order 1954 – S.I. 1954, No. 23 as amended] together with the Open General Import Licence dated 4 December 1987 a licence is required from the Secretary of State for the import of certain radioactive substances.

The Secretary of State is responsible for granting licences for the export of dual-use goods, including nuclear materials and equipment, pursuant to the provisions described under Part I, Section 5 “Trade in Nuclear Materials and Equipment” of this study *supra*.

ii) Office for Civil Nuclear Security (OCNS)

The Office for Civil Nuclear Security (OCNS), placed under the auspices of the DTI in October 2001 and which operates as an independent unit within the DTI, acts as the government’s security regulator. One of its specific tasks is to set out security requirements for nuclear sites in respect of the use, storage and transport of special nuclear materials. This role includes, for instance, setting the right staffing levels for the police who guard the various sites. The OCNS reports annually to the Minister for Energy, and is advised by an Advisory Board.

b) Secretary of State for Environment, Food and Rural Affairs and the Secretary of State for Health

Under the Radioactive Substances Act 1993, in England, the Secretary of State for Environment, Food and Rural Affairs and the Secretary of State for Health acting jointly have powers to call in applications and issue directions to the Environment Agency. The Secretary of State for Health’s functions under the 1993 Act were previously exercised by the Minister for Agriculture, Fisheries and Food. These functions were transferred to the Secretary of State for Health by virtue of the Food Standards Act 1999.

In Wales, the powers of call in and direction under the Radioactive Substances Act 1993 are exercisable by the National Assembly for Wales in respect of the Environment Agency. Scottish ministers have similar powers with respect to the Scottish Environment Protection Agency (SEPA), and in Northern Ireland, the Department of the Environment, Northern Ireland has power to call in applications and make regulations with respect to the Industrial Pollution and Radiochemical Inspectorate (see Part I “General Regulatory Regime”, Section 3 “Radioactive Material” *supra*).

In addition to their functions under the Radioactive Substances Act 1993, the Secretary of State for Health in England and the National Assembly for Wales have more general responsibilities in matters of health, and they are administratively accountable for the National Radiological Protection Board (NRPB) [Radiological Protection Act 1970, Sections 1 and 2].

c) Secretary of State for Transport

The Secretary of State for Transport has the power to regulate the transport of radioactive material by road and rail in Great Britain, and air and sea in the United Kingdom. He is also the competent authority for those modes of transport in respect of the requirements of the IAEA’s recommended Regulations on the Safe Transport of Radioactive Materials [TS-R-1].

d) Secretary of State for Education

As already mentioned, the Secretary of State for Education in England and Wales and Scottish ministers in Scotland must approve the use of radioactive substances in excess of 100 becquerels per gram in the course of instruction, as well as the use of electrical equipment emitting ionising radiation and containing components operating at a potential difference of more than 5 kilovolts. [In relation to England and Wales: Regulation 7 of the Education (Schools and Further and Higher Education) Regulations 1989, S.I. 1989, No. 351, made under Section 218(1)(e) of the Education Reform Act 1988; paragraph 7 of Schedule 1 to the Education (Special Needs) (Approval of Independent Schools) Regulations 1994, S.I. 1994, No. 651, made under Sections 172(6), 189(2) and 301(6) of the Education Act 1993. In relation to Scotland: the Dangerous Materials and Apparatus (Educational Establishments) (Scotland) Regulations 1984, S.I. 1984, No. 668, made under Section 19A of the Education (Scotland) Act 1980].

2. Advisory Bodies

a) Medical Research Council (MRC)

The Medical Research Council (MRC) is an autonomous body established by Royal Charter. It is grant-aided through the Office for Public Service and Science, and its functions include advising the government and authorities discharging responsibilities in that field on the somatic and genetic effects of ionising radiations [Science and Technology Act 1965]. The Council advises on the biological bases on which radiation protection standards rest, in the light of its own and the latest international findings.

b) Nuclear Safety Advisory Committee

In September 1976, the Standing Royal Commission on Environmental Pollution, which was set up in 1970, presented to parliament its Sixth Report, covering nuclear power and the environment. The Royal Commission expressed concern about “the need for a source of independent, expert advice to the government on technical matters and [matters] which are relevant to policy decisions on major and hazardous technological developments, whether nuclear or otherwise [...]. The Health and Safety Executive have a responsibility to give such advice and [...] should develop the capability to do so.”

The government agreed with this recommendation, and in 1977 the Health and Safety Commission set up the Advisory Committee on the Safety of Nuclear Installations. This Committee was renamed the Nuclear Safety Advisory Committee on 11 July 1997. The Committee consists of a chairperson and twenty members appointed for a three-year term, drawn from academic, scientific, and industrial circles, advised by a number of expert assessors from the nuclear industry.

The Committee’s mandate is to advise the Health and Safety Commission and make recommendations on major issues affecting the safety of nuclear installations, including their design, siting, operation, maintenance and decommissioning which are referred to them or which they consider require consideration.

c) *Radioactive Waste Management Advisory Committee*

In its Sixth Report to parliament, the Royal Commission on Environmental Pollution took the view that “the responsibility for developing the best strategy for dealing with radioactive wastes is one for the government, and specifically for a department concerned to protect the environment, not one concerned to promote nuclear power” and recommended that a Committee be established to advise the Secretary of State for the Environment on the management of radioactive wastes.

The Radioactive Waste Management Advisory Committee was set up as a non-statutory body to provide independent advice to government. Its members are drawn from a wide range of specialists, including radioactive waste management, earth sciences, nuclear medicine, radiological protection and the social sciences. Members are appointed by the Secretary of State for Environment, Food and Rural Affairs, with the agreement of Ministers in the Devolved Administrations for Scotland and Wales.

The Committee’s mandate is to advise the relevant ministers on major issues relating to the development and implementation of an overall policy for all aspects of the management of civil radioactive waste, and on any matters referred to it by these ministers.

3. *Public and Semi-Public Agencies*

a) *United Kingdom Atomic Energy Authority (UKAEA)*

The United Kingdom Atomic Energy Authority (UKAEA) is a statutory corporation which, while remaining in the public sector, has moved progressively away from its original role as the research and development body responsible for taking forward the mission of developing nuclear power technology in the United Kingdom. Although the Authority is still the repository of very considerable nuclear expertise and research capability it is now entrusted with the task of dealing with the legacy of past nuclear research (including decommissioning of redundant nuclear installations, the responsibility for the land and property holdings of the Authority, and certain activities which are not appropriate to be carried out on a commercial basis, such as research into nuclear fusion and the operations of the UKAEA Constabulary).

i) *Legal status*

The UKAEA was set up as a statutory corporation by the Atomic Energy Authority Act 1954 [Section 1] in implementation of the government’s policy that the mission of developing atomic power in the United Kingdom should be carried out by an autonomous organisation outside the scope of direct ministerial control and free from day to day involvement by government in its activities. During its existence the Authority has been under the general supervisory authority of a succession of government departments. The Secretary of State for Trade and Industry has the “sponsorship” role at present. The Secretary of State can give directions to the Authority, and they must comply, but in the same section of the 1954 Act [Section 3] it is expressly provided that he should not concern himself with the detail of operations. The UKAEA therefore enjoys a significant degree of autonomy. It has certain powers which are normally attached to government agencies, such as the power to acquire land compulsorily for the performance of its functions, but it has not exercised such powers for many years and has never had significant regulatory functions. As already mentioned, nuclear installations operated by the UKAEA were not previously subject to licensing. Since 1990, this exemption has been removed [the Nuclear Installations Act 1965 (Repeal and Modification) Regulations 1990].

ii) Responsibilities

The original functions of the Authority, in effect the activities which it has legal power to carry out (because there is no legal obligation to carry on all or any of these activities), and which it retains, are to produce, use, and dispose of atomic energy and to carry out research into related matters; to manufacture, buy or acquire, store and transport any articles which, in its opinion, may be required in connection with the production and use of atomic energy; to produce, treat, transport and dispose of radioactive substances; and to disseminate information relating to and train persons in matters concerned with atomic energy and radioactive substances [Atomic Energy Authority Act 1954, Section 2(2)].

This mandate was extended to include research and development in non-nuclear fields as required by the Secretary of State [Science and Technology Act 1965, Section 4]. There have been numerous such requirements. There has also been an extension to certain activities related to treatment and disposal of wastes [Control of Pollution Act 1974, Section 101].

In 1986, the UKAEA was empowered to exploit commercially the intellectual property which it acquired through the performance of its functions [Atomic Energy Authority Act 1986]. This was the basis for the UKAEA's expansion into consultancy and the provision of specialised services.

These commercial operations of the UKAEA were privatised in 1996 under a new company: AEA Technology plc. [Atomic Energy Authority Act 1995].

The Authority must submit to the Secretary of State for Trade and Industry a report on its activities as soon as possible after the end of each financial year [Atomic Energy Authority Act 1954, Section 3(5)].

iii) Structure

The Authority consists of a chairperson and from four to fifteen members; all are appointed by the Secretary of State for Trade and Industry on a full-time or part-time basis [Atomic Energy Authority Act 1995].

Historically the UKAEA has on several occasions been divested of parts of its undertaking which were capable of independent commercial existence. For example, in 1971 the major fuel cycle operations were devolved to form what is now British Nuclear Fuels plc. (public limited company) while the Authority's radiochemical centre became an independent company, now Amersham International plc. [Atomic Energy Authority Act 1971]. This was in line with the original conception of the UKAEA's development. The Authority Weapons Group was also transferred to the Ministry of Defence in 1973.

The UKAEA was reorganised in 1994 into two divisions: Government Division and AEA Technology. The former was to continue as a public sector organisation with responsibilities broadly as outlined above. In preparation for privatisation, the latter was to carry on the commercial science, engineering and consultancy work that had been developed in more recent years. AEA Technology was vested as a separate company at the end of March 1996 and privatised by flotation in September 1996 [Atomic Energy Authority Act 1995].

iv) *Financing*

For a large part of its existence the UKAEA has been financed by parliamentary grants to an amount determined by the Secretary of State, with the consent of the Treasury [Atomic Energy Authority Act 1954, Section 4]. In 1986 the Authority was placed on a trading fund basis [Atomic Energy Authority Act 1986]. This means that its assets were valued and capitalised to form a “commencing debt” on which the UKAEA is required to provide such financial return to the government as the Treasury may determine from time to time. The Authority was required to carry on business on a commercial basis, and was given appropriate borrowing and ancillary powers. The commencing capital debt and the capital of the outstanding loans borrowed from the National Loans Fund (NLF) were repaid in October 1996 from proceeds from the flotation of AEA Technology plc. [Atomic Energy Authority Act 1995, Section 10 and the UKAEA (Extinguishment of Liabilities) Order 1996, S.I. 1996, No. 2511]. The UKAEA has now reverted to being a predominantly grant funded body.

The Department of Trade and Industry remains a substantial customer for services provided by the Authority.

The Authority is required to transmit to the Controller and Auditor General statements of accounts for each financial year [Atomic Energy Authority Act 1954, Section 4(3)].

b) ***Health and Safety Commission and Executive (HSC/HSE)***

i) *Legal status*

The Health and Safety Commission (HSC) and the Health and Safety Executive (HSE), the latter being the Commission’s operational arm, originally were set up as bodies corporate under the general authority of the Secretary of State for Employment [Health and Safety at Work etc. Act 1974, Sections 10, 11 and 12]. Subsequently, the Secretary of State for Work and Pensions assumed responsibility for the administration of this act. Under an interdepartmental arrangement agreed in 1975, the Secretary of State for Trade and Industry is answerable to parliament for all aspects of safety concerning the UK civil nuclear power industry, including responsibility for ensuring the adequacy of measures for protecting the health and safety of the public and those employed in the industry. Responsibility for certain civil nuclear emergency issues relating to Scottish nuclear sites lies with the Scottish Executive. It is the Secretary of State for Trade and Industry who is accountable to parliament for nuclear safety in Scotland as well as in England and Wales. The functions of the Commission and the Executive are performed on behalf of the Crown [Section 1(7)].

ii) *Responsibilities*

The general functions of the Commission are to do such things and make such arrangements as it considers appropriate for securing the health, safety and welfare of persons at work and others who may be affected by work activities, and to control the keeping and use of dangerous substances [Section 11]. This general mandate extends to all aspects of health protection related to nuclear activities.

The Commission is empowered to make agreements with any government department or person to perform on behalf of the Commission or the Executive any of their functions [Section 13]. It may also conclude agreements with any minister, government department or public authority to perform on

their behalf functions which are exercisable by them, if the Secretary of State considers it appropriate to do so. The Commission may appoint persons or committees to provide it with advice in connection with its functions [see Section 2, b) “Nuclear Safety Advisory Committee” above] and has power to direct investigations and inquiries [Section 13]. It may furthermore formally approve and issue codes of practice with the consent of the Secretary of State, following consultation with appropriate bodies and government departments.

The HSE is the authority responsible for the licensing of nuclear installations in the United Kingdom. Certain provisions of the Nuclear Installations Act 1965 relating to licensing are relevant statutory provisions for the purposes of the Health and Safety at Work etc. Act 1974. The HSE has a duty to make adequate arrangements for the enforcement of the relevant statutory provisions [Section 18]. The Executive is empowered to appoint inspectors to carry into effect the relevant statutory provisions within its field of responsibility [Section 19].

The Nuclear Installations Inspectorate (NII) (a branch of the Executive) ensures the compliance with all statutory requirements concerning the safety of the workforce and the public in relation to nuclear installations. The Inspectorate also regulates the safety aspects of design, construction and operation of nuclear installations. In this respect, the NII can subject the grant of a nuclear site licence to any conditions it deems necessary in the interest of safety. Its staff includes safety assessors whose principal task is to examine those facets of nuclear installations which are significant for safety and to recommend, where necessary, the improvements that should be made.

The Commission must submit to the Secretary of State as soon as possible after the end of each accounting year, a report on its activities [Schedule 2, paragraph 14].

iii) Structure

The Commission consists of a chairperson and not less than six members, all appointed by the Secretary of State for Work and Pensions. Before appointing the members of the Commission, other than the chairperson, the Secretary of State, as to three of them, consults organisations representing employers, as to three others, organisations representing employees, and as to any other members he may appoint, organisations representing local authorities, and all organisations the activities of whose members are pertinent to the purposes of the Health and Safety at Work etc. Act 1974 [Section 10(2) and (3)].

The Executive consists of a director-general and two other members. The Commission appoints the Director-General of the Executive with the approval of the Secretary of State; the other two are appointed by the Commission, also with his approval after consultation with the Director-General [Section 10(5)].

iv) Financing

The Secretary of State is empowered, with the consent of the Treasury, to pay the Commission such sums as he considers appropriate for the carrying out of its work [Section 43].

The Commission is required to prepare each year a statement of accounts for the Secretary of State and the Comptroller and Auditor General; the latter examines the statement, certifies it and lays a copy of it before parliament [Schedule 2, paragraph 14].

c) National Radiological Protection Board (NRPB)

The National Radiological Protection Board (NRPB) was established by the Radiological Protection Act 1970 [Section 1 as amended by the Health and Safety at Work Act etc. 1974, Section 77]. The functions of the Board are [Section 1]:

- by means of research and otherwise, to advance the acquisition of knowledge about the protection of mankind from radiation hazards; and
- to provide information and advice to persons (including government departments) with responsibilities in the United Kingdom in relation to protection from radiation hazards either of the community as a whole or of particular sections of the community.

The functions of the Board were extended by the National Radiation Protection Board (Extension of Functions) Order 1974 [S.I. 1974, No. 1230], which provided that the Board's existing functions mentioned above should also be exercised in respect of the dangers of radiation which is electromagnetic but not ionising. The Board has power to provide technical services to persons concerned with radiation hazards and to make charges for those services and for providing information and advice [Radiological Protection Act 1970, Section 1(2)].

The Health Ministers (the ministers respectively responsible for health in England, Scotland, Wales and Northern Ireland) gave two directions to the Board on 9 August 1977 under the Radiological Protection Act, requiring the Board to advise on radiation protection standards, to specify emergency reference levels of dose and guidance on their derivation, for those with responsibilities for the protection of the public in the event of an accident involving, or likely to involve, radiation doses to the public in excess of dose limits [Section 1(7)].

The Board is a body corporate, consisting of a chairperson and not less than seven nor more than twelve other members; the chairperson and members of the Board are appointed jointly by the Health Ministers [Section 2, as amended by S.I. 1980, No. 970]. In practice, by arrangements between the Health Ministers, appointments are made by the Secretary of State for Health after consultation with the Medical Research Council (MRC) and the UKAEA [Sections 1(4), 1(8) and 2(1)].

To avoid duplication of activities, the Board has assumed responsibility for the Radiological Protection Service of the MRC and carries on in place of the UKAEA activities related to the effect of radiation hazards in relation to health and safety. Section 77 of the Health and Safety at Work etc. Act 1974 amends Section 1 of the 1970 Act by requiring the Board, when carrying out tasks which relate to those of the Health and Safety Commission, to act in consultation with the Commission and to have regard to its policies. It empowers the Board, on the direction of the Health Ministers, to enter into an agreement with the Commission to carry out its functions relating to ionising or other radiation.

The Board is financed from receipts from charges it makes for the provision of services and from funds provided by parliament through the Secretary of State for Health [1970 Act, Sections 1(2)(b) and 3]. The Scottish Executive also contributes separately a grant to the Board.

The Board must prepare each year a statement of accounts and other records for submission to the Secretary of State for Health, who in turn lays them before parliament with his own report, after the statement has been examined and certified by the Comptroller and Auditor General [Section 3(4)]. A copy of the accounts of the Board is also laid before the Scottish parliament.

The Board carries out pilot studies and research on its own volition in addition to undertaking such work under contract. In 1974, the MRC and the Board established a Joint Committee on Radiological Protection to improve liaison between the two bodies with regard to research on radiobiology.

d) *Environment Agencies*

The Environment Agency, a non-departmental public body, was set up under the Environment Act of 1995. The Environment Agency is vested with extensive powers and has statutory duties to protect and improve the environment across England and Wales with principal functions of pollution prevention and control, water resources, flood defence, fisheries, recreation, conservation and navigation. Its Environmental Protection Directorate has responsibility for radioactive substances, integrated pollution control, waste regulation and quality and water quality functions.

The Scottish Environment Protection Agency (SEPA) has similar, but not identical, powers to the Environment Agency in the fields of pollution prevention and control. SEPA also has functions in other fields such as conservation, including water and flood monitoring advice.

In Northern Ireland, the Environment and Heritage Service became an agency within the Department of the Environment, Northern Ireland on 1 April 1996. Its role is to build on the work of its predecessor, the Environment Service, which brought together Countryside and Wildlife, Environmental Protection and Historic Monuments and Buildings.

The Service is responsible for implementing environmental policy in Northern Ireland within the framework of Northern Ireland legislation and EC Directives and other provisions. It protects wildlife sites, habitats and species, and protects and promotes the countryside. The Service maintains water quality, regulates pollution, promotes environmental quality, oversees waste management and is responsible for the control of radioactive materials. Historic monuments, buildings and shipwrecks are identified, recorded and protected, and sites in state care are conserved and preserved for the public.

Since April 1996, the power to grant authorisations to discharge radioactive waste has been exercisable by the Environment Agency alone, after consulting the Food Standards Agency or the Secretary of State for Wales and the Health and Safety Executive (HSE).

In England, the Secretary of State for Environment, Food and Rural Affairs and the Secretary of State for Health acting jointly, in Wales the National Assembly for Wales, and in Scotland the Scottish Ministers have the power to call in applications for the disposal of radioactive waste for their own determination and the power to direct the relevant Agency (in England and Wales, the Environment Agency, and in Scotland, the Scottish Environment Protection Agency). In Northern Ireland, the Department for the Environment for Northern Ireland has the power to call in applications and make regulations with respect to the Industrial Pollution and Radiochemical Inspectorate.

In discharging its functions, the principal aim of the Environment Agency as expressed in the Environment Act 1995 is to protect or enhance the environment taken as a whole so as to contribute towards attaining the objective of achieving sustainable development. SEPA has a similar aim, although not directly enshrined in statute, that is, “to provide an efficient and integrated environmental protection system for Scotland which will both improve the environment and contribute to the government’s goal of sustainable development”.

The Environment Agency's legal powers are vested in its board; members of the board are appointed by the Secretaries of State for Environment, Transport and the Regions and for Wales, and by the Minister of Agriculture, Fisheries and Food. SEPA's legal powers are also vested in its board members who are appointed by Scottish ministers.

The Environment Agency is responsible for enforcing, among other things, the provisions of the Radioactive Substances Act 1993, the Transfrontier Shipment of Radioactive Waste Regulations 1993 and Council Regulation (Euratom) No. 1493/93 of 8 June 1993 on Shipments of Radioactive Substances between Member States. SEPA is responsible for enforcing the same legislation in Scotland and the Industrial Pollution and Radiochemical Inspectorate (IPRI) in Northern Ireland.

Most of the Environment Agency staff is located in eight regions across England and Wales. Its head office is located in Bristol. In each region there is a statutory Regional Environmental Protection Advisory Committee which is consulted on major policies. SEPA staff is located in three regions across Scotland, each with a headquarters within the region. Its head office is located in Stirling.

The Agencies consult widely in exercising their function under the Radioactive Substances Act 1993, particularly for determination of applications for disposal of radioactive waste. Documents are made available for public scrutiny at Agency and at local authority offices.

Government policy for radioactive waste management is taken into account by the Agencies. The most recent statement of policy was in the 1995 White Paper Cm. 2919. The UK Strategy for Radioactive Discharges for the period 2001-2020 was published by the Department for Environment, Food and Rural Affairs in July 2002. This Strategy shows how the UK government proposes to implement the OSPAR Strategy with regard to Radioactive Substances agreed in Sintra in 1998. Work is underway to develop statutory guidance to the Agencies on the regulation of radioactive discharges into the environment.

The Agencies' role and responsibilities and those of the HSE impinge on each other. Memoranda of Understanding between the organisations have been agreed to ensure effective co-ordination so that the possibility of conflicting requirements being placed on licensees and others is eliminated, and to minimise duplication.

*e) **British Nuclear Fuels plc. (BNFL)***

*i) **Legal status***

In 1971, as part of the reorganisation of the UKAEA, British Nuclear Fuels Ltd. was set up as a private limited company and subsequently transformed into a public limited company. The fuel cycle operations previously undertaken by the UKAEA were transferred to BNFL, together with the related property, rights and obligations [Atomic Energy Authority Act 1971]. BNFL is responsible to the Secretary of State for Trade and Industry. Originally, shares in BNFL were issued to the UKAEA, but with effect from 3 August 1981 were transferred to the Secretary of State by the British Nuclear Fuels Ltd. (Transfer of Shares) Order 1981 [S.I. 1981, No. 868] made under Section 11 of the 1971 Act.

The Secretary of State has power to dispose of shares held by him in any nuclear company (including BNFL, but in this case no more than a minority stake) whether or not the disposal is consistent with promoting or controlling the development of atomic energy [Atomic Energy (Miscellaneous Provisions) Act 1981].

ii) Responsibilities

BNFL provides the full range of nuclear fuel cycle services to the United Kingdom and international markets, including enrichment (through its associated company, Urenco Ltd.), uranium hexafluoride production, fuel manufacture, reprocessing and waste management. BNFL also provides world-wide nuclear fuel transport services, runs a successful power generation business and has a thriving engineering business. BNFL is also committed to research and development in order to support and develop its business.

iii) Structure

BNFL is managed by a board of eleven directors, (including non-executive directors) appointed in accordance with the Company's Articles of Association, one of whom is the chairperson and another the chief executive. The Company Secretary convenes the annual general meeting at the direction of the board.

The Company is organised into a head office at Risley which provides, via a small central team, overall strategy direction and control to four business groups and six Function/Process Owners. Central services, such as Corporate Strategy and Legal, provide certain services to the rest of the company. The four Business Groups are: Fuel, Magnox Generation, Thorp, and Waste Management and Decommissioning. The six Functions are: Technology and Operations, Safety, Health and Environment (SHE), Commercial, Finance, Public Affairs and Human Resources.

BNFL's UK operations span five sites in North West England and Southern Scotland. BNFL also has a number of overseas offices. Export success is strengthened through its wholly-owned subsidiary, BNFL Inc., based in North America, and its offices in Japan, China, South Korea, South Africa, Germany, Belgium and France.

iv) Financing

The initial capital was subscribed by the Secretary of State with the consent of the Treasury [Atomic Energy Authority Act 1971, Section 11(4)]. The Secretary of State may, with the approval of the Treasury, make loans to the Company [Section 12(1)]. Under the Nuclear Industry (Finance) Act of 1977, the Secretary of State is empowered, with the consent of the Treasury, to guarantee any loans made to BNFL, including the loan interest. The 1977 Act imposed new limits on the amount of public finance that may be committed to BNFL under the 1971 and 1977 Acts. The limit initially set by the 1977 Act was British pounds (GBP) 300 million. The initial limit of GBP 300 million was raised to GBP 1 000 million by order under Section 2(1)(a) of the 1977 Act [S.I. 1987, No. 875]; and to date, the limit has been increased from GBP 1 500 million to GBP 2 000 million by the Atomic Energy Act 1989 [Section 1].

The board submits an annual report and a statement of accounts, audited by independent auditors, to its shareholders at the end of each financial year.

f) Amersham International plc.

Also as part of the reorganisation of the UKAEA [Atomic Energy Authority Act 1971], Amersham International Ltd. was set up as the Radiochemical Centre Ltd., a private limited company,

at the same time as BNFL. With effect from 1 April 1971, the Radiochemical Centre Ltd. took over the UKAEA's activities in connection with the production and marketing of radioactive materials [Atomic Energy Authority Act 1971, Section 2, and S.I. 1971, No. 478]. The company, which has been transformed into a public limited company, has subsidiaries in a number of countries, including Australia, France, Germany, Japan and the United States. On 1 October 1981, the shares held by the UKAEA in Amersham International Ltd. were transferred to the Secretary of State [The Amersham International Ltd. (Transfer of Shares) Order 1981, S.I. 1981, No. 850]. The Secretary of State then divested himself of the ownership of the company, whose shares are now wholly owned by the private sector. [The Atomic Energy (Miscellaneous Provisions) Act 1981, Section 1(3), provides that the Secretary of State's power to dispose of shares is exercisable whether or not the disposal is consistent with promoting or controlling the development of atomic energy].

g) *The National Nuclear Corporation Ltd. (NNC)*

The National Nuclear Corporation Ltd. (NNC) was set up in 1973 as a private limited company whose shareholders were the UKAEA, General Electric Company plc. (GEC) and British Nuclear Associates Ltd. (representing companies engaged in the nuclear construction industry). The NNC was responsible for the design, instruction and marketing of nuclear power plants.

In 1977, the Secretary of State was empowered to incur, with the consent of the Treasury, out of money provided by parliament, any expenditure necessary for the acquisition of shares in the NNC or any of its subsidiaries [Nuclear Industry (Finance) Act 1977].

In 1988 the NNC became a wholly owned subsidiary of GEC, and is now a major project management and technical consultancy company operating in both the nuclear and non-nuclear sectors. It has an issued share capital of GBP 10 million.

h) *United Kingdom Nirex Ltd.*

i) Legal status

The United Kingdom Nuclear Industry Radioactive Waste Executive (NIREX) was set up in 1982. It was incorporated in 1985 as United Kingdom Nirex Ltd., a private limited company with shares held by the UKAEA, BNFL, the Central Electricity Generating Board (CEGB) and the South of Scotland Electricity Board (SSEB). The Secretary of State for Energy held a special share which gave it ultimate control over land on which waste disposal facilities are sited if need be in perpetuity. In 1990 the CEGB and SSEB shares were transferred to Nuclear Electric plc. and British Energy Generation Ltd. respectively. In April 1992, the special share was transferred to the Secretary of State for Trade and Industry. On 31 March 1996 the ordinary shareholdings were further redistributed. Current shareholders are BNFL, British Energy Generation Ltd., British Energy Generation (UK) Ltd., Magnox Electric plc. and the UKAEA.

ii) Responsibilities

The Company's principal activity is to carry out research, development and design with a view to developing and managing commercial facilities for radioactive waste disposal.

The government has overall responsibility for radioactive waste strategy. The role of the Company, working within that strategy, is to provide disposal services for solid intermediate and low-level radioactive waste to its shareholders and other UK users of radioactive materials, such as hospitals, industries, etc. The ordinary shareholders are expected to be the majority users of the Company's services. High-level waste is managed by its producers, BNFL and the UKAEA.

iii) Structure

Nirex is based at Harwell and is managed by a board of directors. The board comprises two directors nominated by each shareholder (although for the time being shareholders have agreed to nominate only one director) together with such external directors as the shareholders may from time to time agree. As at 1 April 1999, three such external directors were in post, including the chairperson and the managing director.

iv) Financing

Nirex is funded by loans from its shareholders who have agreed to provide, by way of such loans, all funds in excess of the sums from time to time paid up on the issued share capital of the Company which may be necessary for the conduct of the business of the Company.

The directors submit a report on the Company's activities and a statement of accounts, audited by independent auditors, to its shareholders at the end of each financial year.

Note on the restructuring of the electricity industry

On 31 March 1990, the electricity industry in England and Wales and Scotland was completely restructured in accordance with the provisions of the Electricity Act 1989. The Central Electricity Generating Board (CEGB) which had until then been responsible for generating all electricity and its transmission and distribution throughout England and Wales was divided into four companies, National Power, PowerGen, both fossil-fuel generators, National Grid plc., for the transmission of electricity, and Nuclear Electric plc. The first three were privatised in 1990/91, while Nuclear Electric plc. remains in public ownership having been renamed Magnox Electric plc. in 1996 (see below). At the same time, the two public utilities responsible for generating, transmitting and distributing electricity in Scotland, North of Scotland Hydro-Electric Board and South of Scotland Electricity Board (SSEB) were also reorganised for purposes of privatisation. Two separate companies were created, Scottish Power plc. and Hydro-Electric plc., to take over the non-nuclear business of the previous bodies, and these were privatised in 1991. British Energy Generation (UK) Ltd. (formerly called Scottish Nuclear Ltd.), set up in parallel, took over the nuclear power plants in Scotland and remained in public ownership until the restructuring and privatisation programme in 1996 (see below).

In May 1995, a government review concluded that the early privatisation of the United Kingdom's advanced gas cooled reactor (AGR) stations and pressurised water reactor (PWR) stations was feasible. A reorganisation took place with effect from 31 March 1996, whereby Nuclear Electric plc. transferred the business of its five AGR stations and its PWR station to British Energy Generation Ltd. (formerly called Nuclear Electric Ltd.), a newly incorporated company, while retaining its Magnox stations. At the same time, British Energy Generation (UK) Ltd., while retaining its two AGR stations, transferred its Magnox station to Magnox Electric plc. A newly incorporated company, British Energy plc., was created as the parent company of British Energy Generation Ltd. and British

Energy Generation (UK) Ltd. On 26 June 1996, a prospectus was published offering shares of British Energy plc. for sale by way of public flotation. The sale took place on 15 July 1996 when the shares were listed on the London Stock Exchange. Lastly, the most recent development is the merge of BNFL with Magnox Electric plc. on 30 January 1998.

i) Magnox Electric plc.

i) Legal status

Magnox Electric plc. (formerly Nuclear Electric plc.) was set up as a public limited company in 1990 and is state-owned, with its shares held by the Secretary of State for Trade and Industry. Since 30 January 1998, the company has been a wholly-owned subsidiary of BNFL.

ii) Responsibilities

Magnox Electric owns nine nuclear power stations in the United Kingdom – six operating Magnox stations and three Magnox stations (including the Magnox station transferred from Scottish Nuclear Ltd. under the 1996 restructuring) which are being decommissioned. Most of the electricity produced by Magnox Electric is sold under contract to the Regional Electricity Companies (RECs) in England and Wales.

iii) Structure

The Company is headed by a board of directors, whose appointments must be approved by the Secretary of State for Trade and Industry. The board consists of five executive directors, one of whom is the chairperson, and four non-executive directors. The day to day management of the Company is the responsibility of the chief executive in consultation where appropriate with the chairperson and the directors. The government expects Magnox Electric to act in a commercial manner.

iv) Financing

Magnox Electric derives its income primarily from sales of electricity. It may obtain grants from the Secretary of State for Trade and Industry.

The directors publish a report on the Company's activities and a statement of accounts, audited by independent auditors in September each year relating to the previous 1 April to 31 March financial year.

j) British Energy Generation Ltd.

Under the 1996 restructuring and privatisation programme the five AGR stations and the PWR station, previously under the control of Nuclear Electric plc. (renamed Magnox Electric plc.), were transferred to British Energy Generation Ltd.

British Energy Generation Ltd., along with British Energy Generation (UK) Ltd., has as its parent company British Energy plc., whose shares were sold and listed on the London Stock Exchange in July 1996, privatising all the AGR and PWR stations in the United Kingdom.

k) *Scottish Electricity Generator Companies*

In accordance with the Electricity Act 1989 [Section 67(4)], the property, rights and liabilities of the Scottish Boards were, with effect from 31 March 1990, transferred by order to three companies nominated by the Secretary of State [The Electricity Act 1989 (Transfer Date) (Scotland) Order 1990, Section 24, S.I. 1990, No. 197]. The companies nominated for this purpose were two Scottish electricity generator companies (Scottish Power and Hydro Electric) and a Scottish nuclear generator company (Scottish Nuclear) [The Electricity Act 1989 (Nominated Companies) (Scotland) Order 1989, S.I. 1989, No. 2448].

l) *British Energy Generation (UK) Ltd.*

i) Legal status

British Energy Generation (UK) Ltd. (previously Scottish Nuclear Ltd.) was set up as a limited company in 1990 and was state-owned under the authority of the Secretary of State for Scotland. In 1996, as part of the restructuring and privatisation programme, it transferred its Magnox station to Magnox Electric plc., while retaining its two AGR stations. It was made a subsidiary of British Energy plc., which was sold by way of public flotation and its shares listed on the London Stock Exchange in July 1996.

ii) Responsibilities

British Energy Generation (UK) Ltd. operates the two nuclear power plants in Scotland, but does not supply electricity directly to customers. It sells all the nuclear electricity produced under contract to Scottish Power and Hydro Electric. It was also responsible for the decommissioning of Hunterston A nuclear power plant, but under the 1996 restructuring programme this Magnox station was transferred to Magnox Electric plc. [formerly Nuclear Electric plc., see *supra*, Section i)].

m) *Regional Electricity Companies in England and Wales*

In accordance with the Electricity Act 1989 [Section 65], the property, rights and liabilities of the twelve Area Boards, previously responsible for acquiring bulk supplies of electricity from the electricity producers and for distributing such supplies to the customers in their respective areas, were, with effect from 31 March 1990, transferred by order to twelve Regional Electricity companies in England and Wales, set up for that purpose [The Electricity Act 1989 (Commencement No. 1) Order 1989, S.I. 1989, No. 1369, and the Electricity Act 1989 (Transfer Date) (England and Wales) Order 1990, S.I. 1990, No. 225].