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NUCLEAR LEGISLATION IN OECD COUNTRIES

Regulatory and Institutional Framework for Nuclear Activities

New Zealand

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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.

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

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NEW ZEALAND

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I. GENERAL REGULATORY REGIME

1. Introduction

There are no nuclear installations in New Zealand.

The first piece of legislation relating to ionising radiation sources was introduced in New Zealand in 1944 and prescribed the registration of X-ray equipment. A 1949 Statute Providing for Controls on Both Radioactive Materials and X-ray Machines came into force with accompanying regulations in 1951. The primary legislation in the field is the Radiation Protection Act 1965, as amended (hereinafter referred to as “the Act”), and the Radiation Protection Regulations 1982 (hereinafter referred to as “the Regulations”).

2. Mining Regime

No nuclear materials are mined in New Zealand and there are, accordingly, no specific provisions in national law which deal with the prospecting for and mining of nuclear ores.

3. Radioactive Substances and Equipment

The Radiation Protection Act 1965 restricts the use of X-ray equipment or radioactive materials to persons holding a licence therefore or those who are acting on the instructions or under the supervision of a licensee [Sections 13 and 15 of the Act]. Similarly, the Act prohibits the sale of X-ray equipment, unless the purchaser is the holder of a licence to use the equipment or is exempt from obtaining such a licence [Section 14 of the Act]. The licensee is responsible for the safe use of X-ray equipment or radioactive materials [Regulation 11]. Applications for licences must be made in the prescribed manner to the Director-General of Health [Section 16 of the Act]. Licences, which are renewable annually [Sections 16(4) and 21 of the Act], may be issued for one or more purposes [Section 18 of the Act]. Licences may be granted subject to special conditions, in addition to any conditions prescribed in respect of licences generally, and such special conditions may be varied at any time by the Director-General of Health [Section 17 of the Act].

The Director-General may, at his discretion, cancel or suspend for such period as he thinks fit, any licence granted under the Act if the licence holder commits an offence under the Act or breaches any of the conditions of the licence, or if he considers it in the public interest to do so [Section 20 of the Act]. Subject to the right of appeal under Section 23 of the Act, the decision of the Director-General in this respect is final.

For the more common purposes, which include the majority of licensees, codes of practice prepared by the National Radiation Laboratory (NRL) are issued to licensees and compliance with the relevant code is a condition of the licence. In the case of licences issued for the use of unsealed

radioactive materials, the radioactivity levels of radionuclides which may be ordered at one time are set out as licence conditions and are dependent on the qualifications and expertise of the licensee, its support staff and facilities.

The codes of practice prepared by the NRL to date are as follows:

- NRL C1: Code of Safe Practice for the Use of Unsealed Radioactive Materials, revised 1996.
- NRL C2: Code of Safe Practice for the Use of Sealed Radioactive Materials in Industry, revised 1997. This code has now been superseded by NRL C19.
- NRL C3: Code of Safe Practice for the Use of Unsealed Radioactive Materials in Medical Diagnosis, Therapy and Research, revised 1994.
- NRL C5: Code of Safe Practice for the Use of X-rays in Medical Diagnosis, revised 1994.
- NRL C6: Code of Safe Practice for the Use of X-rays in Diagnosis (chiropractic), revised 1997.
- NRL C7: Code of Safe Practice for the Use of X-rays in Dentistry, 1991.
- NRL C9: Code of Safe Practice for the Use of X-rays and Radioactive Material in Industrial Radiography, revised 1997.
- NRL C10: Code of Safe Practice for the Use of X-rays in Podiatry, 1990.
- NRL C11: Code of Safe Practice for Use of ^{131}I for the Treatment of Thyroid Disorders in Cats, revised 1997.
- NRL C12: Code of Safe Practice for the Use of Irradiating Apparatus in Medical Therapy, 1992.
- NRL C13: Code of Safe Practice for the Use of ^{90}Sr Ophthalmic Applicators, 1997.
- NRL C14: Code of Safe Practice for the Use of Sealed Radioactive Materials for Brachytherapy, 2003.
- NRL C15: Code of Safe Practice for the Use of Nuclear Density Meters, 2000.
- NRL C16: Code of Safe Practice for the Use of X-ray Security and Inspection Systems, 2001.
- NRL C17: Code of Safe Practice for the Use of X-ray Analytical Equipment, 2001.
- NRL C19: Code of Safe Practice for the Use of Industrial Gauges Containing Sealed Radioactive Sources, 2005.
- NRL C21: Code of Safe Practice for the Use of X-rays in Veterinary Diagnosis, 2005.

All these codes of safe practice are available on the web site of the National Radiation Laboratory at the following address: www.nrl.moh.govt.nz.

Under the Regulations, the owner of a facility is responsible for ensuring that there is a licensee for X-ray equipment or radioactive materials at all times [Regulation 9]. Whenever there is more than one licensee using the source, in order to avoid ambiguity one of the licensees is designated “principal licensee” and takes primary responsibility for the source. The principal licensee is responsible for advising the owner of requirements for radiation safety and producing safety procedures and local rules to be followed by anyone working in the facility. Applicants for a licence under the Act may be required to have qualifications and facilities in relation to the specific purpose involved [Section 18 of the Act]. Exemptions from licensing are granted for the production, sale, storage, transport or use of radioactive materials in certain categories or which contain a quantity or concentration of a radionuclide below the level required for licensing. The Act defines [Section 2] a radioactive material as any article containing a radioactive substance giving it a specific radioactivity exceeding 100 kBq per kg and a total radioactivity exceeding 3 kBq. The Regulations exempt radioactive material with levels of radioactivity below those set out in Schedules 1, 2 and 3 to the Regulations [Regulation 4]. These levels were calculated on the basis of the smaller of two levels of radioactivity, one derived from an external radiation limit and the other based on toxicity.

The Regulations also exempt from licensing clocks, watches and other instruments containing radioactive luminous material in the form of specified radionuclides, with activities up to prescribed limits, which would otherwise exceed the exemption levels. Similar exemptions apply to smoke detectors, radiation source educational kits, ionisation and electron capture detectors used in gas chromatography, and tritium beta lights [Regulation 4(3)].

Any person who has radioactive material under his control is required to keep a record of the quantity, nature and location of the radioactive material. In addition, every purchaser of radioactive materials must keep accurate records specifying the purposes to which the materials are put. These records are open for inspection by an authorised representative of the Director-General of Health and must be retained for 10 years [Regulation 16].

Sales of irradiating apparatus are required to be notified to the National Radiation Laboratory, and may be made only to persons who are licensed for a purpose for which the equipment has been designed [Section 14 of the Act].

Pursuant to the Act, any officer of the Department of Health (or of any area health board) who is properly authorised by the Minister, has the right to enter at all reasonable hours any premises, vehicle, ship, or aircraft in order to examine or test any radioactive material or to examine or calibrate any irradiating apparatus which is located there [Section 24 of the Act].

4. Nuclear Installations

New Zealand has no nuclear installations and no legislation that covers the nuclear safety aspects of reactors.

5. Trade in Nuclear Materials and Equipment

Control of radioactive material entering and leaving the country is maintained through a requirement of prior consent of the Minister of Health [Section 12 of the Act]. This allows

surveillance of quantities imported and ensures that material is acquired and used only by licence holders.

In practice, for the majority of orders the authorisation procedure is streamlined through agreements between overseas suppliers, the New Zealand agents and the National Radiation Laboratory. Under these agreements, the agents are required to process orders only from licensees and to advise the NRL promptly of all orders forwarded. Material from suppliers with whom agreements have been reached (referred to as “approved suppliers”) are forwarded directly to the licensee through Customs at the place of entry into the country.

Most radiopharmaceuticals for medical use, radiochemicals for other uses and industrial radiography sources are imported from approved suppliers. In other cases, an “authorisation to import radioactive materials” document is required for each shipment, to obtain its release from Customs.

Radioactive material shipments imported into the country per year total about 3 000, 80% of which are destined for hospitals and medical laboratories.

6. Radiation Protection

Provisions of the legislation in force in New Zealand are generally consistent with recommendations of the International Commission on Radiological Protection (ICRP) and the International Basic Safety Standards (BSS) for Protection Against Ionising Radiation and for the Safety of Radiation Sources. They include:

- licensing of users [see Section 3, *supra* “Radioactive Substances and Equipment”];
- notification of sales of X-ray equipment [see Section 3, *supra* “Radioactive Substances and Equipment”];
- notification and authorisation of importation of radioactive materials [see Section 5, *supra* “Trade in Nuclear Materials and Equipment”];
- a system of exemption from licensing requirements for radioactive materials [see Section 3, *supra* “Radioactive Substances and Equipment”]; and
- requirements governing dose limits and exposure monitoring, as well as transport, disposal, labelling and records of radioactive materials.

The legislation is administered by the National Radiation Laboratory (NRL), which is a unit of the Ministry of Health. It is the principal adviser to the government on all matters concerning radiation safety. NRL provides a national resource of expert advice, service provision and research capability on matters concerning public, occupational and medical exposure to radiation, the performance of radiation equipment, and the measurement of radiation and radioactivity. NRL also maintains links to international bodies concerned with radiation protection and associated health issues.

Part III of the 1982 Regulations sets out the obligations of owners and licensees for radioactive materials or irradiating apparatus they may own or for which they have responsibility, general safety precautions to be taken or observed by licensees, and requirements for the storage and labelling of radioactive materials and for the disposal of waste materials and containers.

Dose limits are prescribed in the Regulations for persons employed to work with radioactive materials or irradiating apparatus, and also dose limits for other categories of persons [Regulation 18].

The 1991 ICRP Recommendations will be adopted in new Regulations timed to come into force with the adoption of a new bill that is expected to be introduced to Parliament by 2007. The Regulations set out the requirements for the monitoring of occupational exposures and prescribe actions to be taken in the event of exposures exceeding the occupational dose limit [Regulations 19 and 20].

Many licences to use radiation require compliance with a Radiation Safety Plan. The requirement for the Radiation Safety Plan may be in a particular NRL Code of Safe Practice or it may be an explicit licence condition. The Radiation Safety Plan is a document or collection of documents that sets up the formal responsibility structure, approved policies and standards procedures, and a system for record keeping. It also acts as an induction and training document to be used to ensure all personnel are familiar with standard radiation safety procedures at a facility.

Licensees are responsible for dealing with events which might give rise to on-site contamination as a result of a spill or other incident [Regulation 11]. The potential for inadvertent public exposure is low, but incidents involving the loss of a source, or a transport incident could conceivably occur. In the case of the latter, the possibility of public exposure is limited by virtue of the packaging requirements of the International Atomic Energy Agency (IAEA) Transport Regulations [in force in New Zealand under Regulation 3]. In order to provide local capability for monitoring in the event of an incident, the NRL maintains a set of survey instruments in the care of health protection officers throughout the country. Basic training in radiation safety and use of the instruments is provided by the NRL to allow radiation monitoring to be carried out if an incident is reported.

New Zealand acceded to the 1986 Convention on Early Notification of a Nuclear Accident and to the 1986 Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, in both cases on 11 March 1987.

7. Radioactive Waste Management

The 1982 Regulations set out the obligations of owners and licensees in respect of the disposal of waste materials and containers [Regulations 14 and 15].

In the absence of nuclear installations or mining of nuclear materials, the main source of nuclear waste in New Zealand consists of nuclear materials used for radiochemicals and nuclear medicine. A variety of radioactive materials is used for these purposes, but four radionuclides predominate in these applications: ^{125}I , ^{131}I , $^{99\text{m}}\text{Tc}$ and ^{32}P . These nuclides are relatively short lived, with half-lives of 60 days, 8 days, 6 hours and 14 days, respectively. Most of the radioactivity has disappeared by the normal process of radioactive decay during its use, before it becomes waste.

The NRL rules applying to such waste are based on the IAEA International Basic Safety Standards for Radiation Protection. Thus, NRL C1 "Code of Safe Practice for the Use of Unsealed Radioactive Material" limits the concentration of radioactivity in any waste entering the environment to less than the exempt concentration listed for each nuclide in the Basic Safety Standards, at the point where it enters the environment before any further dilution occurs, and at the time it enters the

environment before any further decay occurs. Licensees are permitted to dispose of waste below those limits without further approvals. Authorisation for disposal of higher concentrations of waste, or abnormal volumes within limits, could be considered if the need arose, but any such approval would be subject to additional conditions.

Unsealed radioactive waste can be in solid, liquid or gaseous form, and, if contaminated with radioactivity above the limit for uncontrolled disposal, its disposal is subject to Regulation 14.

A sealed radioactive source is a quantity of radioactive materials sealed in a metal capsule. The radioactive material is itself securely contained, but ionising radiation can be emitted. Historically, sealed radioactive sources were used for medical applications in the treatment of cancer. However, a variety of industrial uses now predominate. The most common use of sealed radioactive sources in New Zealand is in domestic smoke alarms, which because of the small quantity of radioactivity involved, are exempted from the Act's licensing requirements. In industrial and medical applications with radioactivity levels above the exemption levels in the Basic Safety Standards, uncontrolled disposal is not permitted for any of these encapsulated sources.

The primary emphasis of the NRL's policy for the management of these encapsulated sources is to ensure that each source is always accounted for. Responsibility for keeping track of all licensed radioactive sources is vested in the licensees, but the NRL maintains a database of all such sources and continually updates it on the basis of advice from licensees. An important NRL service is the receipt of all sealed radioactive sources which are obsolete, damaged or unwanted for any reason. National Radiation Laboratory assumes responsibility for supervision, storage and ultimate disposal of these sources. The only significant exception to this service is in the case of high activity sources (in practice ^{60}Co which is being replaced), which are exported back to the supplier of the replacement source.

On 30 April 1975, New Zealand ratified the 1972 London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter.

8. Nuclear Security

The 1982 Regulations contain general provisions regarding the safe storage and marking of materials, containers and places where the materials are stored. Every licensee is required to take all reasonable steps to ensure the safekeeping of radioactive material for which he is responsible, to ensure its proper labelling and to store the material in a fire-resistant container. Every person who stores radioactive material must erect a warning sign in the prescribed form, unless the material is packed and labelled in accordance with the IAEA Transport Regulations or is adequately protected against unauthorised removal [Regulation 12].

The 1987 New Zealand Nuclear Free Zone, Disarmament and Arms Control Act aims to establish in New Zealand a Nuclear Free Zone and to implement the following treaties: the 1985 South Pacific Nuclear Free Zone Treaty; the Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water of 5 August 1963; the Treaty on the Non-Proliferation of Nuclear Weapons of 1 July 1968; the Treaty on the Prohibition of the Emplacement of Nuclear Weapons of Mass Destruction on the Sea-bed and the Ocean Floor and in the Subsoil Thereof of 11 February 1971;

and the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxic Weapons and on their Destruction of 10 April 1972.

New Zealand became a Party to the 1968 Treaty on the Non-Proliferation of Nuclear Weapons (NPT) on 10 September 1969 and to the 1996 Comprehensive Nuclear Test Ban Treaty, not yet in force, on 19 March 1999. New Zealand acceded to the Convention on the Physical Protection of Nuclear Material on 19 December 2003.

9. Transport

The 1982 Regulations require radioactive materials to be transported, and packaged and labelled for transport, in accordance with the IAEA regulations for the Safe Transport of Radioactive Materials [Regulation 3]. These IAEA Regulations form the basis of two other sets of international regulations governing transport of radioactive materials: the International Air Transport Association (IATA) Restricted Articles Regulations, and the Dangerous Goods Code of the International Maritime Organisation (IMO).

10. Nuclear Third Party Liability

New Zealand is not a Party to any of the international conventions on nuclear third party liability and has no specific legislative provisions on the subject.

II. INSTITUTIONAL FRAMEWORK

1. Regulatory and Supervisory Authorities

*National Radiation Laboratory (NRL)*¹

In New Zealand the advisory, investigative, surveillance and regulatory functions are all combined in the National Radiation Laboratory (NRL).

The NRL is a unit of the Ministry of Health and performs the following principal functions:

- Administration of the Radiation Protection Act 1965 and Radiation Protection Regulations 1982 and provision of statistical or scientific data for use in promoting changes to legislation as may be required.

1. Website of the National Radiation Laboratory: www.nrl.moh.govt.nz.

This includes in particular:

- licensing users of radioactive materials and irradiating equipment and ensuring that each use is under the responsibility of a suitably qualified person; and
- controlling the import, export, manufacture, transport and disposal of radioactive materials.
- Developing and maintaining national standards for radiation exposure measurement and providing for calibration of clinical dosimeters, equipment used in radiotherapy, and other radiation-measuring instruments.
- Assessing, advising and providing information on hazards and risks associated with human activities involving ionising and non-ionising radiation and radioactive materials, and acting as a national centre of reference on such matters. In recent years, there has been a substantial advisory component related to non-ionising radiation, particularly radiofrequency radiations and ELF fields.
- Undertaking surveys and research aimed at assessing ionising and non-ionising radiation doses arising from various sources and improving radiation protection measures and programmes.
- Monitoring of radiation doses received by medically examined persons, and operation of inspection and advisory services to educate radiation users and to promote and maintain safe working practices. This includes provision of codes of practice and training courses where appropriate. Field work is held to be an important component of the safety assessment and advisory function.
- Operation of a personal monitoring service to monitor radiation doses received by persons occupationally or otherwise exposed, and investigation of any case of real or suspected over-exposure.
- Monitoring and assessing radioactivity in the environment, undertaking food certification with respect to its radioactive content, and acting as a collaborating laboratory with the WHO International Reference Centre in the field of environmental radioactivity.

NRL is involved in several national and international programmes such as monitoring the Comprehensive Nuclear Test-Ban Treaty, providing data for UNSCEAR reports, and membership of committees of the International Commission on Radiological Protection, Standards Australia/New Zealand, and participation in International Atomic Energy Agency projects.

2. Advisory Bodies

Radiation Protection Advisory Council

Pursuant to the Act, the Council's function is to advise and make recommendations to the Minister of Health on radiation protection matters and to the Director-General of Health in respect of applications for licences which are forwarded by him for advice and recommendation [Section 10 of the Act].

The Council consists of the Director-General of Health, the Director of the National Radiation Laboratory, the Director of the Institute of Nuclear Science in the Department of Scientific and Industrial Research, two persons (each of whom is either a radiologist or a radiotherapist), a medical practitioner and a qualified physicist [Section 5].

3. Public and Semi-Public Agencies

Research Institutes

Some research on radiation protection and nuclear physics is carried out by the Institute of Geological and Nuclear Sciences, a government-owned research company, and by certain universities in New Zealand.