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**Convention on Nuclear Safety**  
**National report for the 7th review meeting**  
**Iceland**

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

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## Introduction

Iceland signed the Convention on Nuclear Safety on 21 September 1995 and the Convention came 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 Seventh Review Meeting to the Nuclear Safety Convention is the third National Report under the Convention of Nuclear Safety by Iceland. The report was prepared by the regulatory authority, the Icelandic Radiation Safety Authority, at the request of the Ministry of Foreign Affairs in Iceland.

This National Report is structured in line with the guidelines set forth in INFCIRC/572/Rev.5 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.5 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.

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. These principles are not addressed in this report since Iceland has no nuclear reactors or nuclear facilities.

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.

## 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.

The Special Rapporteur at the 6th review meeting identified five challenges that need to be addressed by the Contracting Parties:

1. How to minimize gaps between Contracting Parties' safety improvements?
2. How to achieve harmonized emergency plans and response measures?
3. How to make better use of operating and regulatory experience, and international peer review services?
4. How to improve regulators' independence, safety culture, transparency and openness?
5. How to engage all countries to commit and participate in international cooperation?

These are important challenges, in particular for Contracting Parties with reactors or nuclear facilities in operation or in the planning phase.

1. N/A
2. Iceland supports harmonization of emergency plans and response measures by implementing the HERCA-WENRA Approach, see *Practical proposals for further harmonisation of the reactions in European countries to any distant nuclear or radiological emergency* and the „Nordic Flagbook“ which contains *Nordic guidelines and recommendations for nuclear and radiological emergencies*.
3. N/A
4. The effective independence of the regulator has been strengthened through changes in the regulations on radiation protection, in particular as relates to frequency of inspections that are now determined by the regulator and not the Ministry. A new information act took effect in 2013 (Information Act No. 140/2012). The objective of this Act is to guarantee transparency in government administration and the handling of public interests.
5. Iceland is committed to and participates actively in international co-operation.

Follow up from the 6th Review meeting

Regarding Iceland in specific, the 6th Review Meeting identified the following challenges:

- A. Being a small country, Iceland is experiencing challenges in recruiting qualified persons for the regulatory body. Furthermore, there is a challenge justifying the use of current and increased resources for RP.
- B. Maintaining the independence of the regulatory body.

- C. Even though “nuclear safety and security” is not mentioned directly in the Act, the regulatory body (IRSA) has to undertake tasks related to “nuclear safety and security”, as needed.

Iceland’s response to these challenges is following:

A. Finding qualified persons in a small nation with few experts is an ongoing challenge. IRSA addresses this challenge by interacting with students at the university level i.e. teaching, technical visits and by offering a good working environment resulting in a low staff turnover. A related challenge is to ensure transfer of knowledge and a suitable age distribution of experts. IRSA addresses this challenge by employing a good mixture of young and old experts.

Another ongoing challenge is to maintain and increase competence. The solution adopted is to be actively involved in international co-operation.

As for justification of current and increased expenses, the Authority has taken steps to enhance its visibility i.e. news, website, outreach activities focusing on the societal value and importance of effective radiation safety.

B. Actions to strengthen the independence of the Authority have been taken following an IAEA advisory mission to Iceland in 2014 to review the regulatory infrastructure. In particular the Authority now decides on frequency of inspections but before this was decided in a regulation issued by the Ministry of Health. The Authority is now effectively independent in its safety related decision making and has the resources necessary to fulfil its statutory obligations-.

C. 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 regulatory body. 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. Nuclear safety and security are matters clearly related to the duties of the Authority.

The Rapporteurs report mentioned intensive cooperation with the international community and other authorities given the geographical location, size of the country, and non-nuclear character of activities as an example of a good practice in Iceland.

Following the nuclear accident in the Fukushima NPP the Icelandic Radiation Safety Authority (IRSA) had a central role in the response and evaluation in Iceland, including giving advice to the Icelandic Ministry for Foreign Affairs and the Icelandic Embassy in Japan. There was extensive co-operation with the Consular Affairs Unit of the Ministry in providing information to Icelandic citizens in Japan and their concerned relatives.

Following Fukushima there is a decision for even closer cooperation with more joint exercises and development of more common material.

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 of 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 information to the public. Part of this is the regular release of news and information about the Authority's activities on its web. This National Report will be made publicly available before the 7<sup>th</sup> Review Meeting.

## **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 third Icelandic report issued in obligation with 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

Four of the five 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, merging 626/2003 and 640/2003 into 1299/2015 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 (1299/2015) the decisions on frequency and scope of inspections is determined by the Authority. By this change the Authority can be said to be effectively independent in its regulatory decisions.

The regulations currently in force are the following:

- Regulation #[1299/2015](#) deals with radiation protection in medical applications
- 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

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 Ministry or the regulatory Authority can take initiative to establish or revise regulations. If the Authority identifies a need for a regulatory requirement or revision thereof a proposal with supporting information is sent to the Ministry of Welfare. If 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).

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. The exemption limits determined are consistent with the Schedule to and text of Annex 1 of the EU Council Directive 96/29 Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general population against the dangers arising from ionising radiation.

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. He 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 Icelandic Radiation Safety Authority for a term of five years at a time.

#### Resources and competence

There is a staff of 10 of which 7 are technical experts with an academic background. The staffing situation has remained unchanged over the past three years.

Extensive participation in Nordic and international cooperation in the field of scientific projects, emergency preparedness and radiation protection is an important factor in maintaining competence of staff. All staff members are effectively encouraged to seek continuous education.

Financing of the Authority has increased a little over the last three years.

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 9001:2008 certification by the British Standards Institution (FS 540268). The quality 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 institution all the Authority's activities fall under the Information Act No. 140/2012, which applies to all operations of [such] entities.

The objective of this Act is to guarantee transparency in government administration and the handling of public interests, inter alia with the purpose of strengthening the following:

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.

It is the Authority's policy to increase the release of information to the public. A recent example is the release of Iceland's National Report to the 5th Review Meeting of the Joint Convention on The Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management in May 2015 on IRSA's website (<http://www.gr.is/wp-content/media/2015/05/JC5-nat-report-Iceland.pdf>).

Iceland has not received external technical support during the reporting period, nor has it received the support of advisory committees.

### 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.

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 are no sources in category 1 or 2 in the country. 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.

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.

#### 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 spent fuel and 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.

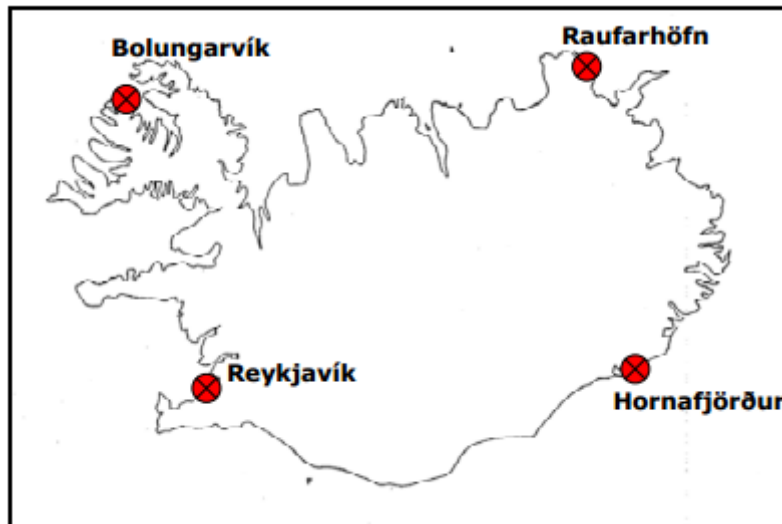


Fig. 1 Locations of gamma monitoring stations in Iceland

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 m<sup>3</sup>/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 m<sup>3</sup>/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. Experts from IRSA have observed exercises

abroad, i.e. in Finland, Sweden and the US. They participated in an international exercise in Sweden in 2012, exercise Refox. Iceland participates in the CONTEX 2016 exercise in Denmark 2016.

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 all the more important, also when faraway incidents are concerned.

#### Nordic cooperation

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

Examples of recent Nordic activity with Icelandic involvement include:

- EFMARE (2014) - Project for establishing models for the effects of dynamic behaviour of Nordic marine environment to Radioecological assessments
- MOBELRAD (2014) - Field Exercise in Fallout Mapping in the Belarusian Exclusion Zone using mobile measurements
- GAMFAC (2015) - Advanced In-situ Gamma Spectrometry Field Activity – Chernobyl; field exercise in the Belarusian Exclusion Zone using mobile measurements using high-resolution gamma spectrometry
- NORCON (2015) - Nordic Nuclear Accident Consequence Analysis: A pan-nordic assessment of the dispersal and transport of contamination after an accident involving a nuclear powerplant in the Nordic region as well as the assessment of the long-term consequences to man, environment and society.
- NORCOP-COAST (2015) - Workshop on nuclear icebreaker traffic and transport of radioactive materials along the Nordic coastline: response systems and cooperation to handle accidents.
- COASTEX (2016) - Project for the preparation of scenarios and table top exercise concepts on events related to traffic of nuclear-powered vessels and transportation of spent nuclear fuel along the Nordic coastline
- MOMORC (2016) - Field experiment in mobile search of material outside of regulatory control (MORC) with emphasis on assessment of detection limits.
- NISI (2016) - Field experiment using gamma measurements and spectrometry in emergency preparedness, measurement strategy and quality assurance.

#### HERCA

HERCA ([www.herca.org](http://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 current chairman of HERCA.

#### 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.

#### 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.

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