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Norway's Report to the joint 8th and 9th Review Meeting of the Convention on Nuclear Safety

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Abstract

Norway's national report to fulfil the obligations in the Convention on Nuclear Safety.

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Content

1 Introduction

1.1 About this Report

Norway signed and ratified the Convention on Nuclear Safety (CNS) on 20 September 1994. This report constitutes the ninth Norwegian report issued in accordance with Article 5 of the CNS. The report describes the nuclear activities in Norway and Norway's commitment to fulfil the obligations of the CNS.

This Introduction (section 1) provides information about the national policy and an overview of the nuclear programme in Norway. The Summary (section 2) summarizes updated information on matters that have developed since the last Norwegian Report to the CNS in 2020. Section 3 shows measures Norway has taken to implement the articles of the CNS.

Norway has no "nuclear installations", according to definition in Article 2 of the CNS. There are also no plans to build nuclear power plants, and therefore compliance with Articles 7, 8, 9, 10, 15 and 16 is presented, in accordance with the guidelines in INFCIRC 572/Rev. 6, section II.E.

1.2 National Policy towards Nuclear Activities

Norway had plans to build nuclear power plants in the 1960s and 1970s, but in 1979 there was a parliamentary decision to postpone these plans following the Three Mile Island accident. In 1986 there was a parliament decision not to build nuclear power plants, following the Chernobyl accident. Currently, Norway has no plans to build nuclear power plants. However, there are ongoing political discussions within the political parties whether Norway should embark on nuclear energy as an answer to the need for future energy development. The Governments energy policy has a firm focus on renewable energy and development of Norway's petroleum industry into a renewable, circular and sustainable future.

Norway is in the process of establishing a comprehensive national policy and strategy for safety, which is a follow-up of the recommendations from the IRRS mission (Integrated Regulatory Review Service) to Norway in 2019 (1).

1.3 Main Safety Issues Addressed in the National Report

There have not been any major safety issues since the last National Report.

1.4 Overview of the National Nuclear Programme

1.4.1 Nuclear Facilities

Even if Norway does not have any "nuclear installations" according to the definition of the CNS, the term "nuclear facilities" is for practical purposes used in this report and hence refers to research reactors and storage, handling and treatment facilities for radioactive materials.

Research Reactors

The Norwegian nuclear activities started in 1948 by the establishment of Institute for Atomic Energy (now renamed Institute for Energy Technology) at Kjeller northeast of Oslo. The first research reactor JEEP I (Joint Establishment Experimental Pile), reached criticality in July 1951. It was followed by the HBWR

(Halden Boiling Water Reactor) in 1959 (part of the OECD Halden Reactor Project), a boiling heavy water reactor with maximum thermal power of 25 MW. The N0RA (Norwegian zero effect Reactor Assembly) reactor at Kjeller came into operation in 1961 and was a joint project between Norway and IAEA. The JEEP I and the N0RA reactors were shut down in 1967 and 1968, respectively, and are partly decommissioned. The JEEP II reactor reached criticality in December 1966. JEEP II is a heavy water pool reactor with thermal power of 2 MW.

The HBWR and JEEP II were permanently shut down in 2018 and in 2019, respectively, and planning for decommissioning has been intensified. All the fuel and heavy water have been removed from the primary system of the JEEP II reactor, while in HBWR only part of the fuel has been removed from the reactor pressure vessel and the heavy water is still in place.

Storage and Disposal of Radioactive Waste and Spent Nuclear Fuel

All spent nuclear fuel is presently stored on site in Halden and at Kjeller, while radioactive waste is disposed of at KLDRA Himdalen or stored at the facilities. KLDRA Himdalen is a combined storage and repository for low and medium level radioactive waste that is located 25 km southeast of Kjeller. The capacity of KLDRA Himdalen is about 10,000 drums of waste (1 barrel is 210 litres), and it is expected to be filled around 2030.

A national policy and strategy for the management of spent nuclear fuel and radioactive waste is under development. Further updates on this and other aspects of spent nuclear fuel and radioactive waste management will be reported under the *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management*.

1.4.2 Organisations

Norwegian Radiation and Nuclear Safety Authority (DSA)

As of 1 January 2019, Norway's regulatory body, formerly known as the Norwegian Radiation Protection Authority (NRPA), changed its name to the Norwegian Radiation and Nuclear Safety Authority (DSA). DSA is the regulatory body in Norway in the areas of radiation protection, safety, security, and safeguards. DSA is organised as a directorate and undertake work for the Ministry of Health and Care Services (HOD), the Ministry of Climate and Environment (KLD) and the Ministry of Foreign Affairs (MFA), DSA also has areas of responsibility for the Ministry of Defence. DSA is described further in Article 8.

Institute for Energy Technology (IFE)

The Institute for Energy Technology (IFE) is an independent research foundation. IFE's objective is to work on a not-for-profit basis for the public good by conducting research and development in the field of energy and other areas where the foundation's expertise is of particular relevance, including nuclear technology. Part of its budget is financed by the Government through the Ministry of Trade, Industry and Fisheries and is marked for use, e.g., operation of nuclear facilities, the rest is from contracts with industry and other research institutions.

IFE is the license holder for Norway's research reactors at two sites, which are now being prepared for decommissioning. IFE is also the operator of KLDRA Himdalen. IFE is thus the operating organisation for three site licenses. IFE is responsible for handling, storage and final disposal of radioactive waste, excluding NORM (Naturally Occuring Radioactive Material) which is disposed of at other waste repositories.

Directorate for Public Construction and Property (Statsbygg)

The Directorate for Public Construction and Property (Statsbygg) is a governmental management company. Statsbygg was the builder of KLDRA Himdalen, and is the owner of the site, which is operated by IFE.

Norwegian Nuclear Decommissioning (NND)

In 2018, the Government decided to establish the Norwegian Nuclear Decommissioning (NND) as a state agency under the Ministry of Trade, Industry and Fisheries, to take over responsibility for decommissioning the research reactors and other nuclear infrastructure and for management, storage and disposal of radioactive waste. When NND is granted a license, it is expected they will be responsible for, among other things:

- Operating the disposal facility KLDRA Himdalen, the radioactive waste treatment facility at Kjeller, and the spent fuel stores at Kjeller and Halden
- Decommissioning the research reactors and other related facilities currently owned by IFE at Kjeller and Halden.
- Developing additional storage and disposal facilities needed for spent fuel and other radioactive waste, including waste from non-nuclear waste producers.

NND is expected to apply to become the licence holder for the three sites at Halden, Kjeller and Himdalen and then, subject to authorization, would replace IFE as the owner and operating organisation of the nuclear installations at Halden, Kjeller and Himdalen. All details for this are not yet finalized, but NND is planning to submit a license application for all three sites in 2023. NND is currently working with the Government and IFE to obtain a full understanding of the facilities and associated responsibilities, to develop the resources and competences, and apply for licences. DSA is providing guidance in relation to the authorisation process.

1.4.3 Legislative and Regulatory Framework

The nuclear activities are mainly governed by three acts: the Nuclear Energy Activities Act (12 May 1972), the Radiation Protection Act (12 May 2000) and the Act Concerning Protection Against Pollution and Concerning Waste (Pollution Control Act 13 March 1981). The Norwegian legislative and regulatory framework is described in more detail in Article 7.

2 Summary

2.1 Significant Changes to the National Nuclear and Regulatory Program

Following a scheduled maintenance inspection at the HBWR, a functional problem with a safety valve requiring a considerable repair cost was identified by IFE. IFE decided in June 2018 to permanently shut down the reactor. Fuel from the Halden reactor has been partially removed, but most of the fuel remains in the reactor core.

IFE decided in April 2019 to permanently shut down the JEEP II reactor at Kjeller following scheduled maintenance and control as part of the aging program. During the maintenance and control, corrosion was identified on several key components requiring a long-term shut down period and considerable repair cost. The JEEP II reactor is shut down, and the fuel and heavy water have been removed from the reactor core.

IFEs site at Kjeller and the Fuel Instrumentation Workshop in Halden were re-licenced according to the Nuclear Energy Activities Act from 1 January 2019 for 10 years of operation, while the reactor site in Halden was re-licensed from 1 January 2021, also for 10 years. Both licenses were given with a number of general and specific license conditions that need to be addressed before the safety is on a satisfactory level. Following a DSA inspection in 2017, IFE was instructed to perform further analysis of the criticality safety assessment in regard to the inadequacy of the safety margins presented, and before they could continue to remove the fuel from the reactor core or the associated fuel storages. A revised criticality assessment was provided to DSA in August 2019. Pending resolution of some remaining concerns, e.g., related to identification and analysis of faults and hazards and related to inventory data for fuel in storage, DSA issued an instruction in December 2019 restricting IFE from moving any fuel or other materials covered by the criticality safety assessment. The restriction can be lifted once an updated criticality safety assessment has been done for all the relevant zones and presented to DSA and approved by DSA.

The nuclear program is now in a transition phase preparing for decommissioning of the research reactors and related facilities.

2.2 Important Safety Issues since the Last Report

There have not been any major safety issues since the last National Report, but a continues focus in improving safety and safety culture.

2.3 Events and Accidents

In 2019, DSA was informed about irregularities and dishonesty identified in projects during earlier experiments and research projects at the Halden research reactor. IFE started an internal investigation focused primarily on the period 1990-2005, but the investigation indicates that the irregularities may have started before 1990 and continued beyond 2005, possibly until the mid-2010s. The projects have been carried out for clients within the nuclear sector and industry in other countries. In parallel DSA started an inspection and instructed IFE in 2019 to investigate the safety consequences of the misconduct in order to clarify whether it has had any impact on safety of the Norwegian reactor sites or on the safety of nuclear programs outside Norway. It was uncovered serious irregularities with data manipulation for economic reasons in some projects, with possible consequences on safety, depending on the application of the results. IFE had extensive dialogue with the customers involved own and their investigation report was finalised in 2021 and on the background of the findings, IFE reported to the Norwegian National Authority for Investigation and Prosecution of Economic and Environmental Crime (Økokrim).

DSA has since it was informed been in dialogue with all the relevant competent authorities in the countries affected and DSA is in the process to thoroughly assess the findings from the inspections and the work of IFEs and consider further follow-up. DSA has, based on what has so far turned up in the inspection and investigation, informed the nuclear safety authorities in the countries in question where the results from the respective projects might have been used by the customers. According to IFE's investigation report, the multinational OECD Halden project has not been affected by the irregularities. Based on the findings from the investigation, IFE has not found any consequences for the safety of the Halden reactor. However, DSA and Økokrim have still not concluded the inspection and investigations.

2.4 Planned Safety Related Activities

After the decisions to shut down the last two operating research reactors in Norway, the operating organisation (IFE), the regulatory authority (DSA), and the newly established organization responsible for decommissioning and management of radioactive waste from the nuclear sector (NND), are now preparing for decommissioning, establishing new infrastructure and facilities for radioactive waste management, and transferring the undertakings from IFE to NND. NND is planning to prepare three site license applications for Halden, Kjeller and Himdalen to be submitted for authorization in January 2023. In this process, operating experience from other relevant international decommissioning projects has been gained by NND, e.g., through site visits to other countries and facilities.

DSA is in the process of follow-up on the recommendations from the IRRS mission, see Section 3.4.2.1.

2.5 Suggestions and Challenges from the 2017 Review Meeting

The challenges and suggestions were described in Norway's National Report for CNS in 2020 (2). The information is included and updated here as was agreed at the Organizational Meeting of the Joint Eighth and Ninth Review Meeting of Contracting Parties in October 2021.

2.5.1 Challenges

Two challenges were identified for Norway at the Review Meeting in 2017:

→ *Challenge 1: Complete actions to establish an effective ageing management program, including an inspection program for JEEP II.*

A maintenance program has been in place for JEEP II since the reactor came into operation in 1966. The ageing management programme (AMP) was formally established in 2016 and was focused on the reactor pressure vessel and the primary coolant circuit, but did not include all Systems, Structures and Components (SSC) relevant to safety. Need to revise the ageing management program was a recommendation in the INSARR report for JEEP II in 2017. Enhancement of the ageing management program at JEEP II is also a specific license condition in the current license. The AMP has been revised further, e.g., by including in-service inspection, periodic testing, and minimizing the ageing effects on SSCs through operational practices. The ageing management inspections led to the identification of corrosion which led to the decision to permanently shut down the JEEP II reactor.

The challenge was identified when the reactor was still in operation, and the measures mentioned above were implemented to address this challenge. The situation has changed after the reactor was shut down in 2019, and DSA is now assessing an updated ageing management program. Meanwhile, ageing management programmes and practices are the same as when the reactor was operating.

→ *Challenge 2: Continue to improve safety culture taking into account the results of the upcoming INSARR and ISCA reviews.*

DSA intensified its inspection program concerning IFE after DSAs major system audit inspection in 2014-16. The findings from this inspection identified challenges and problems connected to several safety and security issues including weak safety culture at IFE. One part of the intensified inspection programme was frequent inspections of IFEs Safety Committee. The intensified inspection program is still on-going and is planned to continue as long as required. As part of the process to improve safety culture at IFE, INSARR (Integrated Safety Assessment of Research Reactors) and ISCA (Independent Safety Culture Assessment) missions were held in Norway in 2017 and 2018, respectively. This reviews also identified that the issue about safety culture was still a safety issue at IFE. One example on improved safety culture work is that IFE has established a separate safety culture activity for the nuclear organisation in collaboration with NND, focusing on maintaining, improving and monitoring leadership and culture for safety and security. See also Section 3.4.1.

2.5.2 Suggestions

The CNS Country Group identified the following Suggestion for Norway:

→ *Suggestion 1: Participate in the EU topical peer review on ageing management.*

According to the European Union (EU) Nuclear Safety Directive, all EU member states shall perform a national assessment on nuclear safety, called a Topical Peer Review (TPR). EU invited neighbouring countries to participate in the review, which started in 2017, and Norway volunteered to participate. The topic for the first TPR review was ageing and ageing management and included nuclear power reactors and research reactors with a thermal power of more than 1 MW. Thus, both Norwegian research reactors were included in the review. Norway submitted a report (3) according to the guidelines from the European Nuclear Safety Regulators Group (ENSREG) and Western European Nuclear Regulators Association (WENRA). Norway participated in the peer review process and submitted a report which was reviewed during a workshop in May 2018.

The feedback to Norway following the review was one "good practice"[1], which was use of external peer review services to assess and review the ageing management programme. There was also one "area for improvement"[2], which was systematic and comprehensive ageing management programme to be implemented for the research reactors, in accordance with the graded approach, the applicable national requirements, international safety standards and best practices (4).

2.6 Emergency Drills and Exercises

Norwegian emergency response arrangements are exercised on the national, regional, and local levels. Relevant scenarios include nuclear power plant accidents in neighbouring countries, accidents at Norway's research reactors, nuclear submarine accidents in Norwegian ports or coastal waters, nuclear ice-breaker accidents, transport accidents, satellite crash, radiological accidents with sealed or open sources and dirty bombs. The initiating event of such accidents also includes deliberate malevolent acts.

[1] "A good practice is an aspect of ageing management which is considered to go beyond what is required in meeting the appropriate international standard." (ENSREG, 1st Topical Peer Review, Country Specific Findings), October 2018

[2] "A "TPR expected level of performance" for ageing management is the level of performance that should be reached to ensure consistent and acceptable management of ageing throughout Europe. These findings were allocated to participating countries (the country specific findings). The "TPR expected levels of performance" are considered as a good performance for those countries which already meet this expectation and as an area for improvement for the others.» (ENSREG, 1st Topical Peer Review, Country Specific Findings), October 2018

DSA contributes to exercise activity on many levels of the response organisation. In previous years there has been a major focus on enhancing the competence of nuclear and radiological response on the regional and local level. Lessons learned from exercises are followed up through internal processes.

IFE has adapted emergency plans for each site. Each site holds exercises regularly and has an exercise where emergency preparedness is the main theme every third year at the minimum. DSA performs inspections during IFE exercises and lessons learned are identified in an inspection report.

More information about exercises is included in Article 16.

2.7 Experience from the Response to the Covid-19 pandemic

In March 2020, the Norwegian government introduced several measures to limit the spreading of the coronavirus in Norway. Among the measures was closure of schools, cancelation of sporting events, closure of close contact businesses, recommended home office and recommendation to avoid unnecessary travels. For DSA employees this meant that national and international business travels were postponed, and home office for those with work tasks that could be performed out of office. A Covid-19 pandemic workgroup was established. The group contributed to publishing and revising organisation level recommendations and guidelines in line with the current national recommendations. It was also introduced several specific initiatives on organisation, department and section level at DSA, to improve social and physical well-being of the employees.

During the Covid-19 pandemic, DSA reviewed the inspection plans and assessed which inspections was critical to perform and which could be postponed. It was also assessed if inspections could be performed virtually. Several inspections related to nuclear safety were postponed, due to the need for in person meeting, internal resource capacity and planned use of external experts, who no longer could travel to Norway. The Pandemic did not otherwise hamper DSAs inspection-programme to a significant extent and DSA conducted several virtual inspections. The virtual inspections were carried out according to the inspection process, with opening meeting, interviews, demonstrations of the deviation system and a final meeting. Norway also facilitated safeguards during the Covid-19 pandemic. Safeguards inspections was defined as a “society critical” function and IAEA inspectors were therefore granted permission to enter and be exempted from quarantine in accordance with the corona regulations.

IFE established a specific preparedness level including delivery of daily reports on the situation at the facilities in regards to the Covid-19 pandemic to DSA. The reports contained updated information regarding status of safety related controls and functions, status of available and infected personnel and which organisational measures IFE have in place. As the pandemic progressed in time, the frequency for reporting was changed from daily to weekly. The daily and weekly reports showed a low infection rate at the nuclear facilities. However, as the national infection trend increased with the omicron variant so did the infection rate at the nuclear facilities. Nevertheless, the safety at IFE facilities was not compromised due to the pandemic.

As of March 2022, the Norwegian government has removed all measures introduced in 2020. DSA employees have returned to the office, and IFE has returned to normal operation.

3 Reporting Article by Article

As mentioned above, Norway does not have nuclear installations, according to the CNS definition. This report therefore covers compliance with Articles 7, 8, 9, 10, 15 and 16, in accordance with the guidelines in INFCIRC 572/Rev. 6, section II.E.

3.1 Article 7: LEGISLATIVE AND REGULATORY FRAMEWORK

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.

3.1.1 Overview

All nuclear activities are regulated by three legal instruments, the Nuclear Energy Activities Act 12 May 1972, the Radiation Protection Act 12 May 2000 and the Pollution Control Act 13 March 1981.

The Nuclear Energy Activities Act

The Nuclear Energy Activities Act of 12 May 1972 regulates the licensing system, general requirements for licences, inspection programme and the legal basis for the regulatory body. The Act also establishes the liability system according to the Paris Convention of 29 July 1960 as amended and related international legal instruments. The Act regulates confidentiality and penalties in case of non-compliance.

Pursuant to the Nuclear Energy Activities Act, there are four regulations issued:

- → *Regulation 2 November 1984 on the Physical Protection of Nuclear Material and Nuclear Facilities (last amended 20 December 2018).* Theis regulation establishes requirements for the physical protection of nuclear material and nuclear facilities. The regulation implements Nuclear Security Series 13 and the obligations of the Convention of the Physical Protection of Nuclear Material and Nuclear Facilities as amended 2005.
- → *Regulation 15 November 1985 on Exemption from the Nuclear Energy Activities Act for Small Amounts of Nuclear Material (last amended 20 December 2018).* This regulation exempts small amounts of nuclear material from Chapter III of the Act and thus from the liability system.
- → *Regulation 12 May 2000 on Possession, Transfer and Transportation of Nuclear Material and Dual-use Equipment (last amended 20 December 2018).* This regulation regulates the control and accountancy of nuclear material as required in the Additional Protocol to the Safeguards Agreement between Norway and IAEA.

→ *Regulation 14 December 2001 on Economical Compensation after Nuclear Accidents.* This regulates how Contracting Parties to the Vienna Convention of 21 May 1963, Contracting Parties to the Joint Protocol of 21 September 1988 and Hong Kong shall be considered in connection to Norwegian legislation on nuclear liability. It also regulates how nuclear accidents in a non-party state shall be considered in connection to the Norwegian legislation.

The Radiation Protection Act

The Radiation Protection Act of 12 May 2000 constitutes the legal basis for regulating the use of ionising and non-ionising radiation, radiation protection requirements, medical use of radiation, and contingency planning. The Act itself establishes the framework, which is described in further detail in the Regulation on Radiation Protection and Use of Radiation of 16 December 2016.

Pursuant to the Act, one regulation has been adopted:

→ *Regulation 16 December 2016 on Radiation Protection and Use of Radiation.* This defines radioactive material that is exempted from the Act, and specifies more detailed requirements, including specific requirements for different types of use of radiation. The Radiation Protection Act was updated in 2018, in order to also address radiopharmaceuticals.

The Pollution Control Act

The Pollution Control Act of 13 March 1981 regulates the risk of pollution[3], and is the basis for authorisation of discharges of radioactive substances and the management of radioactive waste and contamination. The application of this act is stipulated in regulations of which the most relevant one to the CNS is: Regulation of 1 November 2010 on the Application of the Pollution Control Act on Radioactive Pollution and Radioactive Waste. Further description of this and other regulations under the Pollution Control Act is found in Norway's national report to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

Royal Decree on Emergency Preparedness

The Royal Decree of 23 August 2013 describes the organisation and mandate of the emergency preparedness and response system in Norway. This is further described under Article 16.

The Planning and Buildings Act

The Planning and Building Act of 27 June 2008, and the associated Impact Assessment Regulations, cover the conceptual design and siting process for nuclear installations and DSA is specifically identified as the competent authority.

The Freedom of Information Act

The Freedom of Information Act of 19 May 2006 facilitates an open and transparent public administration.

Act relating to national security (Security Act)

The Security Act of 24 January 2018 shall ensure protection of national security interest; prevent, deter and counter threat to security; and implement security measures with fundamental legal principles. The act includes protection of information regarding safety.

The Public Administration Act

The Public Administration Act of 10 February 1967 gives provisions for a formal decision-making process and ensures the right to appeal decisions made by the regulatory body.

[3] Pollution is defined in the Pollution Control Act as 1. the introduction of solids, liquids or gases to air, water or ground; 2. noise and vibrations; 3. light and other radiation to the extent decided by the pollution control authority; 4. effects on temperature which cause or may cause damage or nuisance to the environment.

International Conventions and Legal Instruments Related to Nuclear Safety

Norway has signed, ratified and implemented the following international conventions related to nuclear safety:

- → Convention on Nuclear Safety
- → Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management
- → Convention on Early Notification of a Nuclear Accident
- → Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency
- → Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention)
- → Norway has also made a political commitment with regard to the Code of Conduct on the Safety of Research Reactors

3.1.2 Establishing and Revising Regulatory Requirements

A need for regulatory revision may be identified due to new scientific knowledge or new international recommendations. DSA uses IAEA Safety Standards and other relevant international standards such as WENRA Safety Reference Levels as important guidelines when national laws and regulations are developed, reviewed, and updated. The Parliament amends national laws. Changes in regulations must be approved by the Government or by the relevant ministry. Revision of regulations must follow the provisions laid down in the Public Administration Act. All laws or regulations must be sent to public hearing, according to the provisions of the Public Administration Act and other requirements included in the Acts mentioned above. The public hearing process involves publishing the proposed regulation, along with a justification of the changes made, and the positive and negative consequences, including economic and administrative consequences, that these changes might have.

The general regulatory requirements, specified in the Nuclear Energy Activities Act and the Pollution Control Act and associated regulations, are developed with the intent to be implemented in individual authorization or licence conditions, on a case-by-case basis, rather than in generic regulations or guidance. This facilitates detailed application of ALARA (As Low As Reasonably Achievable), BAT (Best Available Technique) and a graded approach. Accordingly, also the procedures for such decisions are described in the Public Administration Act. An individual decision is “an administrative decision relating to the rights or duties of one or more specified persons” (Public Administration Act, section 2 b) and since they are legally binding there are requirements on such decisions; they have to be mandated in a law or a regulation according to the law and they shall inter alia be well informed, grounded and can be appealed.

DSA may clarify and interpret laws and regulations in guidance documents as needed. Such general guidance for applicants is available, based on general requirements in the above-mentioned acts and regulations. In addition, DSA gives specific guidance on the implementation of laws and regulations in the documentation of individual decision letters.

In the operating license for the JEEP II reactor for 2019-2028 General Licence Conditions (GLC) were developed for the first time (5), with the intention that these will be applicable to all the nuclear sites in Norway that are subject to licensing under the Nuclear Energy Activities Act. The GLCs were made applicable for the HBWR in the operating licence for 2021-2030. The GLCs are applied through the Nuclear Energy Activities Act and are based on international safety standards. The GLCs are intended to be comprehensive relating to the requirements placed on the operating organisation or applicant for a license but are not prescriptive in terms of how these requirements should be met. The GLCs clarify the regulatory requirements related to nuclear facilities and activities and are intended to facilitate the operators’ understanding of regulatory expectations. The GLCs are site-based, rather than installation-based, following international practice. The GLCs were published in 2018 and are publicly available on the DSA web page. DSA is currently preparing a guidance document to elaborate the conditions set out in the GLCs

and specify the significance of IAEA safety standards in relation to them. In addition, the guidance document on the GLCs will specify required processes, procedures and routines in order to maintain safety and security at nuclear facilities.

3.1.3 Licensing

The nuclear facilities are required to have a licence under the Nuclear Energy Activities Act. IFE holds a licence to own and operate HBWR and other facilities at the Halden site for the period 2021-2030, and a licence to own and operate IFE Kjeller site, and the Fuel Instrumentation Workshop in Halden, for the period 2019-2028. In addition, IFE has the operating licence for the combined storage and repository for low and intermediate level radioactive waste (KLDRA Himdalen) which is owned by the governmental management company Statsbygg.

Licensing under the Nuclear Energy Activities Act is a process that may take up to two years. License applications under the Nuclear Energy Activities Act shall be submitted to The Ministry of Health and Care Services. Upon request, DSA shall prepare and submit recommendations to the Government or the relevant ministry on all applications concerning licences under the Nuclear Energy Activities Act. Prior to processing a license application, DSA and the applicant usually hold a start-up meeting, where the applicant presents the justification for and summary of the licence application. DSA describes how the application will be processed and meetings and inspections related to the application are planned.

To strengthen the review and assessment process, DSA uses technical support from independent external consultants. The consultants may assist DSA in inspections to clarify identified safety issues. If relevant, DSA also uses information from other external contributors, such as IAEA missions, and evaluation or peer review reports in safety, security and safety culture areas. DSA reviews and assesses the application, and performs site visits and inspections, with use of external experts as needed.

The application for a license is sent on public hearing to relevant stakeholders (section 3.2.10), according to the Public Administration Act. When the results and the conclusion of the licence application review and assessment process are finalised, DSA presents the results and conclusions to the DSA Nuclear Safety and Radioactive Waste Advisory Committee for advice.

Based on the findings, observations and comments from the review and assessment process, feedback from external stakeholders, and the DSA Nuclear Safety and Radioactive Waste Advisory Committee, DSA prepares a Recommendation Report, which is submitted to The Ministry of Health and Care Services and recommends whether or not to grant or renew the licence to own and operate the nuclear facilities. DSA also provides recommendations on licence conditions that need to be fulfilled.

3.1.4 Inspections

Norwegian legislation provides DSA with the necessary legal basis for inspection activities covering all nuclear facilities in Norway. According to the Pollution Control Act, the Radiation Protection Act and the Nuclear Energy Activities Act, DSA shall be given free access to all relevant information to sites, facilities and activities. DSA may perform both announced and unannounced inspections.

DSA has developed an inspection strategy for the period 2022-2030. The strategy ensures implementation of IAEA-requirements for performing inspections. The strategy states that inspections shall be risk-based in accordance with a graded approach, both with regard to the frequency of inspections and to the facilities or activities to be inspected.

DSA has a process for inspections which include inspection guidelines, procedures and templates. The inspection procedures describe the practical inspection activities, including the responsibilities of inspectors, staff and mangers. The procedures also include templates for writing notice letters and inspection reports, and templates for opening/closure meetings. Within most inspection areas, checklists and question lists have been established. The checklists are adapted to each inspection.

DSA performs several different types of inspections, which include planned and reactive inspections, both announced and unannounced. Normally DSA perform 15-20 inspections per year under the Nuclear Energy Activities Act. In 2019, 2020, and 2021 DSA performed 16, 12, and 8 inspections respectively at IFEs' nuclear facilities under this Act. The reduced numbers of inspections in 2020 and 2021 was due to the corona pandemic as described in section 2.7. Two of the inspections in 2021 continued into 2022.

Under the Nuclear Energy Activities Act, DSA performs inspections on nuclear safety, nuclear security, safeguards, waste management, and emergency preparedness. The inspection plan is developed in line with the inspection strategy and considering experience and judgement of DSA staff. When the inspection plan for facilities or activities is developed, the inspection topics are described on a high level. The details for each inspection are developed in the period before the inspection. The facilities associated with the highest safety risks are prioritized, and that might relate to age or the status of the facility, incidents at the facility or the planning of special operations or modifications. DSA continues to develop the process and procedures relating to inspections. The focus of inspections in recent years has been on the management system, spent fuel management, and the safety and security culture of the operator, including the work of its safety committee. In addition, DSA has since 2019 inspected IFEs investigation of irregularities and scientific dishonesty during earlier scientific projects at the Halden reactor facility (section 2.3).

3.1.5 Enforcement

The Radiation Protection Act, the Nuclear Energy Activities Act, and the Pollution Control Act provide enforcement powers to DSA. Through different sections of the legislation, these Acts empower DSA to amend or revoke an operating permit, shutdown a facility or stop an activity, require further information to be provided, or require a modification of a facility or activity to be performed. When these enforcement powers are used, DSA must do so in a manner that is consistent with the Public Administration Act. The decision shall be transmitted to the licensee in writing, identifying the legal basis for the non-compliance, and informing about the right to appeal. Any non-compliance of the three acts, regulations and decisions made in accordance with them, is a criminal offence.

According to the Nuclear Energy Activities Act, DSA has authority to enforce corrective actions for any non-compliance of the act or regulations and decisions given in accordance with the act, if necessary, with the assistance from the police. If deemed necessary by DSA, DSA can enforce any safety measures on its own.

If there is substantial health hazard, DSA can stop any activity or confiscate radioactive material and equipment with the assistance from the police.

If there is radioactive pollution or risk of radioactive pollution, DSA can require measures by the polluter to prevent further pollution and to clean up the pollution. If such measures are not executed by the licensee, or if there is risk associated with delaying clean-up measures, DSA may arrange for immediate implementation of measures and claim reimbursement from the polluter.

DSA has on occasions revoked operating permits or restricted specific activities because of non-compliance or pending implementation of corrective actions. For example, IFE is now restricted from

moving fuel due to inadequate criticality safety assessments. DSA has identified the need to further strengthen enforcement actions and is in the process of implementing legal provisions for infringement fines, which was also a recommendation in the IRRS report.

3.2 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.

3.2.1 Legal Foundations and Statute of the Regulatory Body

The Nuclear Energy Activities Act states that DSA is the highest specialist agency as far as questions of nuclear safety and security are concerned. It functions as the institution making recommendations and giving advice to the ministry concerned. DSA shall prepare and submit recommendations to the Government or the relevant ministry on all applications concerning licences under the Nuclear Energy Activities Act and shall on its own initiative put into effect all such measures as it deems necessary for safety reasons. It is the duty of DSA to ensure that all rules and conditions pertaining to safety precautions are complied with and put into effect, as well as such orders that are given in pursuance of the Nuclear Energy Activities Act.

The Radiation Protection Act states that DSA is the dedicated authority to follow up compliance with provisions laid down in or pursuant to the Radiation Protection Act and can, for this purpose, make such individual decisions as are necessary. DSA shall be given free access to perform supervision and shall be provided with information to perform its functions under the provisions of the Radiation Protection Act. DSA shall be given access to undertake measurements and investigations.

The Ministry of Climate and Environment has assigned DSA to act and fulfil its regulatory obligations for the control of facilities and activities under the Pollution Control Act. The regulations relevant to radioactivity under the Act and the delegation decision given on the 30 December 2010 gives DSA the legal authority necessary to enable it to fulfil its regulatory obligations for control of radioactive pollution and radioactive waste according to the Pollution Control Act.

3.2.2 Mandate, Mission and Tasks

DSA is organized as a directorate under the Ministry of Health and Care Services. DSA is also a directorate under the Ministry of Climate and Environment, with respect to radioactive releases to the environment and radioactive waste from nuclear and non-nuclear industries, and under the Ministry of Foreign Affairs, with respect to the State System for Accountancy and Control (SSAC) for safeguards, implementing safety measures under the Action Plan for Nuclear Safety and Security in Russia, Ukraine and other countries in Eurasia. DSA also has areas of responsibility for the Ministry of Defence concerning the regulation of nuclear-powered military vessels entering Norwegian waters and ports. DSA also provides assistance and advice to other ministries on matters related to radiation protection, radioactive waste management, and nuclear safety, security and safeguards.

In addition to the national mandate for safety, security, and safeguards, DSA undertakes international tasks related to promoting radiation protection, nuclear security, nuclear safety, disarmament, and non-proliferation.

DSA chairs and serves as the secretariat for the Norwegian Crisis Committee, which coordinates nuclear and radiological emergency preparedness and response. This is described in more detail under Article 16.

3.2.3 Authorities and Responsibilities

DSA is the responsible national regulatory body for:

- → use of radiation sources
- → radiation protection
- → nuclear safety and security
- → safeguards
- → radiological and nuclear emergency preparedness and response
- → transport
- → radioactive waste and radioactive discharge to the environment
- → natural radiation
- → non-ionizing radiation.

The “Directive for the Norwegian Radiation Protection Authority”, adopted by the Ministry of Health and Care Services on 1 July 2017, describes DSA’s authority and responsibilities as a directorate for the Ministry of Health and Care Services, the Ministry of Climate and Environment, the Ministry of Foreign Affairs and the Ministry of Defence. The primary legal basis for DSA’s regulatory work is the Radiation Protection Act, Nuclear Energy Activities Act, the Act on Pollution Control, and their underlying regulations.

There is an effective separation between the regulatory body and organizations concerned with promotion or utilization of nuclear energy. DSA serves the three ministries mentioned above. NND is organized under the Ministry of Trade and Fisheries. IFE is partly funded by the Ministry of Trade and Fisheries. The relationship of governmental bodies and operators can be seen in Figure 1.

DSA prepares a work program for the following year following the annual letter of commitment from the Ministries where the budget and tasks are specified. During the year, DSA report on the progress of the work, after 6 months and at the end of the year. In addition, DSA and the Ministry of Health and Care Services, the Ministry of Climate and Environment, and the Ministry of Foreign affairs have agency management meetings, at least twice a year.

Concerning radiological and nuclear emergency preparedness in Norway, DSA is by Royal Decree given the responsibility to provide a secretariat for the national Crisis Committee. The Director General of DSA chairs the Committee, which has the mandate to handle the acute phase of the crises and has the responsibility to implement swift measures to reduce the impact and protect the people, the environment and societal interests. It comprises representatives from a range of agencies and organizations with responsibilities for emergency preparedness and response, as described in more detail under Article 16.

The Government has also given DSA a key role in the implementation of international conventions and agreements to which Norway has ratified or signed. In addition, DSA is also involved in the implementation of governmental strategies. The governmental strategies shall respect the role and independence of the regulatory body as set out by the Nuclear Energy Activities Act.

DSA is also responsible for coordination and inspections related to the security of sensitive entities[4] that fall within DSA's areas of responsibility according to the Nuclear Energy Activities Act. These facilities are regulated under the Security Act and the underlying regulation. The Security Act is administered by The Norwegian National Security Authority (NSM), which reports to the Minister of Defence and Minister of Justice and Public Security. From January 1st 2023, DSA will undertake the responsibility for inspections according to the Security Act with sensitive nuclear entities. A Government Forum for the Protection of Nuclear Installations and Nuclear Fuel in Norway was established in 2016. The aim of the Government Forum is to secure cooperation between national authorities and agencies and to produce, summarize and disseminate knowledge about how best to secure nuclear facilities and nuclear fuel in Norway.

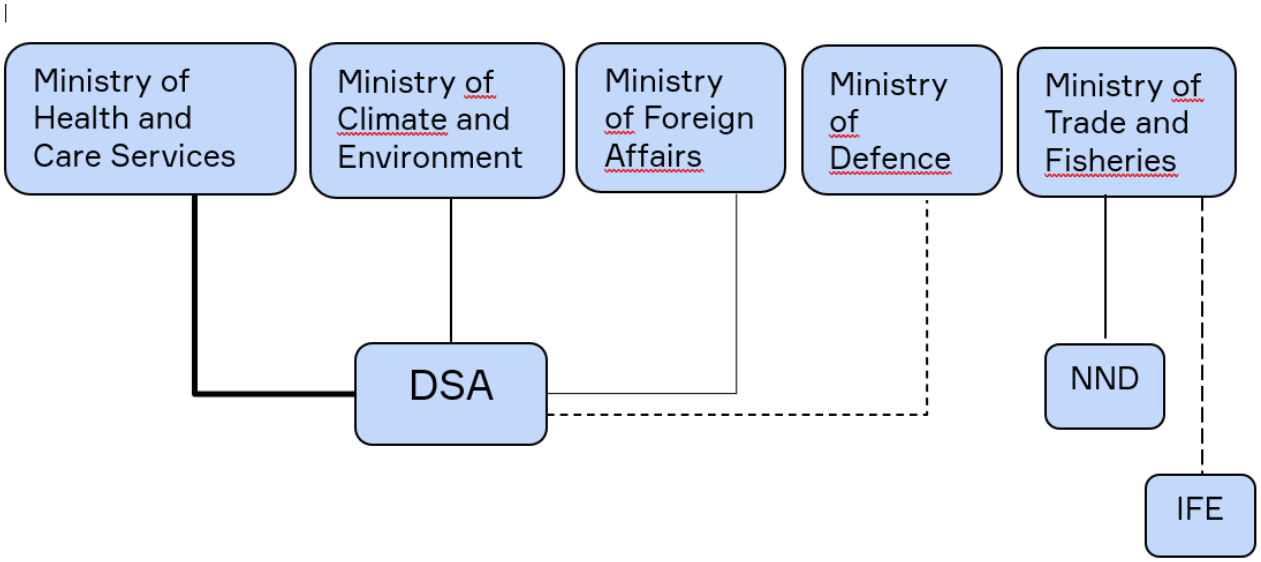

Figure 1: *Relationship of governmental bodies and operators.*

3.2.4 Organizational Structure of the Regulatory Body

As of January 2021, DSA is organised in four departments responsible for topical subject areas, in addition an administrative unit, a support unit for the director general and a communications unit. The organisation chart of DSA can be seen in Figure 2.

The Department for Nuclear Safety and Control of sources is responsible for the supervision of safety, security and safeguards of the nuclear facilities; military reactor powered vessels entering Norwegian waters or ports; transport of nuclear and radioactive materials; industrial use of radiation and radiation protection. The department is organised in two sections: Section for Nuclear Safety and Section for Nuclear Security, Safeguards and Control of Sources. The department has 18 employees in total.

The Department for Radiation and Environmental Safety is responsible for the supervision of environmental and health related consequences of discharges of radioactive substances from nuclear, industrial and medical facilities and activities; and the supervision of medical applications and radiation protection; natural radiation, and non-ionizing radiation. The department is organised in three sections:

[4] A sensitive entity is defined in the Security Act as "property that must be protected against activity that poses a threat to security in the interests of the security of the realm or of allies or other vital national security interests."

Section for Pollution Control and Decommissioning, Section for Medical Applications, and Section for Environmental Monitoring and Radon- and UV-protection. The department has 40 employees in total.

The Department of Emergency Preparedness and Response is responsible for the Norwegian radiological and nuclear emergency preparedness and response (EPR), including the role of the secretariate for the Crisis Committee and coordination with different agencies. The work also includes, e.g., threat assessments, scenario descriptions and impact analyses. The department operates DSA's laboratories at the headquarter and is responsible for DSAs mobile measurement equipment and field survey instrumentation. The department is organised in three sections: Section for Operational EPR, Section for EPR Assessments, and Section for Radiation Measurements. The department has 29 employees in total.

The Department of Research and Development and International Nuclear Safety and Security is responsible for work related to international nuclear safety and security, the tasks assigned by the Ministry of Foreign Affairs, and for knowledge development within DSA's area of responsibility. The department is organised in three sections: Section for Research and Development, Section for International Nuclear Safety and Security, and Section for the High North. The department has 29 employees in total.

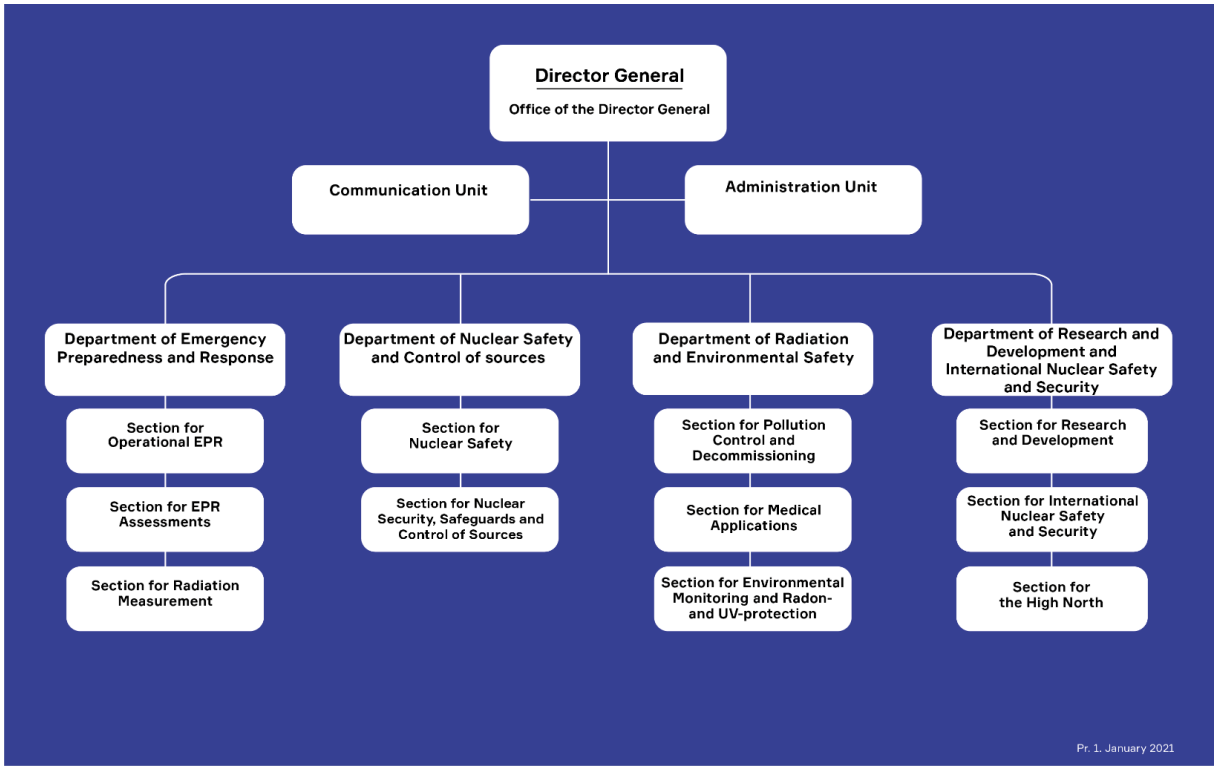

Figure 2: *Organisation chart of DSA as of January 2021*

3.2.5 Development and Maintenance of Human Resources over the last three years

The Director General of DSA has the mandate to employ the staff needed to conduct the tasks given by the Government. At ministerial level human resource plans and policies are implemented as joint overarching plans and policies valid for Government and state bodies, including the subordinate bodies in different sectors. DSA plans its activities and allocation of resources in the annual Operation Plans, in accordance with DSAs' Strategic Action Plan.

DSA has experienced challenges in recruiting competent personnel with the necessary qualifications due to the limited scale of the nuclear program in Norway and to the relatively few candidates with relevant

expertise. Due to this, DSA has recently recruited employees from other European countries with the necessary knowledge and experience. To ensure that the necessary infrastructures for spent nuclear fuel and radioactive waste management are in place before future decommissioning activities commence, DSA will continue to recruit staff nationally and internationally.

To address, among other things, the recommendations and suggestions from the IRRS mission in 2019 and the decision to shut down the Norwegian research reactors in 2018 and 2019, DSA underwent a reorganization in 2021 to improve the regulatory nuclear oversight in general. DSA will continue with the recruitment of human resources and extend the use of external consultancy services to fulfil the Technical Support Organization function to support implementation of regulatory functions.

3.2.6 Measures to Develop and Maintain Competence

DSA develops and maintains competence and national regulatory practices through work within its area of responsibility, participation in relevant international processes, contribution to the implementation of Norway's international obligations and evaluation of the implementation of international recommendations.

DSA's staff participates in the development of IAEA safety standards through participation in the IAEA's Safety Standards Committees (NUSSC, WASSC, RASSC, TRANSSC, NSGC and EPReSC), and in consultancy meetings for the development of safety standards.

DSA participates in several international networks, fora and cooperation projects, to both share and receive information and international experience. The results on this information exchange are taken into account in the regulatory work and procedures of DSA.

As a separate initiative on competence management and development since the last National Report, DSA has established a project for the application of the IAEA SARCoN (Systematic Assessment of the Competence Needs of the staff of a Regulatory Body) methodology to the charting and assessment of competence and their development plan. The majority of DSA's staff has participated in the process and their competence self-assessment is integrated in the yearly employee interviews between DSA staff and their managers.

3.2.7 Developments with Respect to Financial Resources over the last three years

DSA receives funding according to an annual budget that is decided by the parliament, based on proposals from the Ministry of Health and Care Services, the Ministry of Climate and Environment, the Ministry of Foreign affairs and taking account of the overall priorities established in the national budget. These proposals are developed taking account of input from DSA on the risk-based priorities for its work programme over the next year. Following parliamentary agreement on the budget, the ministries allocate the budget and assign specific tasks within their areas of responsibility (for health, including nuclear safety, environment issues and international work) to DSA in the annual letter of commitment. In addition, resources are available from fees in connection with the Nuclear Energy Activities Act and the Pollution Control Act. The budget and associated tasks are then distributed within DSA in December each year, according to an established DSA process.

DSA's funding has increased over the last years to strengthen the regulatory nuclear oversight of present and future challenges in the decommissioning of nuclear research facilities and the implementation of a long-term strategy for the safe management and final disposal of radioactive waste and spent fuel. However, in the years to come it will be important to monitor and assess the situation to ensure adequate funding and necessary competence.

3.2.8 Statement of Adequacy of Resources

The DSAs' resources for regulatory oversight are considered adequate at the time of reporting. The cost of licensing and inspections under Nuclear Energy Activities Act is financed by licensing and inspection fees. Connected to the new phase in the lifetime of the facilities that Norway will need to address in the coming years, there is a process to evaluate the adequacy of resources going forward.

3.2.9 Management System of the Regulatory Body

The DSA management system is being revised to be brought in line with the recommendations from IAEA GSR Part 2. The five core roles of a nuclear regulator (Authorization, Review and Assessment, Inspection, Enforcement, Regulations & Guides) are being addressed by specific working groups at DSA, who will ensure the appropriate processes and procedures are in place and are kept up to date at any given time.

3.2.10 Openness and Transparency of regulatory activities including actions taken to transparency and Communication with the Public

Mechanisms and legal provisions are in place for DSA to inform and consult interested parties and the public about the possible radiation risks associated with facilities and activities, and about the processes and decisions of the regulatory body. The Freedom of Information Act is also an essential mechanism for ensuring the public access to information.

According to the Public Administration Act, the administrative agency must ensure that the case, e.g., application for a licence, is as well investigated as possible before a decision is made. In order to secure a basis for its own recommendations and the basis for further processing and decision-making, DSA requests relevant stakeholders to come forward with views on the licence application. Stakeholders include state authorities, national organizations, municipalities councils and the general public.

The DSA website is an important tool for providing information to the public and other interested parties. The Communication Strategy commits DSA to take an active role in communicating its regulatory practices with licensees, registrants and other stakeholders. The Communication strategy states that DSA shall have regular contact with ministries, agencies, institutions and organizations linked to DSA's work, and that such contacts should be performed in a professional and service-minded manner. As part of DSA's Communication Strategy, reports and information of interest to the public are published on DSA's webpages, including documents relevant to the decision-making process. In addition, DSA publishes press releases and news, including information concerning incidents, accidents and abnormal events. Inspection reports are also published on the webpage. Relevant information concerning public hearings in the licensing process of nuclear facilities is also published on the webpage. DSA also actively uses social media platforms such as Facebook and Twitter in its communication with the public. In 2021, DSA started a podcast series to inform the public about different topics, e.g., emergency preparedness and response and radon. In addition, DSA considers the media to be an important communication channel. DSA keeps a proactive dialogue with the media and provides several national editorial offices with news.

All international review reports and Norway's national reports under the Convention for Nuclear Safety and the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management are published on the DSAs' website.

3.2.11 External Technical Support

DSA often uses external support organisations (e.g., consultancy services) to support development and implementation of regulatory functions related to nuclear safety and security (e.g., review and assessment of authorization applications, inspections of nuclear facilities and activities). These activities are administered through a contract framework that has been established following an internal DSA process to identify the additional competences necessary to support its work.

3.2.12 Advisory Committee

An independent expert Advisory Committee on Nuclear Safety and Radioactive Waste Management was established in 2018 to provide advice on international developments and to review relevant work undertaken by DSA. The Committee comprises international experts in the field, including representatives from regulatory bodies of other countries.

3.3 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.

The prime responsibility for safety of facilities and activities is specified in the Nuclear Energy Activities Act, the Pollution Control Act, and the respective regulations. However, the IRRS mission of 2019 (1) observed that the prime responsibility for safety had not been established fully in the Radiation Protection and Use of Radiation Act. The mission report suggests that the Government should consider making legal provision that compliance with regulations and requirements does not relieve the person or organization responsible for the facility or activity under the Radiation Protection and Use of Radiation Act from the prime responsibility for safety.

For nuclear facilities and activities, the Nuclear Energy Activities Act states under section 15 first paragraph that the licensee has the prime responsibility for safety:

"The operator of a nuclear installation shall maintain the installation and equipment in sound and proper condition and take all necessary measures to ensure that no damage will be caused as a result of radioactivity or other hazardous features of nuclear material or radioactive products found on the installation site, or which are removed or discharged therefrom, or which are undergoing transportation on the operator's behalf."

A person or organization, responsible for safety for a facility or activity, is required to document how safety issues and responsibilities are described in its organizational structure, management system and quality assurance system. The responsibility for safety is absolute, it cannot be transferred, delegated, outsourced, or contracted to any other party.

IFE arranges public meetings with the local communities. These are often arranged when needed, often in connection with some specific event or other development.

Communication with external parties during an event is described in IFEs emergency preparedness plans. There are regular exercises of the emergency plans, which includes communication with external parties such as the local and national authorities and the police.

The regulatory framework provides requirements for the operation of nuclear facilities. For example, according to the license conditions, the licensee shall provide and maintain adequate financial and human resources to ensure the safe operation of the licensed facility. The Ministry of Trade and Fisheries grants funds to IFE for the operation, safety and security of the nuclear facilities at Halden, Kjeller and Himdalen. IFE distributes financial and human resources internally when making the annual budget. The resources are distributed to ensure safe operation and to keep the emergency preparedness on an adequate level (section 3.6.1).

DSA mechanisms for ensuring that the operator commits to prime responsibility to safety is mainly done through review and assessment of reports and documents, inspection (section 3.1.4) and enforcement (section 3.1.5). For example, DSA made it a requirement in the license conditions for IFE to submit regular reports (weekly, monthly, quarterly or annual) concerning the operation and safety of the nuclear facilities. This includes reports on the operation of the research reactors, radiation doses and discharges of radioactivity to the environment. The aforementioned reports are reviewed and assessed using a graded approach by DSA to ensure that safety is kept a priority by the license holder.

3.4 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.

3.4.1 Priority to Safety by the Licence Holder

Regulatory requirements on policies and programmes

According to the licence conditions, the licensee of a nuclear facility is required to establish a management system, including a written safety policy that places safety paramount within the management system, overriding all other demands.

Among the licence conditions relevant for safety, IFE shall at all times provide the necessary financial and human resources for the safe operation of the nuclear facilities. The license holder shall have control over any changes in the organization structure or resources that could affect safety and shall at all times facilitate and encourage a healthy safety culture. Additionally, IFE shall submit planned resource and organisational changes for approval. Furthermore, the authorized party shall have and keep up to date a comprehensive strategy for training with objectives that recognize the importance of safety. The Nuclear Energy Activities Act specifies that DSA shall make sure that the nuclear facilities' management and personnel have the necessary qualifications and clear responsibilities before the installation is granted an authorization to operate. According to the recommendations made by the IRRS team in 2019 (1), the Government should establish provisions regarding the building and maintaining of competence of all parties having responsibilities in relation to the safety of facilities and activities, including the strengthening radiation protection training in health education programs and the formal recognition of medical physicists.

The safety analysis report (SAR) and the description of the management system are main parts of the documentation required to support an application for authorization for operation of a nuclear facility. The Nuclear Energy Activities act requires the license holder to submit a complete SAR on the installation

before the nuclear facility is put in operation. The GLCs further highlight the licensee's duty to ensure that a SAR is available and regularly and systematically reviewed using a graded approach.

All safety significant modifications to the installation, operating organization or management changes, changes to the SAR and operational limits and conditions (OLCs) shall be authorized by DSA. Operating procedures shall be reviewed regularly by the license holder and updated accordingly to predetermined processes. It is also a condition for the licensee to keep the necessary documentation of operation, inspection and maintenance of all operations that could affect safety.

In addition, the GLCs make it a requirement for the license holder to prepare procedures and implement the necessary measures to control any changes; temporary changes or experiments performed on any part of the nuclear plant or processes, which may affect safety. These measures shall provide for the classification of changes according to their safety significance. The measures shall be, when appropriate, divided into stages. Where DSA so specifies, the licensee shall not commence or proceed from one stage to the next without the consent of DSA.

IFE shall ensure that all SSCs that are important for safety are designed to be calibrated, tested, maintained, repaired, replaced, inspected, and monitored as necessary, to ensure their function and to maintain original specifications or condition. A maintenance plan is required for the facility and for each relevant SSC. Upon request, the license holder shall submit the maintenance plan to DSA for approval. The licensee shall also ensure that all safety systems are designed so that they automatically terminate operation safely by all predefined triggering unwanted events. SSCs shall be operated within specified safety limits and safety margins under all operating conditions.

It is also stated in the license conditions that the management of the licensee shall encourage and work to foster and maintain a healthy safety culture. Following the system audit inspection by DSA in 2014-16, IFE has been working on addressing DSAs identified lack of compliance and requirements, the findings from the ISCA review in 2018, and improving the safety culture within its organisation. IFE has assessed ethical awareness, integrity, culture and working environment through a survey among its employees. DSA has established a follow-up plan and provisions for regular reporting to ensure that IFE is continuously working on improving its safety culture.

Implementation of Safety

As described above, it is clear that IFE is responsible for the implementation of nuclear safety. However, the intensified inspection program of DSA has shown that IFE is not in full compliance with regulatory requirements but there is an ongoing process to reach full compliance, which is also a specific license condition in the current license.

It is defined in the GLCs that IFE shall have a program for training and refresher courses to ensure their employees competence. IFE is to include information on organised training and refresher courses for their staff at Kjeller and in Halden in line with requirements for yearly reporting. DSA checks compliance through inspections and audits about the resources and training/retraining provided.

Also as defined in the GLCs, IFE shall have a system for management of health, safety, and environment. IFE has established a system for management of health, safety, and environment, but it has been identified that this needs to be improved and developed into an integrated management system.

The licensee of a nuclear installation shall establish and maintain a safety committee according to the GLCs. The IFE safety committee encompasses experts from different IFE organizational units who have competence on nuclear and radiation safety, security, reactor operation, chemistry and materials, and human factors. The IFE safety committee reviews cases and safety documents relevant for safety and is chaired by the Head of Safety. The committee's mandate is organized according to the management

system which also includes a general description of the committee's working procedures. The committee has an advisory role (to IFE's President) on nuclear and radiation safety of IFE's nuclear and radiation facilities, including the JEEP II and HBWR research reactors. As part of the intensified inspection program, DSA observes the meetings frequently and prepares half-yearly inspection reports of IFEs safety committee meetings.

3.4.2 Priority to Safety by the Regulator

DSA prioritizes safety in its own line of work by ensuring that the review and assessment of facilities and activities is implemented using a graded approach. DSA allocates relevant human, technical, and financial resources commensurate with the risk and safety significance of the facilities and activities authorized. Furthermore, the authorization process is graded in proportion to the safety significance and risk.

DSA established a process for addressing the recommendation made by the IRRS to develop a comprehensive human resource plan including a specific training programme. Actions taken by DSA to prioritize safety are described in sections 3.2.5 and 3.2.6. In addition, DSA is developing a strategy at the organizational level to support research and development activities on nuclear safety in Norway.

DSA regularly performs inspections to the nuclear facilities to ensure that safety is prioritized, and that the license holder is abiding by the license conditions and national regulations. DSA's strategy for implementing inspections commensurate with the risk is discussed in section 3.1.4.

3.4.2.1 International Peer Reviews

A full scope IRRS mission to Norway took place in June 2019. The mission report has been made publicly available and published on DSAs web page (1).

The IRRS Team identified two good practices related to the global safety regime and inspection, respectively:

- → The Government of Norway through establishing the Nuclear Action Plan (NAP) and continuing it for more than 20 years shows a long-term commitment for international cooperation in safety and security. By strategically providing funding for projects to ensure risk reduction regarding serious accidents and radioactive contamination as well as to prevent nuclear and other radioactive material from falling into the wrong hands. Norway's NAP has substantially contributed to increasing safety and security in Russia and Ukraine.
- → The formalized cooperation group of regulatory authorities, proactively devising joint guidelines and training for harmonizing inspections and the performance of joint inspections, integrating radiation protection with overall health and safety aspects is identified as a good practice.

Further areas of good performance were identified, including strengthened justification in the substitution of blood irradiators based on caesium chloride and the establishment of the Crisis Committee for Nuclear and Radiological Emergency Preparedness and Response.

The IRRS Team report also included a number of recommendations and suggestions to improve the Norwegian regulatory system and the effectiveness of the regulatory functions in line with IAEA safety standards. In summary, the IRRS Team concluded that the following issues are representative of those which, if addressed by the Government of Norway and DSA, should further enhance the overall performance of the regulatory system.

The Government should:

- → Establish a comprehensive national policy and strategy for safety
- → Update and further develop the national framework for safety and security
- → Establish a national policy and a strategy for spent fuel and radioactive waste management including decommissioning
- → Make provisions to provide DSA with the necessary resources to fulfil its obligations
- → Establish provisions regarding national competence in nuclear and radiation safety

The regulatory body, DSA, should:

- → Develop, establish, implement, assess and continuously improve a documented integrated management system to ensure safety, using graded approach, in line with IAEA safety standards.
- → Implement a human resource plan and training programme based on an analysis of the necessary competence and skills
- → Take action for the further development of regulation and guides in order to ensure a comprehensive regulatory framework
- → Establish and implement an enforcement policy
- → Introduce and implement the concept of clearance
- → Implement an inspection programme based on a systematic graded approach

3.4.2.2 Current Practices and Improvement Measures

The focus of current activities and measures for improvement are heavily influenced by the early shut down of the research reactors and the need to prioritize issues related to preparations for decommissioning and the associated management of spent fuel and radioactive waste. The recommendations from the IRRS mission are being considered in the preparation of a national Action Plan.

The IRRS mission recommendations related to DSA are reflected in the current overall programme of work. In order to comply with the IRRS-recommendations, DSA has with effect from 2021 undertaken a major organisational reorganization and development of policies and strategies. This includes development of a Business strategy, ICT-strategy, Vision and Company Values, Integrated Management System and Competence Planning. In addition, recruitment of staff and management has been carried out. DSA is working towards developing a policy and strategy for nuclear safety and human resource planning. One of the aims of this reorganization was to further enhance the organizational structure to respond to present and future regulatory challenges, notably those associated with decommissioning and the management of spent fuel and radioactive waste.

In addition to these internal arrangements, DSA has established the following mechanisms to enhance its competence and capacity by working with external support organizations:

- → Enhancing its framework contract arrangements with external support organizations to cover a broader range of expertise. These external support organizations essentially cover the functions of a technical support organization.
- → An Advisory Committee on Nuclear Safety and Radioactive Waste Management comprising international experts and representatives from regulatory bodies from other countries that among other things, may provide advice to DSA on matters concerning nuclear safety such as activities relating to internal regulatory development, safety related issues associated with the licence holder, enforcement actions and licencing decisions.

Key features of the IRRS recommendations particularly relevant to current and future DSA activities related nuclear safety include:

- → Development and implementation of a national policy and strategy for spent fuel and radioactive waste management, to reflect national priorities and to form the basis for long-term decision making with respect to the decommissioning of facilities, management of spent fuel, predisposal waste management and disposal of radioactive waste, including the necessary financial provisions.
- → Ensuring the regulatory framework clearly addresses all stages of the lifetime of nuclear installations, including siting, design and decommissioning.
- → Further development of processes for the release (clearance) of materials from regulatory control.

DSA has established GLCs (5) that are applied through the Nuclear Energy Activities Act and are designed to ensure international safety standards may be applied in regulation of the licence holder. The objective is to clarify the regulatory requirements related to nuclear facilities and activities to, among other things, facilitate the operators' understanding of regulatory expectations. Additionally, a guidance document on the application of the GLCs is developed. The guidance document specify the principles, requirements, and associated criteria for safety upon which DSA's regulatory decisions and actions are based. DSA plans to issue additional specific guidance documents in the future that would provide additional guidelines for specific types of facilities that are, or could be, licensed under the Nuclear Energy Activities Act.

3.5 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.

In accordance with the Radiation Protection Act of 12 May 2020 and associated regulations, any user of ionising radiation is committed to measure the radiation doses to workers exposed to ionising radiation. There are provisions on radiation protection in the Radiation Protection Act and the Regulation on Radiation Protection and Use of Radiation of 16 December 2016. For instance, any manufacture, import, export, transport, transfer, possession, installation, use, handling, and disposal of radiation sources shall be prudent, so that there is no risk to those who carry on the activities, other persons, or the environment. Human activity that results in elevated natural ionizing radiation from the surroundings must also be justifiable. Emphasis shall be placed on whether the benefits of the activity exceed the risks that the radiation may entail, and whether the activity is designed so that acute health damage is avoided, and the risk of late damage is kept as low as can reasonably be achieved (ALARA principle). The GLCs also require the licensee to implement and maintain an adequate radiological protection programme at the nuclear facility.

The annual dose for each worker shall be kept as low as reasonably achievable and below the limits specified in the Regulation on Radiation Protection and Use of Radiation of 16 December 2016, which are consistent with those recommended by ICRP in their Publication No. 103, and in Publication No. 118 for the occupational limit for the lens of the eye. DSA, in coordination with other authorities, is aiming to harmonize its regulatory framework in the future with all requirements of IAEA GSR Part 3 for the protection and safety of workers in planned exposure situations, and as recommended by the IRRS mission to Norway in 2019. The Regulation on Radiation Protection and Use of Radiation of 16 December 2016 set the following dose limits among others for occupational exposure:

a) The effective dose for exposed workers, apprentices, and students over the age of 18 shall not exceed 20 mSv per year. The Norwegian Radiation and Nuclear Safety Authority may grant

dispensation for individuals, where in consideration of the nature of the work, it is not practically possible to establish an annual limit of 20 mSv. In such cases, a permit to practise a limit of 100 mSv over a consecutive five-year period may be granted, if the dose does not exceed 50 mSv in any single year.

b) The equivalent dose to the lens of the eye for exposed workers, apprentices and students over the age of 18 years, to the lens of the eye, shall not exceed 20 mSv per year, or 100 mSv over a consecutive five-year period, provided that the dose does not exceed 50 mSv in any single year.
c) The equivalent dose to the skin for exposed workers, apprentices and students shall not exceed 500 mSv per year. The dose limit applies to the mean value of measured dose or calculated over any 1cm² skin area. Equivalent dose for extremities shall not exceed 500 mSv/year.
d) Equivalent dose to the foetus for pregnant exposed workers, apprentices and students shall not exceed 1 mSv for the remainder of the pregnancy, i.e. after the pregnancy is known.

For apprentices and students between the age of 16 and 18 years who are using radiation sources as part of their education, the dose limits of respectively 5, 15 and 150 mSv per year shall apply instead of the doses stated under a-c above, according to the Regulation on Radiation Protection and Use of Radiation of 16 December 2016. The radiation dose limits for apprentices and students between the age of 16 and 18 years are more restrictive than the ones established in GSR-3, where an effective dose of 6 mSv in a year; and an equivalent dose to the lens of the eye of 20 mSv in a year are set for this group.

Pregnant and breastfeeding workers, apprentices and students shall not work with assignments, which might imply a significant risk for intake of radionuclides or contamination. The undertaking shall, if a worker might have exceeded the dose limits, immediately make an investigation and if possible, find the cause, and initiate measures to avoid repeats.

IFE utilises several different measuring methods for assessing the dose received by IFE employees. Effective dose from external radiation is measured using personal dosimeters, and the dose to extremities is measured by finger dosimeters. Another personal dosimeter is used to assess the dose to skin. When the work to be performed requires it, an eye lens dosimeter attached to a headband is used. If the body dose is higher than the eye lens dose, the eye lens dose is set equal to the body dose.

IFE is, as a nuclear operator, responsible for its own dose registration system. IFE measures individual whole-body dose, skin dose, finger dose, eye-dose, and internal dose. The whole-body dose for the last 12 months is reported to DSA bimonthly for each worker, while the other dose measurements are reported annually to DSA. In 2021, IFE monitored 336 employees for external exposure to ionising radiation at the Kjeller site. Among these, 36 have received an effective radiation dose above the dosimeter's lower detection limit. The average radiation dose at Kjeller for that year was reported at 0.6 mSv and the collective dose at 0.023 man-Sv. The maximum effective dose was reported at 14.3 mSv. On the other hand, 150 people were individually checked at the Halden site for external radiation exposure in 2021. The average annual dose for the personnel at Halden for that year was registered at 0.59 mSv, while the highest annual dose was 2.1 mSv. The collective dose at the Halden reactor for 2021 was 0.0176 man-Sv. The doses have decreased in the past three years, due to shutdown of the reactors and associated activities as well as reduced activity due to the pandemic. In addition to reviewing and assessing the periodic reports submitted by IFE, DSA organizes regular inspections to IFE as described in section 3.1.4.

According to the Regulation on Radiation Protection and Use of Radiation of 16 December 2016, the effective dose to the public and non-occupationally exposed workers shall not exceed 1 mSv/year for ionizing radiation. Equivalent dose to the lens of the eye shall not exceed 15 mSv/year. Equivalent dose to the skin shall not exceed 50 mSv/year, measured, or calculated over any skin area of 1 cm². The undertaking shall plan the use of radiation and protective measures to ensure that exposure of the non-occupationally exposed workers and the public, shall not be exposed to an effective dose exceeding 0.25 mSv/year.

DSA may issue a permit under the Pollution Control Act for an activity which leads or may lead to radioactive pollution and may set conditions in the permit to prevent pollution from resulting in damage or nuisance to humans or the environment. Activity that leads to or may lead to the release of radioactive substances whose total or specific activity exceeds the limits set in the Regulation of 1 November 2010 on the Application of the Pollution Control Act on Radioactive Pollution and Radioactive Waste, shall always be considered to result in significant damage or nuisance and may not take place without a permit pursuant to the Pollution Control Act of 13 March 1981. As a part of the conditions associated with the IFEs discharge authorisations, the effective dose to members of the public resulting from the release of radioactivity to the aquatic environment must be kept below 1 μSv/y. For discharges to the air, the total amount of releases shall not yield to an effective dose exceeding 100 μSv/y to the public, and not more than 10 μSv/y from iodine isotopes. These limits are applicable to each of the sites individually.

In accordance with the discharge permit for operation of the Halden reactor and Kjeller site granted by DSA, IFE shall annually monitor radioactivity levels in the environment around the facilities it operates. All environmental samples analysed for 2021 showed low to non-measurable activity concentrations of anthropogenic radionuclides. The results are in line with previous years. The environmental samples analysed by IFE include rain, drinking water, grass, fish, sediments, sand, among others. IFE also has area dosimeters to measure the dose rate from background radiation.

As mentioned in section 3.4.1, building and maintaining of competence of all parties having responsibilities in relation to the safety of facilities and activities, strengthening radiation protection training in health education programs, and the formal recognition of medical physicists has been a recommendation made by the IRRS team in 2019.

DSA is working on addressing the recommendation to make provisions for periodic assessments of the radiation doses to transport workers and members of the public associated with the transport of radioactive material, as recommended by the IRRS mission to Norway (1) DSA is also considering to implement provisions to ensure that doses received by aircrew from occupational exposure to cosmic radiation are assessed and recorded, also as recommended by the IRRS mission to Norway.

3.6 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.

Although Norway does not have nuclear installations according to the CNS definition, IFEs research reactors and facilities are nuclear facilities that pose a substantial risk to society. DSA abide by the CNS as far as possible for these facilities, nevertheless.

3.6.1.1 Legal framework and emergency preparedness and response plans

Legal framework

The following laws and regulations make up the current legal framework for emergency preparedness and response:

- → Act on Radiation Protection and the Use of Radiation
- → Act on Nuclear Energy Activities
- → Pollution Control Act
- → Regulations on Radiation Protection and Use of Radiation (Radiation Protection Regulations)
- → Regulations on the application of the Pollution Control Act to radioactive pollution and radioactive waste
- → Royal Decree on Nuclear and Radiological Preparedness: Central and Regional Organisation

Emergency preparedness scenarios

The Norwegian threat assessment has identified six scenarios for radiological and nuclear emergencies that need emergency response planning, namely:

1. large airborne release from foreign nuclear installation
2. large airborne release from domestic nuclear facility
3. local event with mobile radiological or nuclear source
4. covert local radiological event that develops over time
5. release (or rumour of release) of radioactive substances to the marine environment
6. serious nuclear accidents abroad that can affect Norwegian interests and citizens abroad, but not Norwegian territory

IFEs facilities are covered by scenario 2. These scenarios were adopted by the Government in 2010. Following the recent change in the global security situation, the Crisis Committee has developed a 7th scenario concerning the use of nuclear weapons on Norwegian territory. Its future inclusion in the dimensioning scenarios is subject to adoption by the Government.

Emergency preparedness and response plans

Any license holder for a radiological or nuclear facility has the prime responsibility for on-site emergency preparedness and response, according to the radiation protection, nuclear energy and pollution control acts and regulations. Before authorization, the operator must present adequate EPR plans as part of the authorization/licensing procedure. DSA is responsible for review and assessment of these EPR plans, as the national regulator. The licence holder is responsible for revising the EPR plans whenever there are changes in production, threat assessment, organisation or other that may impact on emergency preparedness, or when exercises or responses to real incidents reveal necessary changes. Any revision should be approved by DSA.

Operators' EPR plans shall be exercised regularly. For instance, IFE has adapted on-site EPR plans for each site, and these are exercised regularly. EPR plans and exercises are among the requirements in the GLCs. The on-site response is coordinated with the plan for on-site and off-site response developed by the local police and fire authorities, and with the EPR plan for the Crisis Committee.

DSA performs inspections of EPR plans and observes emergency exercises to assess compliance with the legal framework. In case of non-compliance, DSA can issue an order to implement changes.

The licensee is responsible for updating their threat assessment whenever there are changes that may influence on this, either internal or external, including the changing global security situation. For IFE a specific DBT (Design Basis Threat) has been developed recently and they must now plan for exercising such scenarios at their sites. DSA follows closely the implementation of measures related to this and the planned exercise regime.

At the national level, a Nuclear and Radiological Emergency Preparedness and Response Organisation (see figure 3) has been created to provide expertise to deal with radiological and nuclear incidents and to ensure rapid implementation of measures to protect lives, health, the environment, and other important social interests. It is comprised of:

- → The Crisis Committee for Nuclear and Radiological Preparedness,
- → Advisors to the Crisis Committee,
- → Secretariat of the Crisis Committee (DSA),
- → The county governors and the governor of Svalbard as the regional arm of the Crisis Committee.

The Crisis Committee

The Crisis Committee for Nuclear and Radiological Preparedness is responsible for and mandated to decide implementation of protective measures to reduce the impact of a nuclear accident. The Crisis Committee is given this authority in the Royal Decree of 23.08.2013.

The Crisis Committee consists of representatives from:

- → The Directorate for Radiation Protection and Nuclear Safety (DSA)
- → The Norwegian Armed Forces
- → The Norwegian Directorate of Health
- → The Norwegian Food Safety Authority
- → The National Police Directorate
- → The Ministry of Foreign Affairs
- → The Norwegian Coastal Administration
- → The Norwegian Directorate for Civil Protection (DSB)

The DSA chairs and provides the secretariat of the Crisis Committee.

The Crisis Committee is responsible for implementing early protective actions in case of a nuclear event representing a potential threat to Norway, or Norwegian citizens and interests abroad. The Committee can decide:

- → To initiate the evacuation of the population if the situation represents a direct threat to health
- → To give advice on sheltering and intake of stable iodine
- → Cordoning off (potentially) contaminated areas
- → Decontamination of exposed people
- → The short-term restriction in production and distribution of foodstuffs
- → Advise on dietary restrictions and other dose-reducing actions

The Crisis Committee has a dedicated EPR plan where roles and responsibilities are described and with a detailed description of incident response, including decision-making for early protective measures. All the members of the Crisis Committee have their own EPR plans as well, with detailed descriptions of the response to be undertaken within their own organization. These plans are coordinated and aligned with the Crisis Committee EPR plan.

Advisors to the Crisis Committee

The Crisis Committee's advisors consist of representatives from institutions and agencies with specialist expertise relating to nuclear preparedness and response, or expertise that may be needed during a nuclear or radiological emergency. In the event of a nuclear incident, the advisors will act as a specialist support apparatus for the Crisis Committee.

The county governors and the governor of Svalbard

The county governors and the governor of Svalbard are the regional units of the Crisis Committee. In the event of a nuclear or radiological incident, they will coordinate communication and crisis management, and assist in implementing coordinated measures at the regional and local level.

Municipal level

Norwegian municipalities must also have up-to-date contingency plans for all kinds of incidents that may occur in their territory, including radiological and nuclear. This is stated in the act and regulation on municipal emergency preparedness and protection of civilians. The county governors are responsible for inspections regarding municipal EPR plans and exercises.

The Ministries

The ministries are responsible for EPR within their area of competence, specifically in the prevention and preparedness phase. The Ministry of Health and Care Services heads the Ministerial Coordination Committee for radiological and nuclear EPR. In the annual budget from the ministries, resources are allocated specifically for EPR purposes and for nuclear safety. It is worth noting that in order to deal effectively with the early phase of a nuclear event, the responsibility for deciding and implementing early protective actions has been transferred to the Crisis Committee for the acute phase (Royal Decree).

The role of the DSA

The director of the DSA chairs the Crisis Committee. The DSA is also a member and provides the secretariat of the Crisis Committee.

In the event of a nuclear incident, the DSA is responsible for gathering and processing information, acquiring and presenting measurement data, preparing prognosis for development of the incident

(including worst-case estimates), and advice the Crisis Committee on which urgent protective actions to implement.

DSA arranges annual exercises for the Crisis Committee and assists the county governors in their exercise programme for the municipalities. DSA also arranges internal EPR exercises regularly.

In the day-to-day work, DSA ensures an adequate situational awareness, shares information with other EPR actors, ensures a 24/7/365 officer-on-duty service, arranges regular meetings with the Crisis Committee, its advisors and the county governors, and assists the Ministries in EPR related issues.

DSA is the national and international warning point and competent authority for early notification of nuclear or radiological incidents. There are bilateral agreements on early notification with Finland, Germany, Lithuania, the Netherlands, Poland, Russia, Sweden, Ukraine, and United Kingdom. The agreements differ slightly in wording but are based on the IAEA Convention of Early Notification from 1986. These agreements will ensure an early notification if an event occurs at a facility covered by the agreements, as well as information exchange during the response phase of an incident.

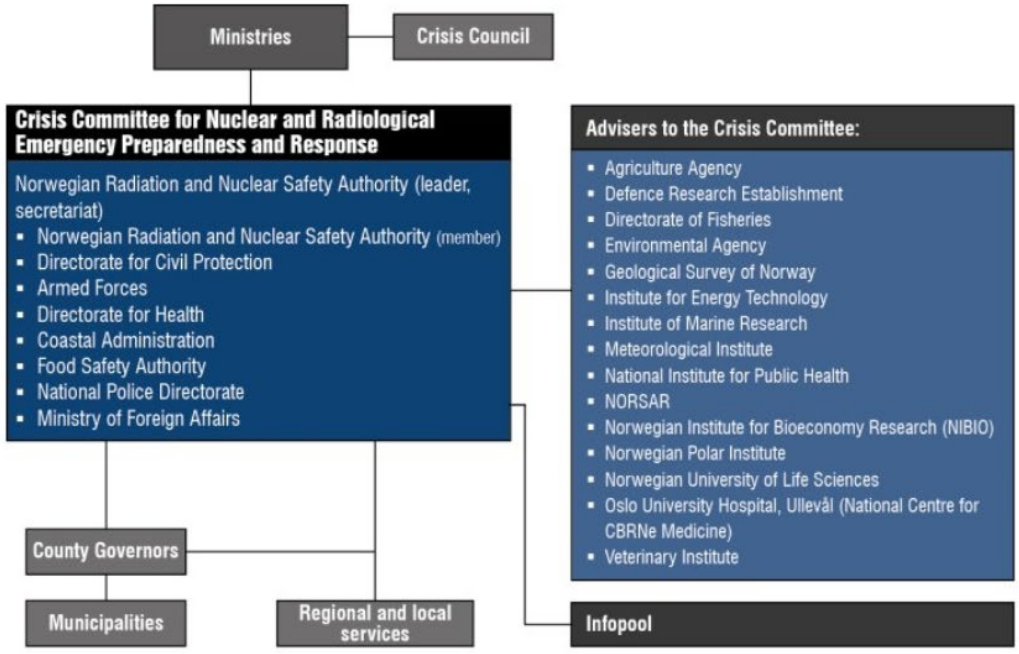

Figure 3: *Organisational chart for the Norwegian nuclear and radiological emergency preparedness and response organisation.*

3.6.2 Information and communication

The Crisis Committee has developed a communication strategy for radiological and nuclear incidents. Its latest revision was in 2021. In addition, it has developed communication plans for targeted audiences for each of the six scenarios stated above. Both documents have been published and are available on the DSA web site.
According to the Royal Decree, the Crisis Committee is mandated to ensure coordinated information and communication with the public and the media during incident response. The DSA communications unit has a leading role in this task.

To reach out to the public with information about EPR and how they should behave during an emergency, DSA uses their web site, social media, podcasts, brochures, and videos to transfer their message. For the written material, DSA seeks to translate important messages into many languages to reach also minority groups, immigrants and foreign workers.

The information material is shared with the county governors, and DSA encourages them to actively share and use it with actors at the municipal level.

3.6.3 Cooperation with neighbouring states that have nuclear installations

The Nordic countries have a strong cooperation in radiation issue and EPR. For instance, the five Nordic EPR authorities for radiological and nuclear incidents meet twice a year to discuss issues of common interest and share recent risk analyses, impact assessments and developments in EPR planning and response. Of the five Nordic countries, only Sweden and Finland have nuclear installations. There is a joint Nordic guidance for implementation of protective measures in incidents with cross-boundary consequences and a manual for notification and information exchange between the Nordic countries. DSA also takes part in EPR exercises organised by neighbouring countries.

The cooperation with Russia has been drastically reduced since February 2022, but Norway continues cooperation on early notification and information exchange in case of nuclear and radiological incidents.

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5 List of Abbreviations

ALARA	As Low As Reasonably Achievable
AMP	Ageing Management Programme
BAT	Best Available Technique
CCNP	Crisis Committee for Nuclear Preparedness
CNS	Convention on Nuclear Safety
DSA	Norwegian Radiation and Nuclear Safety Authority
ENSREG	European Nuclear Safety Regulators Group
EPR	Emergency Preparedness and Response
EPReSC	Emergency Preparedness and Response Standards Committee
EU	European Union
GLC	General License Conditions
HBWR	Halden Boiling Water Reactor
HOD	Ministry of Health and Care Services
ICRP	International Commission on Radiological Protection
IFE	Institute for Energy Technology
INSARR	Integrated Safety Assessment of Research Reactors
IRRS	Integrated Regulatory Review Service
ISCA	Independent Safety Culture Assessment
JEEP	Joint Establishment Experimental Pile
KLD	Ministry of Climate and Environment
KLDRA Himdalen	Combined disposal and storage facility for low and intermediate level waste in Himdalen
MFA	Ministry of Foreign Affairs
NAP	Nuclear Action Plan
NND	Norwegian Nuclear Decommissioning
N0RA	Norwegian zero effect Reactor Assembly
NORM	Naturally Occuring Radioactive Material
NRPA	Norwegian Radiation Protection Authority
NSGC	Nuclear Security Guidance Committee
NSM	Norwegian National Security Authority
NUSSC	Nuclear Safety Standards Committee
OECD	Organisation for Economic Co-operation and Development
RANET	Response and Assistance Network
RASSC	Radiation Safety Standards Committee

SAR	Safety Analysis Report
SARCoN	Systematic Assessment of the Competence Needs of the staff of a Regulatory Body
SSAC	State System for Accountancy and Control
SSC	Systems, structures and components
TPR	Topical Peer Review
TRANSSC	Transport Safety Standards Committee
TSO	Technical Support Organisation
WASSC	Waste Safety Standards Committee
WENRA	Western European Nuclear Regulators Association

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3 DSA-rapport 03-2023
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