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ICELANDIC RADIATION SAFETY AUTHORITY

Convention on Nuclear Safety
National Report for the Joint 8th and 9th
Review Meeting 20 - 31 March 2023
Iceland

This report was compiled by the Icelandic Radiation Safety Authority (IRSA) on behalf of the Government of Iceland.

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List of Acronyms and Abbreviations

ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
ALARA	As Low As Reasonably Achievable
AMAP	Arctic Monitoring and Assessment Programme
ArcticREIHN	Arctic Radiation Exercise in High North
CC	Country Group Coordinator Report
CNS	Convention on Nuclear Safety
ConvEx	Exercises held to test the operational arrangements of the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency
CRR	Country Review Report
CTBTO	Comprehensive Nuclear-Test-Ban Treaty Organisation
EPPR	Emergency Prevention, Preparedness and Response working group of the Arctic Council
EU	European Union
EURDEP	European Radiological Data Exchange Platform
IAEA	International Atomic Energy Agency
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ICRP	International Commission on Radiological Protection
IEC	IAEA Incident and Emergency Centre
IRSA	Icelandic Radiation Safety Authority
IXP-NARAC	International Exchange Program – US National Atmospheric Release Advisory Center
JC, Joint Convention	Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management
NCA(A)	National Competent Authority (Abroad)
NCA(D)	National Competent Authority (Domestic)
NKS	Nordic Nuclear Safety Research
NNSA	US National Nuclear Security Administration
RAD	Radiological
RANET	IAEA Response and Assistance Network
Regulatory Authority	Icelandic Radiation Safety Authority
RM	Review Meeting
RR	Country Review Report
SAR	Search And Rescue
TRIAGE	(here) NNSA analytical services
USIE	Unified System for Information Exchange in Incidents and Emergencies
VDNS	Vienna Declaration on Nuclear Safety

Introduction

Iceland signed the Convention on Nuclear Safety on 21 September 1995 and the Convention entered into force for Iceland on 2 September 2008.

There has never been a nuclear reactor of any type in operation in Iceland or nuclear facilities of any kind and there are no plans for such an operation, neither for production of energy nor for research. This is reflected in the national legal framework for radiation protection.

Iceland affirms its commitment to the Convention and supports international efforts to harmonize and increase nuclear safety and considers the Convention on Nuclear Safety to be an important instrument in developing a sustainable global nuclear safety culture. The Review meetings of the Convention provide an excellent opportunity for a small non - nuclear country with limited nuclear expertise such as Iceland to gain valuable insight and information regarding nuclear safety issues and progress in Member States of the Convention.

The aim of this national report is to demonstrate that Iceland meets its obligations of the Convention on Nuclear Safety.

This National Report **for the combined 8th and 9th Review Meeting of the Contracting Parties to the Convention on Nuclear Safety** is the fifth National Report under the Convention on Nuclear Safety by Iceland. The report was prepared by the regulatory authority, the Icelandic Radiation Safety Authority, at the request of the Ministry for Foreign Affairs in Iceland.

This National Report is structured in line with the guidelines set forth in INFCIRC/572/Rev.6 and with the requirements of the President of the 7th Review Meeting of the Convention in his letter dated 11 February 2016, as applicable for a Contracting Party without nuclear installations. The Information Circular INFCIRC/572/Rev.6 states that reporting on Articles 7, 8 and 16 is applicable for Contracting Parties with no nuclear installations planned or in operation, reporting on activities covered by Articles 9, 10 and 15 is also encouraged. Since Iceland has no nuclear reactors, this national report focuses mainly on giving an overview of the Legislative and regulatory framework, as required by Article 7, the Regulatory body as required by Article 8 and Emergency preparedness as required by Article 16. For the same reason the focus in the section on emergency preparedness is on Paragraph 3 of article 16.

The Annex lists signature and ratification of international conventions, agreements and legal instruments related to nuclear safety.

The Icelandic Radiation Safety Authority concludes that the Icelandic regulations and practices are in compliance with the obligations of the Convention on Nuclear Safety.

This report has been prepared by Iceland for the combined 8th and 9th Review Meeting of the Contracting Parties to the Convention on Nuclear Safety. It shows how Iceland meets the obligations of the articles of the Convention that apply to Iceland. The Country Review Report at the 7th RM found the National Report for Iceland to be "comprehensive, transparent and well structured". Therefore, the form and the main text of the National Report for the 7th RM has been kept, except deletions of texts that no longer apply or that addressed specific issues related to earlier RMs. During the preparation of this report the Coordinator's Analysis of Comments and Questions Posed on National Reports in Country Group 3 (CC/2020/G3) was taken into consideration, as well as the

draft Country Review Report for Iceland (RR/2020/G3) for the planned 8th RM. Any significant additions in the National Report for the 8th and 9th RM are highlighted in bold text.

In the current, challenging global situation with travel restrictions as well as social distancing requirements in place to mitigate the propagation of COVID-19, many resilience measures have been taken to ensure business continuity at IRSA. COVID-19 restrictions were implemented according to the recommendations of The Directorate of Health.

Summary

Iceland's first legislation on radiation protection was passed in 1962 and has been revised periodically. The legislation covers all relevant radiological safety issues. The latest major revision took place in 2002, Act 44/2002, with the aim of harmonizing the Icelandic legislation in the field of radiation protection and its implementation with the EU Acquis. Iceland is not a member of the European Union and the Directives of the European Union in the field of radiation protection have no legal bearing in Iceland. Minor revisions to the radiation protection Act were made in 2008 and 2010.

Following Iceland's application for membership of the European Union in 2009 the legislation on radiation protection was reviewed and compared with the EU Acquis. Based on the review, a bill to change the Act on radiation protection with the aim of harmonizing further towards the EU Acquis was submitted to the parliament in the autumn of 2013 and became effective as of 1 January 2014.

No important safety issues have been identified in Iceland's previous National Report, nor have they arisen since.

[Follow up from the 7th Review meeting](#)

At the 7th RM, the Country Review Report for Iceland concluded that all 3 Challenges from the 6th RM had been closed.

The Country Group identified the following Challenge for Iceland: To recruit and maintain competent staff for the regulatory body.

Iceland's response to the challenge is following:

On 1 June 2018 IRSA recruited two young, highly competent professionals, one with a master's degree in medical physics and the other with a PhD in Physics. This increases the total number of staff members from 9 to 11. The number of staff members is still 11. IRSA strives to maintain a stimulative work environment with challenging tasks and diverse career opportunities for all staff.

Follow Up Status: Closed.

There have been no changes to Iceland's energy programs as to the possible use of nuclear energy: there are no plans to implement a national nuclear energy program.

The legislative framework has been reviewed with regard to provisions regarding nuclear and radiological emergencies. A need for minor changes related to i.e. public information was identified and these are addressed in the changes in legislation that entered into force on 1 January 2014.

IRSA has developed support material providing general information and advice to Icelandic citizens abroad in the case of a nuclear or radiological emergency in co-operation with the Consular Affairs Unit of the Ministry for Foreign Affairs and exercise arrangements for providing such information.

In the aftermath of the Fukushima nuclear accident there was increased interest from the public and media regarding radiation and nuclear safety. This has demonstrated the need for more public information on these issues. When Iceland was the first European country to detect radioactivity in air due to release from Fukushima there was a media frenzy for half a day.

IRSA has developed more public information on radiation and nuclear safety. Interaction with domestic and international media has been exercised. It is IRSA's policy to openly release relevant information to the public. Part of this is the regular release of domestic and international news items on nuclear and radiological issues as well as information about the Authority's activities on its website. This National Report will be made publicly available on the website before the combined 8th and 9th Review Meeting in line with IRSA's policy.

The principles outlined in the Vienna Declaration on Nuclear Safety guiding Contracting Parties in implementing the objectives of the CNS relate to states with nuclear installations. The VDNS is merely mentioned but not addressed in detail in this report (as per the Letter of the president of the 8th CNS RM on addressing VDNS implementation in National Reports, December 13, 2018) since Iceland has no nuclear reactors or nuclear facilities.

IRSA concludes that the Major Common Issues arising from Country Groups Discussions as described in the Summary Report to the 7th Review Meeting (CNS/7RM/2017/08/Final), and as reminded by the President in item number 12 of his communication dated 17 October 2018, the Coordinator's Analysis of Comments and Questions Posed on National Reports in Country Group 3 (CC/2020/G3), as well as the draft Country Review Report for Iceland (RR/2020/G3) for the planned 8th RM are addressed as applicable in this report.

Article 4 - Implementing measures

Each Contracting Party shall take, within the framework of its national law, the legislative, regulatory and administrative measures and other steps necessary for implementing its obligations under this Convention.

Implementing measures to fulfil the obligations of the Convention are discussed in this report.

In conclusion, the Icelandic regulations and practices are in compliance with the Obligations of Article 4.

Article 5 - Reporting

Each Contracting Party shall submit for review, prior to each meeting referred to in Article 20, a report on the measures it has taken to implement each of the obligations of this Convention.

This report constitutes the fifth Icelandic report issued in obligation of Article 5.

In conclusion, the reporting of Iceland is in compliance with the obligations of Article 5.

Article 6 - Existing Nuclear Installations

Each Contracting Party shall take the appropriate steps to ensure that the safety of nuclear installations existing at the time the Convention enters into force for that Contracting Party is reviewed as soon as possible. When necessary in the context of this Convention, the Contracting Party shall ensure that all reasonably practicable improvements are made as a matter of urgency to upgrade the safety of the nuclear installation. If such upgrading cannot be achieved, plans should be implemented to shut down the nuclear installation as soon as practically possible. The timing of the shut-down may take into account the whole energy context and possible alternatives as well as the social, environmental and economic impact.

In terms of the Convention Iceland has no nuclear installations.

Article 7 - Legislative and Regulatory Framework

1. *Each Contracting Party shall establish and maintain a legislative and regulatory framework to govern the safety of nuclear installations.*
2. *The legislative and regulatory framework shall provide for:*
 - i. *the establishment of applicable national safety requirements and regulations;*
 - ii. *a system of licensing with regard to nuclear installations and the prohibition of the operation of a nuclear installation without a licence;*
 - iii. *a system of regulatory inspection and assessment of nuclear installations to ascertain compliance with applicable regulations and the terms of licences;*
 - iv. *the enforcement of applicable regulations and of the terms of licences, including suspension, modification or revocation.*

[Description of the Legislative and regulatory framework](#)

Since Iceland has no nuclear installations and no plans to establish nuclear activities, this report focuses on the more general obligations under Article 7.

Act on Radiation Protection of 18 April 2002

The Act on Radiation Protection of 18 April 2002 constitutes the legal basis for regulating the use of ionizing and non-ionizing radiation, radiation protection requirements, medical use of radiation, emergency planning, waste management and discharges to the environment.

The objective of the Act is to ensure adoption of the necessary safety measures to protect against radiation from radioactive materials and radiological equipment and to limit the detrimental effects of such radiation. An effort shall be made to ensure that all exposure to radiation resulting from any practice covered by this Act shall be as low as reasonably achievable, taking into account economic and social factors.

The objectives of the Act shall be attained through specific measures, for example, the inspection of radioactive materials and radiological equipment, studies and research, monitoring of radioactive substances in the environment, measures against radiological emergencies, and through education and guidelines on radiation protection.

The Act applies to:

- safety measures against ionising radiation in respect of any practices that could cause a risk of radiation exposure to persons, for example, the production, import, export, delivery, possession, installation, use, handling and disposal of radioactive substances and radiological equipment;
- safety measures against ionising radiation in practices that result in increased levels of natural radiation in the environment;
- safety measures against ionising radiation from radioactive substances and radiological equipment insofar as this is not governed by other legislation pursuant to international conventions;
- monitoring and research in respect of radioactive substances in the environment and foodstuffs;
- radiological aspects of measures concerning radiological and nuclear emergencies.

The Icelandic Radiation Safety Authority is an authority under the auspices of the Minister of Health. The Authority's role is to implement safety measures against radiation from radioactive substances and radiological equipment.

Minor amendments to the Act were approved by the parliament in April 2008 and became effective as of 1 January 2009. These amendments mainly involved clarifying wording in a few clauses. The main change relevant for this report is that previously it could be deduced that export of radioactive substances would require a licence, now it is clearly stated. The wording concerning emergency preparedness was also made clearer, a reference to analysis of threats was added as well as coordination of emergency preparedness planning with internationally accepted practices.

Further amendment to the Act were approved by the parliament in late 2010 and became effective as of 1 January 2011. This amendment is not relevant for this report since it addressed a general ban for young people under 18 using commercial sunlamps.

Following Iceland's application for membership of the European Union the legislation was reviewed and compared with the EU Acquis. Based on the review, a bill to change the Act on radiation protection with the aim of harmonizing further towards the EU Acquis was submitted to the parliament in the autumn of 2013, adopted in December 2013 and became effective as of 1 January 2014.

The Annex to this report lists signature and ratification of international conventions, agreements and legal instruments related to nuclear safety.

Regulations

The regulations on radiation protection and use of radiation issued in 2003, based on the act on Radiation Protection of 18 April 2002, have been revised in 2015 following the most recent amendment to the Act. Revised regulations were issued by the Ministry of Health in December 2015 and entered into force in January 2016. The most important change is in relation to inspections carried out by the Authority. Previously the frequency of inspections was determined in the regulations of 2003 but in the new regulations the decisions on frequency and scope of inspections is determined by the Authority. By this change the Authority is effectively independent in its regulatory decisions.

The regulations currently in force are the following:

- Regulation #[1299/2015](#) deals with radiation protection in medical uses of X-rays
- Regulation #[1298/2015](#) covers the use of sealed sources
- Regulation #[1290/2015](#) covers limits of exposure
- Regulation #[809/2003](#) with amendment #[920/2003](#) covers the use of open sources
- **Regulation #[738/2003](#) on waste landfill, which prohibits the disposal of radioactive waste in landfill**
- Regulation #[810/2003](#) on sunlamps
- Regulation #[1339/2015](#) with amendment #[1079/2017](#) on the import and use of lasers, laser pointers and IPL devices

In addition, the following apply:

- Act #[20/1972](#) on the prohibition of release of dangerous materials to the ocean
- Act #[33/2004](#) on the prevention of pollution of the coast and the ocean
- Regulation #[1077/2010](#) on the transport of dangerous goods on land

Reference to the EU COUNCIL DIRECTIVE 2013/59/EURATOM of 5 December 2013 replaces the previous EU Council Directive 96/29 Euratom of 13 May 1996.

The Code of Conduct on the Safety and Security of Radioactive Sources, and supplementary Guidance on the Import and Export of Radioactive Sources (IAEA/CODEOC/2004) is adhered to in the legal framework. The provisions of ADR, ICAO and IATA regarding the transport of dangerous goods are applicable on Icelandic territory.

Details regarding regulation of radioactive waste are found in the relevant regulations and further developed by the regulatory authority through guidelines and requirements in licences.

The regulatory body does not issue regulations but has issued several guides, in particular related to radiation protection in medical applications.

The process of establishing and revising regulations is the following: The regulatory Authority identifies a need for a regulatory requirement or revision thereof and sends a proposal with supporting information to the Ministry of Welfare. When the Ministry decides to issue a regulation based on the proposal it sends a draft to the interested parties for comments before finalising the review process and issuing a new or amended regulation.

Licensing and enforcement

The production, import, ownership, use, storage, delivery or disposal of radioactive substances, whether pure, mixed with other substances or installed in equipment, are subject to licensing by the Icelandic Radiation Safety Authority. The granting of licences is subject to conditions set out by the Institute, including provisions governing the handling of radioactive substances at the end of their use.

The Act on Radiation Protection itself requires that a Licence must be obtained for radioactive substances, unless the quantity or concentration is below the exemption limits or the substance is in a product that has been approved (e.g. ionising smoke detectors) or defined as not being of concern (e.g. old radio luminescent watches).

All who have radioactive sources in interim storage hold a licence to own and use such sources and are subject to the terms of the Icelandic radiation protection Act, relevant regulations, and regular inspections. This includes keeping the sources in a safe and secure storage, assuring that the doses to workers and the public are below the limits given in regulations (which is consistent with the recommendations of the ICRP and EU directives). Furthermore, the principle of ALARA must be applied.

A Licence is not required in respect of radioactive substances if their total content or concentration per mass unit is under the exemption limits as determined by the Icelandic Radiation Safety Authority. **Exemptions from the requirements with respect to specific and total activity of material handled are covered under Article 7 of the Act. Corresponding guidelines, GR-19:04 were issued in October 2019. These are based on COUNCIL DIRECTIVE 2013/59/EURATOM of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation and IAEA publication Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, IAEA SAFETY STANDARDS SERIES No. GSR Part 3 (2014).**

A Licence can be suspended, modified or revoked. If the offence is serious, then the Act states that a breach of the provisions of this act is subject to fine or imprisonment for up to 2 years, unless other law stipulates more severe penal action. No such serious offence has been discovered.

In conclusion, the Icelandic legislative and regulatory framework is in compliance with the obligations of Article 7.

Article 8 - Regulatory Body

1. Each Contracting Party shall establish or designate a regulatory body entrusted with the implementation of the legislative and regulatory framework referred to in Article 7, and provided with adequate authority, competence and financial and human resources to fulfil its assigned responsibilities.

2. Each Contracting Party shall take the appropriate steps to ensure an effective separation between the functions of the regulatory body and those of any other body or organization concerned with the promotion or utilization of nuclear energy.

The status of the regulatory body as per Paragraph 1 is described below.

Since there is no current or planned utilization of nuclear energy in Iceland, there are no bodies or organizations concerned with the promotion or utilization of nuclear energy in specific. Paragraph 2 is thus not applicable for Iceland.

The Icelandic Radiation Safety Authority

Legal foundation

As defined in the Act on Radiation Protection, the regulatory authority (the competent authority) is the Icelandic Radiation Safety Authority (IRSA) which is a governmental authority under the auspices of the Minister of Health.

Mandate, mission and tasks

The Authority's role is to implement safety measures against radiation from radioactive substances and radiological equipment. The Authority regulates matters concerning radiation protection, nuclear safety and security, nuclear and radiological emergency preparedness and radioactive waste.

Authorities and responsibilities

The Icelandic Radiation Safety Authority (IRSA, the Authority) is responsible for (as defined in the revised Act effective 1 January 2009):

- monitoring and supervising the implementation of this Act and its implementing rules and regulations;
- any inspections and research deemed necessary pursuant to this Act and its implementing rules and regulations;
- monitoring workers' exposure to ionising radiation, and maintaining a dose register of the results of the dose estimates for every worker;
- regular assessment of the total ionising radiation exposure of the general public from practices under this Act;
- regular assessment of patients' exposure to ionising radiation from practices under this Act;
- monitoring and researching radioactive substances in foodstuffs and the environment;
- courses in radiation protection for workers who work with radiation, as well as dissemination of information to the general public and the mass media;
- research in the field of radiation protection;
- the radiological part of measures concerning all types of radiation emergencies, including analysis of threats, coordination of emergency preparedness with internationally accepted practices, the operation of emergency response and radiation measuring systems, and other measures relating thereto;
- dosimetric activities appropriate for meeting the need arising from the use of ionising radiation in Iceland;
- collaborating with foreign institutions in relation to radiation protection and nuclear issues;
- other factors pertaining to the implementation of this Act, and other projects in the field of radiation protection in accordance with further decisions thereon by the Minister.

The Minister may request the Institute to address certain matters or projects relating to its duties under this Act.

Organizational structure of the regulatory body

The organisational structure of the Authority is flat, with work being carried out through activities and tasks, each under the leadership of a staff member. Each group of related activities, such as inspections, emergency preparedness etc., is lead by a member of staff having an over-all responsibility. The director is in charge of the management of the Authority. The director shall see to it being operated in accordance with existing laws and regulations at all times, and is responsible for its daily operation. The minister appoints the director of the Authority for a term of five years at a time.

Resources and competence

There is a staff of 11 of which 8 are technical experts with an academic background (2 PhD, 4 MS, 2 BS+).

Extensive participation in Nordic and international cooperation and scientific projects is an important factor in increasing and maintaining competence of staff. All staff members are effectively encouraged to seek continuous education. IRSA has taken part in international proficiency tests, notably through the ALMERA network, with quite satisfactory results.

The funding of the Authority has been stable since the 7th RM with an annual increase to compensate for increased costs i.e. due to inflation and higher salaries of staff.

The funding from the government and other income i.e. fee for inspections and authorizations, is sufficient to ensure that the Authority can carry out its regulatory activities in accordance with the legislation.

Quality management system

The Authority holds for all of its operations an ISO 9001:2015 certification by the British Standards Institution (FS 540268). The last external audit took place on November 2, 2021, with the following main result: "Planned activities have been fully realised. The MS [Management System] framework processes was clear, with specifications and evidence of good working practices". The quality management system provides a framework for the various tasks the Authority needs to perform, e.g. dealing with incidents and accidents.

Openness and transparency

As a governmental organization the activities of the Authority are subject to the Information Act No. 140/2012, which applies to all operations of such entities. The objective is to guarantee transparency in government administration and the handling of issues of public interests, inter alia with the purpose of strengthening:

1. the right to information and the freedom of expression,
2. possibilities for the public to participate in a democratic society,
3. the restraints exercised by the media and the public on government authorities,
4. possibilities for the media to communicate information on public affairs,
5. public confidence in government administration.

Iceland is party to the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters.

Nuclear safety and security

The Authority undertakes activities related to "nuclear safety and security" as needed. These activities are not specified directly in the legislation but collaborating with foreign institutions in relation to nuclear issues is specified in the legislation as one of the tasks of the Authority. In this context *nuclear issues* is taken to mean both nuclear safety and security. Furthermore the Act states that the Minister may request the Authority to address certain matters or projects relating to its duties under this Act.

On request of Iceland, in January 2019 the IAEA concluded successfully a preparatory mission to Iceland for the management of the Radium-226 sealed source inventory of The National University Hospital of Iceland. A follow-up

mission to condition the sources was planned before the end of 2019 but had to be postponed due to the pandemic and will be carried out in October 2022.

In conclusion, the regulatory body of Iceland is in compliance with the obligations of Article 8.

Articles 9, 10 and 15

Article 9 Responsibility of the Licence Holder:

Each Contracting Party shall ensure that prime responsibility for the safety of a nuclear installation rests with the holder of the relevant licence and shall take the appropriate steps to ensure that each such licence holder meets its responsibility.

Article 10 Priority to Safety:

Each Contracting Party shall take the appropriate steps to ensure that all organizations engaged in activities directly related to nuclear installations shall establish policies that give due priority to nuclear safety.

Article 15 Radiation Protection:

Each Contracting Party shall take the appropriate steps to ensure that in all operational states the radiation exposure to the workers and the public caused by a nuclear installation shall be kept as low as reasonably achievable and that no individual shall be exposed to radiation doses which exceed prescribed national dose limits.

Although these Articles refer to nuclear installations, their requirements are similar to those made for any licensed user of radioactive substances in Iceland, according to radiation protection Act of 18 April 2002.

In conclusion, Iceland complies with the obligations of Articles 9, 10 and 15.

Article 16 - Emergency preparedness

- 1. Each Contracting Party shall take the appropriate steps to ensure that there are on-site and off-site emergency plans that are routinely tested for nuclear installations and cover the activities to be carried out in the event of an emergency. For any new nuclear installation, such plans shall be prepared and tested before it commences operation above a low power level agreed by the regulatory body.*
- 2. Each Contracting Party shall take the appropriate steps to ensure that, insofar as they are likely to be affected by a radiological emergency, its own population and the competent authorities of the States in the vicinity of the nuclear installation are provided with appropriate information for emergency planning and response.*
- 3. Contracting Parties which do not have a nuclear installation on their territory, insofar as they are likely to be affected in the event of a radiological emergency at a nuclear installation in the vicinity, shall take the appropriate steps for the preparation and testing of emergency plans for their territory that cover the activities to be carried out in the event of such an emergency.*

Since Iceland does not have a nuclear reactor, Paragraphs 1-2 of Article 16 are not applicable. Obligations under Paragraph 3 are covered below.

General

Radiological emergency preparedness and response in Iceland is based on the safety standards of the IAEA and the IAEA framework for emergency preparedness and response. The nearest nuclear power plant is more than 1000 km away from Iceland. Therefore, a nuclear accident in a power plant is very unlikely to have a significant health effect in Iceland. An accident in a nuclear-powered vessel close to Iceland or the re-

entry of a nuclear-powered satellite could have significant effects in a restricted area. Malevolent acts may affect Iceland, even if they would not be directed against the country, since the country is a hub for many types of transports (passengers and goods) over the North Atlantic.

IRSA maintains a comprehensive registry of radioactive sources in Iceland based on the IAEA categorization of sources. **According to the registry there is one source in category 1 and one source in category 2 in the country. Both are in use at the University Hospital.** Since there is no nuclear industry in Iceland and due to the limited use of radioactive sources it is difficult to envision a domestic radiological emergency requiring more than an on-site response. There is a classification of situations in the generic emergency plans in use, and they are being revised and harmonised as possible with the classifications used for emergency situations in general in Iceland. This work is carried out by the Department of Civil Protection and Emergency Management of the National Commissioner of the Icelandic Police with IRSA in an advisory capacity.

The radiation protection Act states that the licensee is responsible for organizing local plans to deal with on-site emergency preparedness and response. The licensee is also responsible for informing IRSA immediately in case of a radiological emergency, for making initial estimates of potential consequences and for doing what is possible to minimize these.

The objective of the IRSA is to be able to deal with any radiological situation (incl. rumours, incidents and accidents), in cooperation with other authorities as appropriate, and to minimise possible harmful effects as possible. With no specific nuclear threat to Iceland, the emergency response is generic in structure based on the IAEA framework, taking into account but not limited to a set of predefined scenarios. The aim has also been to lower the threshold, to be able to respond to any radiation related situation that might be of public concern, whether it poses a significant health risk or not. This can e.g. include responding to false rumours that might cause public concern and could subsequently have societal and economical effects.

[The National Competent Authority](#)

The Icelandic Radiation Safety Authority (IRSA) is the National competent authority for nuclear emergencies Abroad (NCA(A)) as well as Domestic (NCA(D)) in terms of the Convention on Early Notification of a Nuclear Accident.

Iceland has started its entry of information into the Emergency Preparedness and Response Information Management System of the IAEA (EPRIMS).

In the radiation protection law, it is stated that IRSA is responsible for (amongst other things, as mentioned in the text on Article 8): the radiological part of measures concerning all types of radiation emergencies, including analysis of threats, coordination of emergency preparedness with internationally accepted practices, the operation of emergency response and radiation measuring systems, and other measures relating thereto.

In practice this means that IRSA initiates response when it receives international or domestic notifications, but it also provides support to other authorities when expertise in radiation protection is needed. This includes the Department of Civil Protection and Emergency Management of the National Commissioner of the Icelandic Police, Customs Office and first responders (police, fire brigade).

The national nuclear and radiological emergency preparedness in Iceland is being integrated with other fields of emergency preparedness. This is reflected in the Act no. 82/2008 on civil protection, according to which the director of IRSA is a member of the

committee for civil protection and safety. The integration is carried out by the Department of Civil Protection and Emergency Management of the National Commissioner of the Icelandic Police. IRSA has also a member in the committee on infectious diseases, set up in accordance with law no. 19/1997. This committee has the role of coordinating response against threats to public health.

Interaction between IRSA and other authorities are defined in terms of harmonised response plans, using the framework developed at the Department of Civil Protection and Emergency Management of the National Commissioner of the Icelandic Police.

An overall emergency management plan for CBRNE events is being finalised and is expected to be ready for use in an exercise in late 2019 or early 2020. This is supported by a translation and distribution of a First Responders Handbook addressing CBRNE issues. The emergency management plan is the joint effort of the Department of Civil Protection and Emergency Management of the National Commissioner of the Icelandic Police, the National University Hospital, the Directorate of Health, the Icelandic Met Office, The Icelandic Food and Veterinary Authority, the Environment Agency, the Iceland Construction Authority and the Icelandic Radiation Safety Authority, with active involvement of other relevant stakeholders.

2022 update: The CBRNE emergency management plan and the First Responders Handbook have been finalised and are ready for use. The formal testing during emergency preparedness exercises has been delayed as many of the planned exercises have been postponed due to the ongoing coronavirus pandemic.

Early warning

Iceland has ratified the Convention on Early Notification of a Nuclear Accident.

Effective and fast low-threshold exchange of information has been made possible through close cooperation with the other Nordic countries. A high-level working group on emergency preparedness has been instrumental in this, e.g. by preparing a manual on response activities and information exchange.

Gamma monitoring stations

IRSA operates a network of 4 gamma monitoring stations in cooperation with the Icelandic Meteorological office. The data from the stations are combined with meteorological data to aid assessment. Given the size of Iceland and the distance to other countries having nuclear installations, spent fuel or radioactive waste management facilities, these 4 stations should be sufficient to detect a plume coming from another country. The locations of the stations are shown in Fig. 1.

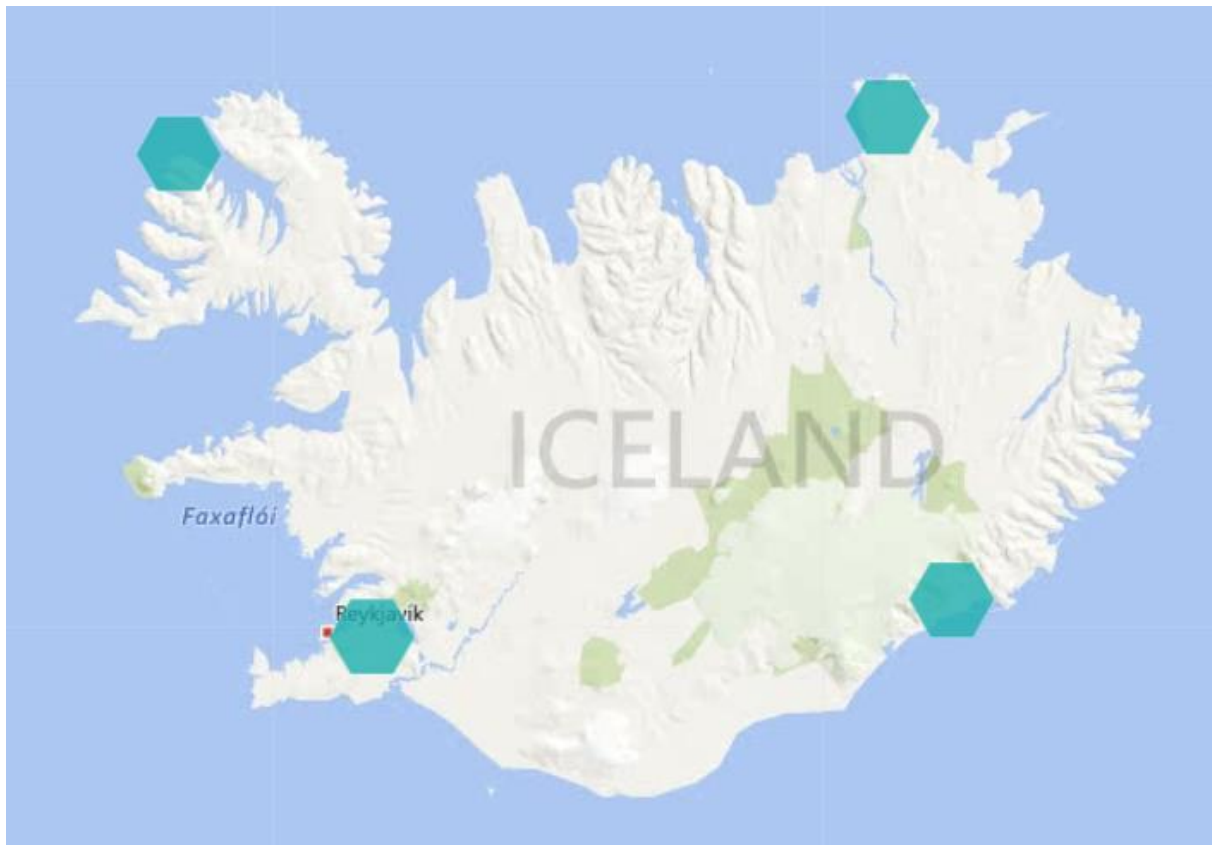


Fig. 1 Locations of gamma monitoring stations in Iceland (Picture: EURDEP)

These data are accessible by the European Radiological Data Exchange Platform (EURDEP) system. In case of a nuclear incident in Europe, Iceland would access real-time EURDEP data.

High volume aerosol samplers

The regulatory authority also operates an automatic high-volume air sampling station (>500 m³/h) in the network of the Comprehensive Nuclear-Test-Ban Treaty Organisation (CTBTO). Aerosols are collected for 24 hours, the filters are then stored for 24 h to let short-lived natural radionuclides decay and then counted for 24 h. Even though these are not real-time results, they are very useful for assessing possible effects of suspected releases, which could result in low air concentration in Iceland, but which might nevertheless be of concern. The first detection in Europe of radionuclides from the Fukushima accident was by IRSA's CTBTO high volume radionuclide sampling station. IRSA has also a mobile high volume (>100 m³/h) aerosol sampler that can be utilised to assess specific situations where needed.

Capability to detect and analyse radioactivity

Three sets of sensitive gamma spectrometric mobile systems are currently in use in Iceland, as a part of cooperation with the US National Nuclear Security Administration (NNSA). The systems can be operated from planes, cars or be operated in a stationary mode. IRSA has also co-operated with the NNSA by testing its analytical services (TRIAGE system) by a non-US user. The IXP-NARAC system is used to assess potential atmospheric distribution of radionuclides. IRSA staff have received extensive training by NNSA in the use of these equipment by NNSA on a yearly basis.

Exercises

Maintaining competence in emergency preparedness and response is a challenge for a small non-nuclear country such as Iceland. The solution adopted is to be actively involved in international co-operation and exercises.

Information exchange exercises between the Nordic countries are performed on a routine basis, a few times per year. Iceland also participates in international exercises i.e. ConvEx exercises organized by the IAEA. Exercises of specific parts of the response functions (functional exercises) involving other authorities in Iceland have been performed, and they will be carried out regularly on a more formal basis when the harmonised response plans currently being developed are in place.

International Cooperation

Even for faraway accidents, international exchange of information and assessments is essential. All information by authorities can now be instantly compared with information from other sources, the slightest discrepancy can be spotted at once and lead to lack of confidence. This makes international cooperation even more important, also when faraway incidents are concerned.

Iceland has been active in the preparation for the large-scale Arctic REIHN exercise originally planned to take place in 2020, then postponed until 2022, again postponed for about a year or until further notice due to the coronavirus pandemic.

Nordic cooperation

The radiation safety authorities in the Nordic countries (Denmark, Finland, Iceland, Norway and Sweden) have cooperated closely for decades, including radiation emergency response planning and management. A part of this cooperation is the *Nordic Nuclear Safety Research* (NKS, www.nks.org), which has supported joint Nordic research projects and seminars. The director of IRSA is the current chairman of the Board of NKS.

NKS projects with IRSA participation since the last National Report include:

- **AUTOMORC (2017) - Improvement of automatic methods for identification of radioactive material out of regulatory control (MORC) by mobile gamma spectrometric search.**
- **EPHSOGAM (2017) - Early Phase Source Term Estimation From Gamma Spectra.**
- **GammaSpec (2017) - Seminar for users of gamma spectrometry.**
- **NANOD (2017) - Dose estimates from natural radioactivity in food.**
- **RadShield (2017) - Activity estimation of shielded or hidden radionuclides in emergency conditions.**
- **AUTOMORC (2018) - Improvement of automatic methods for identification of radioactive material out of regulatory control (MORC) by mobile gamma spectrometric search (cont.).**
- **GammaRay (2018) - Seminar for users of gamma ray spectrometry.**
- **RadShield II (2018) - Continuation of RadShield (2017).**
- **RINFOR (2019) - Development of a Resource for the Improvement of National Nuclear Forensics Gamma Spectrometric Core Capabilities.**
- **SHIELDMORC (2019) - Detection distances and methods to locate orphan gamma radiation sources in shielded building geometries by mobile gamma spectrometry.**

- **SHIELDMORC (2020) - Detection of orphan gamma radiation sources in shielded building geometries by mobile gamma spectrometry - A method of using Compton scattered radiation to estimate the shielding mass thickness of common building material.**
- **EcoFood (2020) - A tool for assessment of radiation exposure in terrestrial environments impacted by airborne releases.**
- **COMBMORC (2021) - Combined analysis of primary and scattered components in mobile gamma spectrometric data for detection of materials out of regulatory control.**
- **NUCSEM (2021) - Use of nuclear weapons towards a Nordic country: Scenarios, impact assessments and protective measures.**
- **CRESCENT (2021) - Credible release scenarios for nuclear-powered vessels operating in Nordic waters.**
- **GammaRay X (2021) - Webinar for users of gamma ray spectrometry.**
- **BIOAPP (2022) - Application of biokinetic parameters for some representative accident cases based on state of the art modelling**
- **RNSARBOOK (2022) - Nordic Handbook for Search and Rescue in a Maritime Radiological / Nuclear Emergency (RNSARBOOK).**
- **NUPFLIGHT (2022) - Workshop on Potential release scenarios from flight testing of nuclear-powered flying vehicles.**
- **RNSARCARDS (2022) - Operationalization of RAD and SAR cooperation in RN rescue operations (partly postponed due to postponement of ArcticREIHN exercise)**

US DOE / AMS

IRSA staff members are regular participants at the annual Aerial Measuring System (AMS) technical exchange programs. This is an initiative under the U.S. Department of Energy, National Nuclear Security Administration / Office of Counterterrorism and Counterproliferation / Office of Nuclear Incident Policy and Cooperation.

HERCA

HERCA (www.herca.org) is a voluntary association of the *Heads of European Radiological Competent Authorities*. Lessons learned after Fukushima are an important part of the work and HERCA has a working group on emergencies chaired by Luxembourg, which has been given the task to identify the most urgent needs for further harmonisation of European response to faraway events and propose practical solutions. Iceland is actively taking part in the work of HERCA, with the director of IRSA being the chairman of HERCA from 2011 to 2017.

CTBTO

The Comprehensive Nuclear-Test-Ban Treaty Organisation (CTBTO) has a very powerful worldwide network of air samplers, and it has also the capability to analyse the data. Data from the network are being widely used for civil, scientific, and emergency preparedness purposes. IRSA has the role of the Icelandic National Data Centre and has direct access to all data from the CTBTO International Monitoring System and the CTBTO International Data Centre.

Arctic Council

IRSA participates in the AMAP programme (Arctic Monitoring and Assessment Programme) of the Arctic Council and will continue to provide monitoring data to the planned 2023 assessment update. IRSA is also active in the Emergency Prevention, Preparedness and Response (EPPR) working group of the Arctic Council as well as the new EPPR Radiation Experts group. Recent products of the EPPR include the report "Analysis of Capability to Respond to RN Emergencies in the Arctic". Work under the Arctic Council has suffered from the situation in Russia/Ukraine since 25 February 2022.

IAEA

The IAEA safety standards are at the core of the current radiation emergency response plans in Iceland, as well as the new plans now being developed using the general framework for response. The close cooperation of the Nordic countries, e.g., concerning low threshold notification of incidents, is based on the framework provided by the IAEA. For Iceland, the IAEA provides the framework for international cooperation for dealing with radiation emergencies.

As a rule, Iceland takes part in the regular IAEA ConvEx exercises. IRSA is the National competent authority for nuclear emergencies Abroad (NCA(A)) as well as Domestic (NCA(D)) in terms of the Convention on Early Notification of a Nuclear Accident and as such communicates with the IAEA's IEC through the USIE system as the formal Emergency Contact Point. This greatly facilitates seeking assistance through the RANET should the need arise.

In conclusion, Iceland's emergency preparedness for Contracting Parties without nuclear installations is in compliance with the obligations of Article 16.

Annex – International and bilateral instruments to which Iceland is a party:

	In force
Statute of the International Atomic Energy Agency	06.08.1957
Agreement on the Privileges and Immunities of the IAEA	19.03.2007
Convention on the Physical Protection of Nuclear Material	18.07.2002
Convention on Early Notification of a Nuclear Accident (ENAC)	28.10.1989
Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency	26.02.2006
Convention on Nuclear Safety	02.09.2008
Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	27.04.2006
Revised Supplementary Agreement Concerning the Provision of Technical Assistance by the IAEA (RSA)	09.05.1984
Application of safeguards in connection with the Treaty on Non-Proliferation of Nuclear Weapons (with Small Quantity Protocol)	16.10.1974
Protocol Additional to the Agreement between the Government of Iceland and the IAEA for the Application of Safeguards in connection with the Treaty on the Non-Proliferation of Nuclear Weapons	12.09.2003
Modified Small Quantity Protocol	15.03.2010
Partial Test Ban Treaty	29.04.1964
Comprehensive Nuclear-Test-Ban Treaty (CTBT)	26.06.2000
Treaty on the Prohibition of the Emplacement of Nuclear Weapons and other Weapons of Mass Destruction in the Sea-Bed and the Ocean Floor	30.05.1972
International Convention for the Suppression of Acts of Nuclear Terrorism	16.09.2005
Legislation and regulations based on commitment to United Nations Security Council Resolution 1540 (2004)	2009-2011
The Global Initiative To Combat Nuclear Terrorism (GICNT)	2007
Proliferation Security Initiative – PSI	
Memorandum of Understanding No. 32187 between the European Union and the National EURDEP Data Provider of Iceland on the participation to the EURDEP system during routine and emergency conditions	07.06.2011
Nuclear Suppliers Group – NSG	2009
The Antarctic Treaty	13.10.2015
The Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters	2011