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Statement
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TRANSLATION

THE COMPETENT AUTHORITY'S STATEMENT ON THE ENVIRONMENTAL IMPACT ASSESSMENT PROGRAMME FOR THE EXTENSION OF THE SERVICE LIFE OF THE OLKILUOTO 1 AND OLKILUOTO 2 PLANT UNITS AND FOR THE UPRATING OF THEIR THERMAL POWER

On 5 January 2024, Teollisuuden Voima Oyj (hereinafter TVO) submitted to the Ministry of Economic Affairs and Employment an environmental impact assessment programme (hereinafter the EIA programme) referred to in the Act on the Environmental Impact Assessment Procedure (252/2017, hereinafter also the EIA Act) concerning the Olkiluoto 1 and Olkiluoto 2 (OL1 and OL2) nuclear power plant units located in the Eurajoki Olkiluoto power plant area.

1 Project details

1.1 Developer

The developer of the project is Teollisuuden Voima Oyj.

1.2 Competent authority

The competent authority for the environmental impact assessment procedure of the project is the Ministry of Economic Affairs and Employment in accordance with section 10(1) of the EIA Act.

1.3 The developer's description of the project and its options

In the environmental impact assessment procedure, the implementation options reviewed are continuing the operation of the Olkiluoto 1 and Olkiluoto 2 plant units in the Olkiluoto power plant area at the current power level until 2048 (VE1a) or 2058 (VE1b) and continuing the operation at an uprated power level until 2048 (VE2a) or 2058 (VE2b). In addition, the continued use of the plant units at the current power level until the expiration of the current operating licence until 2038 (VE0) is examined.

The starting point for the uprating assessed in the EIA procedure is a 10% increase in the thermal power of the reactor to 2,750 MW, which corresponds to an increase in the nominal electrical output of the plant units from the current 890 MW to 970 MW. The annual increase in electricity production in the OL1 and OL2 plant units would total approximately 1,200,000 MWh.

The plant units were commissioned in 1978 (OL1) and 1980 (OL2). The initial planned service life of the plant units was 40 years. The service life of the plant units has previously been extended to 60 years. The extension of operation until 2048 or 2058 currently examined is equivalent to an extension of the service life to 70 or 80 years.

If the operation of the Olkiluoto 1 and Olkiluoto 2 plant units is not continued (VE0), the plant units will be decommissioned after the expiry of the valid operating licence. If the operation of the plant units continues, decommissioning will take place after expiry of the new operating licence. A separate environmental impact assessment procedure will be prepared for the decommissioning of the plant units in accordance with the legislation in force when decommissioning becomes topical.

1.4 Connections to other projects

In addition to the OL1 and OL2 plant units, the Olkiluoto site area houses the OL3 plant unit, for which the Government granted an operating licence in 2019. The commercial operation of the plant unit started in April 2023. OL3 has a planned service life of 60 years. Its current operating licence pursuant to the Nuclear Energy Act is in force until the end of 2038. The power plant area also houses the interim storage facility for spent nuclear fuel (KPA) and the storage facilities for very low-level waste (HMAJ), low-level waste (MAJ) and intermediate-level waste (KAJ) as well as the operating waste repository (VLJ repository) for the final disposal of low-level and intermediate-level waste. The operating licence under the Nuclear Energy Act of the VLJ repository is valid until the end of 2051.

According to the assessment programme, TVO has also been planning the establishment of a separate near-surface final disposal facility for very low-level waste (HMAJ) in its power plant area. The environmental permit for the near-surface final disposal facility was obtained in October 2023. The assesment programme points out that building the HMAJ disposal repository also requires a building permit from the municipality and a permit to operate from the Radiation and Nuclear Safety Authority.

Posiva Oy’s encapsulation plant and disposal facility for spent nuclear fuel is located in the Olkiluoto power plant area and has its own separate plant area. Posiva is responsible for the research and technical implementation of the final disposal of spent nuclear fuel produced in Finland by TVO and Fortum Power and Heat Oy. In November 2015, the Government granted Posiva a construction licence in accordance with the Nuclear Energy Act for the construction of an encapsulation and final disposal facility in Olkiluoto.

1.5 Plans and permits required by the project

The assesment programme describes the permits and decisions that may be required by different project options. In addition, the assesment programme describes the project’s relationship with various plans and programmes concerning the use of natural resources and environmental protection.

The current operating licence for the Olkiluoto 1 and Olkiluoto 2 plant units under the Nuclear Energy Act (990/1987) is valid until 2038. A new licence must be applied for in all project options. According to the assesment programme, in the case of options VE2a and VE2b, this will be done by the end of 2028 and with options VE1a and VE1b no later than before 2038 when the

current licence expires. The assessment programme states that, under the terms of the current operating licence, TVO must carry out a periodic safety assessment of the OL1 and OL2 plant units and submit it to the Radiation and Nuclear Safety Authority for approval by the end of 2028.

The operating licence of the VLJ repository is valid until the end of 2051. According to the assesment programme, TVO will apply for a new operating licence for the VLJ repository well in advance of the expiry of the operating licence, which will enable the use of the VLJ repository even after the decommissioning of the power plant units.

The assesment programme highlights that the operating licence for the plant units includes the use of intermediate nuclear waste storage facilities (KAJ, MAJ, KPA) and, if the service life is extended for OL1 and OL2, the use of these intermediate storage facilities will also be continued with the same operating licence. If the use of the plant units ends in 2038, a separate operating licence will be applied for the intermediate storages or it will be combined with the operating licence of the OL3 plant unit. An operating licence for the final disposal facility for very low-level nuclear waste planned for the Olkiluoto power plant area (near-surface final disposal) will be applied for so that the activities would start in the mid-2020s.

The assesment programme indicates that if the operation of the OL1 and OL2 plant units is not continued, the plant units will be decommissioned after the expiry of the valid operating licence. If the operation of the plant units continues, decommissioning will take place after the expiry of the new operating licence. According to the assesment programme, a separate environmental impact assessment procedure will be prepared for the decommissioning of the plant units in accordance with the legislation in force when decommissioning becomes topical.

Posiva’s spent fuel encapsulation and final disposal facility is also located on the island of Olkiluoto, for which Posiva applied for an operating licence at the end of 2021. The operating licence is issued by the Government. The final disposal of spent nuclear fuel is planned to begin around the mid-2020s.

The assesment programme highlights that the operation of the Olkiluoto nuclear power plants may require other permits subject to the Nuclear Energy Act in the future and they will be applied for if necessary. Section 21 of the Nuclear Energy Act lays down the conditions for granting a licence for other uses of nuclear energy, such as the possession, manufacture, production, transfer, handling, use, storage, transport and import of nuclear material and nuclear waste, and disposal of nuclear waste that is of a lesser extent than large-scale disposal of nuclear waste (operating licence). Under section 16(2) of the Nuclear Energy Act, the Radiation and Nuclear Safety Authority grants a permit for the above-mentioned activities upon application.

The programme also describes the permits required under the Radiation Act that the implementation of the project may require. According to the programme, TVO currently has three separate safety licences for the use of unsealed sources, X-ray sources and sealed sources in industry and research. The safety licences for radiation activities are all valid until further notice. According to the programme, in the case of continued use, radiation activities in industry and research will continue to an extent deemed sufficient and the safety licence will be updated as necessary.

The programme also describes the permits required for the transport of radioactive materials. The programme points out that, in the case of the extension of the lifetime of plant units, new fresh fuel is still needed by the plant units and that the licence practice will remain the same in that respect. Posiva is responsible for the transporting of spent fuel for encapsulation and final disposal to Olkiluoto in Eurajoki.

The assesment programme points out that the decommissioning of a nuclear power plant is subject to a licence, which is laid down in the Nuclear Energy Act and Decree and the regulations and instructions of the Radiation and Nuclear Safety Authority. Under the current EIA Act, the dismantling or decommissioning of a nuclear power plant requires an EIA procedure.

The assesment programme also covers permits required under the Land Use and Building Act (132/1999), the Environmental Protection Act (527/2014) and the Chemicals Act (390/2005). The programme also states that a restriction on movement has been imposed around the power plant area under section 52 of the Police Act. In addition, the environment of the power plant area has been designated as a no-fly zone by the Government Decree on Restricted Areas in Aviation (VNa 930/2014). The programme also states that the other permits related to the operation of the power plant are mainly various technical permits, the purpose of which is to ensure occupational safety and prevent material damage.

According to the programme, the valid local detailed plan enables the modification of the power plant area and the construction of additional structures and/or buildings.

According to the assesment programme, the project may have an interface with various plans and programmes concerning the use of natural resources and environmental protection, which include both international commitments and national target programmes. According to the programme, the most significant plans and programmes are identified and listed in the EIA report, and the project's relationship with them is assessed.

1.6 Location of the project and space requirements

As described in the assesment programme, the Olkiluoto nuclear power plant area owned by TVO is located in the municipality of Eurajoki, on Olkiluoto Island. The OL1 and OL2 plant units are located in the plant area that is delimited in the western part of Olkiluoto Island. The plant area contains the OL1, OL2 and OL3 plant units as well as facilities, equipment and functions related to the plant units, which include the interim storage for spent fuel (KPA storage) and the interim storage facilities for very low, low and intermediate-level operating waste (HMAJ, MAJ and KAJ storages). According to the assesment programme, the project alternatives do not require new space reservations in the power plant area and any modifications will be implemented within the existing, constructed plant area.

1.7 Planning and implementation schedule

According to the assesment programme, a preliminary analysis for the uprating of the plant units' thermal power was drawn up during 2022. In addition to the technical analyses regarding plant engineering and nuclear fuel, the scope of the preliminary analysis included assessments related to nuclear safety, a preliminary licensing plan and permit plan for the project and the analyses related to the management and implementation of the power uprating project. Following the preliminary analysis, a project planning stage of the power uprating project has been launched. During the project planning stage, safety analyses are drawn up, the necessary plant modifications are specified and, based on them, a plant-level plan for principles for the power uprating is drawn up, allowing for the information presented therein to be used at the project's EIA report stage. The EIA procedure has been estimated to last until the end of 2024.

According to the assesment programme, the preliminary schedule for the power uprating project indicates that the plant modifications and operating tests required for the power uprating may be

implemented in the 2020s but that they could also be implemented in the 2030s. No decision has been made on the implementation or its date. The earliest possible implementation time for the power uprating would be in 2028, assuming that all necessary permits for the implementation have been granted.

According to the assesment programme, in the alternatives where the decision is made to extend the service life but no power uprating is done, the necessary permits will be applied for by 2038.

The Ministry of Economic Affairs and Employment states that by its decision dated 29 November 2023 (VN/9813/2023) it has issued binding preliminary information following a request for preliminary information submitted by Teollisuuden Voima Oyj. In the decision, the ministry has considered that the valid operating licences issued by the Government for the Olkiluoto 1 and 2 nuclear power plant units can be used to carry out the plant modifications and test runs required by the power increase, provided that they have been assessed and approved by the Radiation and Nuclear Safety Authority. The ministry has further stated in the decision that the documents prepared in the preparation of the periodic safety assessment can be used in connection with the licence processing under the Nuclear Energy Act resulting from the power uprating of the Olkiluoto 1 and 2 nuclear power plant units.

2 Information and consultation on the assesment programme

Under section 17(1) of the Act on Environmental Impact Assessment Procedure, the competent authority must ensure that the necessary statements on the assessment programme are requested and that an opportunity to submit opinions is provided. The competent authority must request a statement on the assessment programme from the municipalities in the area affected by the project and from the other authorities likely to be concerned by the matter, including the project permit authority. Further according to subsection 2 of the section, the competent authority must announce the environmental impact assessment programme by public notice without delay. Under subsection 3 of the section, information on the notice must be published without delay in the municipalities in the area likely to be affected by the project. In addition, information on the assesment programme must also be published in at least one newspaper in general circulation in the area affected by the project.

On 23 January 2024, the Ministry of Economic Affairs and Employment has notified the assesment programme with a public notice published on the ministry’s website. The ministry has also submitted the assesment programme and the related announcement to the municipalities in the area affected by the project and asked the municipalities to keep the document on their website between 23 January 2024 and 25 March 2024.

In addition, the ministry has requested an opinion on the assesment programme from the following parties: Municipality of Eurajoki, municipality of Eura, municipality of Nakkila, city of Pori, city of Rauma, Regional State Administrative Agency for Southwestern Finland, Regional State Administrative Agency for Southern Finland, Satakunta ELY Centre, Southwest Finland ELY Centre, Regional Council of Satakunta, Helsinki–Uusimaa Regional Council, Southwestern Finland Police Department, Rescue Department of Satakunta, Ministry of Social Affairs and Health, Ministry of the Interior, Ministry of Defence, Ministry of the Environment, Ministry of Finance, Ministry of Transport and Communications, Ministry for Foreign Affairs, Ministry of Agriculture and Forestry, Radiation and Nuclear Safety Authority, VTT Technical Research Centre of Finland Ltd, Finnish Safety and Chemicals Agency (Tukes), Advisory Committee on Nuclear Safety, Finnish Heritage Agency, Geological Survey of Finland (GTK), Finnish Environment In-

stitute , AKAVA ry, Confederation of Finnish Industries, Greenpeace, Central Union of Agricultural Producers and Forest Owners (MTK), Finnish Society for Nature and Environment, Finnish Energy, Central Organisation of Finnish Trade Unions, Federation of Finnish Enterprises, Finnish Association for Nature Conservation, Finnish Confederation of Professionals (STTK), WWF, Fingrid plc and Posiva Ltd. The request for an opinion has been sent electronically via the lausuntopalvelu.fi service. Other parties and citizens have also had the opportunity to give their statements and express their opinions on the project.

On 23 January 2024, the ministry has provided information on the assesment programme, its availability for viewing and the possibility of issuing statements and expressing opinions in the following journals: Helsingin Sanomat, Hufvudstadsbladet, Länsi-Uusimaa and Satakunnan Kansa.

In cooperation with the developer, the ministry organised a public event on the assesment programme at the Olkiluoto Visitor Centre on 6 February 2024 from 5:30 p.m. to 7:30 p.m. The event allowed remote participation. In addition to representatives of the competent authority, the developer and Ramboll Finland Oy, 4 people attended the event in person and around 20 people participated remotely.

On 15 January 2024, the Ministry of Economic Affairs and Employment has submitted a request for action to the Finnish Environment Institute to launch an international consultation. On 23 January 2024, the Finnish Environment Institute submitted a notification of the project to Sweden, Estonia, Latvia, Lithuania, Norway, Denmark, Poland and Germany. Austria has also requested the notification of the project, which has been submitted to it. In addition, on 23 January 2024, the Finnish Environment Institute informed all parties to the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention). In their reply, Bulgaria and Hungary have requested a notification of the project, which has been submitted by the Finnish Environment Institute to the countries concerned.

The announcement, assesment programme and statements and opinions concerning the programme have been published on the ministry’s website at https://tem.fi/olkiluoto-ol1-ja-ol2-yva-ohjelma.

3 Statements and opinions on the assesment programme

3.1 A summary of statements and opinions

The ministry received 20 opinions from national consultations. Regional State Administrative Agency for Southern Finland, Regional State Administrative Agency for Southwestern Finland, Satakunta ELY Centre, Helsinki–Uusimaa Regional Council, Ministry for Foreign Affairs, Ministry of Transport and Communications, municipality of Eura, city of Pori, municipality of Nakkila, AKAVA ry, Confederation of Finnish Industries, Greenpeace, Central Union of Agricultural Producers and Forest Owners (MTK), Finnish Society for Nature and Environment, Finnish Energy, Finnish Association for Nature Conservation, Finnish Confederation of Professionals (STTK), WWF and Fingrid plc have not submitted a statement. The Southwestern Finland Police Department stated, referring to its statutory duties, that it does not consider it necessary to provide an actual statement on the matter. The Finnish Environment Institute stated that it will not provide a statement on the matter.

The statements largely considered the EIA programme to be comprehensive and sufficient. Under normal conditions, the environmental impacts of the project were generally considered to be

minor. In their statements, the parties paid particular attention to the increase in the thermal load caused by cooling water on the sea water and the risks caused by climate change. Attention was also paid to nuclear waste management and, among other things, to the energy market.

In an international consultation under the Espoo Convention, Sweden, Estonia, Denmark, Latvia, the Land of Saxony in Germany, Austria and Bulgaria have announced that they will participate in the environmental impact assessment procedure of the project. Norway, Lithuania and Poland do not consider themselves to be affected parties and will not participate in the assesment procedure. However, Lithuania requests the assessment report for information. A total of 2 statements from organisations were received. The international consultation highlighted in particular the risk of a severe nuclear accident and its consequences.

The statements and opinions received by the ministry are available on the Ministry of Economic Affairs and Employment's website on the project.

3.2 Requested official statements

3.2.1 Geological Survey of Finland (GTK)

The Geological Survey of Finland GTK (GTK) considers that the EIA programme as a whole is comprehensive and takes due account of the impacts of the extension of service life and the power uprating.

GTK further notes that the power uprating and extension of operation (VE2a and VE2b) will also generate impact due to the fact that the spent fuel will be hotter than fuel produced at the current power level. The EIA programme states that cooling will take place after the initial cooling in the interim storage facility for spent nuclear fuel, whose space capacity is either sufficient for the required cooling or, if necessary, will be increased. The EIA programme does not comment on the cooling schedule from the perspective of final disposal. However, a possible longer cooling time would probably only affect the planned implementation schedule of the final disposal, and the timetable effects, if any, would hardly have environmental impacts. In addition, the EIA programme does not comment on the possible effects of uprating on the composition of the fuel used. From the perspective of final disposal of spent nuclear fuel, it would be advisable to know whether the options VE2a and VE2b have an impact on the cooling time of the fuel in the interim storage facility or on the composition of the spent fuel, although the EIA programme duly includes an indication that the nuclear power plant has final disposal methods and plans on which the continued operation and power uprating will have no significant impact.

3.2.2 Municipality of Eurajoki

In the view of the municipality of Eurajoki, it is very positive that the EIA programme currently under way has been drafted thoroughly and the various impacts are assessed comprehensively, taking into account different areas. In this way, the impacts of extending the service life of plants and uprating their thermal power can be assessed thoroughly and accurately in compliance with the high Finnish safety culture and the objectives of the Nuclear Energy Act. The municipality considers it particularly important that environmental impact assessments examine in particular the possibilities of preventing and mitigating the potential adverse impacts of the project, for example by means of planning and implementation, which are presented later in the EIA report.

3.2.3 Finnish Heritage Agency

The Finnish Heritage Agency notes that future measures will take place on the current plot, inside the existing walls, so they will have no direct impact on the values of the cultural environment. The Finnish Heritage Agency therefore has nothing to comment on the proposed EIA programme.

3.2.4 Ministry of Defence

The Ministry of Defence states that the proposed extension of operation from 2038 to 2058 (VE2b) can be favoured. The estimated environmental impacts of this option can be considered to be minor, particularly in view of the positive social impacts of the increase in thermal and electric power. The implementation of option 2B would significantly increase our weather-independent electricity production and strengthen our degree of self-sufficiency for a considerable period of time. At this stage, the Ministry of Defence does not see any significant increase in existing security risks in any of the options presented.

3.2.5 City of Rauma

The city of Rauma states that of the three options for implementing the EIA procedure, all have environmental impacts on the city of Rauma. The most significant environmental impact is the warming of seawater due to the conduction of cooling water, which gets prolonged with option VE1 and both prolonged and increased with option VE2. Fish mortality associated with cooling water intake and its partial impact on fish stocks in the city of Rauma can be considered a minor impact. The environmental and licensing board of the city of Rauma has not been informed of any facts on the basis of which it should be assumed that the prolonged or increased warming effect would cause harm, on the basis of which one of the proposed alternatives should be chosen instead of another alternative. As a result of the long age of the energy production plants, the environment and species have adapted to the warming effect. It can even be assumed that cessation of the warming effect would in some respects have a greater environmental impact than continuation of operations.

3.2.6 Satakunta rescue department

In the view of the rescue authorities, the alternatives would not change the nature of the rescue services' protection measures in a severe radiation accident. The assesment plan states that when examining the option of uprating power, the changed reactor inventory is taken into account in an unlikely but potentially severe reactor accident. In any case, rescue resources to protect the environment are small in large-scale radiation accidents and cooperation between actors is emphasised. The assessment of the overall ability is also carried out at the international level, and the results obtained from these should be taken into account in this context. The Radiation and Nuclear Safety Authority has the right expertise for the assessments. According to the rescue department, it should be taken into account in the assessment plan whether any preparation obligations follow from any power increase that would have an impact on the storage volumes of other chemicals, such as fuel oil. In the view of the rescue authority, any increase in chemical storage volumes would be minor and would not be likely to change the operator's obligations here.

3.2.7 Regional Council of Satakunta

The Regional Council of Satakunta states that it is advisable to examine the conditional extension of the service life of the OL1 and OL2 nuclear power plant units if the safety requirements are met in terms of material efficiency and the use of the areas.

According to the Regional Council of Satakunta, it is important to take into account the progress of climate change and the risks arising from climate change. The combined effects of the OL1 and OL2 plant units and the Olkiluoto 3 plant unit should be assessed to assess the extent of the spread of warm water and the average and highest temperature values at different distances and the permanently ice-free area or area of weak ice. In addition, the link between known projects and TVO's project and the preservation of the prerequisites for its implementation should be examined as a synergy with other energy production projects. It is also important to clearly indicate the need for electricity transmission in the alternatives examined in the EIA procedure. The change in the role of nuclear power in the electricity market as a result of the growing production of renewable energy and the connection to electricity storage and price-based use should be discussed in the evaluation procedure.

In addition, the Regional Council's statement discusses the regional land use plan situation in the region.

3.2.8 Ministry of Social Affairs and Health

The Ministry of Social Affairs and Health considers the EIA programme to be comprehensive and well prepared and notes that the programme provides a good basis for preparing the next EIA report.

The Ministry of Social Affairs and Health states that the assesment programme does not indicate whether a power uprating would be implemented in connection with annual maintenance or at some other time. Thus, the programme does not indicate whether increasing the electrical power will have an impact on electricity production in Finland. The Ministry of Social Affairs and Health considers it important that this is reflected in the EIA report prepared on the basis of the programme, as Finland lacks a significant amount of electricity production needed during peak consumption. Electricity shortages during price spikes may have negative social impacts on households due to electricity price pressures. In addition, the programme does not clearly indicate whether additional permits are needed for the organisation of nuclear waste management if the plant units' electrical power increases are implemented.

3.2.9 Radiation and Nuclear Safety Authority

The Radiation and Nuclear Safety Authority (STUK) notes that the EIA programme takes into account the emissions of radioactive substances during normal use and in possible accidents, as well as the increase in fuel use and, as a result, the increased amount of spent fuel and other active waste to be disposed of. In the view of the Radiation and Nuclear Safety Authority, the EIA programme proposed by TVO meets the EIA programme criteria laid down in section 16 of the Act on Environmental Impact Assessment Procedure in terms of radiation and nuclear safety. The EIA programme presents the necessary information on the project, its reasonable alternatives, and a description of the current state of the environment, a proposal for assessing the environmental impacts and how they are to be examined, and a plan for organising the assesment procedure.

The Radiation and Nuclear Safety Authority further notes that the radiation impacts caused to the environment and humans by different alternatives will be assessed during the EIA procedure. The Radiation and Nuclear Safety Authority will assess the fulfilment of safety requirements in detail in connection with the processing of any new licence application. According to section 2.2. of the EIA programme, due to the low radiation levels in fresh fuel, the transport packaging requires no radiation protection features. In this context, it should be pointed out that although

fresh fuel radiates weakly and thus does not pose a radiation hazard to humans or the environment, the transport of fresh nuclear fuel is subject to a licence for the transport of substances classified as hazardous. Transport packaging is subject to requirements in the code for the transport of hazardous goods.

3.2.10 VTT Technical Research Centre of Finland Ltd

VTT Technical Research Centre of Finland Ltd (VTT) states that from the perspective of national and international climate objectives and the predictability of electricity production, it is a good thing that the continued operation of the OL1 and OL2 plant units and also power uprating are examined, as nuclear power is carbon-neutral and stable form of energy production. VTT considers that the EIA programme meets the requirements set for the EIA programme. In addition, VTT states that the energy market has been listed as an area to be examined in the EIA procedure, but not the Finnish energy system from the perspective of infrastructure. VTT proposes that, in addition to what is presented in the EIA programme, a separate object of examination could be impacts on the Finnish energy system, such as the main grid and the security of supply of electricity distribution.

3.2.11 Southwest Finland ELY Centre

Southwest Finland ELY Centre considers that the assesment programme is a carefully prepared entity. However, in its statement, the ELY Centre points out some detailed observations, especially concerning the impacts on waterways, the risks associated with the operation of the plant and the decommissioning of the nuclear facility. According to the statement, the production of electricity at the Olkiluoto nuclear power plant has so far not been found to have caused significant environmental damage in its normal operations.

The ELY Centre states that the assesment programme has appropriately identified the significant impact of the project on the increase in heat load caused by cooling water on sea water. According to the ELY Centre, the impact assessment has mostly been presented in the assesment programme in an adequate manner when assessing the impacts on the physicochemical water quality and ice conditions of the marine area and the possible indirect impacts on aquatic organisms and impacts on the ecological and chemical status of the marine environment in the different alternatives.

The ELY Centre considers that the assessment report should describe whether the use of cooling waters in plant units is associated with an increasing risk for invasive species in the coming years. In addition, according to the ELY Centre, more detailed research is needed for the assessment of the effects of the heat load of the Olkiluoto plant units on the state of sediment in the sea area and the regulation of internal loading. According to the statement, the assessment report must include a more extensive extract from the maritime spatial plan in the environment of the project, and the assessment of the effects of thermal loads must be based on the entire water column and also the seabed. The statement says that the modelling of the impacts of the project on water bodies caused by thermal loading will not be able to directly assess how the so-called internal load on the seabed of the affected area will change. According to the statement, the effects of cooling water abstraction should also be included in the examination of surface waters.

According to the statement, the cooling water temperature used by the project may also be affected by climate change as it heats seawater, which should be taken into account in the assessment. In the assessment report, it is still important to assess what the increase in temperature in

seawater means in the marine flora and fauna and how the monitoring of changes and the prevention of harmful impacts will be implemented. The ELY Centre also considers why, for example, algae production in the research area is constantly increasing, even though there have been no significant changes in the amount of heat load.

The ELY Centre considers it important that, in addition to a severe reactor accident and its effects, the assessment report discusses and analyses reasons that may lead to a severe reactor accident at the plant, its threat or other exceptional situation. According to the statement, as a result of the impact assessment, it is necessary to present a probability analysis of the risks, on the basis of which it can be assessed whether the changes planned in the plant's implementation options (VE1 and VE2) are environmentally safe.

The ELY Centre states that integrating the decommissioning of a nuclear power plant into the current assessment procedure would not be an unreasonable addition when the nuclear power plant already has a decommissioning plan, to be updated every six years. In addition, the ELY Centre notes that the assesment programme remains unclear as to whether some by-products are formed in the plant units. According to the statement, it is difficult to get an overall picture of the "other waste" described in the assesment programme.

With regard to permits related to land use planning and the project, the ELY Centre states that the assessment report should specify the objective of the plans drawn up for the area and the national land use goals targeted for the area. As regards plans and planning processes, it is also necessary to describe any pending significant land use plans in the assessment report, such as the Satakunta regional land use plan 2050. According to the statement, it is also necessary to assess whether a change to a water permit and a permit for the final disposal of very low-level waste is needed.

3.2.12 Advisory Committee on Nuclear Safety

The Advisory Committee on Nuclear Safety notes that the EIA programme has been drawn up in such a way that the central role of nuclear safety in the operation of the nuclear power plant is well and sufficiently presented, and the advisory committee hopes this will be the case also in the EIA report in accordance with the act. The statement presents that approximately 20 EIA processes related to the use of nuclear energy have been implemented in Finland so far. The first processes in the early 1990s dealt with the power uprating of both Finnish nuclear power plants. The power uprating was already then seen as a significant safety issue and thus also as a significant change in the project referred to in the EIA Act. Over a period of approximately 30 years, the processing of nuclear safety in the EIA has continued to evolve and, for example, the processing of potential transboundary environmental impacts has become established.

The Advisory Board notes that in the EIA programme, nuclear safety issues are related to both extending the service life and power uprating, which will be key issues in STUK's statement on the application for a licence. Ageing management of the plant units becomes an important task in extending the service life. In cases of extension, the amount of spent fuel increases significantly, and the amount of other nuclear waste increases. From the perspective of nuclear safety, the most significant impacts assessed in the project are the report on waste and by-products in the Olkiluoto area, the report on emissions and radiation of radioactive substances, and the modelling of exceptional and accident situations within 1,000 km of the area.

In addition, the advisory committee notes that 100 TBq of caesium emissions have been selected for today's large nuclear power plants for transboundary environmental impacts for accident situations (based on section 22b of the YEA). This procedure has proved effective, as it illustrates the severity of these accidents and the emission limit also covers various imaginable accident chains. Similar processing is also carried out in this EIA, in which emission estimates are compared to historical accidents. A guide for dealing with severe accidents has been written within the scope of the Espoo Convention, and this Finnish practice has been taken into account in them. Any radioactive emissions and their spread are described in the handling of possible accidents. The advisory committee hopes that the above will also be presented in the report by means of examples.

3.2.13 Ministry of Agriculture and Forestry, Ministry of the Interior, Finnish Safety and Chemicals Agency Tukes, Ministry of Finance and Ministry of the Environment

The above authorities did not have any comments on the environmental impact assessment programme for the project.

3.3 Other statements requested

3.3.1 Posiva Oy

Posiva Oy states that it acts as a future final disposal and expert organisation of spent nuclear fuel for its owners Fortum Power and Heat Oy and Teollisuuden Voima Oyj. Posiva states that it has no comments to make on the EIA programme. The programme describes the different future situations sufficiently in terms of different lengths of service life extensions. Posiva has also been consulted on spent nuclear fuel in connection with the preparation of the EIA programme.

According to the statement, in the situation presented in the EIA programme, when the service life is extended by 20 years, the accumulation of spent nuclear fuel is approximately 3% more than Posiva has applied capacity for (6,500 uranium tonnes) in its licence application – in the other situations presented, the capacity will not be exceeded. In its own EIA programmes, Posiva has previously carried out impact assessments for significantly larger fuel volumes than in the project planned by TVO without a significant increase in environmental impacts. Posiva states that, if necessary, additional capacity will be applied for the final disposal of the spent fuel of its owners in accordance with the Nuclear Energy Act.

3.3.2 Central Organisation of Finnish Trade Unions SAK

The Central Union of Finnish Trade Unions SAK estimates that the project would have positive impacts on reducing greenhouse gas emissions and mitigating climate change. This is particularly true if/when nuclear power is compared to fossil-based energy. The project would also have positive impacts on the regional economy, the energy market, self-sufficiency in electricity and the functioning of the Finnish energy system.

According to the organisation, the programme is logical and contains all the essential elements, but remains superficial in some places, especially as regards the impacts of the current state of the environment to be assessed and the most significant environmental impacts. As regards the current state of soil, rock and groundwater, it would have been useful to record in the programme what kind of results have been achieved so far in groundwater research, deep drilling and underground disposal facilities. Similarly, it would have been justified to broaden the scope of the results of the bedrock surveys carried out. The probability of the presence of acid sulphate in the

Olkiluoto area is found to be very low in the current situation in the programme. However, it does not clearly state whether sulphate has already been found to have any effects on the area, e.g. eutrophication. According to the organisation, it would have been useful to open up more the impact of existing measures on groundwater. According to the statement, it is difficult to understand the proportion of occasional significant eutrophication and oxygen depletion in the water near the bottom caused by OL1 and OL2 in relation to other human-induced activities in the area, such as agriculture. Questions arise, for example, as to whether the change in sea water temperature would not also have an impact on the acceleration of eutrophication and the increase in oxygen loss.

According to the organisation, it would be justified to prepare alternative scenarios on the environmental impact of waste volumes and spent fuel and its growth in proportion to the same amount of energy produced with renewable energy.

3.3.3 Federation of Finnish Enterprises

The Federation of Finnish Enterprises states that it has no comments on the environmental impact assessment programme.

3.4 Statements provided in the international hearing

3.4.1 Bulgaria

In its reply, the Bulgarian Ministry of Environment and Water states that Bulgaria will participate in the EIA procedure for the project.

3.4.2 Austria

The Austrian Ministry of Climate, Environment, Energy, Mobility, Innovation and Technology submitted a reply accompanied by an expert opinion commissioned by the Austrian Environment Agency. The reply was also accompanied by a statement by the State of Upper Austria and the Vienna Environmental Ombudsman. The opinion of the Austrian Institute of Ecology, signed by 12 non-governmental organisations in addition to the Institute, was also annexed to the opinion.

In its opinion, the Austrian Environment Agency states that Austria will participate in the EIA procedure for the project. According to the Agency, the possibility of significant environmental impacts on Austria cannot be excluded, in particular in the event of a severe accident. In its reply, the Austrian Ministry of Climate, Environment, Energy, Mobility, Innovation and Technology hopes that Finland will later send an assessment report and information on public consultation and participation in the procedure to Austria.

According to the expert opinion, extending the service life of the plant units to more than 60 years would make these plants the first Gen II plants in Europe with such a long service life. According to the opinion, the assesment programme assesses local environmental impacts in great detail, but the assessment of transboundary impacts and the management of ageing remain less important. According to the statement, prolonging the service life of plant units increases the likelihood of a transboundary accident. The expert opinion requires the presentation of selection criteria and the criteria, technical basis, safety assessment and impact assessment for different options. There is also a need to consider alternatives such as new nuclear power plants or non-nuclear power plants.

According to the expert opinion, the cumulative effect of the power increase on structures and equipment must be carefully investigated, taking into account previous power increases at plant units. According to the expert statement, the assessment report should present an ageing management programme with measures, plans for handling increased failure of equipment as the service life increases, plant changes required by service life extension, an approach for meeting the requirements of the authorities as the service life grows longer, an action plan for carrying out the analysis of the periodic safety assessment, a report on the remaining issues and corrective measures, a concept for reaching the safety objectives of new nuclear power plants with the extension of the service life, and numerical values for the metrics available. With regard to power uprating, the report should include the power uprating concept, a detailed list of plant changes, detailed handling of safety margins, an examination of safety improvements and safety performance in relation to the safety targets set for new nuclear power plants, a list of analyses to be carried out within the framework of the periodic safety assessment, and an assessment of the impact of the power uprating on the ageing of structures, systems and equipment.

According to the expert statement, the assessment report should also present an analysis of extreme weather phenomena and the rise and flooding of sea water, taking into account the impacts of climate change, an assessment of human-induced external threats, a summary of the results of the assessment of human-induced threats, an assessment of the impacts of military measures, an assessment of the combinations of external threats taking into account several units on the site, information on safety margins, impacts of threshold phenomena (cliff-edge) and the necessary or planned safety improvements for the analysis of all external threats and a thorough analysis of events and emissions affecting several plant units.

According to the expert opinion, as a result of a severe accident, actual emissions can be significantly higher than 100 TBq. According to the statement, areas with a radius of more than 1,000 km must be taken into account in the dispersion modelling. Reference is made to the Flexrisk research project. According to the opinion, from the point of view of transboundary impacts on Austria, the assessment report should include a list of cases analysed to determine the source term, a detailed description of severe accidents and source terms, taking into account all radionuclides relevant for transboundary impacts, a detailed description of the modelling assumptions for accidents, a thorough presentation of the modelling of dispersion, a presentation of the significant assumptions and justifications for the distribution calculations, and a probability distribution of radiation impacts that covers all eventualities.

The statement by the State of Upper Austria contains observations on the length of the service life of the plant units and, among other things, on the principles on which the decision to extend the service life of the nuclear power plant should be based. According to the opinion, extending the service life of nuclear power plants and the use of older nuclear power plants increase the risks associated with the use of nuclear energy in Europe. The risks of faults and malfunctions also increase. New threat scenarios, such as terrorism and extreme natural phenomena, have also increased.

In its opinion, the Vienna Ombuds Office for Environmental Protection raises a number of detailed questions related to the reduction of the overall efficiency of the plant in the power increase alternative, analyses of the brittle fracture scenario of the reactor pressure tank, analyses of component replacements, impacts in the proximity of the core, component replacements, compliance of material with safety standards in case of several service life extensions, consideration of the Vienna safety declaration, the latest-generation security systems and environmental risks caused by terrorism and war and the consideration of these in the environmental impact assessment procedure.

3.4.3 Latvia

In its reply, the Latvian Environment Agency states that Latvia will participate in the EIA procedure for the project.

The Latvian Ministry of Health proposes that more detailed information on the transboundary effects of the project on human health be added to the Latvian-language assesment programme and summary.

3.4.4 Lithuania

In its reply, the Lithuanian Ministry of Environment states that Lithuania will not participate in the EIA procedure for the project. However, Lithuania requests the environmental impact assessment report for information.

3.4.5 Norway

In its reply, the Norwegian Environmental Authority states that Norway will not participate in the EIA procedure for the project.

3.4.6 Polish

In its reply, the Directorate-General for Environmental Protection in Poland states that Poland will not participate in the EIA procedure for the project.

3.4.7 Swedish

In its reply, the Swedish Environmental Protection Agency states that Sweden will participate in the EIA procedure for the project. A statement from the Swedish Radiation Safety Authority, the Swedish Forest Agency, Swedish Food Agency, the Swedish Board of Agriculture and the association Miljovänner för Kärnkraft is attached to the Swedish opinion.

The Swedish Radiation Safety Authority estimates that extending the service life and power uprating of the plant units may have significant environmental impacts in the Swedish territory as referred to in the Espoo Convention. According to the authority, the procedure should take into account severe accidents that exceed the planning criteria, such as the assumed accidents in the Radiation and Nuclear Safety Authority's report STUKA268. Emissions must be limited by the application of best available techniques (BAT), also in the case of continued operation.

The Swedish Forest Agency notes that only the release of radioactive substances as a result of a severe reactor accident can lead to significant transboundary effects. In the assessment of the transboundary effects of a severe reactor accident, the impacts on ecosystem services in Swedish forests must be taken into account. The Swedish Food Agency states that a detailed study, risk assessment and impact analysis should be carried out in the environmental impact assessment on how a severe accident would affect drinking water and food production – including fisheries – outside Finland's borders. For example, it should be investigated whether a severe accident can lead to exceeding threshold values for food (Euratom 2016/52) in the EU.

3.4.8 Germany

The Land of Saxony states in its reply that it will participate in the EIA procedure for the project.

The Land of Saxony states that the assessment report should focus in particular on the current state of safety-relevant components and the management of ageing. In addition, different scenarios should be considered that may lead to the release of radioactive substances and, correspondingly, to several different source terms of different sizes in order to better interpret and assess potential transboundary effects. According to the opinion, the programme does not clearly describe how the periodic safety assessment to be carried out by 2028 at the latest relates to the project and what significance it has for the planning of any necessary technical measures. According to the opinion, the assessment report should contain information on the extent to which the risks of accidents leading to the release of radioactive substances change as a result of different project alternatives and how they are handled.

3.4.9 Denmark

In its reply, the Danish environment agency states that Denmark will participate in the EIA procedure for the project.

3.4.10 Hungary

The Ministry of Economic Affairs and Employment will provide the Hungarian reply, after receiving it, to the developer for consideration in the EIA procedure.

3.4.11 Estonia

In its reply, the Estonian ministry of climate announced that Estonia will participate in the EIA procedure for the project. Estonia's response is accompanied by a statement from the Estonian rescue service.

According to Estonian rescue service, the assessment report must describe in more detail how extending the service life and increasing the power of the plant units affect neighbouring countries, including Estonia, in particular as to whether and to what extent the life and health of people is threatened. On this basis, Estonia may assess whether it would be necessary to implement a radiation preparedness plan for Estonia in the event of an accident, rescue measures caused by a radiation emergency at the level of Estonian rescue services, or, with a possible request for assistance, to support Finland with resources.

3.5 Other comments and opinions

3.5.1 Österreichisches Ökologie-Institut, Vorarlberger Plattform gegen Atomgefahr, Anti Atom Komitee, Wiener Plattform Atomkraftfrei, Mütter gegen Atomgefahr | Mothers against Nuclear Hazard, Waldviertler EnergieStammtisch, Verein Lebensraum Waldviertel, atomstopp_atomkraftfrei leben!, Plattform gegen Atomgefahren Salzburg (PLAGE) e.V./Platform Against Nuclear Dangers, Gemeinsam für Sonne und Freiheit, Begegnungszentrum für aktive Gewaltlosigkeit, Jihočeské matky, z.s., NGO Estonian Green Movement

The statement by NGOs contains observations on the examination of alternative forms of energy production, the transboundary effects of a severe nuclear accident, the consequences of the ageing of the power plant and the increasing external threats. According to the statement, the assessment report should present an alternative based on the use of renewable energy, energy efficiency and energy saving measures, as well as a long-term forecast of Finland's energy needs.

According to the statement, the assessment report must provide more information on the consequences of a severe accident. In this context, reference is made to the Flexrisk research project, which, according to the opinion, demonstrates that the breakage of the reactor pressure vessel and the early closure of the containment may result in the release of a large proportion of the radioactive storage from the plant units. According to the statement, the 1,000 km limit used in the dispersion calculation is therefore not sufficient. According to the opinion, safety standards for new nuclear power plants are not applicable to old plants. In addition, according to the statement, the risk of a severe accident increases as the nuclear power plant ages.

The statement also draws attention to external threats such as terrorism and warfare. The statement further draws attention to the risks posed by climate change, such as floods and other extreme weather events. According to the organisations, the assessment report should take into account how the above risks increase as the plant ages. In addition, the assessment report should include accident calculations with the highest source term with non-zero risk, and dispersion calculations for the whole of Europe, not just for a radius of 1,000 km.

3.5.2 Miljovänner för kärnkraft

The Miljovänner för kärnkraft organisation supports the project alternative VE2b, i.e., extending the service life of the plant units at an uprated power level until 2058. According to the organisation, the option in question, together with an environmental perspective in accordance with the Espoo Convention, is the best alternative for comprehensive consideration of the environment in electricity production in Finland and thus in the Nordic electricity market as a whole.

3.6 Comments made in the public event

In cooperation with the developer, the Ministry of Economic Affairs and Employment organised a public event on the assesment programme at the Olkiluoto Visitor Centre on 6 February 2024 from 5:30 p.m. to 7:30 p.m. The event allowed remote participation. Among other things, the event discussed the additional need for electricity transmission to the main grid, the increase in cooling water temperature and volume, the role of the Radiation and Nuclear Safety Authority, the increase in the amount of nuclear fuel used and the consideration of the impacts of climate change in the assessment.

4 Statement by the competent authority on the evaluation programme

The statement of the Ministry of Economic Affairs and Employment is based on the requirements laid down in sections 16 and 18 of the Act on Environmental Impact Assessment Procedure and section 3 of the Government Decree on Environmental Impact Assessment Procedure (277/2017, hereinafter also the EIA Decree) as well as the statements and opinions received regarding the assesment programme. The ministry considers that the assesment programme meets the content requirements laid down in section 3 of the EIA Decree. The assesment programme presents a description of the project, its purpose, planning phase, location, size, land use need and its relation to other projects. In addition, the programme contains information on the developer of the project, an assessment of the project’s planning and implementation schedule, and information on the plans and permits required for the implementation of the project. In addition, as required by the above section, the programme presents reasonable alternatives to the project that are relevant for the project and its specific characteristics and one of which is the non-implementation of the project.

The ministry considers that the assesment programme is a sufficiently extensive and detailed plan for assessing the environmental impacts of the project, provided that the issues presented in this statement are taken into account as the project progresses and in later stages of the EIA procedure. In addition, other questions, comments and points of views have been raised in the statements and opinions received by the competent authority, to which the developer should pay attention.

4.1 Environmental impacts to be assessed and their assessment

As required by section 3 of the EIA Decree, the assesment programme contains a description of the current state and development of the environment in the likely impact area of the project as well as a proposal for identified and assessed environmental impacts, including transboundary environmental impacts and combined impacts with other projects, as well as justifications for the limitation of the environmental impacts to be assessed. In addition, the programme presents information on the reports prepared and planned on environmental impacts as well as the methods used for acquiring and evaluating the material and the related assumptions.

According to the assesment programme, based on preliminary planning data, the continuation of the current type of impacts after the current licence period, either until 2048 or until 2058, has been identified as the most significant environmental impact at this stage. In the case of power uprating, some changes will take place in the operation of the plant units, the most significant of which is an increase in the thermal load of cooling water. Based on preliminary data, the temperature of the cooling water discharged into the sea area would increase by approx. 1 °C compared to the current activity. This would have a slight impact on surface waters and ichtyofauna, also taking into account climate change scenarios.

According to the assesment programme, the positive effects of the greatest significance of the continuation of the operation of plant units and uprating their thermal power would very likely be on regional economies. The energy market is also expected to experience positive effects of great significance. In addition, the project is estimated to have positive impacts on, for example, greenhouse gas emissions and climate change mitigation.

According to the assesment programme, the aim is to define the scope of the environmental impact assessment area so that significant environmental impacts cannot be expected to occur outside the area under consideration. If it is established during the assessment procedure that an environmental impact has a wider impact area than expected, the impact area will be redefined. The environmental impacts will be examined especially in the power plant area and its surroundings, but the scope will also be extended if necessary. According to the assesment programme, the areas under review have been defined to the extent where the impacts could reach, at a maximum. The assesment programme states that in reality, environmental impacts will likely take place in an area smaller than the area under review.

According to the assesment programme, the uncertainties related to the assessment and their significance are described in the assessment report. In addition, as part of the environmental impact assessment work, the possibilities of preventing or mitigating the potential adverse impacts of the project are examined, for example, by means of planning and implementation. The identified prevention and mitigation measures are presented in the EIA report. When assessing the significance of environmental impacts, both the magnitude of the change and the sensitivity of the object affected are taken into account. Based on their significance, the impacts are classified as minor, moderate, large and very large. The impacts may be either positive or negative from an environmental point of view.

Next, the ministry will make some detailed observations to which the developer must pay attention in the further work of the project.

4.1.1 Continuation of operation, power uprating and management of ageing

Continuation of the operation of the plants is linked to the two implementation options examined in the assesment procedure, namely the continuation of the operation at the current power level until 2048 (VE1a) or 2058 (VE1b) and the continuation of the operation at an uprated power level until 2048 (VE2a) or 2058 (VE2b).

The assesment programme points out that the plant units have been qualified for a service life of 60 years. Qualification of the systems for a service life of 70 or 80 years is planned to be done through a separate management programme by 2038. According to the assesment programme, the same basic principles of nuclear and radiation safety will be observed during the continuation of operation as in the current legislation. During the continuation of any use, safety improvements will also be made in accordance with a good safety culture. According to the assesment programme, the maintenance and improvement work required to continue the operation of the plant units is carried out within the plant units and there is no need for additional construction in the power plant area.

Increasing the thermal power of the plant units is related to project options VE2a and VE2b. According to the assesment programme, the maintenance and improvement work already carried out in the plant units in previous years will enable the implementation of the power uprating and its combination with a periodic safety assessment to be carried out by 2028 at the latest. According to the assesment programme, uprating the reactor thermal power can be achieved through changes and reparameterisation of existing systems without substantially changing their functionality.

The Ministry of Economic Affairs and Employment considers it important that the risk factors related to the possible extension of the service life of the plants and the impacts of the ageing of the plants are carefully assessed and that the means of preventing or mitigating the impacts are assessed. The Radiation and Nuclear Safety Authority will assess the safety of continued operation and power uprating later in connection with the processing of the licence application.

In addition, the ministry notes that the assessment report should contain a concise description of the methods used to monitor ageing and reduce the consequences of ageing. In particular, methods should be described to prevent possible risks of accidents and, consequently, high emissions resulting from ageing. The assessment report should also address the application of the BAT principle to reduce or prevent emissions. The impact of power uprating on ageing should also be addressed.

4.1.2 Surface and groundwater and ichtyofauna

The assesment programme identifies, in the case of continued operation, as the most significant environmental impacts the continuation of present-like effects and, in the case of power uprating, the increase of the thermal load of the cooling water. Based on preliminary data, the temperature of the cooling water discharged into the sea area would increase by approx. 1 °C compared to the current activity. This would have a slight impact on surface waters and ichtyofauna, also taking into account climate change scenarios.

According to the assesment programme, the impacts of the thermal load caused by the project on the physicochemical water quality and ice conditions, and possible indirect impacts on the ecological and chemical status of the marine area in different alternatives will be assessed as an expert assessment based on the current state of the marine area and the distribution modelling of heated cooling water. The assessment focuses on Olkiluoto's nearby sea area within a radius of approximately 10 km. The groundwater impact assessment examines whether the project will have an impact on the quality, quantity or surface level of groundwater. Existing research data on groundwater conditions and the quality of groundwater in the area are used as the basis for the assessment.

The Ministry of Economic Affairs and Employment notes that the impacts of cooling waters are the most significant of the environmental impacts of a nuclear power plant during normal operation. However, in the ministry's view, the assessment of impacts on water bodies should not only be restricted to cooling waters, but the impacts should be assessed for the entire operation of the plant. The significance of climate change to the environmental impacts of the project must be taken into account in modelling.

4.1.3 Risks caused by climate change and external threats

According to the assesment programme, the risks caused by climate change (e.g. rising sea level or floods) to the project will be identified during the EIA report phase with regard to possible exceptional situations and accidents related to them, and preparation for the risks will be described.

The Ministry of Economic Affairs and Employment states that climate change affects external threats to the plant, including extreme weather phenomena. The ministry considers that the assessment report should assess phenomena caused by climate change at the site and the preparedness for them. External threats to the project include not only extreme weather phenomena but also other threats. External threats and the risks arising from climate change must be taken into account when assessing the safety of the project. The Radiation and Nuclear Safety Authority will assess the safety of the project later in connection with the processing of the licence application.

4.1.4 Emissions of radioactive substances and radiation

According to the assesment programme, the radiation exposure of employees and the impacts of emissions of radioactive substances are assessed based on the actual emissions of radioactive substances in the power plant and the radiation doses received by the employees. Radioactive emissions to air and water and the calculated radiation doses caused by them to the inhabitants of the surroundings are presented and compared to the set emission limits and dose limits. According to the radiation monitoring carried out in the surroundings of the plant area, the examination area is approximately 10 km, and further the examination area for radiation dose calculations is 100 km.

The Ministry of Economic Affairs and Employment considers the proposed assessment appropriate. In addition, the ministry states that the radiation doses of employees must be examined in accordance with the ALARA principle, also taking into account the effect of the power uprating.

4.1.5 Waste and by-products

According to the assesment programme, the EIA report describes the quantity, quality and treatment of very low, low and intermediate-level waste generated in the operation of the nuclear

power plant as well as conventional and hazardous waste. The related environmental impacts are assessed on the basis of, for example, the properties of waste and by-products, waste treatment methods and final disposal solutions. The processing and intermediate storage of spent nuclear fuel in the power plant area and the transport of spent nuclear fuel from the power plant to the Posiva encapsulation and final disposal plant in Olkiluoto are described. The environmental impacts of the transports and final disposal of spent nuclear fuel have been assessed in Posiva's encapsulation and final disposal facility's environmental impact assessment procedure, the main results of which are described in the EIA report. In addition, the risk and implementation method report on transports will be utilised.

According to the assesment programme, extending the service life does not affect the amount of fuel used annually, but the amount of fuel removed from the reactor annually remains at the current level (19 t/year). However, in the continuation of plant units, the total amount of spent nuclear fuel will increase according to the additional years of operation. If the operation continues from 2038 to 2048, the total amount of spent nuclear fuel will increase by about 378 t. If the operation continues until 2058, the corresponding increase is approximately 767 t. According to the current plan, the final disposal of spent fuel at Posiva is to begin in the 2020s, in which case the capacity of the interim storage for spent fuel will be sufficient to accept the spent fuel from the OL1 and OL2 plant units. If the start of final disposal activities at Posiva were to be substantially delayed for some reason, storage capacity at the KPA storage may need to be increased.

The assessment programme points out that Posiva will licence the capacity of its disposal facility to match the needs of its owner´s nuclear power plants. Posiva has previously carried out an EIA procedure for 12,000 uranium tonnes of spent nuclear fuel, which included the Olkiluoto 4 and Loviisa 3 plant units that were being planned at the time. Based on the aforementioned environmental impact assessment, the impacts on the environment will not substantially increase even if more fuel is placed in final disposal. According to the assesment programme, the extension of service life does not significantly affect the annual accumulation of very low, low and intermediate-level waste. However, the total amount of nuclear waste mentioned above will increase according to the additional years of operation. The programme estimates that the total capacity of the VLJ repository is sufficient for the final disposal of the nuclear waste in question.

In the Ministry of Economic Affairs and Employment's view, extending the service life of nuclear power plant units as well as uprating their thermal power will significantly increase the amount of spent nuclear fuel. The total amount of other nuclear waste will also increase. The ministry considers important the company's planned report on waste and by-products in the Olkiluoto area. Attention should be paid to the adequacy and timeliness of the nuclear waste management arrangements required for the extension of service life. Attention should also be paid to the potential impacts of the fuel technology changes required by the power uprating on existing nuclear waste management arrangements. If the environmental impact assessment of the implementation of nuclear waste management refers to previous environmental impact assessments, their most significant impacts must be described.

4.1.6 Exceptional and accident situations and transboundary impacts

According to the assessment programme, the EIA report examines a severe reactor accident as an imaginary accident case. The assessment is based on the assumption that an amount of radioactive substances equivalent to the limit value for a severe accident pursuant to section 22 b of the Nuclear Energy Decree (161/1988) is released into the environment (100 TBq of Cs-137 nuclides). The impacts of such a release´s dispersion in the accident will be studied over a distance of 1,000 km from the power plant. The fallout and radiation dose resulting from the release and

the impacts on the environment will be described on the basis of the modelling results and existing research data. In addition, the EIA report describes identified environmental and safety risks related to the operation of the power plant and assesses the impacts of potential incidents and accidents based on authority requirements and the power plant´s safety and risk analyses, among other things.

According to the assesment programme, the preliminary estimate for the alternatives to be examined in the EIA procedure is that only the impacts of releases of radioactive substances resulting from a severe reactor accident could extend beyond the borders of Finland. The EIA report assesses possible transboundary, for example on the basis of dispersion calculations, in which the impacts of the dispersion of the accidental release are examined up to 1,000 km from the power plant. In addition, other possible risks related to incidents, accidents and transports are examined and the potential for the impacts extending beyond the borders of Finland is assessed.

The Ministry of Economic Affairs and Employment notes that Finland has set the high emission threshold value at 100 TBq caesium-137 and this value has been used as a source term describing an INES 6 category accident in Finnish environmental impact assessments. The ministry considers that it is appropriate for the developer to present a comparison between the source term used and more realistic emissions estimated for the plant under review. At the same time, the developer should also examine the plant's safety principles that aim to prevent or reduce major emissions in the event of severe accidents.

The ministry also notes that the assessment report must also address any other exceptional situations and risks, such as fires or transport-related risk situations. Assessing the impacts of exceptional circumstances and emergencies must not be limited to the exclusion area or the emergency planning zone for rescue operations. The EIA report must contain various accident scenarios involving emissions and, with the help of illustrative examples, describe the extent of the affected zones and the impact of emissions on people and nature.

4.1.7 Energy market and security of supply

According to the assesment programme, the impacts on the energy market and availability of electricity are assessed on the basis of statistics, forecasts and reports on the electricity markets in Finland and other Nordic countries, taking into account Finland's target of carbon neutrality by 2035. The impacts on the electricity market are examined taking into account the schedule for the various project alternatives.

The Ministry of Economic Affairs and Employment notes that it is appropriate to assess the impacts on the energy market and security of supply, but the developer is not required to carry out nationwide energy market and security of supply reviews.

4.2 Competence of the authors of the assesment programme

According to section 33 of the EIA Act, the developer must ensure that it has sufficient expertise available to prepare the environmental impact assessment programme and report. The competent authority will evaluate the expertise when reviewing the assessment programme and report. According to the detailed rationale of the act (HE 259/2016 vp, detailed rationale of section 33), the provision is flexible, as in addition to training and experience, the adequacy of expertise can be assessed by taking into account, for example, the competence in a special field demonstrated in practice by the experts used by the developer.

The environmental impact assessment programme was prepared by Ramboll Finland Oy as a consultant. The experts participating in the EIA working group are presented in appendix 2 of the assesment programme.

The Ministry of Economic Affairs and Employment notes that the assesment programme contains, as required by section 3 of the EIA Decree, sufficient information on the qualifications of the parties preparing the assesment programme. The ministry considers that the developer has sufficient expertise at its disposal in the preparation of the environmental impact assessment programme.

4.3 Plan for the EIA procedure and participation

The assesment programme includes a plan for organising the assesment procedure and the related participation and interaction. The assesment programme describes the public events organised in connection with the assesment programme and later in connection with the assessment report. A monitoring group consisting of different stakeholders is to be set up for the assesment process.

The assesment programme includes a preliminary schedule for the project and the EIA procedure. According to the assessment presented in the assesment programme, the developer will submit the assessment report to the competent authority in August 2024. The period of availability for viewing of the assessment report would be August, September and October 2024. The reasoned conclusion of the competent authority would then be issued in December 2024.

The ministry notes that, as required by section 3 of the EIA Decree, the assesment programme presents, to the extent necessary, a plan for organising the assesment procedure and the related participation as well as their connection to the planning of the project and an estimate of the date of completion of the assessment report.

5 Submission and communication of the competent authority’s statement

In accordance with section 18 of the EIA Act, competent authority will give its statement on the environmental impact assessment programme and other statements and opinions to the developer. At the same time, the statement will be forwarded to the relevant authorities and published on the ministry’s website at https://tem.fi/olkiluoto-ol1-ja-ol2-yva-ohjelma.

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