Justification for the recommendation for an impact assessment programme for

Nuclear Power Plant at Taftøy Industrial Park

Aure municipality in the county of Møre og Romsdal

Heim municipality in the county of Trøndelag

Developer	Trondheimsleia Kjernekraft AS
Reference	NVE ref. 202508882-31
Date	1 Sept. 2025
Responsible agencies	DSA, DSB and NVE

Summary

The Norwegian Radiation and Nuclear Safety Authority (DSA), the Norwegian Directorate for Civil Protection (DSB) and the Norwegian Water Resources and Energy Directorate (NVE) have submitted a recommendation to the Ministry of Energy, the Ministry of Health and Care Services, the Ministry of Climate and Environment and the Ministry of Justice and Public Security recommending that an assessment programme be established

The four ministries have commissioned the Norwegian Radiation and Nuclear Safety Authority (DSA), the Norwegian Directorate for Civil Protection (DSB) and the Norwegian Water Resources and Energy Directorate (NVE) to prepare a recommendation for the establishment of a comprehensive programme for impact assessment of a proposed nuclear power plant at Taftøy Industrial Park in the municipalities of Aure and Heim.

DSA, DSB and NVE have submitted the recommendation to the ministries. This is available in a separate document.[1]

The assessment programme ensues from requirements in several Acts of law

The establishment of a nuclear power plant triggers requirements for licences and permits pursuant to the Nuclear Energy Act, the Pollution Control Act and the Energy Act. In accordance with the Regulation on impact assessments pursuant to the Planning and Building Act, assessments of the environmental and societal impacts of a nuclear power plant are therefore required. An assessment programme is a review of the aspects that the developer must consider before applying for a licence, permits and authorizations in line with the applicable regulations. The aim is to ensure that environmental and societal aspects are taken into account and safeguarded.

The contents of the recommendation

In this recommendation, we present the specific impacts that DSA, DSB and NVE find must be assessed before a decision can be made on any applications for licences and permits pursuant to the Nuclear Energy Act, the Energy Act and the Pollution Control Act.

The contents of this document

In this document, DSA, DSB and NVE describe the work process for our recommendation on establishment of an assessment programme for a nuclear power plant at Taftøy Industrial Park. We explain why we believe the requirements regarding impact assessments included in our recommendation are necessary, and explain the background to the various requirements. The requirements in the recommendation must be seen in light of this document. Furthermore, the document contains a number of necessary delimitations of the assignment and identifies parallel processes that we believe will be necessary.

There is a need for a comprehensive assessment programme

A nuclear power plant in Aure and Heim will have impacts locally, regionally and nationally. Therefore, there are a number of topics and factors that it is important to find out more about in an impact assessment. The proposed requirements regarding impact assessments are based, among other things, on similar requirements for other types of energy plants, requirements in Norwegian regulations and international best practice. At the same time, nuclear installations require special

[1] NVE ref. 202508882-31

requirements regarding impact assessments related to nuclear safety, radiation protection, emergency preparedness and response, radioactive pollution and waste. It is also important to assess how compliance with Norway's obligations regarding non-proliferation of nuclear material that can be used for nuclear weapons can be ensured.

Although this assessment programme has been drawn up specifically for a nuclear power plant at Taftøy Industrial Park, most of the proposed topics for assessment and requirements will nevertheless also be relevant for other nuclear power plants.

Development of nuclear power should start with an overarching approach

Norway has had four research reactors, but has not previously established commercial nuclear power. The International Atomic Energy Agency (IAEA) recommends that national programmes should be developed to consider how nuclear power can be included in the power mix, and that thorough assessments should be made before deciding where a specific plant should be located. Norway does not currently have a national strategy for how nuclear power, if established, might be included in our power production.

We believe that the development of nuclear power production in Norway should start with an overarching, central-governmental approach, rather than a local initiative for a specific plant in a given location. This is also in line with international recommendations from the IAEA.

Since our assignment has been to prepare a recommendation for an assessment programme for a specific nuclear power project, no position has been taken on whether nuclear power should be part of the Norwegian energy mix, no requirements have been set related to assessment of suitable locations for the establishment of nuclear power plants in Norway, and it has not been assessed what kind of nuclear power plant it is most appropriate to establish.

We recommend waiting for the report from the Nuclear Power Committee and the decision on nuclear power

The Nuclear Power Committee has been set up to conduct a broad review and evaluate various aspects of the possible future establishment of nuclear power in Norway. The agencies recommend that the government postpone further consideration of this matter until the Nuclear Power Committee has submitted its review, and until a decision has been made on whether Norway is going to start producing commercial nuclear power. The establishment of a nuclear power plant must also be presented to the Storting (Norwegian Parliament) before a licence can be granted pursuant to the Nuclear Energy Act.

If nuclear power plants are to be established in Norway, it will be important to undertake a thorough assessment of the need to further develop the existing regulatory framework in line with international recommendations, conventions and standards. Norway's national nuclear preparedness must also be reviewed, and it must be assessed whether there is a need to strengthen the national nuclear preparedness, in line with a new risk landscape in Norway.

The agencies are of the opinion that there will be a need for thorough assessments of the consequences for Norwegian municipalities of hosting a nuclear installation, including for the municipal nuclear preparedness. Preparedness for nuclear incidents must be included in the municipalities' coordinated work on civil protection and emergency preparedness.

Relationship to the Act relating to national security (the Security Act)

A need has been identified that parts of the documentation that must be prepared in connection with the assessment programme ought to be covered by the Security Act. This applies in particular to information related to safety measures and security precautions, but also to technical specifications of the facility in general (cf. the requirements concerning the duty of confidentiality in Section 53 of the Nuclear Energy Act). This is especially relevant because the plant's design is expected to ensure that safety requirements are met. It must therefore be clarified whether all or part of the facility will be covered by the requirements regarding classified procurements in Chapter 9 of the Security Act. Any decision to designate the facility as nationally critical pursuant to the Act will normally come later in the process.

In the assessment programme, we point out that the developer must assess the value of the documentation included in the assessment programme. We therefore recommend that the Ministry consider these issues.

An Espoo consultation should be conducted

DSA, DSB and NVE would also draw special attention to Norway's obligations pursuant to the Espoo Convention, whereby Norway as a state is obliged to notify other countries of planned measures with potentially major transboundary environmental impacts. A nuclear power plant is a measure that could have major transboundary consequences. It is also a requirement that both government authorities and the general public in countries that may be affected by the proposed project must be given the opportunity to comment on the assessment programme. The Norwegian Environment Agency is Norway's national single point of contact. DSA, DSB and NVE recommend that an Espoo consultation be conducted on the recommendation for the assessment programme before the programme is established.

Glossary of terms

Below is a list of the key terms used in this document and in the recommendation for the assessment programme.

Adverse incidents: means accidents, deliberate adverse events, incidents that may affect the safety of the nuclear power plant, incidents that may lead to consequences for people, the environment and society, and incidents that may affect the security of the power supply.

Affected municipalities: Municipalities that may be affected by the proposed project. Which municipalities these are, in addition to Heim and Aure, will vary depending on the assessment topic and the area of influence of the impacts to be assessed.

Cascade effect: At a nuclear installation, a "cascade effect" is an incident where a small disturbance or change in one safety system leads to a series of subsequent, more serious incidents or impacts. It can start out quite minor, but grow to have major, significant consequences for the safety of the facility.

Characterization of waste: Characterization provides information on, among other things, the material composition, physical and chemical condition and properties of the waste, in addition to the activity content of the waste. Classification provides information about the waste category that the waste can be placed under. Classification and characterization of radioactive waste is discussed in Section 6.1 of the "Strategy for safe, secure and responsible management of radioactive waste in Norway".

Criticality event: An uncontrolled nuclear chain reaction that can lead to elevated radiation levels and releases of radioactive substances.

Decommissioning: A phase during the life cycle of a nuclear installation during which planned dismantling, demolition and other measures are carried out at the nuclear installation and contaminated soil is removed from the area, in order to bring about a safe condition and enable all or parts of the area to be released from regulatory control and used for other purposes.

Deliberate adverse actions: Deliberate adverse actions means, for example, theft of nuclear material, sabotage or threat of sabotage, explosion, physical deactivation of security functions, cyberattacks, terrorism or war caused by an actor with intent to cause harm.

Deliberate adverse events: Means incidents that occur as a result of intentional adverse actions such as theft of nuclear material, sabotage or threat of sabotage, explosion, physical deactivation of security functions, digital attacks, terrorism or war.

Grid connection: Grid infrastructure that is necessary for the transmission of power from the nuclear power plant. The grid connection can 1) be part of the proposed project and owned and operated by the developer, or 2) be owned and operated by other developers (Statnett, a regional grid company or a local grid company).

Handling of radioactive waste: Common term for receipt, storage, treatment and other disposal of radioactive waste (cf. Section 16-3 (d) of the Waste Regulation).

Host municipalities: The municipalities in which the proposed project is planned to be located, i.e. Heim and Aure. When the finer details of the proposed project are further specified, including the location of the permanent waste management solution and the grid connection system, there

may be more host municipalities than currently indicated in the initial notification from Norsk Kjernekraft.

Justification and optimization: Section 5 of the Radiation Protection Regulation stipulates requirements regarding the justification and optimization of use of radiation. According to the provision, justification means that the benefits of the use of radiation must outweigh the disadvantages it causes. Optimization means that exposure to ionizing radiation must be kept as low as practically possible, taking into account technological knowledge, social and economic factors.

Nuclear fuel: General understanding: Fuel intended for or used in a nuclear reactor. Spent fuel is nuclear fuel that has previously been in an operational reactor and been permanently removed. Nuclear fuel is defined in Section 1 (a) of the Nuclear Energy Activity Act: fissile material in the form of uranium or plutonium in metallic form, in an alloy or chemical compound, and such other fissile material as the Ministry may determine.

Nuclear incident: Nuclear incidents are defined as accidents, deliberate adverse events, and incidents that can lead to increased radiation levels and acute radioactive contamination (i.e. pollution), and incidents that can affect the operation and safety of the facility.

Nuclear installation: Nuclear installations are defined in Section 1 (e) of the Nuclear Energy Act as: factory for the production or processing of nuclear substances; factory for the separation of isotopes in nuclear fuel; factory for the reprocessing of irradiated nuclear fuel; facility for the storage of nuclear substances other than for facilities intended exclusively for use as temporary storage during transportation; facility for the disposal of nuclear substances; reactor, factory, facility or plant of the aforementioned kind that is being decommissioned; and, according to the Ministry's further determination, other facility where there is nuclear fuel or a radioactive product.

Nuclear power plant: A nuclear installation (see the definition above) and power plant that produces electrical energy using nuclear energy. Section 4, second paragraph, of the Nuclear Energy Act uses a slightly different term in Norwegian. A nuclear power plant also includes the necessary infrastructure and land use.

Nuclear preparedness: Norway's national nuclear emergency preparedness system comprises the Crisis Committee for Nuclear Preparedness, the Crisis Committee's advisors, and the County Governor as the Crisis Committee's regional representative. The County Governor is responsible for coordinating emergency preparedness at the regional level and coordinating with the municipal authorities (cf. Royal Decree on the Mandate for the Crisis Committee for Nuclear Preparedness etc. of 1 September 2013).

Nuclear safety: Nuclear safety encompasses all aspects of significance to the safety of a nuclear installation, so that the facility can be operated safely, securely and responsibly. Nuclear safety includes all measures to limit the negative effects of radiation on human health and the environment, safeguarding the facility against deliberate acts, and measures to ensure that nuclear and radioactive material cannot go astray and be used for non-peaceful purposes such as nuclear weapons. In our context, the term nuclear safety often includes the terms nuclear safety, nuclear security and safeguards as used in various regulatory requirements.

Occupational exposure: exposure of workers during their work, where the radiation source or exposure situation is an accountable part of the professional work and connected to this (cf. Section 4 (y) of the Radiation Protection Regulation).

Radiation protection: includes all measures to ensure responsible use of radiation, prevent harmful effects of radiation on human health, and contribute to the protection of the environment.

Radioactive pollution: Radiation from radioactive substances that is or could be harmful or detrimental to the environment. This also includes radiation from naturally occurring radioactive substances where human activity leads to increased radiation exposure of people or the environment.

Radioactive waste: Objects of personal property or substances that are considered to constitute waste and contain, or are contaminated with, radioactive substances with a specific activity greater than or equal to the values specified in the Regulation on the application of the Pollution Control Act to radioactive pollution and radioactive waste (cf. Section 2, first paragraph (c) of the Regulation). This includes spent nuclear fuel.

Safeguards: Safeguards refers to the various security measures at nuclear facilities, monitoring of nuclear material (uranium (enriched, natural and depleted), plutonium and thorium) and activities to prevent misuse of nuclear facilities and diversion of nuclear material from peaceful uses.

Security: Security refers to the prevention of deliberate adverse events. Security includes physical and electronic measures to secure objects and infrastructure, as well as preventive security work within digital security, information security, personnel security, etc. Security also includes preparedness for deliberate adverse actions and events, including the implementation of additional measures in the event of a possible increased threat.

Stages or phases in the life cycle of a nuclear installation include: concept selection, site selection, construction, commissioning, operation, decommissioning and release from regulatory control.

The fuel cycle: Nuclear fuel cycle encompassing the course of all stages that the nuclear fuel undergoes, from the extraction of fissile materials, conversion, enrichment, fuel production, transport and storage to the final disposal of the spent nuclear fuel. The fuel cycle is characterized as closed or open, depending on whether the spent fuel is sent for reprocessing or not.

The nuclear preparedness organization has been established to provide expertise to deal with nuclear incidents and to ensure rapid implementation of measures to protect lives, health, the environment and other important societal interests. Nuclear incidents are both accidents and incidents resulting from intentional acts in peacetime, security policy crises and armed conflict (cf. Royal Decree on the Mandate for the Crisis Committee for Nuclear Preparedness etc. of 1 September 2013).

The proposed project: The specific facility to which the recommendation for the assessment programme and this document refer. The term also includes related activities.

Waste: Objects of personal property or substances that have been discarded, are going to be discarded or must be discarded (cf. Section 27, first paragraph, of the Pollution Control Act).

Contents

1 Introduction

1.1 The content and structure of the report

The Ministry of Energy (ED), the Ministry of Health and Care Services (HOD), the Ministry of Climate and Environment (KLD) and the Ministry of Justice and Public Security (JD) have commissioned the Norwegian Radiation and Nuclear Safety Authority (DSA), the Norwegian Directorate for Civil Protection (DSB) and the Norwegian Water Resources and Energy Directorate (NVE) to prepare a recommendation for the establishment of a comprehensive programme for impact assessment of a proposed nuclear power plant at Taftøy Industrial Park in the municipalities of Aure and Heim.

In this report, DSA, DSB and NVE describe the background to our recommendation. The main purpose of this report is to explain the reasoning behind the requirements that have been included in the recommendation and to provide supplementary information for the conduct of the assessment programme. The report also contains information about delimitations in the work and parallel processes that DSA, DSB and NVE have identified as necessary.

Chapter 1 contains general information about DSA, DSB and NVE, the proposed project in question, and a brief introduction to the licensing, authorization and permit processes for nuclear power plants. A more detailed overview of relevant laws and regulations is provided in Appendix 1. In chapter 2, we present the assignment and explain the various delimitations and parallel processes. In chapter 3, we present general information about the requirements in the recommendation, including an overview of which parts of the assessment programme are necessary to meet requirements pursuant to various Acts of law. Chapter 4 provides information on involvement and participation in our work on the recommendation, while chapters 5 to 22 contain explanations of the reasoning behind, and more detailed elaboration of, the specific requirements in our recommendation.

This report must be read in the context of the recommended assessment programme. This is available in a separate document.[2]

1.2 Brief presentation of DSA, DSB and NVE

The Norwegian Radiation and Nuclear Safety Authority (DSA) is Norway's national authority and expert body in matters concerning radiation protection, nuclear safety, and non-proliferation of nuclear arms, radioactive pollution and radioactive waste, including emergency preparedness in response to acute radioactive pollution. DSA has powers pursuant to the Norwegian Radiation Protection Act and the Norwegian Pollution Control Act. The Norwegian Nuclear Energy Act states that DSA is the supreme expert body with regard to safety issues and cannot be overruled in this area. DSA is also the competent authority for Norway's non-proliferation obligations pursuant to the Safeguards Agreement and Additional Protocol with the International Atomic Energy Agency (IAEA). Activities in this area include monitoring Norway's stock of nuclear material, nuclear installations and activities in connection with these. DSA prepares and submits recommendations regarding applications for licences for nuclear installations and permits for the production, trade, treatment and transport of nuclear substances.

DSA is a government agency under the Norwegian Ministry of Health and Care Services (HOD). DSA is also the Ministry of Climate and Environment (KLD)'s directorate in matters concerning

[2] NVE ref. 202508882-31

radioactive pollution and radioactive waste, and the Ministry of Foreign Affairs' directorate within the field of international collaboration on nuclear security. In addition, DSA performs directorate tasks for the Ministry of Defence, including making recommendations on permission for military nuclear-powered vessels to Norwegian enter ports and waters.

According to the Regulation on Impact Assessment, DSA is the competent authority for nuclear power plants and facilities that handle nuclear fuel pursuant to the Nuclear Energy Act, the Pollution Control Act and the Radiation Protection Act, in addition to the Ministry of Health and Care Services (HOD) and the Ministry of Climate and Environment (KLD).

DSA chairs, is a member of and acts as the secretariat for the Crisis Committee for Nuclear Preparedness. Nuclear preparedness is cross-sectoral, based on civil–military collaboration, and aims to coordinate measures in the acute phase of a nuclear incident (cf. Royal Decree on the Mandate for the Crisis Committee for Nuclear Preparedness etc. of 1 September 2013).

The Directorate for Civil Protection (DSB) is required to maintain an overview of risks and vulnerabilities in society, to act as a driving force in the work to prevent accidents, crises and other adverse incidents, and to ensure good preparedness and effective handling of accidents and disasters.

DSB administers several regulations that are likely to be affected by the establishment of nuclear power in Norway. DSB has technical, administrative and supervisory responsibility pursuant to the Fire and Explosion Prevention Act, the Act relating to supervision of electrical installations and equipment, the Product Control Act and the Civil Protection Act.

According to the instructions for the ministries' work on civil protection[3], DSB must also support the ministry's coordination role within civil protection and emergency preparedness, and lay the foundation for good, coordinated preventive work and good emergency preparedness within the public administration and activities that are critical for society. DSB is organized under and reports to the Ministry of Justice and Public Security

The Norwegian Water Resources and Energy Directorate (NVE) is responsible for the management of Norway's energy resources and the security of the country's power supply.

NVE has been designated as the licensing authority for a number of types of energy plants and has been delegated authority to issue licences pursuant to the Energy Act. NVE works to promote for socio-economically efficient production, transmission and sale of energy.

NVE is also Norway's emergency preparedness authority pursuant to the Energy Act. As the emergency preparedness authority, NVE leads the national power emergency preparedness, is responsible for coordinating work on security and emergency preparedness in the power supply through the Power Supply Emergency Preparedness Organization, and is responsible for ensuring that the power supply is robust and can handle both intentional and unintentional incidents.

In addition, NVE has overarching responsibility for central-government administrative tasks in the prevention of flood damage and accidents caused by slide events (landslides and avalanches). NVE is organized under and reports to the Ministry of Energy.

[3] The Civil Protection Instructions: https://lovdata.no/dokument/INS/forskrift/2017-09-01-1349.

1.3 Brief presentation of the proposed project

On 2 November 2023, Norsk Kjernekraft AS (hereinafter referred to as Norsk Kjernekraft) submitted a notification to the Ministry of Energy (ED) with a proposal for an assessment programme for the establishment of a nuclear power plant at Taftøy Industrial Park in Aure municipality in Møre og Romsdal county and Heim municipality in Trøndelag county. The nuclear power plant itself is planned to be located in Heim municipality, but the supporting infrastructure will be in Aure municipality. The map in figure 1 shows the planned site for the proposed nuclear power plant. The site covers an area of approximately 420 acres.

Figure 1: Location of the planned nuclear power plant. Source: Notification from Norsk Kjernekraft of 2 November 2023.

In the notification, Norsk Kjernekraft writes that the nuclear power plant will be based on small modular reactors (SMR) located in separate buildings. There are several possible options, in terms of both the type of reactor and the size of the power plant. The notification indicates a total maximum installed capacity of up to 1,500 MW. According to Norsk Kjernekraft, this could result in an annual power production of 12.5 TWh, which corresponds to approximately 8% of the total annual power production in Norway today.

In addition to the reactor buildings, nuclear power plants entail a number of other buildings and land uses, including substations, control buildings, buildings for steam turbines and generators, storage areas for fuel and waste, cooling systems and service functions such as workshops, parking lots and offices.

On 23 April 2025, Trondheimsleia kjernekraft AS was established as the developer. The company was founded as a partnership between the future host municipalities, the local energy company NEAS and Norsk Kjernekraft AS. [4]

[4] Trondheimsleia Kjernekraft AS established for a nuclear power plant in the municipalities of Heim and Aure – Norsk Kjernekraft AS

For more information about the project, we refer to the notification.

1.4 Brief presentation of the process for licensing, authorization and permits for nuclear power plants

A developer must obtain a number of different licences, authorizations and permits in order to be able to build, operate and own a nuclear installation in Norway. For a nuclear power plant, the most important processes are related to the Nuclear Energy Act and the Energy Act. In addition, permits are required pursuant to other legislation, including the Pollution Control Act and the Radiation Protection Act. In Appendix 1, we provide a brief description of the most relevant regulations for nuclear installations in Norway today.

Nuclear power plants must be impact assessed in accordance with the Impact Assessment Regulation. The Regulation contains requirements regarding the content of an impact assessment. The purpose of the Impact Assessment Regulation is to ensure that consideration is given to the environment and that society is taken into account during the preparation of plans and proposed projects and when deciding whether plans or proposed projects can be implemented, and if so under what conditions. An assessment programme serves as an elaboration and more detailed specification of the requirements in the Regulation.

In the initial notification with a proposed assessment programme, Norsk Kjernekraft states that they will prepare an impact assessment that will be approved in accordance with a separate process. We would underline that there is no such separate approval process in the current legislation. Impact assessments must be attached to any applications for a licence, authorizations and permits pursuant to the relevant regulations, and are not processed separately.

With effect from 1 July 2025, the Energy Act has introduced a requirement that applications for a licence must be submitted no later than two years after the assessment programme has been established. It may take more time to assess the impacts of this proposed project, and we would underline that the licensing authority can extend the deadline after receiving an application.

2 About the assignment and necessary delimitations

2.1 DSA, DSB and NVE have been commissioned to make a recommendation for an impact assessment programme

In a letter dated 8 April 2025[5], the Ministry of Energy (ED), the Ministry of Health and Care Services (HOD), the Ministry of Climate and Environment (KLD) and the Ministry of Justice and Public Security (JD) commissioned DSA, DSB and NVE to prepare a joint recommendation for the establishment of a comprehensive programme for impact assessment of the project at Taftøy Industrial Park in the municipalities of Aure and Heim for which Norsk Kjernekraft has submitted an initial notification. The aim was to submit the recommendation to the ministries before the summer, and no later than September 2025.

[5]NVE ref. 202508882-1 https://www.regjeringen.no/no/aktuelt/utredningsprogramme-for-etablering-av-kjernekraftverk/id3096258/

The background for the assignment is an initial notification on a specific nuclear power plant with a proposal for an assessment programme (cf. Section 1.3). According to the Regulation on Impact Assessment, the establishment of nuclear power plants requires an impact assessment.[6] There is also a requirement for an impact assessment of facilities for the processing or disposal of irradiated nuclear fuel or waste with high radioactivity and facilities for the storage of radioactive waste.[7]

The purpose of the recommendation shall be to lay the foundations for an impact assessment that sheds light on the impacts and consequences of the proposed project and provides a good and justifiable basis for decision-making in any subsequent licensing processes pursuant to the Nuclear Energy Act and the Energy Act, as well as for permits pursuant to the Pollution Control Act and authorizations pursuant to the Radiation Protection Act.

2.2 Delimitations and parallel processes

2.2.1 We have not assessed whether, or where, Norway should establish nuclear power plants

If nuclear power is to be introduced as part of the energy mix in Norway, it is crucial that this happens in line with current regulations, international obligations and long-term national strategies with broad political support. Nuclear power plants have an expected useful life of 60–80 years, necessitating long-term planning. International recommendations indicate that national programmes should be developed before nuclear power is established and before assessments and decisions on the specific location of a particular nuclear power plant are made. Norway currently has no national strategy, for example in the form of a white paper, for how nuclear power (if introduced) should be included in our power production.

In its consultation statement, the Norwegian Defence Research Establishment (FFI) writes that the challenges associated with handling spent nuclear fuel, physical safeguards and non-proliferation indicate that the question of nuclear power in Norway should be treated as a matter of principle where all the long-term consequences for the nation are taken into account before proceeding with plans for nuclear power in individual municipalities.

DSA, DSB and NVE support the international recommendations and believe that the development of nuclear power production in Norway should start with an overall, governmental approach, rather than with an initiative for a specific plant at a given location. Before specific locations are determined, there should also be a comprehensive assessment of national needs and parameters that will affect the location of the nuclear power plant.

However, our assignment has been to make a recommendation for an impact assessment programme for a specific nuclear power project in the municipalities of Heim and Aure. An important delimitation of the assignment is therefore that the requirements regarding impact assessments only apply to this specific project. We have not considered whether nuclear power should be part of the Norwegian energy mix, and we have not set requirements related to a general assessment of suitable locations for the establishment of nuclear power plants elsewhere in Norway. International best practice dictates that a set of criteria must first be developed at the national level to start the process of identifying suitable sites for the construction of a nuclear

[6] Cf. Section 6, first paragraph (c) of the Regulation on impact assessments (cf. Appendix I (2) b).

[7] Cf. Section 6, first paragraph (c) of the Regulation (cf. Appendix I (3) a and b).

power plant, and that several different sites must be evaluated in parallel before a decision is made to proceed with assessments of a specific location for a concrete nuclear power plant. This has not yet happened in Norway.

2.2.2 Nuclear power requires further development of the regulatory framework

If nuclear power plants are to be established in Norway, it will be important to make a thorough assessment of the need to further develop the regulatory framework in line with international recommendations. There will also be a need to consider whether changes need to be made to laws and regulations to ensure that the establishment is in line with international conventions and standards. We have not considered this as part of the work on the assessment programme, but refer, among other things, to the Nuclear Power Committee, which is going to conduct a broad review and evaluation of various aspects of the possible future establishment of nuclear power in Norway.[8]

2.2.3 Nuclear power will require a review and assessment of the need to strengthen national nuclear preparedness

Norway's national nuclear emergency preparedness system comprises the Crisis Committee for Nuclear Preparedness, the Crisis Committee's advisors, and the County Governor as the Crisis Committee's regional representative. The County Governor is responsible for coordinating emergency preparedness at the regional level and coordinating with the municipal authorities (cf. Royal Decree on the Mandate for the Crisis Committee for Nuclear Preparedness etc. of 1 September 2013). If a nuclear power plant is to be established, Norway's national nuclear preparedness must be reviewed and it must be assessed whether there is a need to strengthen the national nuclear preparedness, in line with a new risk landscape in Norway.

The nuclear preparedness organization has been established to provide expertise to deal with nuclear incidents and to ensure rapid implementation of measures to protect lives, health, the environment and other important societal interests. Nuclear incidents include both accidents and incidents resulting from deliberate actions in peacetime, security policy crises and armed conflict.

DSA chairs, is a member and secretariat of the Crisis Committee for Nuclear Preparedness, which is cross-sectoral and based on civil–military collaboration. DSB is a member of the Crisis Committee for Nuclear Preparedness. The Crisis Committee for Nuclear Preparedness will coordinate measures in the acute phase of a nuclear incident, and can advise on other consequence-reducing measures. Norwegian nuclear preparedness is based on six dimensioning scenarios that can also include nuclear incidents at a nuclear power plant. These are set by the government and can be found on DSA's website.

The Crisis Committee, the County Governor, the host municipalities and other relevant emergency preparedness and response providers, as well as the Norwegian Civil Defence, must be involved in the assessment work. Impacts on local, regional and national basic preparedness in general (incidents other than fire, such as accidents, pollution, etc.) must be included in the assessment. DSA has guidance related to nuclear emergency preparedness on its website.

[8] Read more about this on the government's website: Appointment of a public committee to investigate nuclear power as a possible power source in Norway – regjeringen.no.

There will be a need for in-depth government studies of the consequences for Norwegian municipalities of hosting a nuclear power plant, including for municipal nuclear preparedness. Preparedness for nuclear incidents must be included in the municipalities' coordinated work on civil protection and emergency preparedness. DSA provides guidance on municipal nuclear preparedness on its website.

2.2.4 Nuclear power requires collaboration between the developer and host municipalities on risk and vulnerability analysis and emergency preparedness

Civil protection and emergency preparedness are about preventing adverse incidents that can threaten or affect society's assets, and being prepared to deal with these kinds of incidents. As the local planning authority, the municipal authority is responsible for ensuring that public safety is taken into account in planning pursuant to the Planning and Building Act, and is responsible for following up on the requirements regarding municipal duties in respect of emergency preparedness in the Civil Protection Act.

The establishment of nuclear power will change the risk and vulnerability landscape in both the host municipality(ies) and any adjacent municipalities. It is therefore very important that the planning take into account what risk nuclear power represents, how this risk is to be followed up, and who is responsible for it.

As a local authority, the municipal authority is the foundation of the national work on civil protection and emergency preparedness. Its primary task is to protect the population, act as a planning authority, safeguard important services, and ensure governance and crisis management capabilities. The municipal authority must see the breadth of civil protection work in respect of prevention, preparedness and crisis management.

The municipal duties in relation to of emergency preparedness assume that each municipal authority must have a long-term perspective, must act preventively, must have good capacity in its services and functions, and must have a generic emergency response system in order to be able withstand and handle a range of different types of incidents. This means that the individual municipal authority must be aware of how developments and changes in the local challenges will also change the preconditions for civil protection.

Changes in the challenges, such as in connection with the establishment of nuclear power, will lead to changes in the risks and vulnerabilities in the municipality, and it will be necessary to update the municipal authority's comprehensive risk and vulnerability analysis.

Therefore, before a nuclear power plant can be established, the developer must collaborate with the host municipality(ies) to update the municipal authority's overall risk and vulnerability analysis, which will form the basis for a revised emergency preparedness plan and the municipal authority's work on civil protection and emergency preparedness in all sectors. The developer must also collaborate with the fire and rescue service on the specific emergency preparedness and response related to the facility.

The municipal authority has a responsibility to ensure that there is adequate preparedness for "everyday incidents". It is about the robustness of the municipal authority's services and functions, preventive activities and ability to respond, including the emergency and rescue services. This is called basic preparedness.

The municipal fire and rescue service is a central part of the basic preparedness and the most decentralized emergency service in Norway, due to its municipal organization. The basis for organization, staffing and equipment is the minimum requirements in the Fire and Explosion Protection Act and appurtenant Regulations, and the municipal authority's comprehensive risk and vulnerability analysis pursuant to the Civil Protection Act. The fire and rescue service is tailored to local needs, based on peacetime and normal conditions.

The recommendation for an impact assessment programme includes a requirement that the developer must obtain information from the County Governor and the municipal authorities and assess what consequences the proposed project will have for emergency preparedness at various levels. However, the assessment programme cannot set specific requirements regarding the updating of the municipal authorities' overall risk and vulnerability analysis or the risk and vulnerability analysis, preventive analysis and preparedness analysis that will form the basis for the staffing and equipment of the fire and rescue service. This is because we cannot impose requirements on the host municipalities or other authorities as part of the assessment programme for a specific developer. We would nevertheless stress the importance of the developer engaging in dialogue with the municipal authorities and other relevant parties in the assessment work. At the same time, it is important that the municipal authority updates its analyses to be aware of what risks the proposed project represents and how these risks are to be followed up.

2.2.5 The level of detail in the requirements regarding impact assessments is limited by the notification

The notification from Norsk Kjernekraft is fairly general in a number of areas. This applies, among other things, to the size and scope of the facilities that will be included in the proposed project, the number of nuclear reactors, technology, financing, industrial and nuclear expertise, as well as waste management and emergency response resources. The lack of detail in the notification means a number of additional assessments may be necessary, depending on the activity at the nuclear installation.

2.2.6 The recommendation does not contain a complete list of requirements for applications

The Impact Assessment Regulation only sets the framework for impact assessments, and not for requirements related to applications pursuant to various different pieces of legislation. An impact assessment does not in itself provide a sufficient decision-making basis for the processing of applications pursuant to the Nuclear Energy Act, the Energy Act or other regulatory frameworks.

In assessment programmes that are established as part of an application process, it is common to include requirements regarding the content of the application, in addition to requirements regarding the impact assessment. The recommendation for an impact assessment programme for a nuclear power plant in the municipalities of Heim and Aure constitutes a comprehensive assessment programme that will form the basis for several application processes. However, the programme will not contain complete requirements for the applications, as there is still much that is unclear related to both the proposed project and the regulatory processes for a nuclear power plant.

In the assessment programme, we have stipulated a number of requirements for the description of the proposed project that go beyond the requirements in the Regulation on Impact Assessment. These are considered necessary to process applications pursuant to the Nuclear Energy Act, the

Energy Act and other relevant regulatory frameworks. It is emphasized that these requirements are not exhaustive. Depending on which applications become relevant, additional requirements may be set for their content at a later date.

2.2.7 The recommendation does not include detailed requirements for assessment of grid connection

NVE points out that there will be a need for a separate parallel process related to the assessment and processing of new grid infrastructure pursuant to the Energy Act. The permitting process for new grid infrastructure depends on the type and size of the grid infrastructure required[9]. The notification indicates a wide range in total installed capacity for the nuclear power plant. Suitable grid connection solutions and the need to upgrade regional and transmission grids are therefore unclear. It is therefore also unclear which assessments and permitting processes are necessary for the grid connection of the nuclear installation. In the work on this recommendation, it has therefore not been possible to formulate detailed requirements regarding impact assessments related to connection to the power grid.

On a general basis, NVE encourages applications for grid infrastructure and power generation facilities to be submitted at the same time, for joint processing. Changes in the grid structure and possible high installed capacity in the power plant could have a significant impact on the power system in the region and elsewhere in the country, with both positive and negative effects. This indicates that any application pursuant to the Energy Act for a nuclear power plant at Taftøy Industrial Park ought to be processed at the same time as the application(s) for the necessary grid facilities. If the grid connection involves power lines over 50 km at 132 kV voltage level or higher, as of 1 June 2025 there is a requirement for a notification with a proposal for an assessment programme for the grid solutions before a licence can be applied for.[10]

2.2.8 The recommendation does not include detailed requirements for the assessment of a landfill facility for radioactive waste including spent nuclear fuel

According to the Regulation on Impact Assessment, facilities for the disposal of radioactive waste and spent nuclear fuel must be assessed through an impact assessment. The initial notification with a proposed assessment programme does not include an assessment of landfill solutions for radioactive waste, and there is therefore no requirement for an impact assessment of landfill facilities at this time.

Requirements and considerations related to a landfill facility for radioactive waste or spent nuclear fuel will be significantly different from those that apply to the establishment of a nuclear power plant. Even if a landfill facility for radioactive waste and a nuclear power plant are co-located at the same site, it will be necessary to conduct separate impact assessments for the landfill facility.

[9] Read more about this on NVE's website: Permitting process for grid infrastructure – NVE.

[10] Read more about the requirements regarding notifications and licence applications on NVE's website: Requirements regarding an initial notification for grid infrastructure and Application for a licence for grid infrastructure.

Although this phase does not set detailed requirements for the assessment of landfill solutions, the assessment programme must describe how radioactive waste, including spent nuclear fuel, will be handled. This also includes disposal solutions.

Radioactive waste and spent nuclear fuel constitute one of the most long-lasting consequences of the proposed project, as it will contain radionuclides with very long half-lives. It is therefore crucial that impact assessments related to the management of radioactive waste are included in the assessment programme, even if specific plans for a landfill facility are not covered by the programme. See chapter 10 on radioactive pollution and waste, including spent nuclear fuel.

2.2.9 The recommendation does not include detailed requirements for the decommissioning of the nuclear installation

According to the Impact Assessment Regulation, the decommissioning of nuclear power plants must be impact assessed. The impact assessment must be carried out when it is decided that the nuclear power plant is to be decommissioned. There is therefore no requirement for decommissioning to be fully assessed in this assessment programme, but there is a requirement for a description of the decommissioning plans. This is because a number of choices made in the design phase of a new nuclear power plant will determine how the plant will eventually be decommissioned. Reference is made to chapter 8 on decommissioning in the impact assessment programme.

2.2.10 The recommendation does not include requirements ensuing from municipal planning processes

It follows from the Planning and Building Act[11] that there is no requirement for a zoning plan for facilities for the production of energy that require a licence pursuant to the Energy Act. However, municipalities can choose to have zoning plans drawn up for energy plants. On April 12, 2024, Heim municipal authority announced the start of zoning work for an area zoning plan for Taftøy nuclear power. No planning programme has been adopted for an area zoning plan. We have not included requirements regarding impact assessments that will be part of a possible further zoning planning process in our work. However, we recommend that the municipal authority consider the requirements in our recommendation if they choose to proceed with the planning process.

2.3 Notification requirements according to the Espoo Convention

According to the Impact Assessment Regulation and the Espoo Convention, notifications of projects that may have transboundary impacts must be sent for consultation to countries that might be affected. It was clarified early in the work with the client that this should not be done as part of the assignment. We have included some requirements for assessing transboundary impacts, but this should be supplemented with any requirements obtained from other countries.

Nuclear power plants and other nuclear installations are important topics in connection with the Espoo Convention, and it is established practice to consult widely on these kinds of matters. The Norwegian Environment Agency has informed NVE that they have already been contacted by a number of other European countries requesting information on this matter. In order to meet the requirements of the Espoo Convention, a consultation of the assessment programme must be

[11] Read more about this in Appendix 1.

carried out before the assessment programme is established. The Norwegian Environment Agency is the national single point of contact for conducting these kinds of consultations.

3 General presentation of the requirements in the recommendation for an impact assessment programme

3.1 The requirements in the assessment programme are linked to several laws and regulations

It follows from the assignment that, as far as possible, the recommendation should indicate which parts of the assessment programme are necessary to meet the requirements pursuant to the Nuclear Energy Act, the Energy Act, the Radiation Protection Act, the Pollution Control Act, the Fire and Explosion Protection Act, the Civil Protection Act, the Act relating to supervision of electrical installations and equipment and in some cases also the Security Act.

In the licensing processes pursuant to the Nuclear Energy Act and the Energy Act, the competent authority must assess all the effects the proposed project might have on the environment and for society. In principle, therefore, all the requirements in the recommendation for an assessment programme are relevant to meet the requirements in both the Nuclear Energy Act and the Energy Act.

In addition, the Pollution Control Act triggers a requirement for an impact assessment in line with Appendix 1 of the Regulation of Impact Assessment, on nuclear power. The same applies to facilities that will be used to handle nuclear fuel and waste facilities for radioactive waste.

Many of these requirements are also linked to other legislation, and some of these Acts require separate permit applications. The table below provides an overview of the parts of the assessment programme that are necessary to meet the requirements of the other Acts of law mentioned in the assignment letter, in addition to the Nuclear Energy Act, the Pollution Control Act and the Energy Act. A more detailed description of the legislation is provided in Appendix 1.

Other legislation	Requirements in the recommendation	Remarks
The Radiation Protection Act	Chapter 6	Authorization pursuant to the Radiation Protection Regulation is required for all activities that involve ionizing radiation. DSA is the competent authority responsible for issuing such authorization pursuant to this Regulation. The assessments described in chapter 7 of the assessment programme will also be relevant as part of the basis for processing applications for licences pursuant to the Nuclear Energy Act and the Energy Act.

The Norwegian Fire and Explosion Protection Act	Section 7.1 and Chapter 10 In addition, the requirements in chapter 3 regarding description of the proposed project are relevant	Pursuant to the Norwegian Fire and Explosion Prevention Act, DSB can require that consent be obtained from DSB for the handling of hazardous substances to ensure the safety of the surroundings. DSB and the municipalities can also issue necessary orders for preventive and emergency preparedness measures. It is a prerequisite that there is collaboration between the developer and the fire and rescue service on the specific emergency preparedness related to the facility, and that the developer contributes to the municipal authority's analyses related to staffing and equipment of the fire and rescue service
The Civil Protection Act	Section 2.5.	There are no permit processes regulated by the Civil Protection Act, but it is a prerequisite that the developer contributes to the municipal authority's comprehensive risk and vulnerability analysis pursuant to the Civil Protection Act
The Act relating to supervision of electrical installations and equipment	Section 2.5.	There are no licensing processes pursuant to the Act relating to supervision of electrical installations and equipment, with the exception of requirements for recognition of professional qualifications.
The Security Act	Section 2.5.	The application of the Security Act must be further investigated when establishing a nuclear power plant. There will be a need at an early stage in the assessment process to classify documentation on technology and safety at the facility, in addition to the provisions on confidentiality in Section 53 of the Nuclear Energy Act. It must also be considered whether the actual procurement of all or part of the facility will fall under chapter 9 on security classified procurements. In Section 1, last paragraph, of the Regulation on the physical protection of nuclear material and nuclear facilities, it is stated that nuclear materials and nuclear

		facilities covered by the Regulation are to be regarded as objects of critical national importance. The Regulation refers to the fact that the (former) Security Act and Regulations issued pursuant thereto apply to legal entities covered by the Regulation. Any nuclear power plant will fall within the scope of the Regulation. According to Section 7-1, second paragraph, of the (current) Security Act, the ministries are responsible for designating, classifying and maintaining an overview of critical national objects and infrastructure.

In addition to the Acts of law mentioned in the assignment letter, other laws and regulations are also relevant. For example, the Nature Diversity Act provides the framework for many of the requirements for assessing impacts on biodiversity. Separate permits related to different legislation may also be required, depending on what emerges from the impact assessment. Examples of such permits include permits for physical measures in watercourses in accordance with the Act relating to salmonids and fresh-water fish etc. or the de-designation of cultural heritage monuments through exemption from the Cultural Heritage Act. In the recommendation for the assessment programme, we have set a requirement that the developer must describe all the relevant Acts of law and rules, and how they plan to comply with these requirements.

Norway is party to a number of international conventions relating to nuclear safety, handling of radioactive waste and spent nuclear fuel, liability in the event of nuclear accidents and non-proliferation of material that can be used for nuclear weapons, with additional protocols:

List of relevant international obligations (not exhaustive)[12]:

- Convention on Nuclear Safety[13]
- Convention on the Physical Protection of Nuclear Material [14]
- Convention on Early Notification of a Nuclear Accident[15]
- Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management [16]
- The Paris Convention on Third Party Liability in the Field of Nuclear Energy and the Vienna Convention on Civil Liability for Nuclear Damage[17]

[12] Conventions on nuclear safety – DSA

[13] Convention on Nuclear Safety of 20 September 1994

[14] Convention on the Physical Protection of Nuclear Material of 2 August 1987

[15] The Convention on Early Notification of a Nuclear Accident of 26 September 1986

[16] Joint Convention on the safety of spent fuel management and on the safety of radioactive waste management of 29 September 1997

[17] Paris Convention on Third Party Liability in the Field of Nuclear Energy of 29 July 1960

These obligations have been implemented in Norwegian regulations. Norway has also endorsed the international safety standards developed by the IAEA. In 2019, Norway was evaluated by experts affiliated with the IAEA, where a thorough review of the implementation of these standards was carried out. The review resulted in a report with recommendations that Norway must follow up. This included that Norway must develop a national strategy for safe, secure and responsible management of radioactive waste in Norway[18], and a national strategy for radiation protection and nuclear safety[19]. These strategies have now been adopted by the government and provide important parameters that are also significant to this programme.

A follow-up review will take place at the end of 2025. This is of significance for the interpretation of the regulatory framework, and the developer should ensure they have thorough knowledge and understanding of the international frameworks.

3.2 Many of the requirements regarding impact assessments are based on standard requirements for energy plants

The proposed requirements regarding impact assessments are based on existing requirements related to various authorization processes. Many of the requirements for assessing the impact on environmental and societal interests are based on NVE's standard requirements for other energy initiatives, which are based on experience from the construction and operation of hydropower, wind power and grid infrastructure. These requirements are largely based on the Norwegian Environment Agency and the Directorate for Cultural Heritage's Impact Assessment Handbook (M-1941) and on dialogue with the Norwegian Environment Agency and other sector authorities.

The reason why many of the requirements are based on NVE's standard requirements is that NVE has extensive experience in establishing requirements regarding impact assessments pursuant to the Regulation on Impact Assessment as the competent authority for energy plants. In recent years, NVE has worked systematically on the development of standard requirements. Among other things, the current standard requirements for onshore wind power plants were reviewed in 2021/2022 in dialogue with the relevant expert authorities.[20] For topics that overlap with topics that it is relevant to assess for other types of energy plants, NVE's standard requirements have therefore been used as a starting point, but with necessary adaptations that are relevant because the proposed project is a nuclear power plant.

3.3 Special requirements regarding impact assessments for a nuclear installation

The recommendation includes many requirements relating to assessments and descriptions to ensure nuclear safety, civil protection, radiation protection and protection of the environment in connection with the establishment of a nuclear installation. Several of the requirements concerning nuclear safety, radiation protection, radioactive contamination and waste, decommissioning and nuclear emergency preparedness follow from DSA's regulations.

[18] Read more about this on the government's website: Strategy for safe, secure and responsible management of radioactive waste in Norway – regjeringen.no.

[19] Read more about this on the government's website: Norway's first national strategy for radiation protection and nuclear safety – regjeringen.no

[20] Read more about this on NVE's website: nve.no/media/14070/forslag-til-mal-for-ku-krav-3997281_7_0.pdf.

DSA has not established an impact assessment programme pursuant to the current EIA regulations from 2017, but when the regulatory framework was introduced, the government decided that the existing nuclear installations at Halden and Kjeller should undergo an impact assessment. The establishment of a combined storage and landfill facility for radioactive waste ("KLDRA") in Himdalen was subject to requirements regarding an impact assessment in the 1990s. Since the Impact Assessment Regulation came into force in 2017, DSA has not established an assessment programme for nuclear installations in Norway, but DSA has assessed the requirements concerning impact assessments for the establishment of new waste facilities for radioactive waste. The requirements regarding impact assessments in these areas follow international requirements and guidance from the International Atomic Energy Agency (IAEA) and are based on best practice from other countries.

The special requirements regarding impact assessments include assessments and descriptions related to nuclear safety at the facility, but also security and non-proliferation safeguards. This also includes assessments and descriptions related to radiation protection, releases of radioactive substances, management of radioactive waste and spent nuclear fuel, and decommissioning. Furthermore, this includes assessments and descriptions related to nuclear incidents and nuclear preparedness.

The requirements for assessment are based on requirements set out in Norwegian regulations, the Safety Standards drawn up by the International Atomic Energy Agency (IAEA), and the "Strategy for safe, secure and responsible management of radioactive waste in Norway". There is a comprehensive international framework of safety standards, guidelines and guidance from the IAEA regarding nuclear installations. We have set a requirement that the studies to be carried out must follow international best practice.

DSA has prepared general licence conditions, which are based on the IAEA's Safety Standards. The conditions are published in StrålevernHefte 2018:33 and provide guidelines for what an application for a licence must contain and for DSA's assessments of an application. In addition, DSA has prepared a guide to the general licence conditions in DSA booklet no. 5. The licence conditions are an important part of the basis for the requirements we have set for the impact assessment.

3.4 Relationship between a safety case for a nuclear installation and an impact assessment for a nuclear power plant

An application for a licence pursuant to the Nuclear Energy Act must include a safety case for a nuclear installation that documents that the facility meets all the relevant safety requirements and shows how the facility can be operated safely, securely and responsibly. A safety case must describe in detail how the safety of the facility will be ensured throughout the entire lifetime of the facility, and must document how the nuclear installation meets all the safety requirements. Some issues that are relevant in an impact assessment may also be relevant in the safety case.

The safety case will contain, among other things, technical descriptions of the facility, safety analyses, describe vulnerabilities and risk factors, include measures introduced to minimize risk, operating regulations, contingency plans to deal with any incidents at the facility, and provide an account of the necessary expertise and personnel. The safety case will also provide an assessment of defence-in-depth, including how to handle deviations from normal operations, detect and correct any safety-related deviations from normal operations, and describe active and passive safety barriers including physical measures. The report will also consider different degrees of protection and physical barriers to isolate radioactive material. Other measures to support

defence-in-depth also need to be identified in a safety case, including an account of the safety margins in the design and operation of the facility and describing how cascade effects[21] can be avoided. The requirements regarding the content of a safety case will depend on the various stages of development of a nuclear installation, from construction, to operation and later decommissioning and dismantling of the facility.

A preliminary safety case is sufficient for an application to construct a nuclear power plant, but the owner must submit a complete safety case for the plant in good time before the plant is put into operation. The requirements for the safety case will also change when the facility is to be decommissioned and dismantled in the future.

In order to ensure a comprehensive and consistent assessment of the impacts and safety of the proposed project, it is important that there is consistency between the assessments made in the impact assessment and those included in the safety case for the facility. The content, analyses and assessments in the two documents must be mutually aligned, especially where there is an overlap between, for example, environmental impacts and safety issues.

4 Involvement and participation in the work on the recommendation

4.1.1 The notification has undergone consultation

The Ministry of Energy sent the notification with the proposed assessment programme for public consultation on 21 May 2024 with a response deadline of 21 November 2024. A total of 53 consultation responses were submitted by the deadline, and these are available on the government's website.

The requirements regarding impact assessments in our recommendation are based, among other things, on Norsk Kjernekraft's proposal for an impact assessment programme and the input that the Ministry of Energy received within the consultation deadline.

4.1.2 Involvement of expert authorities

The assignment letter states that advice and input must be obtained from the National Security Authority (NSM), the Norwegian Police Security Service (PST) and the National Police Directorate (POD). Early on in the work, it was decided that DSA would assume responsibility for this involvement.

DSA presented the assignment at the Authority Forum on 30 April 2025, which was attended by the aforementioned agencies. On 10 June 2025, contact persons at NSM, PST and POD were sent the chapter on civil protection from the draft recommendation on establishment of an impact assessment programme for the project. They were asked to provide input on whether the chapter addressed the need for investigation within the individual agency's areas of responsibility, or whether there was a need for changes or additions. NSM, PST and POD stated that they needed more time and more comprehensive documentation to be able to make a proper professional

[21] At a nuclear installation, a "cascade effect" is an incident where a small disturbance or change in one safety system leads to a series of subsequent, more serious incidents or impacts. It can start out quite minor, but grow to have major, significant consequences for the safety of the facility.

assessment of the proposed project. On 4 July 2025, DSA therefore sent a letter to NSM, PST and POD, with a complete preliminary draft recommendation for the establishment of the impact assessment programme. The deadline for feedback on this was set to 14 August 2025. DSA received input from POD, and this input has been incorporated into the assessment programme.

On 7 May 2025, NVE sent a request for input to national agencies that had not received the notification in the initial consultation, and received input from the Directorate of Fisheries, the Norwegian Food Safety Authority and the Norwegian Coastal Administration. In addition, both NVE and DSA have had dialogue with the Norwegian Environment Agency, which has contributed with proposals for requirements regarding impact assessments related to pollution and biodiversity in the sea, among other things.

The input from the expert authorities has been included in the assessment programme.

4.1.3 Involvement of the host municipalities and the developer

NVE, DSA and DSB had a joint meeting with the municipal authorities in Heim and Aure on 5 June 2025. The host municipalities were given the opportunity to provide new written input after the meeting. The municipalities submitted input on June 18 and 20, 2025, respectively, and these have been incorporated into the basis for the recommendation.

DSA, DSB and NVE have also been in dialogue with Norsk Kjernekraft during the work on the recommendation, including at a meeting on 16 May 2025. At the meeting, Norsk Kjernekraft announced that a separate company, Trondheimsleia Kjernekraft AS, has been established, which will be the developer of the notified nuclear power plant.

DSB has informed the fire and rescue services in the host municipalities about the proposed project and requested that the chief fire officers familiarize themselves with the proposal and assess what consequences this will have for emergency preparedness, specifically the need for equipment, expertise and cooperation between the fire and rescue services.

5 Reasoning behind the requirements related to methods and participation

5.1 General requirements and method requirements

Chapter 2 of the recommendation for the assessment programme contains general requirements for the impact assessment, requirements for presentation and compilation, requirements for methodology and the underlying data, and requirements for participation. The reason why this is presented here, and not reproduced under each thematic area of assessment, is that the chosen layout results in less repetition and contributes to a more comprehensive assessment with a common starting point for the various specific assessments and experts.

Among other things, the chapter requires Norsk Kjernekraft to investigate the effects of all parts of the nuclear power plant with associated infrastructure and activities (section 2.1) and conduct the assessment so that all the factors that affect and are included in the various assessments are adequate and representative for the various alternatives that are being considered (e.g. choice of technology, type of reactor, number to be built and order in which they are built) and for all phases in the lifetime of the nuclear power plant (section 2.3). Furthermore, there is a requirement that new topics be includes in the impact assessment if the further development of the project shows

that topics not covered by this programme become relevant, and to adapt and/or limit the assessment if the further development of the project shows that certain individual topics or a specified methodology are irrelevant to the decisions to be made (chapter 2.3).

In the notification, the proposed project is described in very general terms. We believe it is important that it is a requirements that the impact assessment be carried out such that it is sufficiently comprehensive. To ensure that the impact assessments are adequate for the chosen project and at the same time reduce the need for additional assessments, the assessments must be carried out so that they are as relevant and representative as possible for the chosen project. Once the choice of design, the number of nuclear reactors and other support facilities as well as associated activities has been decided, Norsk Kjernekraft must ensure that the assessments in the reports are adequate and comprehensive.

Furthermore, a requirement has been included in section 2.3 of the recommendation that it must be assessed whether regulatory or administrative requirements and considerations from one authority related to the proposed project may entail a risk of contradiction or conflict with requirements established or guidelines issued by other relevant authorities. This could, for example, be guidelines or requirements issued by other authorities that conflict with requirements from DSA and NVE. DSA has the authority to lodge objections pursuant to the Planning and Building Act in the areas of nuclear safety and radioactive pollution, and NVE has the authority to lodge objections in the areas of energy, slide events (landslides and avalanches), floods, watercourses and groundwater. A holistic approach at an early stage will help to identify and address this, and facilitate compliance.

5.2 Participation

The requirements for participation are based on NVE's standard requirements for energy plants and recommendations from the IAEA on the participation of stakeholders and affected parties in connection with the establishment of a nuclear plant.

Since the proposed project is a nuclear installation, it is necessary to involve more parties than is usually the case in energy cases. The recommendation therefore includes, among other things, a requirement that the developer must establish extensive collaboration with local, regional and national emergency response providers, as well as involve relevant national authorities. There is also a requirement that the developer must draw up a separate plan for participation in dialogue with the host municipalities at an early stage in the assessment work. We believe this is necessary in order to ensure the necessary local support for the assessment work. As input to the recommendation, the host municipalities have provided an overview of organizations and companies that the developer must contact. This list is included in bullet point four in section 2.4 of the recommendation. We emphasize that this bullet point is not exhaustive. Norsk Kjernekraft is responsible for making sure relevant stakeholders and affected parties are included in the work. Broad involvement is key to ensuring diversity in the report. For example, stakeholder groups may have special expertise related to the proposed project that can be useful, even if they are not directly affected by the proposed project.

We also hold that there should be a requirement for an account of how the participation of affected parties and stakeholders will be ensured throughout the entire lifetime of the nuclear installation, from design until the plant is closed down and decommissioned.

We believe it is important that the participation work is documented for the public, and the recommendation therefore includes requirements for this, including dates for meetings and visits.

5.3 Environmental condition – the zero alternative

Section 2.6 of the recommendation includes requirements for a description of the environmental condition/zero alternative. This is a requirement that follows directly from Section 20 of the Regulation on Impact Assessment, which states that the assessment must be based on a description of the current environmental condition and an overview of how the environment is expected to develop if the plan or proposed project is not implemented.

This requirement is necessary to meet requirements pursuant to the Nuclear Energy Act and the Energy Act. All the assessments included in the licensing authorities' decision-making basis must assess the effects compared with the same zero alternative. We emphasize that it is important to have a realistic zero alternative for areas of influence both on land and at sea, and would stress that the zero alternative must be based on the chapter on zero alternatives in the Norwegian Environment Agency and the Directorate for Cultural Heritage's Impact Assessment Handbook (M-1941).

It is required that the background levels of radioactivity in the area for the proposed project and areas near the proposed project must be described. This requirement is set to ensure that radiation levels are well documented before activities with a radiation risk are carried out in the area, and which will be important for subsequent requirements for the enterprise's environmental monitoring in licences and permits. This will also be important when the nuclear installation is to be decommissioned and the areas are to be returned in the future.

6 Reasoning behind the requirements related to description of the proposed project

6.1 Description of the proposed project

In section 3.1 of the recommendation, we have included requirements for an overall description of the proposed project. The purpose of this is to provide a general, initial description of the facility, as a basis for more detailed descriptions of the various parts of the facility.

6.2 Justification for the proposed project

Section 3.2 of the recommendation includes requirements for a justification for the proposed project. This is a requirement that follows directly from the Impact Assessment Regulation and is necessary to meet the requirements relating to the licensing processes pursuant to the Nuclear Energy Act and the Energy Act.

We have also included a requirement to describe relevant alternatives to the proposed project, including assessment of both alternative regional and national locations for a nuclear power plant and relevant regional and national alternatives to nuclear power production. In the assessment of relevant regional and national alternatives to nuclear power production, we believe that both other types of power production, measures such as improving energy efficiency and other measures that affect the need for new power production are relevant.

6.3 Choice of location

A nuclear power plant is usually planned to operate for at least 60 years. In addition, it takes several years to plan and build it, and several years to dismantle and decommission it. The choice

of location and suitability of the site must therefore be carefully assessed, so that there can be reasonable assurance that the nuclear power plant can be built, operated, decommissioned and dismantled over time in a location without undue risk to human health, the environment or other societal and commercial interests.

Requirement 5 of the IAEA Safety Requirements SSR-1 for site evaluation states that: *"The site and the region shall be investigated with regard to the characteristics that could affect the safety of the nuclear installation and the potential radiological impact of the nuclear installation on people and the environment."*

Before a licence pursuant to the Nuclear Energy Act for the construction of a nuclear installation can be granted, the following general questions must be answered:

- Can a nuclear installation be established and operated safely and securely at the proposed site? Is the proposed site suitable for the planned activity?
- Will the impacts for people and the environment of the planned activity at the site in question be acceptable?

An impact assessment is mainly intended to answer the second question, while the first is addressed through a site evaluation as part of the work on the safety case for the facility. However, the two questions are closely interlinked, and at this stage of the project (in connection with the choice of location), assessments must be carried out that to some extent answer both questions.

SSR-1 also states that the following factors should be considered when evaluating the suitability of a proposed site:

- The effects of natural and human induced external events occurring in the region that might affect the site of the nuclear installation.
- The characteristics of the site and its environment that might influence the transfer of radioactive material released from the nuclear installation to people and to the environment.
- Demographic factors, such as the population density, population distribution and other characteristics of the external zone, in so far as these might affect the feasibility of planning effective emergency response actions, and the need to evaluate the risk to individuals and to the population.

In order to be able to assess the suitability of the site in accordance with the constraints set out in SSR-1, we hold that the assessment programme must require the developer to describe a number of aspects of the site and its surroundings. A nuclear power plant needs, among other things, continuous access to cooling water and stable electricity to ensure that safety is maintained at all times and in the event of downtime, maintenance, fuel changes, etc. A key aspect that needs to be investigated is therefore access to critical infrastructure, such as access to an adequate and safe supply of cooling water, as well as a stable power supply to the nuclear installation. These factors are crucial for both normal operations and in the event of adverse incidents. A thorough description and assessment of these factors is therefore necessary in order to be able to conclude whether the specific location is suitable for the establishment of a nuclear installation.

In addition, the justification for the choice of site for a nuclear power plant must show how economic and societal factors have been taken into account, such as the need for power, grid connection, logistics and transport, as well as access to human resources and expertise. The choice

of location must also be justified on the basis of other considerations, such as whether the nuclear power plant is located near a national border or near other civilian or military installations that in themselves may pose a risk or that have important national functions, making, for example, evacuation difficult. The assessment must also take into account the fact that the threat situation has changed and what this means for the location of the facility. This applies to the facility as a target in times of crisis or war, the facility's need for a stable supply of electricity and cooling water, and the facility's ability to supply electricity given its proximity to areas/activities that are important for the total defence concept.

A nuclear power plant is also dependent on an external power supply, and will therefore be dependent on a stable power supply also *in* to the power plant. Experience from Russia's attacks on nuclear power plants in Ukraine shows that loss of power to the nuclear power plant is an important risk factor that must be taken into account.

International best practice and guidance from the IAEA indicate that, based on a national decision to establish nuclear power, a set of criteria must be developed to identify suitable sites. These criteria will be based on the considerations mentioned above, and a number of overall assessments related to choice of location must be made before proceeding with a specific site.

6.4 Land area requirements

Section 3.4 of the recommendation contains a requirement that the land area requirements for the nuclear installation must be described and quantified. This is a requirement that follows directly from the Impact Assessment Regulation and is necessary to meet the requirements of the Nuclear Energy Act, the Energy Act and other regulations.

6.5 Grid infrastructure

As stated in section 2.2.7, the recommendation does not include detailed requirements regarding impact assessments related to connection to the grid. We nevertheless believe that there will be a need for information about the necessary grid infrastructure and power supply to the power plant in any applications for the nuclear plant pursuant to both the Energy Act and the Nuclear Energy Act, and have therefore included assessment requirements related to this in section 3.5 of the recommendation.

In line with the Regulation on assessments of energy needs, as a general rule, all proposed projects in the power grid must be justified in a concept evaluation and selection study before a licence is applied for. It is essential that Norsk Kjernekraft clarifies the necessary grid requirements based on the specific size of the planned power plant, and that a concept evaluation and selection study is carried out that justifies the need for grid infrastructure in accordance with the Regulation on assessments of energy needs and appurtenant guidelines[22]. In the recommendation, we have therefore assumed that a concept evaluation and selection study of this nature will be carried out.

We find it necessary that Norsk Kjernekraft, as part of the description of the proposed project, must describe the facilities and solutions necessary to connect the power plant to the power grid, based on the concept evaluation and selection study and the chosen concept. This includes both the actual grid connection and any necessary upgrades to the existing grid in order for the connection

[22] Read about this on NVE's website: Regulation on assessments of energy needs: Concept evaluation and selection studies.

to be operationally sound. This will contribute to a comprehensive overview of the scope of the infrastructure that the establishment of the nuclear power plant will require.

Furthermore, we have ensured that the report makes a clear distinction between which of the grid infrastructures are included in the application for a licence for a nuclear power plant pursuant to the Energy Act, and which may be applied for by other players.

In its consultation response, Statnett has requested that Norsk Kjernekraft be required to assess whether functional requirements for synchronous production facilities are sufficient for a nuclear power plant of this size. NVE suggests that this be done in connection with the concept evaluation and selection study and has therefore not proposed a separate requirement for it in this assessment programme.

6.6 The construction phase

Section 3.6 of the recommendation contains requirements regarding a description of the construction phase, i.e. the building of the nuclear installation. Licences pursuant to the Energy Act normally require a detailed plan for this phase of the proposed project, among other things. In deciding the licensing issue, the effects resulting from construction work are relevant. We have therefore included a separate chapter with requirements for the study of the construction phase in the recommendation.

6.7 Project timeline

We believe it is important that the impact assessment contain a realistic project timeline for the planning, design and construction of the proposed project, including any plans for sequential development of nuclear reactors. The plan must take into account what has been used as a basis in the work on the technical studies. This is to ensure that time-dependent impacts are adequately assessed in accordance with the assessment requirements.

7 Reasoning behind the requirements related to description of the nuclear installation and nuclear safety

7.1 General information about the nuclear installation, technology and activities

Chapter 4 of the recommendation includes requirements regarding the description of the nuclear installation, technology and activities. These are partly requirements that follow directly from the Impact Assessment Regulation, but we have also included requirements in the recommendation that go beyond this Regulation, and which are particularly important as the proposed project is defined as a nuclear installation pursuant to the Nuclear Energy Act. We believe this is necessary to meet the requirements of the Nuclear Energy Act and the Energy Act, as well as the Pollution Control Act and the Radiation Protection Act.

For a nuclear installation, we believe it is important that the impact assessment shows how requirements relating to nuclear safety will be addressed in the design, construction, operation, decommissioning and dismantling of the facility, including radiation protection for both

occupationally exposed workers and the general public, releases of radioactive substances, management of radioactive waste, plans for environmental monitoring of radioactive substances, plans for emergency preparedness and non-proliferation of nuclear material that could be used in weapons, including safeguards and physical security measures at the facility.

There is an increased risk associated with transport of nuclear and radioactive material. Requirements regarding a description of how nuclear and radioactive material will be transported to and from the nuclear installation must therefore be included in the assessment programme. Reference is also made to IAEA SSR-6 “Regulations for the Safe Transport of Radioactive Material”, which contains provisions, activity limits and requirements for the transport of radioactive material, including controls, packaging, test procedure and administrative requirements. This is important for requirements pursuant to the Nuclear Energy Act, the Pollution Control Act and the Radiation Protection Act.

The detailed requirements are also relevant to ensure compliance with requirements ensuing from other regulations. The requirement regarding a description of how information security is to be safeguarded is also necessary to meet the requirements of the Regulation on security and emergency preparedness in the power supply. The requirement regarding a description of the technical solution, other facilities and components is necessary in order to assess compliance with the requirements for necessary safety measures to prevent fire and explosion pursuant to the fire and explosion legislation. The requirement regarding a description of the handling of hazardous substances at or near the facility will be necessary in order to be able to assess whether there is a need for consent from DSB in accordance with the Regulation on the handling of hazardous substances.

7.2 Nuclear safety, security and safeguards

Nuclear safety includes all measures at a nuclear installation that are intended to protect people, society and the environment from the negative impacts that a nuclear installation can cause. This involves preventing and/or reducing the consequences of accidents and other adverse incidents at the nuclear installation, as well as ensuring safe operating conditions. Preventing and/or reducing the consequences of accidents and other adverse incidents is closely linked to the choice of technology etc. and the safety analyses for the nuclear installation in question, and must be described in the impact assessment, but also be further elucidated and justified in connection with the preparation of the safety case and an application for a licence pursuant to the Nuclear Energy Act.

The recommendation requires that safety and security of the facility be described. This includes both logical and physical security. In this context, reference is made to the fact that the Regulation on the physical protection of nuclear material and nuclear facilities contain a number of requirements designed to minimize the possibility of theft of nuclear material and sabotage against nuclear facilities. Recommendations and guidelines relating to security at nuclear installations are provided by the IAEA in Nuclear Security Series No. 13 “Physical Protection of Nuclear Material and Nuclear Facilities” and Nuclear Security Series no. 35-G “Security during the Lifetime of a Nuclear Facility”.

Based on the facility owner’s assessments and national threat assessments, DSA issues a decision on a design basis threat to define which threats a nuclear installation must be able to withstand, and which will form the basis for setting requirements regarding the design of security measures at the facility. The recommendation therefore sets a requirement for thorough assessments of how balanced protection can be achieved at the plant, including an adapted time-based security

analysis. The methodology for determining a design basis threat is based on internationally recognized methodology from the IAEA.

The Regulation on the possession, sale and transport of nuclear material and dual-use equipment regulates the obligations of owners of nuclear installations to keep material accounts and their duties in connection with inspections and safeguards. DSA's general licence condition no. 23 also contains a requirement that the owner of a nuclear installation must ensure appropriate arrangements for material accounting and safeguards. The background to the requirement for material accounting and safeguards stems from the Safeguards Agreement and Additional Protocol between Norway and the IAEA.[23] The recommendation therefore includes a requirement for a description of material accounts for nuclear material at the facility and how Norway's obligations under international agreements will be maintained.

Many existing nuclear installations were designed and built before the requirements regarding inspections and safeguards came into effect. In some cases, this has made such controls difficult. In the case of new nuclear power plants, we therefore believe that consideration must be given to how the design of the plant can best facilitate the safeguarding of the material at the plant. We have therefore included a requirement in the recommendation to describe how the design of the facility addresses this. The IAEA provides guidance on how safeguards can be included from an early stage in the process when designing new facilities and modifying existing facilities in "Safeguards by design guidance"[24].

Nuclear safety and the security of the facility is a recurring topic in several of the consultation statements. NEAS AS asks, among other things, that the assessment programme focus on nuclear safety, ensuring that the technology meets both national and international safety standards, in line with the recommendations of the IAEA, including an assessment of the reliability and safety profile of the SMR technology. Relevant consultation input has been assessed, and is considered to be covered by the requirements regarding assessments set out in chapter 4 of the recommendation.

7.3 Nuclear fuel

Section 4.2 of the recommendation contains requirements for a description of the entire fuel cycle from extraction to final disposal of spent nuclear fuel. There is also a requirement for a description of the overall impact that the facility's fuel cycle will have on the environment and society.

In addition, we hold that the assessment must describe what kind of nuclear fuel will be used at the plant, how this nuclear fuel will be procured, produced and handled, and whether the proposed project will include local production or whether fuel will be transported to and from the plant. Spent nuclear fuel must be handled as radioactive waste, and it is therefore a requirement that the assessment must also include a description of how spent nuclear fuel will be finally disposed of.

The handling of spent nuclear fuel constitutes a significant risk factor at a nuclear installation and must therefore be assessed in thorough detail. The handling of nuclear fuel will also be assessed by DSA as part of the processing of an application for a licence pursuant to the Nuclear Energy Act.

[23] INFCIRC 177 and INFCIRC 177.Add.1

[24] Safeguards by design | IAEA

8 Reasoning behind the requirements related to assessment of competence needs

Norway has never had commercial nuclear power before, and yet we will face major and demanding tasks in the future related to the decommissioning of Norway's nuclear research activities at the Institute of Energy Technology's premises in Kjeller and Halden. It may therefore be challenging to secure sufficient expertise to establish, operate and decommission a commercial nuclear power plant in Norway, at the same time as there is an urgent need to ensure the safe operation of the existing facilities and make progress in the clean-up work. There is already a great need in Norway for expertise related to the clean-up and management of radioactive waste.

DSA's general licence condition no. 5 requires, among other things, that the owner of a nuclear installation must have enough personnel with sufficient expertise at all levels of the organization at all times. It is important to establish, maintain and further develop relevant expertise. This also follows from international requirements and recommendations from the IAEA.

We therefore find it is important that the developer describe the need for expertise throughout the entire lifetime of the facility and how they will ensure relevant expertise at the right time in the various stages of the life cycle of the facility. This includes specialist expertise in the handling of adverse incidents. The need for expertise will vary from the design and construction phases to the decommissioning of the facility. The requirements are stated in chapter 5 of the recommendation.

9 Reasoning behind the requirements related to assessment of radiation protection

A nuclear power plant will entail a risk of exposure to radiation, and how suitable radiation protection can be ensured during all the phases of the life cycle of the nuclear power plant must therefore be assessed. This means, among other things, that assessments must be made of the radiation exposure of all employees at the facility, a description of how radiation sources and doses will be monitored, and an assessment of measures to reduce or prevent radiation exposure. The requirements for assessment of radiation protection in the recommendation are set out in chapter 6.

Section 5 of the Radiation Protection Act requires that all production, import, export, transport, transfer, possession, installation, use, handling and waste management of radiation sources shall be justifiable to ensure that risks do not arise to those performing any such activity, to other persons or to the environment. Furthermore, Section 5 of the Radiation Protection Regulation stipulates that all use of radiation must be justified and optimized. This means that the benefits must be greater than the disadvantages caused by the radiation and that exposure to ionizing radiation should be kept as low as practically possible, taking into account technological knowledge, social and economic conditions.

Section 6 of the Radiation Protection Regulation also stipulates requirements in respect of dose limits, limit values and action levels for individuals exposed to radiation. Among other things, it requires the enterprise to plan the use of radiation and protective measures to ensure that non-occupationally exposed employees and the public are not exposed to an effective dose exceeding 0.25 mSv per year.

Higher radiation dose limits are permitted for occupationally exposed workers. Occupationally exposed workers are employees who are exposed to radiation during their work, where the radiation source or exposure situation is an accountable part of the professional work and connected to this. Requirements in respect of dose limits and limit values for occupational exposure are set out in Section 32 of the Radiation Protection Regulation, and it must be described how the developer intends to monitor and keep track of the exposure doses of exposed workers at the nuclear power plant.

The IAEA provides guidelines and guidance on radiation protection, use, handling and transport of radiation sources, primarily through its Safety Standards. Radiation protection aspects related to normal operation, decommissioning and dismantling of the nuclear installation must be assessed in line with these Safety Standards.

DSA's general licence condition no. 12 requires the establishment and implementation of a radiation protection programme for any nuclear installation.

The impact assessment must adequately prove that the radiation exposure, where applicable with measures, is such that compliance with the aforementioned requirements in the Radiation Protection Act and the Radiation Protection Regulation is ensured. We also hold that the developer must assess measures at the facility that can reduce or prevent exposure to radiation (radiation protection measures), how radiation doses should be monitored, how a radiation protection programme should be developed at the specific enterprise, and how the design of the facility should ensure radiation protection throughout all the operational phases of the facility. Furthermore, we believe that modelling and analysis of exposure pathways for vulnerable groups are relevant assessment approaches that can be used in the studies.

10 Reasoning behind the requirements related to assessment of radioactive pollution and waste

10.1 Releases of radioactive substances during operation of the nuclear installation

In its initial notification with a proposal for an assessment programme, Norsk Kjernekraft writes that modern nuclear power plants have no significant releases. However, it is not specified what insignificant releases there might nevertheless be.

Section 21 of the Impact Assessment Regulation requires that the impact assessment must include an assessment of pollution. Requirements nos. 25 and 26 in IAEA SSR-1 "Site Evaluation for Nuclear Installations" state that the dispersion in air and water of radioactive material released from the nuclear installation in operational states and in accident conditions shall be assessed. We therefore hold that the requirements included in section 7.1 of the recommendation on releases of radioactive substances during operation of the nuclear installation are necessary. We would like to point out that activities that may result in radioactive pollution require a permit from DSA pursuant to the Pollution Control Act.

Although a nuclear power plant is considered to have low emissions of CO_2 and other greenhouse gases, a nuclear power plant will cause radioactive pollution in the form of releases of radioactive substances as a consequence of activities at the plant. This might be releases of radioactive substances to air and water. We hold that the developer must assess radioactive pollution that

may occur from all operating conditions at the facility. This may include releases of radioactive substances during ordinary operation, shutdowns, maintenance, replacement of filters, ion exchange resins, etc.

In Section 2 of the Regulation on the application of the Pollution Control Act to radioactive pollution and waste, radioactive pollution is defined as "radiation from radioactive substances which cause or may cause damage or nuisance to the environment. This also includes radiation from naturally occurring radioactive substances where human activity leads to increased radiation exposure of humans or the environment." DSA may issue a permit pursuant to Section 11 of the Pollution Control Act for activities that lead to or may lead to radioactive pollution, and may stipulate further conditions in a permit pursuant to Section 16 of the Pollution Control Act to prevent radioactive pollution from resulting in damage or nuisance. Appendix II of the Regulation stipulates which releases always require a permit pursuant to Section 4 of the Regulation. It is underlined that the summation rule applies if the release consists of several different radionuclides.

We also find that it is necessary to require assessment of which pathways exist in the area for the proposed project for spreading radioactive pollution in the environment, and what consequences this pollution may have for human health and the environment. This includes the total load for relevant recipients in the area for the proposed project. Furthermore, we propose a requirement that it must be assessed how the enterprise will monitor its radioactive releases in an environmental monitoring programme.

Releases of radioactive substances have also been a topic in several of the statements from consulted parties. The Women's International League for Peace and Freedom (IKFF) requests, among other things, more detailed information about the type of reactor and installed capacity, and that the assessment programme should specify which substances the nuclear power plant will release during operation, highlighting in particular the release of tritium to both the air and water. Salfjord AS requests, among other things, an assessment of the impacts (direct and market-related) for the aquaculture industry of releases of radioactive material in the area or the sea. The County Governor of Trøndelag holds that it is important that the risk of pollution, and in particular release of radioactive substances, be properly assessed, in relation to the impact on the water quality of freshwater, groundwater and the sea, on biodiversity (vegetation and animals) and on short-term and long-term damage to human health. We find that the consultation input has been taken into account in chapter 7 of the recommendation on radioactive pollution and waste and in chapter 17 on biodiversity. In respect of impacts for the aquaculture industry, we also refer to section 19.5 of the recommendation on the assessment of impacts for aquaculture and fisheries.

In order to monitor any changes in radiation levels as a result of the proposed project and to clarify whether releases of radioactive substances are above the limit values in Appendix II of the Regulation on Radioactive Pollution and Waste, it is necessary to map the background radiation in the area before the proposed project is implemented (the zero alternative). We find it is also necessary to assess what measures can be implemented to ensure that releases are kept as low as possible and how requirements for the use of best available technology (BAT), as well as the principle that exposure should be kept as low as reasonably achievable (the ALARA principle) are to be complied with.

10.2 Radioactive waste, including spent nuclear fuel

In the initial notification with a proposal for an assessment programme, Norsk Kjernekraft has not presented any description of the estimated type and amount of radioactive waste that the

proposed project will generate. According to Section 19 of the Regulation on Impact Assessment, an impact assessment must include a description of this. Section 7.2 of the recommendation therefore includes a requirement for a description of radioactive waste and how this waste is going to be handled. This also includes spent nuclear fuel from the nuclear power plant, which is radioactive waste with high activity and high risk.

Nuclear power plants in operation will generate radioactive waste. Some of the waste will be low-activity operational waste, while other radioactive waste, such as spent nuclear fuel, will require management for a very long time into the future. The eventual closing down and decommissioning of a nuclear power plant will also produce radioactive waste. Radioactive waste must be managed safely, securely and responsibly in line with the regulatory framework and international conventions and standards, and without placing undue burdens on future generations. The amount of radioactive waste must be as small as practically possible, and there will be minimization requirements in any licences and permits that might be granted. It is therefore essential that Norsk Kjernekraft assess how the radioactive waste, including spent nuclear fuel, produced as a result of the proposed project will be handled.

Principles for the management of radioactive waste are outlined in the "Strategy for safe, secure and responsible management of radioactive waste in Norway". Assessments of the management of radioactive waste and spent nuclear fuel must show that the management is in line with the principles and strategy in general. Costs associated with the management of radioactive waste have also been included in the requirements regarding impact assessments.

IAEA GSR Part 5 "Predisposal Management of Radioactive Waste" and SSR-5 "Radioactive Waste Disposal" contain, among other things, requirements for the handling of radioactive waste and will be relevant to the impact assessment. An important requirement in GSR Part 5, which it will be important to take into account in the assessment, is that the handling of radioactive waste from the nuclear power plant must be compatible with the expected landfill solution, and that it has been taken into account that the various steps in the handling of radioactive waste are mutually interdependent. We therefore believe that the report must show how these requirements have been taken into account, even if there is no requirement for a study of the final landfill solution.

Furthermore, several of the consultation statements point to the importance of assessing the management of radioactive waste, and in particular spent nuclear fuel. The Norwegian Defence Research Establishment (FFI) points out that end-of-life handling of nuclear fuel (and the financing thereof) ought to be included in any assessment of the establishment of nuclear power in Norway. The Women's International League for Peace and Freedom (IKFF) requests specification of how much spent nuclear fuel the proposed project will produce. Norwegian Nuclear Decommissioning (NND) requests that consideration be given to how the necessary infrastructure for waste management and decommissioning can be planned for shared use. Regulations, responsibilities, risks and opportunities should be clarified from an early stage. These comments have been taken into account in the requirements regarding what must be assessed in section 7.2 of the recommendation.

10.3 Other waste

The proposed project will also produce waste that is not radioactive. According to the Regulation on Impact Assessment, assessments must provide an estimate of the type and quantity of waste, residues, releases and pollution that will be produced during the construction and operational phases. We have therefore included a requirement regarding this in our recommendation.

11 Reasoning behind the requirements related to assessment of decommissioning

A nuclear installation that is to be established must also take into account that at some point in the future, the facility will no longer be in use and must be closed down and decommissioned. When establishing a nuclear power plant, the various stages in the life cycle of the nuclear installation must therefore be taken into account.[25] This includes taking into account the future decommissioning of the plant right from the design phase, a process that will extend over several decades and generate large amounts of waste, including radioactive waste. This waste must be handled safely, securely and responsibly. International best practice states that the design of the facility must also plan for how the facility will be decommissioned. We therefore hold that the decommissioning of the nuclear installation must be included in the assessment programme, and have included requirements related to this in chapter 8 of the recommendation.

A decommissioning plan that describes in detail how the facility can be decommissioned and how radioactive waste from the decommissioning will be handled must be included in an application for a licence pursuant to the Nuclear Energy Act. In addition, the description of the design of the facility must describe how decommissioning will be organized at end of life. Decommissioning plans must be prepared and approved by DSA, and updated every five years in line with general licence condition no. 9. The plan must show that decommissioning of the facility can be carried out safely, securely and responsibly in line with national priorities and applicable regulations, as well as international best practice.

The IAEA's Safety Standards have 15 requirements related to decommissioning that are mentioned in GSR Part 6 "Decommissioning of Facilities", which must be taken into account in the assessment. During decommissioning, there will also be a risk of elevated radiation doses to both employees and the general public, and this must also be assessed.

We believe that decommissioning plans must be described as part of the impact assessment programme. At this stage of the process, a description at a general level covering plans for decommissioning, including the necessary expertise, resources and financing, will be sufficient. The desired end state for the area after decommissioning must be described, as this will be important for the decommissioning plans. To ensure that there will be sufficient expertise during the decommissioning of the plant, it must be described how this will be safeguarded throughout the entire clean-up period.[26]

[25] The stages or phases in the life cycle of a nuclear installation include: concept selection, site selection, construction, commissioning, operation, decommissioning and release from regulatory control; see page 76 of "Strategy for safe, secure and responsible management of radioactive waste in Norway".

[26] See the explanation of word clean-up in "Strategy for safe, secure and responsible management of radioactive waste in Norway".

12 Reasoning behind the requirements related to assessment of nuclear incidents and other adverse incidents

In the notification, Norsk Kjernekraft writes that emergency preparedness and accident risk will be included in the impact assessment to a certain extent, and that these aspects will be assessed in more detail in the safety cases that are required in connection with an application for a licence pursuant to the Nuclear Energy Act.

Section 21 of the Regulation on Impact Assessment requires that the assessment must identify and describe the factors that may be affected by the proposed project, and to assess significant impacts on the environment and society, including emergency preparedness and the risk of an accident. The Nuclear Energy Act, the Radiation Protection Act and DSA's general licence condition no. 14 contain requirements related to emergency preparedness, including contingency plans. Furthermore, the Pollution Control Act contains requirements related to emergency preparedness against acute pollution, including the preparation of contingency plans and the duty to have an emergency response system. There are strict requirements for emergency preparedness at an enterprise that carries out activities that entail a risk of radiation and radioactive pollution. The Energy Act also sets requirements for emergency preparedness and measures to manage and limit the effects of extraordinary situations.

Nuclear power entails a risk of accidents and other incidents that can affect the safety of the plant. Examples include loss of cooling water, reactor meltdowns and other criticality events that can lead to elevated radiation levels and releases of radioactive substances. These kinds of accidents and incidents can have major consequences for people, the environment and society. In the worst-case scenario, a nuclear incident will result in acute radiation damage and the need to evacuate the local population, making large areas uninhabitable and affecting agriculture and food production through radioactive pollution. A nuclear incident can also have consequences for other countries and the effects can last for decades. A well-known example of this is the Chernobyl disaster in 1986.

The recommendation therefore requires that possible nuclear incidents at and in connection with the facility must be described. The likelihood of such incidents occurring and the potential consequences for people, the environment and society must also be assessed. The risk, probability and impacts of nuclear incidents and other adverse incidents must be thoroughly assessed.

A nuclear incident at a nuclear installation includes accidents, deliberate adverse events, and incidents that may result in increased levels of radiation and radioactive pollution in the form of releases of radioactive substances, and incidents that may affect the operation and safety of the facility. Fires and explosions at a nuclear power plant will be a nuclear incident, as this may affect the operation and safety of the plant. Nuclear incidents include both accidents and incidents resulting from deliberate actions in peacetime, security policy crises, and armed conflicts in line with the Royal Decree on the Mandate for the Crisis Committee for Nuclear Preparedness etc. of 1 September 2013.

Other adverse incidents include accidents, deliberate adverse events, and incidents that may endanger people, the environment and society, and incidents that may affect the power supply.

Deliberate adverse events may encompass both nuclear incidents and other adverse incidents. This means incidents that occur as a result of intentional adverse actions such as theft of nuclear material, sabotage or threat of sabotage, explosion, physical deactivation of security functions, digital attacks, terrorism or war.

All transport of nuclear and radioactive material entails an increased risk, and it is therefore required that this must be assessed separately. It is also a requirement that the developer must assess which safety measures should be implemented to reduce the risk during transport.

The assessment of nuclear incidents must be based on best international practice, and it is a requirement that internationally recognized methodology in line with the IAEA's Safety Standards be used in the assessment programme. The IAEA also provides guidance on the methods and scenarios to be used in these kinds of assessments.

In our opinion, it is also important that the assessment programme include a requirement that a risk and vulnerability analysis be carried out for the proposed project to identify possible nuclear incidents and other adverse incidents, and the consequences thereof. In the risk and vulnerability analysis, all internal and external risk and vulnerability factors that may be relevant to the safety of establishing the proposed project at the specified site must be assessed, in line with international best practice.

The establishment of a nuclear power plant will affect the areas of responsibility of many other expert authorities, and we therefore find it necessary to make it a requirement that they be involved. In our opinion, it is also important to require assessment of the impacts of an incident for national security interests. In addition, the risk and vulnerability analysis must demonstrate how the planned development will and might affect the surroundings and the security of the power supply.

13 Reasoning behind the requirements related to assessment of nuclear preparedness and other emergency preparedness

The Nuclear Energy Act and the Pollution Control Act both contain a requirement that a nuclear installation in operation must have the necessary emergency preparedness plans. In general licence condition no. 14, DSA sets requirements for emergency preparedness at these kinds of facilities. We have therefore included a requirement in the assessment programme that the enterprise must describe its emergency preparedness and its capacity to detect, minimize and reduce the consequences of nuclear incidents and other adverse incidents throughout the entire lifetime of the facility.

Norway aims to minimize the likelihood of radiation and nuclear incidents that may pose risks to human health and the environment, and to ensure effective preparedness to manage and reduce the consequences of such incidents should they occur[39].

Norway has national nuclear preparedness that is cross-sectoral and based on civil–military collaboration. According to Section 16 of the Radiation Protection Act, the King organizes emergency preparedness against nuclear accidents and other incidents that might result in radiation or the dispersal of radioactivity, in order to protect life, health, the environment or other important societal interests. Responsibility for this has been delegated to the central-governmental Crisis Committee for Nuclear Preparedness. This means that, during the acute phase

of a nuclear accident or other incident that could result in ionizing radiation or the dispersal of radioactivity, the Crisis Committee may, without hindrance from any delegation of powers under other laws, order state and municipal bodies to implement evacuation, area access restrictions and measures to safeguard foodstuffs, including drinking water and the protection of animals. The Crisis Committee shall furthermore be entitled to order private and public organizations to carry out analyses and obtain information to enable a situation to be assessed. The organization, mandate and delegation of authority are defined in Section 16 of the Radiation Protection Act.

Norway's national nuclear emergency preparedness system comprises the Crisis Committee for Nuclear Preparedness, the Crisis Committee's advisors, and the County Governor as the Crisis Committee's regional representative. The County Governor is responsible for coordinating emergency preparedness at the regional level and coordinating with the municipal authorities. DSA chairs and is a member of and the secretariat for the Crisis Committee for Nuclear Preparedness. DSB is also a member of the Crisis Committee for Nuclear Preparedness. We refer here to the Royal Decree on the Mandate for the Crisis Committee for Nuclear Preparedness etc. of 1 September 2013.

The nuclear preparedness organization has been established to provide expertise to deal with nuclear incidents and to ensure rapid implementation of measures to protect lives, health, the environment and other important societal interests. Nuclear incidents include both accidents and incidents resulting from deliberate actions in peacetime, security policy crises and armed conflict. The government has assumed six dimensioning scenarios for Norwegian nuclear preparedness.

The establishment of nuclear power in Norway will affect the national nuclear preparedness. A nuclear installation will be of great importance for national, regional and local emergency preparedness, and the ability to handle a potential incident must therefore be assessed in thorough detail. DSA has submitted a proposal to the Ministry of Climate and Environment (KLD) that the provisions in Sections 43, 44, 46 and 47 of the Pollution Control Act relating to a municipal emergency response system to deal with incidents of acute pollution, the duty to provide assistance, etc. be made to apply to acute radioactive pollution. The matter is now under consideration by the Ministry.

The establishment of the proposed nuclear power plant will change the risk and vulnerabilities in the municipalities of Heim and Aure. These municipalities currently have no experience of hosting a nuclear installation. DSA can set requirements regarding the coordination between the enterprise's emergency preparedness and the municipal emergency preparedness in light of changes in the local risk situation. The Civil Protection Act requires municipal authorities to assess risks and analyse vulnerabilities.

In municipalities that do not have nuclear installations, such as Heim and Aure, there is currently insufficient knowledge and experience in the fire and rescue service related to responding to a major nuclear incident at a nuclear power plant, and capability to handle this kind of incident must be ensured (e.g. personnel, expertise, equipment, etc.). Pursuant to the Norwegian Fire and Explosion Prevention Act, the municipalities must cooperate on local and regional solutions for preventive and emergency preparedness tasks with the aim of making the best possible use of overall resources. Due to the need for specialist knowledge in the fire and rescue services, it will be necessary to collaborate on regional solutions in order to be able to fulfil the preventive and emergency response tasks required by the establishment of a nuclear power plant.

Pursuant to the Fire and Explosion Protection Act, DSB can order the owner of any building, storage facility, area, etc. that is considered to pose an extraordinary risk in the municipality to establish its own fire and accident preparedness service, or pay for and maintain a necessary upgrade of the municipal fire service. Fire and accident preparedness at the facility will be covered by requirements in a licence granted pursuant to the Nuclear Energy Act.

In the recommendation, we have therefore set a requirement that the developer must assess which incidents they can handle themselves, i.e. "in-house", and which will require input from the national nuclear emergency response system, including local and regional emergency response resources, in addition to the power supply emergency preparedness system and other emergency response systems. We have also set a requirement that the developer must assess the consequences for emergency and response providers, who must adapt their ability to handle in the event that the facility is established.

We have also included a requirement that the developer must describe how the enterprise's emergency preparedness will be coordinated with the national nuclear emergency preparedness, including local and regional emergency resources, in addition to the power supply emergency preparedness system and other emergency preparedness. It is important to ensure that this is done in close dialogue with the County Governor, the host municipalities and neighbouring municipalities, as well as the emergency services and other preparedness players.

It is expected that the proposed project will result in increased costs related to the preparedness of all the affected emergency response providers. We therefore find that this must be included in the impact assessment.

The assessment of nuclear emergency preparedness must be based on best international practice, and it is a requirement that the assessments must be based on the IAEA's Safety Standards. The IAEA provides guidelines and guidance on emergency preparedness and response (EPR) primarily through its Safety Standards. The IAEA safety standard GSR Part 7 "Preparedness and Response for a Nuclear or Radiological Emergency" stipulates the requirements for preparedness and response to nuclear incidents or radioactive releases, regardless of the cause. Useful information can also be found in the IAEA's SSG-77 "Protection Against Internal and External Hazards in the Operation of Nuclear Power Plants".

Some of the consultation responses mention emergency preparedness and accident risk, largely focusing on the fact that this is a topic that must be fully illuminated in the impact assessment. In its consultation statement the Norwegian Defence Research Establishment (FFI) points out that it is particularly important for nuclear power plants to also plan for so-called deliberate acts, i.e. adverse events caused by state or non-state actors. FFI also writes that the establishment of a nuclear power plant should include the development of plans for dealing with deliberate, adverse actions throughout the entire crisis spectrum, and refers to the International Convention for the Suppression of Acts of Nuclear Terrorism and the Convention on the Physical Protection of Nuclear Material and Nuclear Facilities. In addition, they state that the planning and establishment of local emergency response resources should also take into account the consequences of any sabotage or attack on nearby critical infrastructure, the risk of which is higher in places like a proposed industrial park. Similarly, it must be taken into account that any attacks aimed at nearby targets may have consequences for the nuclear power plant. In our opinion, FFI's input, and the input from other parties, is covered in chapter 10 of our recommendation for the assessment programme.

14 Reasoning behind the requirements related to assessment of energy production

14.1 Power production

Since the benefits of a commercial nuclear power plant will mainly be related to power production, an assessment of the proposed project's power production will be an important part of the decision-making basis in the licensing processes pursuant to the Nuclear Energy Act and the Energy Act. There is a lack of comparable figures for annual energy production that the licensing authorities can use for comparison purposes. Production estimates are relevant as part of an impact assessment, and will also be an important basis for socio-economic assessments in the processing of any applications for a licence. In our opinion, it is therefore necessary to include requirements related to power production, as stated in section 3.8 of the recommendation.

According to the notification, the nuclear power plant will have an installed capacity of between 300 and 1,500 MW and an annual power production of between 2.4 and 12 TWh per year. This is a very wide range, and the impact assessment must specify the expected energy production in more detail, based on the chosen technology (see chapters 6 and 7 above).

14.2 Use of surplus heat

In the notification, Norsk Kjernekraft writes that it will be relevant to consider the utilization of surplus heat from the plant. The alternatives referred to are food production (greenhouses), fish farming or hydrogen production. In their consultation statements, Aure Næringsforum (ANF), Salfjord AS, Statnett SF, Tjeldbergodden Utvikling, Trøndelag County Authority and the County Governor of Trøndelag all mention that the potential for utilization of surplus heat ought to be assessed.

There is an estimated 20 TWh of surplus heat in Norway today, including several large sources of surplus heat in the region where the nuclear power plant is planned. There have been many attempts in Norway to utilize surplus heat, so far without success. The biggest barrier to the utilization of surplus heat is access to external infrastructure and parties that can make use of the heat, especially if the temperature is low.

We find it is essential that Norsk Kjernekraft prove the realism of any proposed utilization of surplus heat from a future plant at Taftøy Industrial Park in the decision-making basis for applications for licences. This is why section 3.12 of the recommendation includes a requirement for Norsk Kjernekraft to describe parties that could make use of the surplus heat, and assess possible measures and alternatives for facilitation (including district or local heating networks and technical solutions to increase the temperature of the surplus heat).

In its consultation statement, Salfjord AS writes that the assessment should include potential and costs, as well as market impacts for food producers in the same area. We hold that if the proposed users of the surplus heat are food producers (greenhouses, aquaculture), the assessment must be seen in the context of the requirements for assessment of the impacts on agriculture and aquaculture.

If Norsk Kjernekraft goes ahead with the plans, in addition to conducting an impact assessment, they will also be required to submit a separate cost–benefit analysis for the utilization of surplus heat, or an application for exemption. The developer must also meet the requirements stipulated

in the Pollution Control Regulation regarding describing how the proposed project will ensure utilization of surplus heat. Plants for the production of hydrogen and ammonia may be subject to DSB's requirement for consent pursuant to the Regulation on the handling of hazardous substances. Read more about these processes in Appendix 1.

15 Reasoning behind the requirements related to assessment of costs and financing

The construction and operation of nuclear power plants for commercial power generation in Norway is new. There is a lack of comparable cost figures that the authorities can use for comparison purposes. Cost estimates are relevant as part of an impact assessment, and will also be an important basis for socio-economic assessments in the processing of any applications for a licence pursuant to the Nuclear Energy Act and the Energy Act. There are also requirements regarding compensation and insurance in Chapter 3 of the Nuclear Energy Act. We therefore hold it is necessary to include a number of requirements relating to costs associated with the construction, operation and decommissioning of the power plant, and have included these in chapter 12 of the recommendation. Requirements for the description of financing must also cover the financing of waste management, including the management of spent nuclear fuel.

A nuclear power plant is a thermal power plant with the ability to regulate power production. This means that the plant can offer other types of system services than non-dispatchable power production. We have therefore included a requirement in the recommendation that the developer must describe how the proposed project can contribute with various system services and participation in other balancing markets, including an estimation of revenues from this.

16 Reasoning behind the requirements related to assessment of natural hazards and vulnerability to climate change

Natural hazards are defined as events that are triggered in nature and entail a risk to human life and health or significant material assets.[27] Facilities for the production of electrical energy are exempt from the requirements of Chapters 20-25 and Chapters 27-31 of the Planning and Building Act[28]. Installations for the transmission and production of electrical energy are, as far as applicable, not exempt from the technical guidelines in the Norwegian Regulation on technical requirements for construction works (TEK17). For the proposed project, Chapter 7 of TEK17 will define the parameters for how protection against natural hazards is to be ensured, in addition to other relevant legislation such as the Regulation on security and emergency preparedness in the power supply, the Major Accident Regulation, the Energy Act, etc. For this reason, we find it necessary to include requirements for assessments related to natural hazards in our recommendation. This also follows from the Impact Assessment Regulation.

In addition, we require that the impact assessment must also comply with international safety standards and requirements from the IAEA. In the wake of the Fukushima accident in 2011,

[27] Cf. NVE Report 21/2023: The management regime for natural hazards in Norway – central government responsibilities.

[28] Section 4-3 of the Building Application Regulation – Lovdata

international recommendations relating to vulnerability to natural hazards and how climate change can affect safety were tightened. The international standards complement the requirements laid down in the Norwegian regulatory framework, as they require impact assessment of a number of factors of particular relevance to a nuclear power plant. This includes, among other things, wind phenomena, drought, loose materials entering the cooling water, etc. The assessment programme refers to relevant documents from the IAEA.

In the recommendation, the requirement for protection against natural hazards is set at the level stipulated in Sections 7-2 and 7-3, first paragraph, of the Norwegian Regulations on technical requirements for construction works (TEK17). We consider that a natural disaster affecting this proposed project could result in elevated radiation levels and serious pollution, and the consequences of an incident could have particularly major and unacceptable consequences for society. The requirement regarding protection against natural hazards applies to the nuclear power plant, and the same requirement applies to associated buildings/infrastructure that are critical to the safety and functioning of the power plant.

The consequences of climate change must also be assessed (cf. the central government planning guidelines for climate and energy[29] and the Regulation on Impact Assessment. This is explained in more detail in the guides referred to below and in the county climate profiles that have been prepared. The climate profiles will be an important part of the knowledge base. Consideration must be given to whether there is a need to supplement national and regional information with more detailed knowledge of local conditions, including previous adverse natural events.

The requirements imposed on the developer relate to how protection against natural hazards is to be mapped and documented:

- *Flooding and erosion*
  A river/stream runs alongside the proposed planning area that has a defined caution area for flooding and erosion, where the maximum water level rise has been estimated to approximately 2.8 metres (cf. NVE atlas[30]). The real risk of flooding and erosion must be mapped.

  To meet the requirement in Section 7-2, first paragraph, of the Norwegian Regulations on technical requirements for construction works (TEK17), the proposed project must be sited outside the area that will be flooded in the event of a probable maximum flood (PMF). The method for mapping the risk of flooding and erosion must be done in accordance with NVE Guide 3/2022.[31]

- *Slide events in steep terrain*
  The proposed planning area is not within NVE's caution areas for slide events (landslides and avalanches) in steep terrain. A small possible rockfall detachment area (slopes lower than 50 meters that are not captured by the caution map) has been identified through the use of slope maps. No steep streams (over 10°) or debris fans have been identified. The real risk of slide events in steep terrain must be mapped.

[29] Central government planning guidelines for climate and energy – 1. Purpose – Lovdata.

[30] https://atlas.nve.no/Html5Viewer/index.html?viewer=nveatlas.

[31] NVE Guide 3/2022: Protection against flooding. Assessment of flood risk in zoning plans and building applications.

Satisfactory protection against slide events and secondary effects of slide events is specified as a greatest nominal annual probability of landslides and avalanches in Section 7-3 of the Norwegian Regulations on technical requirements for construction works (TEK17). For first-stage measures, there must be no residual risk, and the proposed project must be located in an area completely free of danger. The method for mapping slide events in steep terrain must be carried out in accordance with NVE's guidelines for assessing safety against slide events in steep terrain.[32]

- *Rockslides*
  NGU has carried out a national mapping of unstable rocks in Norway, which shows that it is unlikely that rockslides or secondary effects following a rockslide (e.g. a displacement wave) will affect the proposed planning area. However, it cannot be completely ruled out based on the available data. The proposed planning area is located along a larger, regional geological fault zone (Møre-Trøndelag fault complex), which could give rise to unstable rock sections in the area. Given the nature of the proposed project, a more detailed assessment of possible unstable rocks in the vicinity must be made using inSAR, terrain models and aerial photography, with a particular focus on whether there are rocks that could cause displacement waves that could affect the area in question.

- *Quick clay landslide*
  The planned nuclear power plant is located in an area with the possibility of marine clay, and an expert study must therefore be carried out to document sufficient safety against quick clay landslides. The assessment must always be quality assured by an independent third party. The assessment must adhere to the procedure in NVE 1/2019, and the expert assessor must have education and experience according to the requirements in NVE 1/2019, paragraph 3.1.

  The assessment must document that the nuclear power plant will be sited such that it cannot be affected by quick clay landslides. The same requirements apply to associated buildings/infrastructure that are critical to the safety and functioning of the power plant.

  Adequate safety is documented if the assessment unambiguously shows that there is no brittle failure material in potential release or runout areas that might affect the proposed project, or that identified brittle failure material cannot form part of a landslide.

  If the assessment identifies real danger zones that could affect the proposed project, sufficient safety can still be achieved by physical safety measures to prevent the proposed project from being affected by slide events.

- *Safety measures to protect against natural hazards*

  If a protection system has to be built, it is a requirement that the system that does not require maintenance and inspection in order for its risk-reducing effect to be maintained. The protection system must therefore have the capacity to handle repeated slide events or flood events without its capacity being compromised.

  Even if the proposed project is to be sited in an area with no known danger, it must still be ensured that the erection of buildings, infrastructure and interventions in the terrain will not cause flooding and erosion conditions, the risk of slide events (landslides and

[32] Assessing safety against slide events in steep terrain.

avalanches) and the risk of flooding to be exacerbated for others (cf. Section 7-1 second paragraph, of the Norwegian Regulations on technical requirements for construction works (TEK17)).

- *Stormwater*
  Transformation of the proposed planning area from a natural area with a large proportion of marshland to a commercial area will change the runoff pattern and groundwater level. This could result in increased and more acute flooding in the watercourse that runs alongside the proposed planning area, or surface water flooding in the proposed planning area.

  It must be assessed whether the proposed project can be built with satisfactory safety against damage from stormwater without increasing the risk to third parties. The starting point must be the terrain's natural ability to infiltrate, digest and remove large volumes of precipitation. Safe drainage of stormwater (flood paths) must be planned with sufficient capacity, all the way to the recipient (a river, lake or the sea).

17 Reasoning behind the requirements related to assessment of other pollution and emissions

17.1 Other pollution of water and soil during operation

The requirements for assessing pollution of water and soil that are not radioactive releases (in section 14.1 of the recommendation) follow from the Impact Assessment Regulation, and are based on NVE's standard requirements and the Norwegian Environment Agency and the Directorate for Cultural Heritage's Impact Assessment Handbook (M-1941).

The recommendation also contains a requirement for an assessment of the current pollution situation in the area for the proposed project. In order for this investigation to be in line with Section 17 of the Impact Assessment Regulation, it must be carried out by persons who have knowledge of and experience in impact assessment and sampling of contaminated soil.

Any pollution of water and soil that may have negative consequences for the aquatic environment and biodiversity in coastal and fresh waters must be used as the basis for the assessments related to the requirements in chapter 12 (Aquatic environment and biodiversity in coastal and fresh waters), so that an overall conclusion can be given about possible consequences for biodiversity.

17.2 Noise

It follows directly from the Impact Assessment Regulation that impacts related to noise must be assessed. We have therefore included a requirement regarding this in section 14.2 of our recommendation. The requirements for assessing noise are based on NVE's standard requirements for assessing other types of energy plants and the Norwegian Environment Agency and the Directorate for Cultural Heritage's Impact Assessment Handbook (M-1941).

18 Reasoning behind the requirements related to assessment of visual effects, landscape, outdoor life and cultural heritage

It follows directly from the Impact Assessment Regulation that impacts related to landscapes, outdoor recreation, cultural heritage and cultural environments must be assessed. We have therefore included a requirement regarding this in chapter 15 of our recommendation. The requirements are based on NVE's standard requirements and the Norwegian Environment Agency and the Directorate for Cultural Heritage's Impact Assessment Handbook (M-1941). In the assessment of impacts related to these topics, the visual effects of the proposed project are very relevant, and visualizations showing the proposed project are also, in our opinion, important for neighbours and the host municipalities, as well as others who are going to comment on any applications for a licence. The requirements for visualization points have been set based on input from the municipalities of Heim and Aure.

19 Reasoning behind the requirements related to assessment of overarching environmental targets and climate issues

It follows directly from the Impact Assessment Regulation that impacts related to nationally and internationally established environmental targets must be assessed. The same applies to emissions of greenhouse gases. We have therefore included a requirement regarding this in chapter 16 of our recommendation. The requirements for assessing climate impacts are based on NVE's standard requirements for assessing energy plants and the Norwegian Environment Agency and the Directorate for Cultural Heritage's Impact Assessment Handbook (M-1941), and must include both positive and negative climate impacts. In addition, we have specified that expected emissions from fuel production must be calculated.

20 Reasoning behind the requirements related to assessment of biodiversity and the aquatic environment

It follows directly from the Impact Assessment Regulation that impacts related to biodiversity must be assessed. We have therefore included a requirement regarding this in our recommendation. The requirements for assessing the effects of biodiversity on land are gathered in chapter 17 of our recommendation. These are based on NVE's standard requirements and the Norwegian Environment Agency and the Directorate for Cultural Heritage's Impact Assessment Handbook (M-1941), but supplemented with requirements relating to the effects of adverse incidents. We believe this is necessary, because knowledge of how biodiversity can be affected by any radioactive releases and other consequences of adverse incidents will be a relevant part of the decision-making basis for applications for licences pursuant to the Nuclear Energy Act and the Energy Act. The requirements for assessing the aquatic environment and biodiversity in coastal and fresh waters have been supplemented with new input from the Norwegian Environment Agency. This

applies, among other things, to marine habitats, where the Norwegian Environment Agency has announced that a new instruction for mapping will be introduced in 2026. In our opinion, this instruction should be used in the assessment work. Discharges of cooling water may have significant effects on marine life, and marine mapping will therefore be a key part of the biodiversity assessment.

Since 1986, DSA has carried out measurements of radioactivity in Norwegian nature. This includes samples of soil, fungi and lichens, milk from grazing animals, and wildlife to keep track of how radioactive substances from nuclear weapons testing in the 1950s and 60s and radioactive contamination from the Chernobyl fallout have been absorbed into the food chain and remain in the environment in Norway. Based on this, we have specified in the recommendation some species that are of particular interest in terms of the impact of radioactive substances, and which must be well mapped.

DSA currently monitors shellfish and fish in marine areas in the fjord, the sea and coastal areas. Marine mammals may also be exposed to certain radioactive substances due to their long lifespan. This is to keep track of how radioactive substances are absorbed in the marine ecosystem and may be transferred to humans through the food chain. Marine mammals may also be exposed to certain radioactive substances due to their long lifespan. Good knowledge of the current level of radioactivity in the marine environment is relevant to the impact assessment, including as part of the zero alternative. It will also be important in terms of monitoring doses from releases from the nuclear power plant if a licence is granted, and for emergency preparedness purposes should an incident occur at the plant. We therefore find that this must be assessed specifically.

21 Reasoning behind the requirements related to assessment of public health issues

It follows directly from the Impact Assessment Regulation that impacts related to consequences for human health must be assessed. We have therefore included a requirement regarding this in chapter 18 of our recommendation. There are more requirements than those stated in NVE's standard requirements for energy plants. This is mainly due to the fact that nuclear installations entail a risk of exposure to radiation, and a different type of real and perceived risk of accident than other types of energy plant. We believe this must be investigated and included in the decision-making basis. The requirements for the study of public health in the recommendation are based, among other things, on the input from the County Governor of Trøndelag and Trøndelag County Authority to the proposed assessment programme.

22 Reasoning behind the requirements related to assessment of other public interests

22.1 Defence interests

In its consultation response, the Ministry of Defence has requested that the impacts of a possible serious accident for the use and operation of Ørland Air Base, which is located approximately 50 km as the crow flies from the proposed site, must be investigated, and in this connection the "geological location of the facility" must be taken into account. In section 3.3, we have stipulated that the assessment must include analysis of the consequences of locating a nuclear installation close to critical national public functions, or other important infrastructure such as airports, ports,

hospitals, etc. In addition, we believe it is necessary to treat the interests of the Armed Forces as a separate topic of assessment, and have therefore included this in section 19.1 of our recommendation. The requirements are based on NVE's standard requirements for assessing other types of energy plants.

A nuclear power plant will pose a different type of risk than other energy facilities, and will be designated as a critical national object in line with Section 7-1 of the Security Act.

Before a nuclear power plant can be established in Norway, we find that there must also be a thorough assessment of the consequences of nuclear power for Norway's defence capability, and for Norway as a host for receiving allied troops (Host Nation Support). This must be done by national authorities and is therefore not a requirement imposed on the developer.

22.2 Other infrastructure

Section 19.2 of the recommendation includes requirements related to a variety of topics. Based on NVE's standard requirements for the assessment of other types of energy plants, we believe it must be required that the impacts on aviation and electronic communication are assessed. Based on input from the Norwegian Coastal Administration, we have also included a requirement for assessments of how the proposed project may affect traffic in the waters of Trondheimsleia. We also hold that it is necessary to include a requirement that the impacts that the proposed project might have on road traffic in the area, including effects on pedestrian and cycle paths and school routes for children must be assessed (cf. the Impact Assessment Regulation). Trøndelag County Authority has also highlighted the need to assess safety measures for infrastructure related to the risk of accidents, which has been included in our recommendation.

22.3 Agriculture

It follows directly from the Impact Assessment Regulation that impacts related to soil resources must be assessed. We have therefore included a requirement regarding this in section 19.3 of our recommendation. The requirements in recommendation regarding assessment of the impact on agriculture are more comprehensive than NVE's standard requirements for assessing other types of energy plants. The requirements are partly based on input from the Norwegian Food Safety Authority and the County Governor of Trøndelag. We hold that it is necessary to assess how any adverse events may affect agriculture locally, regionally and nationally, and that the developer must describe the need for monitoring and contingency plans related to this.

Agriculture may be affected by political and market factors in addition to possible direct effects of the nuclear installation. In our opinion, it is therefore also necessary to require an assessment of whether the agricultural industries can be affected indirectly through, for example, import restrictions, reduced demand or special documentation requirements.

22.4 Mineral resources

It follows directly from the Impact Assessment Regulation that impacts related to important mineral resources must be assessed. We have therefore included a requirement regarding this in section 15.2 of our recommendation. The requirements for assessing mineral resources are based on NVE's standard requirements for assessing other types of energy plants.

22.5 Aquaculture and fisheries

The requirements for assessing the impacts for aquaculture and fisheries in section 15.3 of the recommendation are based on input from the Directorate of Fisheries and the Norwegian Food Safety Authority. They are based on the planned discharge of cooling water, which could lead to significant changes in the temperature of the seawater in the Trondheimsleia strait. In addition, the industries may be affected by any accidents and, in the same way as the agricultural industries, be affected indirectly through political and market factors. The Directorate of Fisheries recommends that the industry be actively involved in the further planning and assessment work, and we therefore find it is necessary to include a requirement regarding involvement of both local and regional business interests and other business organizations.

22.6 Local and regional businesses and the host municipalities' economy

In all of NVE's assessment programmes for energy measures, there is a requirement to describe the effects on local and regional businesses, focusing on jobs and the need for local and regional goods and services. A nuclear power plant differs from most other types of energy project in that the proposed project will be very extensive and will require more specialized goods and services. We therefore hold it is necessary to require a specific assessment of whether and how local and regional businesses can deliver sufficient goods and services.

The tourism industry may be affected both directly and indirectly by the proposed project, including effects on the attractiveness of the area for tourists. Activities related to the nuclear power plant can also have a positive impact on local tourism companies that supply goods and services. We therefore hold it is necessary to include a requirement regarding an assessment of the impact on the tourism industry.

A nuclear power plant is also an extensive intervention that will place demands on municipal services. We therefore believe that it must be assessed whether the service offering is sufficient and what requirements may be placed on the municipalities if the nuclear power plant is established. .

It must also be considered how the proposed project will affect the municipal economy through, for example, property tax.

Aure næringsforum (ANF) requests that risk analyses and major accident potential with a focus on existing regional businesses be analysed as part of the assessment. This has been taken into account in the recommendation, through the requirement to assess the impact on local and regional businesses, including other enterprises at Taftøy Industrial Park.

Appendix 1 – General presentation of relevant regulations

In this Appendix, we describe the most relevant regulations for nuclear installations. This overview is not exhaustive. In addition to the legislation and conventions etc. mentioned below, developers of nuclear installations will also have to comply with other legislation, such as the Nature Diversity Act and the Cultural Heritage Act.

1 The Nuclear Energy Act and appurtenant regulations

1.1 General

Act no. 28 of 12 May 1972 on nuclear energy activities (the Nuclear Energy Act) The Act establishes a licensing and permit regime, the purpose of which is to minimize risk and prevent loss of human life and to prevent damage to health, the environment and material assets through the regulation of nuclear installations, nuclear substances and related activities.

The Nuclear Energy Act is a framework law that authorizes the King to issue further regulations. Four Regulations have been adopted pursuant to the Act:

- Regulation no. 1809 of 2 November 1984 on the physical protection of nuclear material and nuclear facilities (Regulation relating to nuclear materials and facilities)
- Regulation no. 433 of 12 May 2000 on the possession, sale and transport of nuclear material and dual-use equipment (Regulation relating to nuclear materials etc.)
- Regulation no. 1912 of 5 November 1985 on exemptions for small quantities of nuclear substance and certain types of nuclear substance from the provisions of the Nuclear Energy Activities Act (Regulation on exemptions from the Nuclear Energy Act).
- Regulation no. 1498 of 14 December 2001 on compensation for nuclear accidents (Regulation on compensation for nuclear accidents).

These Regulations supplement the Nuclear Energy Act with more detailed requirements regarding physical protection and safeguards, among other things.

1.2 Licence for nuclear installation

Section 4 of the Nuclear Energy Act states that a licence from the King is required to construct, own or operate a nuclear installation. Section 4, second paragraph, of the Nuclear Energy Act further stipulates that the matter must be submitted for consideration by the Storting. The provision states that: “A licence for the construction of a nuclear power plant should not be granted before the Storting has given its approval. The matter should be submitted to the Storting when

proposals for the construction site of the nuclear power plant are presented and the question of the operator/ownership is clarified."

According to Section 10 of the Nuclear Energy Act, DSA is the supreme competent body ("highest specialist agency") with regard to safety issues, and must prepare and submit recommendations on all applications concerning licences and permits to the Ministry of Health and Care Services, which then presents the case to the King in Council. Licences are granted subject to such conditions as are considered necessary with regard to safety requirements and other public interests in accordance with Section 8 of the Nuclear Energy Act, and DSA also provides a recommendation on the specific conditions to be included in the licence.

For new nuclear installations, the Nuclear Energy Act defines a step-by-step process, where a licence is first applied for to construct (build) the installation, and once it has been built, a licence to operate the facility is applied for. A preliminary safety case is sufficient for an application to construct a facility, but in good time before the nuclear installation is put into operation, the owner must submit a complete safety analysis report on the installation pursuant to Section 11 (3) of the Nuclear Energy Act. Before a facility is put into operation, the owner must, in addition to a licence, have obtained authorization for operation from DSA in accordance with Section 11 (2) of the Nuclear Energy Act .

An application for a licence pursuant to Section 7 (1) of the Nuclear Energy Act must contain information about the details of the construction site, the purpose, nature and size of the facility, and an account and evaluation of the facility's safety features (safety case). Before the licence is definitively granted, preliminary approval may be given of the construction site and other aspects of the application for the licence (cf. Section 7 (1) of the Nuclear Energy Act).

It follows from Section 8 of the Nuclear Energy Act that the licence or permit shall be subject to such conditions as are considered necessary with regard to safety requirements and the public interest. DSA has prepared general licence conditions. These conditions are published in StrålevernHefte 2018:33 and provide guidelines for what an application for a licence must contain and for DSA's assessments of an application. In addition, DSA has prepared a guide to the general licence conditions in DSA booklet no. 5, which was published in 2022.

1.3 Authorization to operate

Section 11 (2) of the Nuclear Energy Act requires that the owner must have obtained authorization from DSA before a nuclear installation is put into operation (operational authorization). Before granting such authorization, DSA must be satisfied that:

- The technical standards of the installation, the operating regulations, safety measures and emergency preparedness plans are sound.
- The management and personnel of the installation have the necessary qualifications and clearly defined areas of responsibility.
- A guarantee has been provided pursuant to Section 35 of the Nuclear Energy Activities Act (cf. Section 37).
- All the necessary authorizations have been obtained from the competent authorities in accordance with other applicable legislation.

1.4 Safety case

A safety case for a nuclear installation must describe in detail how the safety of the facility will be safeguarded throughout all phases of the life cycle of the facility[33]. The report is a comprehensive document that describes all relevant safety aspects and measures to ensure that the facility can be operated safely and securely. The report must document that the nuclear installation meets all the safety requirements. A preliminary safety case is sufficient for an application for construction, but the owner must submit a complete safety case for the facility in good time before the nuclear installation is put into operation. The requirements for the safety case will also change when the facility is to be closed down and decommissioned.

The safety case will contain, among other things, technical descriptions of the facility, safety analyses, descriptions of vulnerabilities and risk factors, measures to be taken to minimize risk, operating regulations, contingency plans to handle any incidents at the facility, and presentation of the necessary expertise and personnel. The safety case will also provide an assessment of defence-in-depth, including how to handle deviations from normal operations, detect and correct any safety-related deviations from normal operations and describe active and passive safety barriers including physical measures. The report will also assess different degrees of protection and physical barriers to isolate radioactive material. Other measures to support defence in depth must also be identified in a safety case, including accounts for safety margins in the design and operation of the facility and describing how cascade effects[34] can be avoided.

The IAEA has guidance on the content of a safety case, which can be found in the IAEA's "Format and Content of the Safety Analysis Report for Nuclear Power Plants" (SSG-61). The requirements regarding the content of a safety case will depend on the various stages of development of a nuclear installation, from construction, to operation and later decommissioning and dismantling of the facility.

Appendix 2 "*Summary of assessments needed through the lifetime of nuclear power plants"* summarizes the assessments that will be required at the various different stages in the life cycle of the installation.

2 The Energy Act

2.1 Licence

In order to build, operate and own a nuclear power plant, a licence is required pursuant to the Energy Act. In addition to the nuclear power plant itself requiring a licence, the power plant's connection to the grid also requires a licence pursuant to the Energy Act. The Ministry of Energy is the competent authority for licensing processes for nuclear power plants pursuant to the Energy

[33] The stages or phases in the life cycle of a nuclear installation include: concept selection, site selection, construction, commissioning, operation, decommissioning and release from regulatory control; see page 76 of "Strategy for safe, secure and responsible management of radioactive waste in Norway".

[34] At a nuclear installation, a "cascade effect" is an incident where a small disturbance or change in one safety system leads to a series of subsequent, more serious incidents or impacts.. It can start out quite minor, but grow to have major, significant consequences for the safety of the facility.

Act. NVE is the competent authority for licensing processes for power lines and other grid infrastructure.

In the licensing process pursuant to the Energy Act, the energy authorities assess whether the specific plant is socio-economically rational. A nuclear power plant and the associated grid connection can only be granted a licence pursuant to the Energy Act if the benefits to society are considered to outweigh the disadvantages.

Licensing processes for nuclear power plants pursuant to the Energy Act start with a notification with a proposal for an assessment programme, before the competent authority establishes an assessment programme that must be completed before the developer can apply for a licence. The impact assessment must be attached to the application for a licence pursuant to the Energy Act.

A nuclear power plant will be on such a scale that it will be necessary to take measures in the regional grid, and possibly also in the transmission grid. The regional grid owner or Statnett must therefore apply for a licence for grid infrastructure to connect the power plant to the grid. As part of the preparatory work for a licence application, the grid company must carry out a concept evaluation and selection study in accordance with the Regulation on assessments of energy needs. If the developer of the nuclear power plant is also going to build and operate its own high-voltage grid infrastructure, they must apply for a licence for these systems.

Power lines with a voltage of more than 132 kV and a length of 50 kilometres must have a separate notification with a proposal for an assessment programme. For shorter lines/lines with lower voltage levels, the licensing process starts with an application with an impact assessment.

The energy authorities can set a number of requirements for the licence applications, in addition to the requirements for impact assessments set out in the assessment programme. While there are guidelines for applications for a licence pursuant to the Energy Act for most other types of energy plant, there are currently no such guidelines for applications for a nuclear power plant.

If a licence is granted, the developer may be required to prepare a detailed plan that must be approved by the licensing authority before the nuclear power plant can be built. It is standard practice in energy cases that NVE's environmental supervision follows up the detailed plan during the construction and operating period.

When the Ministry of Energy (ED) or NVE grants a licence pursuant to the Energy Act to build, own or operate an electrical installation, it is the regulations administered by DSB that set the technical requirements to ensure that the installation is able to withstand expected stresses and function as intended.

2.2 Regulation on security and emergency preparedness in the power supply

The Regulation on security and emergency preparedness in the power supply stipulates requirements for facilities that are of significant importance to the power supply, and for the companies that own and operate them. The requirements are set to ensure that the power supply is maintained and that normal supply is restored in an efficient and safe manner during and after extraordinary situations to reduce the impacts for society.

The Regulation includes requirements regarding:

- An internal emergency response organization and coordination with the Power Supply Emergency Preparedness Organization to ensure effective handling of extraordinary situations.
- Risk assessment and management to identify which extraordinary incidents the facility and enterprise may be exposed to, and implement preventive measures.
- Contingency planning and exercises to be prepared to handle extraordinary incidents efficiently.
- Repair preparedness in the form of secure access to the necessary spare parts and materials, equipment and means of transport to effectively restore facilities and systems in the event of failure of critical components.
- Access to expertise and personnel to ensure sound operation, efficient repair and handling of extraordinary situations.
- Information security to protect information that could be used to harm the facility or otherwise affect the security of supply.
- Connectivity that provides robust and redundant communication channels to ensure efficient handling of extraordinary situations.
- Securing of digital information systems that may be of significant importance to operations and constitute a vulnerability as a gateway to operational control systems.
- Securing of operational control systems to protect against physical and electronic adverse events that may prevent monitoring, control and restoration of the energy supply. This includes physical and logical protection, staffing, redundancy, personal risk assessment, as well as requirements for the control and restriction of people accessing the systems.
- Design and equipment of the facility to protect against and limit the consequences of deliberate adverse events and unintentional adverse incidents. This includes physical protection against attacks, fire safety, detection, alerting and verification of adverse incidents, backup power systems and redundancy in the facility.

As an emergency preparedness authority pursuant to the Energy Act, NVE has the power to require different or additional security measures through an individual decision.

The Regulation classifies facilities and operational control systems into three categories, based on their importance to the power supply. The highest class is class 3, and these facilities are subject to the most stringent safety and redundancy requirements in the Regulation.

The Regulation's requirements are currently not adapted to nuclear power plants. With the current requirements, the nuclear power plant planned at Taftøy Industrial Park will automatically be classified in class 2, pursuant to section 5-2, eighth paragraph, letter a of the Regulation, but NVE will, based on the size and characteristics of the facility, consider classifying the plant in class 3, pursuant to section 5-7.

2.3 Cost–benefit analysis for surplus heat

Section 7-2 of the Energy Act requires a developer to carry out a cost–benefit analysis of the possibilities for utilizing surplus heat when planning thermal power plants with a total installed thermal capacity of more than 20 MW. A nuclear power plant will fall under this provision and will be obliged to obtain an approved cost–benefit analysis before construction begins (cf. Section 7-4, first paragraph, first sentence). In an individual decision, the Ministry may stipulate that a plant may not be built or upgraded without utilization of the surplus heat, if the cost–benefit analysis shows that the benefits of this are greater than the costs. Implementation, approval and follow-up

of the cost–benefit analysis are specified in the Regulation on cost–benefit analysis of opportunities to utilize surplus heat.

3 The Planning and Building Act and appurtenant regulations

3.1 Impact assessment

Nuclear power plants and other nuclear reactors, as well as facilities intended for the disposal of irradiated nuclear fuel, facilities intended exclusively for the disposal of radioactive waste, and facilities intended exclusively for the storage (planned to last more than 10 years) of irradiated nuclear fuel or radioactive waste at a location other than the production site must be impact assessed in accordance with Section 6, first paragraph (c) of the Impact Assessment Regulation (cf. Appendix I). The same applies to the decommissioning and closing down of nuclear power plants and other nuclear reactors.

The purpose of this Regulation is to ensure that consideration is given to the environment and that society is taken into account when the competent authority is to decide whether plans or measures can be implemented, and if so under what conditions.

The requirements for the content of an impact assessment are set out in Chapter 5 of the Impact Assessment Regulation. Key provisions are that the content and scope of the impact assessment must be adapted to the specific proposed project and be relevant to the decisions to be made. Impact assessments for nuclear power plants must be prepared in accordance with the assessment programme established by the competent authority.

For nuclear power plants in particular, the impact assessment will form a key part of the decision-making basis for applications for a licence pursuant to the Nuclear Energy Act and the Energy Act.

3.2 Plan processing

The municipality is the local planning authority under the Planning and Building Act, and is responsible for preparing a municipal plan with a community section and an area section, and for processing and adopting zoning plans. Facilities that are processed pursuant to the Energy Act are exempt from certain requirements in the Planning and Building Act. Section 12-1, third paragraph, of the Planning and Building Act stipulates that no zoning plan is required for facilities for the production of energy that require a licence pursuant to the Energy Act.

However, a nuclear power plant cannot be built in conflict with municipal plans. If the construction of a nuclear power plant is not in line with approved land use pursuant to the Planning and Building Act, planning permission must be applied for the proposed project. Plan clarification can, for example, take place through zoning or dispensation from the current plan status. Since power generation facilities that are regulated pursuant to the Energy Act are exempt from the obligation to have or prepare a zoning plan, the municipalities cannot require the developer to pay for a zoning plan.

4 The Radiation Protection Act and appurtenant Regulation

4.1 General

Nuclear facilities will be subject to Act no. 36 of 12 May 2000 on Radiation Protection and Use of Radiation (the Radiation Protection Act), which regulates the use of ionizing and non-ionizing radiation, radiation protection, medical use of radiation and emergency preparedness planning. The purpose of the Radiation Protection Act is to prevent the harmful effects of radiation on human health and contribute to the protection of the environment. Section 2 of the Radiation Protection Act states that it applies to any production, import, export, transport, transfer, possession, installation, use, handling and waste management of radiation sources, and to human activities that result in increased levels of naturally ionizing radiation from the environment.

Regulation no. 1659 of 16 December 2016 on radiation protection and the use of radiation (the Radiation Protection Regulation) supplements the Act with more detailed requirements for the procurement, handling and use of both open and sealed radioactive sources. The regulations governing radiation protection include rules on occupational exposure to ionizing radiation, which will be relevant to employees at nuclear installations.

4.2 Authorization and possible exemption from the Radiation Protection Act

According to DSA's management practice, unused fuel in the form of encapsulated fuel rods is regarded as encapsulated radioactive sources. Spent nuclear fuel, fuel that is not encapsulated and activated materials may be considered open radioactive sources. Spent nuclear fuel will in all cases count as radioactive waste.

According to Section 9 of the Radiation Protection Regulation, authorization from DSA is required for various activities that involve ionizing radiation, and this will be applicable to nuclear installations.

The nuclear installations that are established today are exempt from fulfilling some of the provisions of the Radiation Protection Regulation, because the nature of the nuclear installations means that the requirements cannot be met. Newly established nuclear power plants will also need to apply for exemption from some of the requirements. DSA is the supervisory authority pursuant to the Radiation Protection Act and the Radiation Protection Regulation, (cf. Section 18 of the Radiation Protection Act). This means that DSA can make necessary decisions in individual cases, including demanding rectification, shutdown and coercive fines. DSA has also published guides that describe and clarify the provisions of the Radiation Protection Act and the Radiation Protection Regulation.

5 The Pollution Control Act and appurtenant regulations

5.1 General

The purpose of Act no. 6 of March 13, 1981 concerning protection against pollution and concerning waste (the Pollution Control Act) is to protect the outdoor environment against pollution and to reduce existing pollution, to reduce the quantity of waste and to promote better waste management. Pollution is defined in Section 6 of the Pollution Control Act as

- the introduction of solids, liquids or gases to air, water or ground
- noise and vibrations
- light and other radiation to the extent determined by the pollution control authority
- effects of temperature

The Pollution Control Act has been made applicable to radioactive pollution and radioactive waste through Regulation no. 1394 of 1 November 2010 on the application of the Pollution Control Act to radioactive pollution and radioactive waste (Regulation on radioactive pollution and waste). This means that the Pollution Control Act applies to all radioactive pollution and all radioactive waste from nuclear installations.

In addition, Chapter 16 of Regulation no. 930 of 1 June 2004 on the recycling and treatment of waste (the Waste Regulation) regulates the management of radioactive waste. The chapter lays down rules to ensure that radioactive waste is handled responsibly and contains separate rules for the export and import of radioactive waste. Regulation no. 931 of 1 June 2004 on pollution control (the Pollution Control Regulation) establishes rules for applications for pollution permits and other administrative provisions for radioactive pollution and waste.

Section 36A-10 of the Pollution Control Regulation requires the party responsible for operation to ensure that surplus energy is utilized internally as far as possible. Furthermore, the Regulation requires that the party responsible for operation, through measures in its own area, must facilitate the external utilization of surplus energy, unless it can be demonstrated that this is not technically possible or would entail disproportionately high costs.

5.2 Licensing process for radioactive pollution and waste

Any activity that may lead to radioactive pollution must apply for a permit pursuant to Section 11 of the Pollution Control Act. The operation of a nuclear power plant may lead to radioactive pollution in the form of emissions to air and water, and therefore requires a permit pursuant to the Pollution Control Act. A permit must be obtained before the polluting activities can be commenced.

Sections 16-5 and 16-6 of the Waste Regulation require that anyone handling radioactive waste must have a permit. In a permit to handle radioactive waste, DSA will set conditions to ensure safe handling of the waste. The Regulation on radioactive pollution and waste defines limit values for radioactive waste in Norway.

Nuclear power plants in operation will generate radioactive waste that requires special handling and disposal, and a permit must be applied for in accordance with the Waste Regulation.

5.3 Permit process for other pollution

Activities with pollution that is not lawfully permitted pursuant to Sections 8 or 9 of the Pollution Control Act must have a permit from the pollution control authority. For pollution that is not radioactive, the relevant pollution control authority may be the Norwegian Environment Agency, the County Governor or the local municipal authority.

6 The Security Act

The purpose of the Security Act (Act relating to national security) is to protect Norway's sovereignty, territorial integrity and democratic system of government, and other national security interests. It applies to both public and private enterprises that have an impact on national security, including those that manage critical infrastructure. It regulates preventive security measures to protect national security interests.

In Section 1 of the Regulation on the physical protection of nuclear material and nuclear facilities, it is stated that nuclear material and nuclear facilities covered by the Regulation are to be regarded as objects of critical national importance. The Regulation refers to the fact that the (former) Security Act and Regulations issued pursuant thereto apply to legal entities covered by the Regulation. Any nuclear power plant will fall within the scope of the Regulation. According to Section 7-1, second paragraph, of the (current) Security Act, the ministries are responsible for designating, classifying and maintaining an overview of critical national objects and infrastructure.

7 The Civil Protection Act

7.1 General

The purpose of the Civil Protection Act is to protect life, health, the environment, material assets and critical infrastructure through the use of non-military means in the most serious incidents we might face, such as when the realm is at war, war is imminent, or when the independence or security of the realm is in danger. However, the Act also applies to adverse incidents in peacetime. These are incidents that deviate from the norm and have led to or may lead to loss of life or damage to health, the environment, material assets and critical infrastructure.

Critical infrastructure is defined in the Act as facilities, systems or parts thereof that are necessary to maintain central societal functions, human health, safety, security and economic or social welfare and where disruption or destruction of these could have significant consequences.

The Act contains both general provisions on the Norwegian Civil Defence and their tasks, the duties of municipal authorities, municipal duties in respect of emergency preparedness, and civil protection measures.

7.2 Municipal duties in respect of emergency preparedness

The Civil Protection Act sets requirements for the municipal authority as an emergency response authority. Section 14 requires, among other things, that municipal authorities must map the adverse incidents that may occur in the municipality. The municipal authority must assess the likelihood of these events occurring and how the events may affect the municipality. The results of this work must be assessed and compiled in a comprehensive risk and vulnerability analysis. This comprehensive risk and vulnerability analysis must be updated in the event of changes in the risk

and vulnerability situation, and it must form the basis for the municipal authority's work on civil protection and emergency preparedness in all sectors. The establishment of a nuclear power plant could change the risks and vulnerabilities in the municipality.

The requirements for the content of the comprehensive risk and vulnerability analysis that is to be carried out pursuant to the Civil Protection Act are specified in more detail in the Regulation on municipal duties in respect of emergency preparedness[35] and appurtenant guidelines[36]. This states that the municipal authority must, among other things, ensure that private-sector players are invited to contribute to the work on the analysis. If a need for further detailed analyses is identified, the municipal authority must either carry out additional analyses or get other relevant parties to perform them.

According to Section 15 of the Civil Protection Act, the municipal authority must prepare an emergency preparedness plan based on the comprehensive risk and vulnerability analysis. The emergency preparedness plan must contain an overview of the measures the municipal authority has prepared to deal with adverse incidents. If the municipal risk and vulnerability analysis determines that an activity poses a particular risk to the surroundings, it can be ordered to establish and pay for its own arrangements for alerting the general public pursuant to Section 16 of the Civil Protection Act. No specific criteria have been drawn up for when it may be relevant to use this provision, but it is stated in the Civil Defence Regulation[37] that DSB can order an enterprise to establish an alerting system of this nature.

7.3 Self-protection

Pursuant to Section 23 of the Civil Protection Act, enterprises can be required to prepare and implement necessary self-protection measures against adverse incidents. This provision is further elaborated on through the Industrial Protection Regulation[38]. The Ministry of Justice and Public Security has appointed[39] the Confederation of Norwegian Enterprise (NHO) through the Norwegian Industrial Safety Organization (NSO) to supervise compliance with the Civil Protection Act pursuant to Section 23 and provisions issued pursuant thereto. NSO's regulatory role is followed up by DSB.

Nuclear power plant operations are not currently listed in any of the industry codes that are obliged to have an industrial safety system if they employ a minimum of 40 employees, but in Section 2, fourth paragraph, the Regulation authorizes NSO to order other enterprises to establish an industrial safety system when this is deemed necessary based on the enterprise's risk or location.

[35] Regulation no. 894 of 22 August 2011 on municipal duties in respect of emergency preparedness

[36] Guide to the Regulation on municipal duties in respect of emergency preparedness: https://www.dsb.no/siteassets/rapporter-og-publikasjoner/veileder/veileder_til_forskrift_om_kommunal_beredskapsplikt.pdf

[37] Regulation no. 253 of 14 February 2022 on civil defence

[38] Regulation no. 1434 of 20 December 2011 on industrial protection

[39] Regulation no. 329 of 16 April 2012 on the designation of supervisory authority pursuant to Section 23 of the Civil Protection Act

8 The Norwegian Fire and Explosion Protection Act

8.1 General

The purpose of the Norwegian Fire and Explosion Protection Act is to safeguard human life, health, the environment and material assets against fire, explosion, accidents involving hazardous substances and dangerous goods and other acute accidents, as well as deliberate adverse events.

This is the main piece of legislation on protection against fire and explosion. It stipulates obligations for both private individuals and businesses and sets requirements for the implementation of fire and explosion protection work at central and local levels. The Act also contains obligations concerning accident and injury prevention related to the handling of hazardous substances and the transport of dangerous goods by road and rail, as well as requirements for emergency preparedness and response to acute accidents where the fire service has a duty to respond.

The Fire and Explosion Prevention Act also regulates the municipal authorities' duties and powers, including the duty to establish and operate a fire and rescue service. The preparatory works to the Fire and Explosion Prevention Act do not mention nuclear emergency preparedness explicitly as a task for the fire and rescue service. However, the fire and rescue service shall be an emergency response force in the event of *other acute accidents* (cf. kommuneROS) and carry out *specific tasks in war and crisis situations*. These tasks are not currently defined.

The fire and rescue service is a central part of the basic preparedness and the most decentralized emergency service in Norway, due to its municipal organization. Due to the requirements regarding response times, they arrive at the scene of the incident very quickly. There are 193 fire and rescue services in Norway, consisting of approximately 12,000 employees: 4,200 full-time employees and 7,800 part-time employees.

However, there are major differences in the capacity and organization of the fire and rescue services. Approximately 90 fire and rescue services have less than one full-time equivalent, while the 12 largest fire and rescue services employ more than 50 full-time equivalents each to be able to perform their emergency response and preparedness tasks. The basis for organization, staffing and equipment is the minimum requirements in the Fire and Explosion Protection Act and appurtenant Regulations, and the municipal authority's comprehensive risk and vulnerability analysis pursuant to the Civil Protection Act. The fire and rescue service is tailored to local needs, based on peacetime and normal conditions.

The municipal authority's responsibility for the fire and rescue service, and their tasks, are mainly regulated in Section 11 of the Fire and Explosion Prevention Act and appurtenant Regulations. The main task is to carry out fire prevention tasks and to act as a responder in the event of a fire. However, the fire and rescue service must also act as an emergency response force in the event of other acute accidents where this is determined on the basis of the municipality's risk and vulnerability analysis.

8.2 Measures to prevent fire, explosion and other accidents

Pursuant to Section 6 of the Fire and Explosion Prevention Act, the owner of a nuclear power plant is obliged to ensure that necessary safety measures are taken to prevent and limit fire, explosions or other accidents. The duty is primarily related to ensuring that the object etc. has the necessary safety measures, but it is also related to taking active action during a fire, explosion or accident to

limit the damage. Consequently, there will be a need for both technical and organizational measures. Sections 4 and 5 of the Fire Prevention Regulation[40] specify the owner's preventive duties in more detail. These include requirements relating to knowledge of fire safety in buildings and requirements relating to inspections and maintenance of safety devices in buildings.

In general, there is a requirement that all buildings must be designed and constructed so that, in the event of a fire, satisfactory safety is achieved for people in or on the building, for material assets, and for the environment and society. However, these requirements are managed by the Norwegian Building Authority (DIBK).

The obligation to carry out systematic health, safety and environmental work is laid down in Section 8 of the Fire and Explosion Prevention Act, and is further elaborated on in underlying Regulations, including the Internal Control Regulation[41]. According to the Norwegian Internal Control Regulation, enterprises must identify hazards and problems and, on this basis, assess risk, and prepare appurtenant plans and measures to reduce these risk factors. Pursuant to Section 19 of the Fire and Explosion Prevention Act, enterprises have a duty to ensure that safety in relation to fire and explosion, etc. is followed up in a proper manner. Safety considerations must be integrated into all phases of the enterprise, from planning and design to establishment, operation and decommissioning.

According to Section 13 of the Act, the municipality must identify and keep records of special fire objects, which may include buildings or businesses where a fire could lead to the loss of many lives or cause great damage to health, the environment or material assets. The municipal authority decides which enterprises are encompassed by Section 13, but DSB assumes that nuclear power plants would be covered by Section 13.

Enterprises covered by Section 13 are subject to supervision by the fire and rescue service. The inspection focuses on the enterprise's own systems and procedures for preventing fires, and the enterprise itself must document that systems have been established that adequately ensure compliance with the Fire and Explosion Prevention Act and appurtenant Regulations.

According to Section 14, first paragraph, of the Act, the municipality may, in individual cases, impose necessary fire protection measures for any building, storage facilities, areas, etc.

8.3 Emergency preparedness and response

According to Section 9 of the Fire and Explosion Prevention Act, the municipality must ensure the establishment and operation of a fire and rescue service that can carry out preventive and emergency response tasks in accordance with the Act in an effective and safe manner. To ensure that the fire and rescue service is best adapted to the tasks they may face, the municipality must carry out a risk and vulnerability analysis. This is elaborated on in the Fire and Rescue Service Regulation[42], where Chapter 2 states that the municipal authority must organize, staff and equip

[40] Regulation no. 1710 of 17 December 2015 on fire prevention

[41] Regulation no. 1127 of 6 December 1996 relating to systematic health, environmental and safety activities in enterprises

[42] Regulation no. 2755 of 15 September 2021 on the organization, staffing and equipment of the fire and rescue service and emergency call centres

the fire and rescue service on the basis of a risk and vulnerability analysis, prevention analysis and emergency preparedness analysis. Section 7 of the Regulation states that the fire and rescue service must coordinate its risk and vulnerability analysis with the municipal authority's comprehensive risk and vulnerability analysis pursuant to Section 14 of the Civil Protection Act. The nuclear power plant's own risk assessment will be important for the municipal authority's basic preparedness and the organization of the fire and rescue service.

Pursuant to Section 14 of the Fire and Explosion Prevention Act, DSB may order the owner of any building, storage facility, area, etc. that is considered to pose an extraordinary risk in the municipality to establish its own fire and accident preparedness, or to pay for and maintain a necessary upgrading of the municipal fire service. This provision assumes that the enterprise itself will cover the costs of any need for increased preparedness.

According to Section 15 of the Fire and Explosion Prevention Act, municipal authorities must cooperate on local and regional solutions for preventive and emergency preparedness and response tasks with a view to ensuring the best possible use of the combined resources.

8.4 The handling of hazardous substances

The Fire and Explosion Protection Act regulates the handling of hazardous substances that are categorized as flammable, explosive, pressurized or reactive pursuant to Section 4. The Act also regulates the transport of dangerous goods by road and rail. Dangerous goods include all possible goods that are defined as dangerous goods in the UN recommendations on the transport of dangerous goods.

Pursuant to Section 19 of the Fire and Explosion Prevention Act, enterprises have a special duty to ensure that safety in relation to fire, explosion, handling of hazardous substances and transport of dangerous goods by road and rail is followed up in a proper manner. Safety considerations must be integrated into all phases of the enterprise, from planning and design to establishment, operation and decommissioning.

According to Section 20 of the Act, enterprises that handle hazardous substances or dangerous goods must ensure that they are handled in such a way that people, the environment and the surroundings are satisfactorily safeguarded by reducing the risk to a level that can reasonably be achieved. This means that an assessment must be made of the costs associated with reducing the risk, compared with the safety benefit achieved. The cut-off point is ideally where the costs associated with additional technical or organizational measures to marginally reduce the risk are unreasonably high. Priority must be given to measures to reduce the risk to people. More detailed criteria for what constitutes acceptable risk are set out in Regulations.

According to the law, the satisfactory level of security must primarily be established through technical and organizational measures in the enterprise. For the handling of certain types of substances, however, this will not be sufficient to ensure an adequate level of safety, and land-use restrictions must be established in areas surrounding the enterprise. Section 20 of the Fire and Explosion Prevention Act states that such restrictions must be determined in accordance with the provisions of the Planning and Building Act.

The handling of hazardous substances and transport of dangerous goods by road and rail are further elaborated on in Regulations. Radioactive material does not fall under the definition of a hazardous substance, but it is classified as dangerous goods. Section 30 of the Regulation on the

transport of dangerous goods by road and rail[43] states that DSA is the technical and supervisory authority for radioactive material in class 7.

The Regulation on the handling of hazardous substances[44] regulates both the handling of hazardous substances and the equipment and facilities, including pipelines and other associated systems, used in their handling. Requirements are set for the design, construction, manufacture, sale, installation, operation, modification, repair, maintenance and inspection of equipment and facilities used in the handling of hazardous substances. There is also a requirement that the people who perform these tasks must have the necessary expertise.

According to Section 17 of the Regulation, consent from DSB is required if an enterprise handles hazardous substances in such large quantities that it is covered by the Major Accident Regulation[45]. The Major Accident Regulation does not apply to radioactive substances or other sources of ionizing radiation. However, radioactive substances are covered by the Regulation on the handling of hazardous substances if they are pressurized and qualify as a pressurized substance. It is then the risk associated with the pressurization that is the basis for the Regulation to apply, and not the radiation hazard. The Regulation is currently being revised, and a clarification has been proposed so that the Regulation does not regulate components, equipment or containers that are specifically designed for nuclear use and which, in the event of a malfunction, may cause radioactive releases.

Section 17, fourth paragraph, of the Regulation on the handling of hazardous substances allows DSB to decide in special cases that enterprises that do not qualify as a major-accident enterprise are to be covered by the requirement for consent, if the location and design of the enterprise and the handling of hazardous substances so indicate. The requirement to obtain consent is based on DSB wanting to ensure that the interests of third parties are satisfactorily safeguarded and that adverse incidents do not lead to major consequences for society.

Section 14 of the Regulation states that the enterprise must identify hazards and problems with regard to the handling of hazardous substances and, based on this, assess the risk. The assessment must include both internal and external factors, including deliberate adverse actions. Based on these assessments, plans must be developed and measures implemented to reduce the risk to an acceptable level.

The technical solutions chosen for nuclear power plants will determine whether parts of the plant will be pressurized with components, equipment or containers that are not specifically designed for nuclear use. If a complex plant is established for the production of hot water or steam, which, combined with other associated risks, poses a risk to the environment, DSB may decide that consent must be obtained for various parts of the plant. Among other things, the developer has proposed that heat generated from the nuclear power plant can be used to improve the efficiency of hydrogen and ammonia production. DSB's practice is that certain facilities or activities involving hydrogen and ammonia may be subject to a requirement for consent.

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[43] Regulation no. 384 of 1 April 2009 on the transport of dangerous goods by road and rail

[44] Regulation no. 602 of 8 June 2009 on the handling of flammable, reactive and pressurized substances as well as equipment and facilities used in such handling

[45] Regulation no. 569 of 3 June 2016 on measures to prevent and limit the consequences of major accidents in enterprises where hazardous chemicals are present

9 The Act relating to supervision of electrical installations and equipment

The Act relating to supervision of electrical installations and equipment regulates both electrical installations and electrical equipment. Electrical installations must be designed, constructed, operated, maintained and monitored in such a way that they do not pose a danger life, health and material assets. Electrical equipment must be in such a condition that, when in use, it does not pose a danger life, health and material assets.

The Act is supplemented by a number of Regulations. Several of the Regulations are designed with functional requirements that specify the hazards to be protected against and the level of safety that must be achieved. National and international standards can be used as a method to meet the requirements of the Regulation. However, the Regulations governing low-voltage electrical installations and electrical supply systems contain specific technical requirements. Requirements are set for the design, operation and maintenance of the installations. The requirements in the technical regulations apply to all phases of the installation's lifetime, from design, construction, operation and maintenance.

A prerequisite for a high level of electrical safety is that the people who carry out work related to electrical installations and equipment have the necessary qualifications and expertise. In Norway, the electrical professions are therefore regulated by law, and specific qualification requirements are set in the regulatory framework. People who have their education and professional experience from Norway are by virtue of this qualified to exercise an electrical profession in Norway. This applies to Norwegian citizens, EEA citizens and third-country nationals. However, people who have their education and professional experience from another country, and who want to establish themselves in Norway, must apply to DSB for recognition of their professional qualifications in order to continue practising the profession in Norway. Applications are processed in accordance with the legislation on recognition of professional qualifications[46].

The legislation on supervision of electrical installations and equipment will be an important regulatory framework for the electrical safety of nuclear power plants, as they are likely to have extensive electrical installations for power generation, control systems and emergency power supply. With the exception of the requirements for recognition of professional qualifications, however, no authorization from DSB is required pursuant to the Act relating to supervision of electrical installations and equipment.

10 International conventions, agreements and standards

10.1 International conventions

Norway is a signatory to a number of international conventions and agreements relating to nuclear safety, security, safeguards and the management of radioactive waste and spent nuclear fuel. In addition, there are conventions on the protection of the environment, international notification and assistance, transport, and liability for nuclear damage. In order for the rules in international

[46] Act no. 69 of 16 June 2017 relating to recognition of professional qualifications and appurtenant Regulations

conventions to apply to the licensees, they must have been implemented in Norwegian regulations, and the obligations that are exclusively relevant to nuclear installations are mainly implemented in the Nuclear Energy Act, the Radiation Protection Act or the Pollution Control Act and appurtenant Regulations.

10.2 IAEA and its Safety Standards

The International Atomic Energy Agency (IAEA) has developed Safety Standards and the Nuclear Security Series, which reflect international consensus on the requirements that must be met to ensure safety and protect people and the environment from the harmful effects of ionizing radiation. The Safety Standards are used by both regulators and licensees to promote safety and make it easier for enterprises to demonstrate, and for regulators to verify, that nuclear facilities are being operated safely and that there is a focus on safety.

The general licence conditions and appurtenant guidelines described above are largely based on the IAEA's Safety Standards. As a supervisory authority, DSA will consider the licensee and the safety of the proposed project against the IAEA's Safety Standards in all its assessments, including the processing of applications for a licence. If the licensee follows and complies with all relevant requirements in the IAEA's Safety Standards, there will be a presumption that the requirements in or pursuant to the Norwegian regulations are also met.

It will also be in the licensee's interest to meet all relevant requirements in the IAEA's Safety Standards, because this will ensure that the licensee maintains safety in an acceptable manner. If relevant requirements in the Safety Standards are not met, it is unlikely that operations are sound and adequate safety is ensured. In that case, it could be difficult for the enterprise to document that safety can still be regarded as adequately safeguarded.

It is a fundamental principle that the licensee is responsible for safety at the nuclear installation. This also entails an obligation to keep abreast of international developments and ensure compliance with the latest version of the IAEA's Safety Standards. In addition to the IAEA's Safety Standards, the IAEA's standards for security and safeguards (the "Nuclear Security Series") will also be relevant.

The structure of the IAEA's Safety Standards series provides a practical overview of the most important aspects of safety, particularly in terms of assessments of safety and consequences that need to be taken into account in connection with nuclear installations. Appendix 2 "*Summary of assessments needed through lifetime of nuclear power plants"* summarizes the assessments that will be required at the various different stages.

Appendix 2 – Summary of assessments needed through the lifetime of nuclear power plants

Subject	General licence conditions	IAEA recommended requirements	Assessments needed…			
			For site selection	**For construction licence application**	**For operating licence application**	**During commissioning and operation**
Management	2, 4, 7, 10, **15**, 16, 20	GSR Part 2	A management system for site survey and evaluation activities	A management system applied to site characterization and facility design and suitable for construction, including quality assurance and working procedures	Established leadership, integrated management system and culture for safety	Application of leadership, integrated management system and culture for safety, updated on the basis of experience, feedback and continuous improvement
Site evaluation		SSR-1	Screening assessment to identify natural and human induced external hazards that could affect the safety of the nuclear installation. (e.g. seismic assessment, tsunami risk, climate change, industrial development) Assessment of the interactions between the site and the proposed facility(-ies) to inform the facility safety case for operational states and accident conditions over the lifetime of the facility(-ies), and provide input to the reactor technology assessment (and later site-specific safety case)	Full safety assessment of proposed site for proposed design	Updated assessment of site with facility as built	
Safety assessment	**6**, 18, 22	GSR Part 4	Screening or outline assessments of factors in this column, including possible conflicts between factors or measures (and with other factors or measures addressed in the impact assessment programme)	Assessment of all aspects of site and design safety and all plans, programmes and systems in this column	Assessment of all aspects of safety and all plans, programmes and systems in this column (SAR)	Updates of relevant assessments to reflect experience and incidents from operation or changes in the facility, procedures or technology. Periodic safety review (and associated reassessment) at defined periods or when instructed
		Specific reports	*Generic safety report from reactor designer*	*Site-specific preliminary safety report(s)*	*Pre-construction safety report (PCSR)*	*Commissioning safety report*	*Operational safety case*
Radiation protection	**12**, 8, 13, 17	GSR Part 3	Screening assessment of site-specific factors affecting potential doses to the public from any releases of radionuclides during operation and in the event of an accident or incident	Evaluation of measures in design to reduce doses to workers (ALARA) and radioactive releases (BAT) Generic or bounding assessment of potential doses to the public from any releases of radionuclides during operation and in the event of an accident or incident	Full radiation protection programme for workers in the facility and public outside the facility, in operation and in the event of an accident or incident	Updates of programme to reflect experience and incidents from operation or changes in the facility, procedures or technology. Periodic review (and associated reassessment) at defined periods or when instructed

Radioactive waste	**13**	GSR Part 5	Outline of the measures, including design principles, being applied to minimize and manage waste	Provisional waste management plan Evaluation of measures in the proposed design to minimize production of radioactive waste	Full waste management plan, including minimization	Updates of plan to reflect experience and incidents from operation or changes in the facility, procedures or technology (or wider strategy for radioactive waste)
Decommissioning	**9**	GSR Part 6	Outline of approach to how the facility will be decommissioned	Evaluation of measures in proposed design to facilitate decommissioning	Full decommissioning plan (including plan for managing decommissioning waste)	Periodic update of plan Final decommissioning plan before start of decommissioning
Emergency preparedness and response	7, **14**	GSR Part 7	Screening assessment of site-specific factors affecting emergency planning	Provisional emergency plan	Full emergency plan	Implementation of plan if necessary. Updates of plan to reflect experience and incidents, changes in the facility, procedures, logistics or demography
Design	**18**, 20	SSR-2/1	Derivation of site-specific facility design parameters Screening assessment of reactor technologies	Basis for choice of technology Full safety assessment of proposed design at proposed site	Updated assessment of design as built	Reassessment of design (and configuration management) for modifications to the facility or changes in operation
Commissioning and operation	7, **17**, 19, 20, 21, 25	SSR-2/2	Outline of operational safety programme	Plan for operational safety, including for management of spent fuel at reactor	Full operational safety programme, including for management of spent fuel at reactor	Updates of programme to reflect experience and incidents from operation or changes in the facility, procedures or technology. Periodic review (and associated reassessment) at defined periods or when instructed
Transport		SSR-6	Outline of potential transport routes for radioactive materials and waste, including consideration of external hazards and emergency response needs	Assessment of transport package design and compliance with regulatory requirements. Provisional transport and logistics plan for radioactive materials and waste	Full transport safety and security programme, including procedures for packaging, labelling, consignment, and emergency arrangements	Implementation of transport programme, periodic review and update of procedures, maintenance of transport records, and compliance with regulatory changes
Security	1, **24**	NSS 13	Screening assessment of site-specific factors affecting security and application of security measures	Security assessment of proposed facility at proposed site	Security assessment of proposed management of the facility and associated materials	Updates to reflect experience and incidents from operation or changes in threats, the facility, procedures or technology.
Resources	3, **5**, 11	GSR Part 1, GSR Part 2	Demonstration that necessary resources will be available	Plan for developing resources	Programme for applying and maintaining resources	Maintaining resources to reflect operational demands and evolution
Safeguards	**23**		Preliminary engagement with national authority on safeguards obligations and initial declaration of intent for nuclear material use	Submission of facility design information to the regulator and IAEA. Integration of safeguards-by-design features	Full implementation of safeguards arrangements, including material accountancy, reporting, and access for inspections	Ongoing material accountancy and reporting, maintenance of safeguards equipment, updates to design information, and support for IAEA inspections and verification activities