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Fennovoima Oy
Salmisaarenaukio 1
00180 HELSINKI

ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR FENNOVOIMA OY'S NUCLEAR POWER PROJECT; CONTACT AUTHORITY'S STATEMENT

On 9 October 2008, Fennovoima Oy submitted an environmental impact assessment report (the EIA report) to the Ministry of Employment and the Economy (hereinafter the MEE) in accordance with the environmental assessment procedure (the EIA procedure), pursuant to the Environmental Impact Assessment Act (468/1994; EIA Act), on the project for constructing a new nuclear power plant unit. This MEE statement constitutes that issued by the contact authority, as required under the EIA Act, on the construction project in question, and also concludes the EIA procedure for the project.

1 Project information and EIA procedure

1.1 Organisation responsible for the project and the contact authority

The organisation responsible for the project is Fennovoima Oy. Its primary consultant in the environmental impact assessment procedure has been Pöyry Energy Oy.

Pursuant to the EIA Act, the Ministry of Employment and the Economy is acting as the contact authority in the EIA procedure.

1.2 The project and its alternatives in the EIA report

Fennovoima has assessed the environmental impacts of the nuclear power plant project in three, alternative locations. The assessment presented in the EIA report concerns the construction and operation of one or two nuclear power plant units in one of the following

municipalities and sites: Hanhikivi in Pyhäjoki, Kampuslandet and Gäddbergsö in Ruotsinpyhtää or Karsikkoniemi in Simo.

The project's EIA programme and the initial stages of the EIA assessed the construction of the plant in Norrskogen and Kilgrund in Kristiinankaupunki, in addition to the aforementioned alternative sites. Environmental impact assessments concerning these alternatives are not contained in the EIA report. Indeed, due to decisions made on the project at a later stage, Fennovoima has also omitted the site alternative of Kampuslandet in Ruotsinpyhtää.

Two nuclear power plant options are being assessed under the project, the first involving a nuclear power plant unit with a production capacity of some 1,500–1,800 MW and thermal power of 4,500–4,900 MW.

The second alternative involves a plant consisting of two reactors with a production capacity of around 1,000–1,250 MW respectively, and a combined thermal power of 5,600–6,800 MW. Both a pressurised water reactor and a boiling water reactor are under consideration. For the purposes of this report, 'project' refers to the entire Fennovoima nuclear power plant project. Whenever the alternative involving two nuclear power plant units is discussed, the definition 'nuclear power plant units' is used.

The project also includes the intermediate onsite storage of spent nuclear fuel generated by the new unit, the treatment of low- and intermediate level waste, and the final disposal repository. Furthermore, the project entails the implementation of the required power transmission to the national grid.

If the project is implemented, Fennovoima aims to commence the construction of the new nuclear power plant in 2012. The plant could be commissioned sometime around 2018, and in the case of two reactors, the first construction site would proceed one or two years ahead of the second.

The zero option in the EIA report is a situation in which the project is not implemented. Since Fennovoima would not consider building another type of power plant instead of the nuclear power plant, the zero option would entail increasing the import of electricity to Finland and/or implementing other organisations' power plant projects in order to meet the corresponding electricity requirements. The environmental impacts of the zero option are illustrated in an overview of public estimates of the environmental effects of various methods of power production.

1.3 Licensing procedures of a nuclear facility

The licensing procedure of a nuclear facility is described in the Nuclear Energy Act (990/1987, NEA). The first stage is the Government's decision-in-principle, which remains in force only if ratified by Parliament. An EIA report by the organisation responsible for the project is required as a supplement to the application for a decision-in-principle, and thus the report constitutes part of the material required for the consideration of the decision-in-principle.

At a later stage, the implementation of a nuclear facility project requires a construction licence in compliance with the Nuclear Energy Act, and prior to the commissioning of the facility, a separate operating licence. Both are granted by the Government.

Decision-making and the licensing system are based on a number of principles, including the continuous review of safety, and the specification of assessments throughout the lifecycle of the nuclear facility.

Furthermore, a significant number of other permits not stipulated by the Nuclear Energy Act are required for the construction of a nuclear power plant, such as permits in compliance with the Environmental Protection Act and the Water Act, and a building permit issued by the local municipality. Moreover, all planning concerning the prospective nuclear facility must be appropriately completed prior to applying for the building permit and construction licence.

1.3.1 Environmental impact assessment procedure

The EIA procedure constitutes part of the safety and environmental impact assessment for nuclear power plants pertaining to a decision-in-principle under the Nuclear Energy Act (990/1987, NEA). However, it does not form part of the actual licensing process of a nuclear power plant unit.

The EIA procedure is implemented in two stages: initially, the organisation responsible for the project compiles a plan on environmental impact assessment, i.e. the EIA programme, and on the basis of statements and opinions presented on the programme, the contact authority duly issues its statement.

Thereafter, the organisation responsible for the project prepares an environmental impact **assessment report** based on the assessment programme, the contact authority's statement and various reports.

During the second hearing, the Ministry of Employment and the Economy invites several ministries, alongside certain other authorities and organisations, to submit their comments on the EIA report. The general public can participate in this hearing, and also in the hearing at the programme stage. On the basis of the EIA reports and comments given, the Ministry will prepare its final statement in conclusion of the

EIA procedure, which typically takes at least one year in the case of nuclear power plant projects.

1.3.2 Decision-in-principle

The new nuclear power plant complies with the definition of a nuclear plant of considerable general significance, as laid down in the Nuclear Energy Act, requiring the Government's project-specific decision-in-principle on whether the construction project is in line with the overall good of society. In accordance with the Nuclear Energy Decree (161/1988, NED), the decision-in-principle shall include, among other contents, an EIA report complying with the Environmental Impact Assessment Act. The scope of the project, outlined in the application for a decision-in-principle, may not exceed that described in the EIA report, entailing that, for example, the thermal power cannot exceed the maximum thermal power specified in the EIA procedure.

Processing of the application for the decision-in-principle is not solely based on the material provided by the applicant, since the authorities will acquire supplementary reports, both those required under the Nuclear Energy Decree and others deemed necessary, providing a broader analysis of the project. In preparation for the processing of the application, the Ministry of Employment and the Economy will obtain a statement from the council of the local authority intended as the site of the prospective facility, and from its neighbouring local authorities, the Ministry of the Environment and other authorities, as laid down in the Nuclear Energy Decree. In addition, the Ministry must obtain a preliminary safety assessment of the project from the Radiation and Nuclear Safety Authority (STUK).

Pursuant to section 24(h) of the Nuclear Energy Decree, the application for a decision-in-principle shall include an overview of the applicant's plans and available methods for arranging nuclear waste management. The submission of plans based on binding agreements involving matters such as the nuclear waste management of the nuclear power plant project, cannot be expected during the decision-in-principle stage. This rule also applies to the arrangements for fuel supply management (section 24(g) under the Nuclear Energy Decree).

The Ministry of Employment and the Economy will provide local authorities, residents and municipalities in the immediate vicinity of the power plant with an opportunity to express their opinions in writing before the decision-in-principle is made. This will be partly based on the overview of the plant project, publicised by the applicant, the environmental impact assessment of the plant, and its safety. Therefore, the report must be made generally available, and for instance in the municipality where the planned site of the facility is located, it will be distributed to all households (NEA, section 13).

The Ministry will also arrange a public meeting, where the general public will have the opportunity to express opinions verbally or in writing. These responses will be submitted to the Government.

Pursuant to the Nuclear Energy Act, before making the decision-in-principle, the Government shall ascertain whether the municipality forming the intended location of the nuclear facility is in favour of said facility, and ensure that no facts indicating insufficient prerequisites for the safe construction and use of a nuclear facility, and for the requisite protection of people, the environment and property from harm, appear in the statement from STUK or elsewhere during the processing of the application. The Government's decision-in-principle shall be forwarded, without delay, to Parliament for its perusal. Parliament may reverse the decision-in-principle or decide that it should remain in force as it stands.

1.3.3 Construction licence

The actual licensing procedure follows the Government's decision-in-principle. Construction of the nuclear power plant requires a construction licence issued by the Government, stating that the construction of the facility is in line with the overall good of society. Furthermore, the prerequisites for granting the construction licence include sufficient account being taken, in planning the operations, of general safety, the protection of workers, the safety of the population and environmental protection measures, and the appropriateness of the location of the nuclear power plant with respect to said operations.

Any decision regarding the construction licence for the project shall describe how the EIA report and the related statement by the contact authority have been applied (section 13 of the EIA Act).

In connection with the construction licence application, it will be verified that a site has been reserved for the construction in a local detailed plan and that the applicant has possession of the site required for the operation of the facility (section 19(4) of the Nuclear Energy Act). Therefore, the requisite land use planning process must be finalised by this stage (cf. section 9 of the EIA Act). However, information and reports emerging from the EIA procedure can be used in the land use planning process.

A hearing procedure involving municipalities, authorities and citizens will be arranged during the application process for the construction licence.

1.3.4 Licence to operate

Operation of a nuclear power plant requires a licence to operate a nuclear facility, issued by the Government. In order for such a licence to be granted, the operation of the nuclear facility must be arranged so as to conform with the overall good of society, taking due account

of the protection of workers, general safety and environmental protection.

A hearing procedure involving the municipalities concerned, authorities and citizens will be arranged during the operating licence application process.

1.3.5 Other required licences

Activities causing the risk of environmental pollution require a permit in compliance with the Environmental Protection Act. In such a case, the thermal load caused by the cooling water of a condensing power plant is the most significant impact requiring assessment. Such activities are subject to licence on the basis of the Environmental Protection Act (86/2000) and the Environmental Protection Decree (169/2000) issued on the basis of the aforementioned Act. The environmental permit covers all issues pertaining to environmental impacts, such as emissions into the air and water, waste management (excluding nuclear waste), noise abatement and any other related issues.

Separate environmental permits are required for operations during the construction stage, and a building permit granted by the local municipality is required for the actual construction. Extraction of water from water bodies, related to the operation of a power plant, is subject to obtaining permission under the Water Act (264/1961). The EIA procedure must be completed before any licences or permits are granted.

Other technical permits related to environmental impacts include permits for inflammable liquids and pressurised containers, and permits under the Chemicals Act.

2 Communication pertaining to the assessment report, and hearing

A public notice on the assessment report was published on 20 October 2008 (in the first issue of the newspaper after that date) in Helsingin Sanomat, Hufvudstadsbladet and the following newspapers: Ilkka, Vasabladet, Kalajokilaakso, Keskipohjanmaa, Pyhäjokiseutu, Raahelainen, Raahen Seutu, Vieskalainen *(Pyhäjoki area*); Borgåbladet, Uusimaa, Kymen Sanomat, Loviisan Sanomat, Östra Nyland – Kotka Nyheter, Etelä-Suomen Sanomat (*Ruotsinpyhtää area*); Kaleva, Lounais-Lappi, Meri-Lapin Helmi, Pohjolan Sanomat *(Simo area*).

The public notice and assessment report are available from the Ministry of Employment and the Economy website, www.tem.fi.

Members of the public were able to view the assessment report between 20 October and 22 December 2008 in the local government offices of the following municipalities: **Pyhäjoki, Ruotsinpyhtää, Simo,** Raahe, Alavieska, Vihanti, Merijärvi, Siikajoki, Oulainen,

Kalajoki, Pyhtää, Lapinjärvi, Pernaja, Elimäki, Loviisa, Anjalankoski, Keminmaa, Tervola, Ranua, Ii, Kemi. All of the aforementioned were also invited to comment on the EIA report.

Together with the organisation responsible for the project, the Ministry organised a public meeting to discuss the project on 4 November in Simo, on 5 November in Pyhäjoki, and on 6 November in Ruotsinpyhtää.

Moreover, the following organisations were invited to comment on the assessment report:

Ministry of the Environment, Ministry for Foreign Affairs, Ministry of the Interior, Ministry of Social Affairs and Health, Ministry of Defence, Ministry of Finance, Ministry of Transport and Communications, Ministry of Agriculture and Forestry, the Radiation and Nuclear Safety Authority (STUK), State Provincial Office of Southern Finland, State Provincial Office of Oulu, State Provincial Office of Lapland, Western Finland Environmental Permit Authority, Northern Finland Environmental Permit Authority, Finnish Environment Institute, Regional Environment Centre of Lapland, Regional Environment Centre of North Ostrobothnia, Regional Environment Centre of Uusimaa, Occupational Safety and Health Inspectorate of Northern Finland, Occupational Safety and Health Inspectorate of Vaasa, Occupational Safety and Health Inspectorate of Uusimaa, the Safety Technology Authority (TUKES), TE Centre for Kainuu, TE Centre for Southern Ostrobothnia, TE Centre for Northern Ostrobothnia, TE Centre for Lapland, TE Centre for Uusimaa, Regional Council of Northern Ostrobothnia, Regional Council of Ostrobothnia, Regional Council of Lapland, Regional Council of Itä-Uusimaa, the National Board of Antiquities, the Finnish Game and Fisheries Research Institute, the Confederation of Finnish Industries (EK), Finnish Energy Industries (ET), WWF, Greenpeace, Finnish Association for Nature Conservation, the Finnish Society for Nature and Environment, Central Union of Agricultural Producers and Forest Owners (MTK), Confederation of Unions for Professional and Managerial Staff in Finland (Akava), Central Organisation of Finnish Trade Unions (SAK), Finnish Confederation of Salaried Employees (STTK), Federation of Finnish Enterprises, Fingrid Oyj, Posiva Ltd, Fortum Oyj, TVO Oyj, Finavia, Finnish Civil Aviation Authority, Lapland Fire and Rescue Services, Itä-Uusimaa Fire and Rescue Services, Jokilaaksot Fire and Rescue Services.

The Espoo Convention (67/1997) will be applied to the assessment of the project's cross-border environmental impacts. Furthermore, the parties to the Espoo Convention have the right to participate in the EIA procedure. The Ministry of the Environment is responsible for the practical arrangements for conducting the international hearing. Austria, Sweden, Norway, Germany, Estonia, Lithuania and Poland participated in the international hearing on the EIA report.

3 Summary of comments and opinions

The following summary of the comments received by the Ministry on the EIA report focuses on the critical aspects presented in the statements, in order to carry forward the project and the handling process of the related application for a decision-in-principle. In this respect, the summary does not provide a complete overview of the opinions of the organisations commenting on the report. In the summary, any direct quotations are shown inside quotation marks. Otherwise, the statement summaries comprise abstracts created by the Ministry, or conclusions drawn from the original statements. The statements of the Ministry of the Environment, and the Radiation and Nuclear Safety Authority (STUK) are included in full, as verbatim quotations.

This summary has a particular focus on the remarks on whose basis the adequacy of the EIA report can be assessed at this stage of the nuclear power project. The organisations issuing statements have also issued remarks and proposals for improvements alongside other advice and requirements concerning the planning and monitoring of the project, in case it proceeds further. These aspects will be reviewed later.

3.1 Statements

Ministry of the Environment:

General issues

In this project, it is noteworthy that all of the proposed alternative sites are located in areas where no previous industrial activity exists, rendering the local impacts of the project substantial. In terms of environmental protection, the most significant impacts and threats during the project's operational phase relate to nuclear safety, nuclear waste management and cooling waters.

In this statement, the Ministry of the Environment primarily examines how the issues presented in the statement by the Ministry on the assessment programme have been taken into account in the EIA procedure. In addition, the statement highlights distinct defects in the assessment report. At this point, the Ministry takes no stand on the acceptability of the project or its environmental impacts, or indeed, the necessity of the project.

In this statement, the Ministry of the Environment does not present its own detailed comments on special issues affecting various prospective plant sites, but refers to the statements issued on the assessment report by regional environment centres (Regional Environment Centre of Lapland, Regional Environment Centre of North Ostrobothnia, Regional Environment Centre of Uusimaa) and Metsähallitus.

Project and its alternatives

The alternative sites for the project are the cape of Hanhikivi in Pyhäjoki, the island of Kampuslandet in Ruotsinpyhtää, the cape of Gäddbergsö in Ruotsinpyhtää, and Karsikkoniemi in Simo. As concerns the

alternative site of Kristiinankaupunki, included in the assessment programme, surveys were terminated in June 2008. The assessment report does not include any reasons for this.

In its statement on the EIA programme, the Ministry of the Environment proposed that the EIA report separately handle at least the various reactor alternatives on the market that may come into question, their environmental impacts and the differences between them with a view to nuclear safety.

The Ministry of the Environment approves of the report's presentation of the three reactor alternatives selected for the project (chapter 3.2.3). However, the environmental impact assessment (chapter 8) has primarily been conducted for two alternatives: a one unit plant, with an electrical output of 1800 MW, and a two unit plant, with an electrical output of 2500 MW. This approach can be considered sufficient.

As concerns nuclear safety (chapter 6), the assessment report does not handle the possible impacts of the reactor type, output and number of reactors on safety. All in all, the report reviews nuclear safety on a rather general level with reference to legislation, instructions and general principles. The report (p. 119) states that 'Fennovoima's nuclear power plant will be designed and constructed to meet the requirements set by legislation and the authorities'. It is self-evident that the safety requirements provided by law and various instructions shall be fulfilled. However, this does not reveal how well the different plant options can meet these requirements, or clearly exceed them.

Grounds for the project, the zero alternative and energy saving

The project is justified (chapter 1.3) by the fact that Fennovoima's shareholders need electricity at competitive, stable prices for their operations. One of the main purposes of the project is therefore to enhance competition on the electricity market. The assessment report (p. 41) states that 'energy production must be increased in order to secure the operational requirements for, and expand the operations of, Finnish industry and commerce.' Moreover, the report states that electricity consumption in Finland has been increasing continuously, and this rising trend will continue. However, the Finnish Energy Industries' bulletin of 22 January 2009 states that, in 2008, electricity consumption decreased by as much as 3.8 per cent as a consequence of the recession and warm weather conditions. The bulletin did not include any estimate of how long the declining trend would continue and how it would influence prognoses issued.

The electricity consumption prognoses of the Finnish Energy Industries and the Confederation of Finnish Industries, for the period until 2030, have formed the basis of Fennovoima's nuclear power plant project. However, the National Climate and Energy Strategy, prepared by the Ministry of Employment and the Economy, and approved by the Government on 6 November 2008, includes considerably more moderate growth targets for electricity consumption.

Growth in electricity consumption

According to the objective of the National Climate and Energy Strategy, in 2020 electricity consumption will be 98 TWh, and 92-93 TWh in 2030. However, according to the prognosis of the Finnish Energy Industries and the Confederation of Finnish Industries, electricity consumption will attain 107 TWh in 2020 and 115 TWh in 2030.

As the project's zero option, chapter 8.19 reviews a situation in which the project remains unimplemented and Fennovoima's shareholders are forced to acquire the electricity they need from other sources. The zero option assumes that the majority of the planned electricity output of Fennovoima's nuclear power plant will be replaced with electricity imported from the Nordic electricity market and Russia, while approximately one third of the electricity production volume will be replaced with national, separate production, and a minor part with the combined production of electricity and heat. On the basis of these assumptions, sulphur dioxide, nitrogen oxide and particle emissions as well as carbon dioxide emissions generated by the zero option have been calculated.

Chapter 8.19.2 of the report briefly summarises the results of the survey on energy savings measures concerning Fennovoima's shareholders, with the conclusion that the shareholders' remaining potential for enhancing electricity consumption efficiency is marginal in relation to their need for electricity, and these measures cannot replace the electricity production of the prospective nuclear power plant.

It is positive that Fennovoima has surveyed its shareholders' energy savings measures, but an assessment of the impacts of the completed and planned energy saving / energy efficiency measures is not possible on the basis of the facts presented in the assessment report. Indeed, a study and the disclosure of the level of associated companies' energy efficiency (BAT-benchmarking) would have been called for, alongside an evaluation of the measures taken to enhance such efficiency over the last few years, and measures planned for this purpose.

On the whole, the zero option is given only cursory consideration. In particular, the survey of the composition of replacement electricity production is ill-founded and the assessment of the environmental impacts involved in such electricity production remains inadequate.

Assessment of the project's environmental impacts

The Ministry of the Environment's statement on the assessment programme averred that the descriptions of the current environmental status of the site alternatives are, in part, very general and defective in nature, and additional surveys are required as a basis for an impact assessment. Only after this can the impacts of the project be properly assessed. Moreover, the Ministry emphasised that the descriptions of the current status of the environment should be presented in the report for the various site alternatives in a commensurate and illustrative manner, in order to facilitate a balanced comparison of the alternatives.

The Ministry of the Environment still finds the assessment report's descriptions of the current status defective in parts. This complicates the assessment of the project's environmental impacts, particularly as

concerns the assessment of the magnitude of impacts and their significance. It is problematic that any balanced comparison of site alternatives is jeopardised due to this.

Impacts on land use

The Ministry of the Environment finds that the report's assessment (chapters 8.1.1.3, 8.1.2.3 and 8.1.3.3.) of the project's impacts on land use partly underestimates these and their significance. Regarding all site areas, the report states that 'At present, there is no active land use in the actual site area, so that in this respect the change will not be significant.' Such a description of an unbuilt forest area in its natural state, evidently used for recreational purposes, as an area with no active land use, seems too cursory. Moreover, it is wrong to suggest that the project would have only a minor impact on land use, while in any case the purpose of all of the site areas would change completely, imposing restrictions e.g. on the recreational use of these areas. The report should have openly pointed out that the current primary forms of usage (forestry, recreational use) of the assessed site areas will no longer be possible after the construction of a nuclear power plant. For these reasons, the Ministry of the Environment finds the impacts on land use significant.

The assessment report includes no assessment of the relation of the project and its alternatives to national land use guidelines. However, the report should acknowledge the fundamental national land use guidelines in place in terms of the project, and assess how the project and its alternatives will influence the fulfilment of such guidelines. A description of the project's impacts in relation to these guidelines would also facilitate a comparison of the project's alternative site areas in this respect.

Impacts on waterways

In its statement on the assessment programme, the Ministry of the Environment proposed that the current state of the aquatic ecology in the impact area be investigated at all levels of the ecosystem. Following these basic mappings, the impact of thermal load, waste waters and the desalination plant on the aquatic ecosystem, in terms of both individual factors and the overall system, should also be assessed. These impacts should be described in the assessment report so as to provide a clear impression of their targeting and intensity, and the extent of the impact area of various alternatives.

The statements by regional environment centres on the assessment report highlight several defects relating to the report's chapter 8.4, Water system and fishing industry, concerning e.g. deficient information on water quality and the current ecological state, the local calibration of the cooling water model and the assessment of the impacts of cooling waters on the ecological state of water systems.

The nutrient load caused by the project's wastewaters (chapters 8.4.2.2, 8.4.3.2 and 8.4.4.2) is assessed as being so low that it would have no detrimental impact on the state of the marine environment. This evaluation has been arrived at regardless of whether the wastewaters

are channelled to the municipal wastewater treatment plant or a special wastewater treatment plant is built for the plant. The report does not assess the combined effects of wastewaters with cooling waters, in spite of the related proposal in the statement by the Ministry of the Environment on the assessment programme.

These deficiencies in the statements should be addressed and resolved, and thereafter, the assessment concerning the targeting of the project's ecological impacts, and their scale and significance with respect to various site and intake/discharge options, should be specified before the project proceeds. Furthermore, the assessment should take account of all combined effects of operations carried out in the area.

The Ministry of the Environment would draw the attention of the Ministry of Employment and the Economy to the fact that if both Fennovoima's Ruotsinpyhtää nuclear power plant and Fortum's Loviisa 3 are approved for implementation, the combined thermal load of the facilities on the sea would be so high as to require a combined assessment of the plants' effects in considerably more detail than indicated in the report. Moreover, since the possibility of back flows would increase, the intake and discharge options of both nuclear power plants should be reassessed to account for a combined impact scenario.

Impacts on flora, fauna and ecological values

The statements issued by regional environment centres and Metsähallitus on the assessment report highlight several deficiencies relating to chapter 8.6, Flora, Fauna and Ecological Values. In particular, concerning the cape of Hanhikivi in Pyhäjoki and Karsikkoniemi in Simo, a considerable number of improvements are proposed in terms of habitats, flora and bird life. Moreover, the Regional Environment Centre of North Ostrobothnia and Regional Environment Centre of Lapland paid attention to the potential impacts on bird migration of the power line running from the nuclear power plant to the national grid. In order to facilitate a balanced and reliable comparison of the project's site alternatives, the deficiencies highlighted should be remedied and, after these improvements, the project's impact assessment specified as concerns the cape of Hanhikivi and Karsikkoniemi.

The need for a Natura assessment

In the EIA report, a Natura assessment review (chapters 8.6.1.3, 8.6.2.3 and 8.6.3.3) has been conducted for all three site options. The conclusion for all locations is that an actual Natura assessment, as referred to in the Nature Conservation Act, would be unnecessary, because it is not envisaged that the project would have significant detrimental effects on the prerequisites for the conservation of Natura 2000 area(s).

However, the Ministry of the Environment recommends that an assessment be conducted for the site alternatives in relation to the cape of Hanhikivi in Pyhäjoki and Ruotsinpyhtää, in order to ensure that the impacts are non-detrimental. The statements issued by regional environment centres and Metsähallitus draw attention to the uncertainties of the analyses and modelling used.

The Ministry points out that on the basis of recent case law concerning Union legislation, the licences, permits or other official decisions required for the project under the Nuclear Energy Act, Land Use and Building Act, or Environmental Protection Act cannot be granted unless the authorities in question have first ensured that the project has no significant adverse effects on the Natura 2000 site. Correspondingly, assessment of impacts on the Natura 2000 site must be conducted unless the possibility of any significant impact on the area in question can be objectively dismissed.

The Ministry of the Environment also proposes to the Ministry of Employment and the Economy that, if the prospective nuclear power plants at both Ruotsinpyhtää and Loviisa are considered for implementation, the potential combined effects on the Natura 2000 area must be accounted for in the assessment.

The Regional Environment Centre of Uusimaa and the Regional Environment Centre of North Ostrobothnia will issue separate statements on the Natura assessments.

Nuclear waste management

In its statement on the assessment programme, the Ministry of the Environment pointed out that all nuclear waste management measures and the environmental impacts of the structures required for them, and safety aspects related to the project, shall be included in the report. Moreover, the Ministry emphasised that the report must indicate how Fennovoima intends to arrange the final disposal of spent nuclear fuel. Environmental impacts and risks due to the final disposal of nuclear fuel, and the related transport activities, should be assessed in the report.

The report (chapter 3.10.2.2) describes the types of operating waste generated from operating the plant, and the alternative final disposal solutions applicable to them. The suitability of final disposal solutions for various site alternatives are not reviewed. Table 3-8 shows the estimated accumulations of operating waste by waste type for each plant alternative. The table is highly illustrative and highlights the variations in waste accumulations for various plant alternatives very well. However, the text does not explain the table and information in it in any way. The chapter concerning the environmental impacts of operating waste treatment (chapter 8.13.3) does not disclose the quantities of waste generated, but only states that facilities sufficient for waste treatment and storage will be constructed. However, the quantity of operating waste generated will probably have a direct influence on the size of the required final disposal facility, which, in turn, will affect the quantities of excavation masses generated. In other respects, too, the assessment of environmental impacts caused by the treatment of operating waste will remain superficial.

The Ministry of the Environment finds that the assessment of the environmental impacts of operating waste treatment should be completed, paying attention to the characteristics of the site alternatives.

As concerns the interim storage of spent nuclear fuel, the report (chapters 3.10.2.3. and 8.13.4.1) suggests two alternative solutions:

storage in water pools or dry storage. The report does not reveal which solution Fennovoima intends to use, confining itself to stating that interim storage is planned for the site area. Furthermore, the report includes no assessment of the differences between alternative solutions in terms of environmental impacts or nuclear safety, nor does it reveal the grounds for the prospective interim storage solution.

In the Ministry's view, the report should assess the differences between alternative interim storage solutions as concerns environmental impacts and nuclear safety, and point out the grounds on the basis of which Fennovoima intends to select one of the two proposed interim storage options.

Final disposal of spent nuclear fuel is excluded from this assessment, because a specific EIA procedure will be conducted with respect to this in due course. The report (chapters 3.10.2.3 and 8.13.4.) describes the principles of final disposal methods being developed in Finland and Sweden only on a very general level. It does not indicate how Fennovoima intends to arrange the final disposal of spent nuclear fuel. Furthermore, the report (p. 88) states that, on an annual basis, approximately 40-60 tonnes of uranium is removed from the reactor of a nuclear power plant as spent fuel, which, during 60 years of operating life, amounts to a total of some 2,500-3,500 uranium tonnes of spent nuclear fuel. No assessment is provided concerning the quantity of spent nuclear fuel generated by various plant alternatives, neither does the report reveal the aspects that influence the quantity of spent nuclear fuel generated nor mention the size of the facility required for the final disposal of 2,500-3,500 uranium tonnes of spent nuclear fuel.

Transportation of spent nuclear fuel is excluded from Fennovoima's EIA procedure on the same basis as final disposal. With respect to transports, chapter 8.13.4.2 states that they will be conducted in compliance with national and international regulations either by road, rail or sea. The environmental impacts of transports or potential risks involved are not assessed.

The Ministry of the Environment finds the line drawn between Fennovoima's EIA procedure and the EIA procedure concerning the final disposal and transportation of spent nuclear fuel problematic. Furthermore, it considers the report's descriptions on the transportation and final disposal of spent nuclear fuel too general. Although a specific EIA procedure will be conducted in due course for these operations, the key solutions (such as the final disposal site and transport method) and related environmental impacts and risks should be anticipated and presented in the assessment report.

Utilisation of heat in cooling water

The most significant environmental impacts during normal nuclear power plant operation arise from cooling waters, and the utilisation of condensation heat can considerably alleviate the adverse impacts of cooling waters on nature. The assessment report finds the cogeneration of power and heat or industrial steam technically feasible and the report contains a preliminary charting of these prerequisites (chapter 10.2.2.1). While the cogeneration of power and heat, or steam, reduces the

efficiency of electricity production in a nuclear power plant, it can enhance the plant's total efficiency by raising it as high as 90 per cent.

The Ministry of the Environment finds that the possibilities of implementing the cogeneration of power and heat in the nuclear power plant should be analysed in more detail than presented in the EIA report. Aspects to be assessed include partners and cooperation possibilities, technical and financial prerequisites and environmental impacts.

Impacts of accidents and emergency response activities

The statement issued by the Ministry of the Environment on the assessment programme pointed out that the assessment report must handle the necessary environmental decontamination measures during the after-care stage, to follow any emergency that might transpire, alongside the need for and possibility of treating waste generated in decontaminating the environment.

Chapter 8.15.1.3 of the report considering emergency response activities and civil defence aspects. Reported civil defence measures after a nuclear power plant accident include decontamination of the indoor and outdoor surfaces of buildings, the cultivation and fertilisation of fields and the refinement of foodstuffs to reduce radioactive concentrations. However, there are no suggestions in this context of how to arrange the decontamination of the environment and waste management for waste containing radioactive substances, generated in connection with the decontamination process. It should be noted that the licensee of a nuclear facility is obliged to compensate for any damage caused by an accident in the facility, such as personal and property damage, financial damage and costs incurred from environmental restoration and prevention measures.

In the Ministry of the Environment's view, the practical measures utilised for restoring the environment after a potential radioactive fallout should be planned in advance, alongside plans for how potentially very high quantities of waste containing radioactive substances would be treated after such a fallout. These aspects should be registered in the contingency plan prepared by the licensee.

Comparison of alternatives and viability of the project

The impacts of the project are assessed site specifically and a summary of the assessment is presented in table format (table 9-1) for the purpose of facilitating the comparison of alternatives. The Ministry of the Environment points out that a review of the zero option in parallel with other alternatives is missing from the table.

As concerns plant alternatives, chapter 9.1.2 states that the major differences between the alternatives of one and two plant units lie in the extent of the thermal impacts of cooling waters, and the duration of the construction stage. Furthermore, the report claims that there are no considerable differences between plant technologies as concerns environmental impacts. However, this comparison completely ignores the quantities of operating waste and spent nuclear fuel generated,

which clearly vary both as concerns the capacity of the power plant (number and output of units) and plant technologies (see table 3-8).

Moreover, the report (chapter 9.2) states that the project, with various site alternatives, is feasible as concerns environmental impacts, and the detrimental effects are acceptable. This is the opinion of the organisation responsible for the project. In this respect, the report does not present any of the dissenting opinions put forward during the assessment concerning the acceptability of the project and the impacts thereof.

The Ministry of the Environment finds that the aforementioned deficiencies in the impact assessments undermine the potential for a balanced comparison of the alternatives reviewed in the assessment, and the reliability of the comparison presented in the report.

Participation

One of the key goals of the EIA procedure is to enhance the possibilities of citizens to participate in decision-making and have an influence. The report (chapter 2) presents a brief summary of the topics discussed in the monitoring group meetings, and states that the monitoring group's comments have been taken into account during the EIA procedure, with some examples of what the information gained from the monitoring group has influenced. Topics addressed in public meetings in various localities are presented briefly. The report states that the key issues addressed in the public meetings are repeated in the statements and opinions issued on the assessment programme. For the purposes of the report, table 2.2 has been compiled, presenting key comments highlighted in the statements and opinions, and indicating how they have been taken into account in the assessment. It should be stated that this represents an illustrative, reader-friendly approach.

However, participative comments pertaining to the Kristiinankaupunki option should have been reported in this report, with a particular emphasis on how viewpoints that emerged during the participation process have possibly influenced the decision to exclude this alternative from the actual environmental impact assessment.

The report reveals that monitoring groups convened three times in each alternative locality, and that no other official meetings for stakeholder groups or steering groups were arranged. Furthermore, the Ministry of the Environment has been informed that, as part of the EIA procedure for this project, the work of monitoring groups has varied from locality to locality, so that while in a certain locality the information received by the monitoring groups has been sufficient, in others the information received by the group on planned reports has been of a highly general nature and no assessment of report-specific plans has been possible. Hence, the participation procedures can be deemed to have met the related legal requirements, but to have been relatively inadequate in terms of the scope of the project.

A new nuclear power plant unit is an undertaking falling within the scope of the Convention on Environmental Impact Assessment in a Transboundary Context of the ECE, United Nations Economic

Commission for Europe. On this basis, the Ministry of the Environment has reserved the neighbouring countries, Baltic Sea region states and, upon special request, the Austrian authorities the opportunity to participate in the project's EIA procedure. These countries are primarily interested in the environmental impacts of radioactive substances potentially transported outside the borders of Finland in case of an emergency.

Application for a decision-in-principle

Fennovoima submitted its application for a decision-in-principle to the Ministry of Employment and the Economy on 14 January 2009. Although legislation permits this, the company did not comply with the recommendation given by the EIA contact authority in its statement on the EIA programme, to submit the application for a decision-in-principle to the Government only after the conclusion of the EIA procedure. The Ministry of the Environment pointed this out in its statement as well.

A fundamental part of the EIA procedure is the public examination of the sufficiency of the EIA report. The opinions and comments submitted, and, finally, the contact authority's statement on the adequacy of the assessment, form a key part of the EIA procedure and, for the organisation responsible for the project, they should constitute valuable material in compiling the licence and permit applications and ensuring their comprehensiveness, even in terms of environmental issues.

In this context, the Ministry of the Environment repeats its opinion that the handling of the decision-in-principle should not commence prior to the conclusion of the EIA procedure. Furthermore, in the Ministry's view, the licensing procedure can begin only after the deficiencies indicated by the contact authority in the EIA report have been remedied and these completions submitted to the Ministry of Employment and the Economy for attachment to the application for a decision-in-principle. Insofar as the completions concern impacts on nature and waterways, the Ministry proposes that regional environment centres conduct a separate assessment of the sufficiency of the completions before the Ministry of Employment and the Economy attaches them to the application for a decision-in-principle.

Summary

In summary, the Ministry of the Environment states that the EIA report does not contain sufficient information to facilitate the balanced and reliable comparison of the alternatives involved in the project (including the zero option).

In order to facilitate such a comparison, supplementary information is required as follows:

- To correct the deficiencies in the reports on waterways and nature and the assessment of impacts presented in the statements of regional environment centres and Metsähallitus, and

- For the assessment of the combined effects on aquatic ecology of the project's cooling and wastewaters with respect to various alternative sites and intake/discharge options.

Moreover, the assessment report takes insufficient consideration of the following:

- Differences between reactor alternatives as concerns nuclear safety, and

- Arrangement of nuclear waste management, including the transportation and final disposal of spent nuclear fuel, alongside the environmental impacts and risks thereof.

The Ministry of the Environment recommends that the aforementioned deficiencies be remedied and the comparison of alternatives specified thereafter. Moreover, a Natura assessment should be conducted for the cape of Hanhikivi in Pyhäjoki, and Ruotsinpyhtää. Consideration of the application for a decision-in-principle should only begin when all of the abovementioned additions to the report have been made and submitted to the contact authority. Insofar as these additions concern impacts on nature and waterways, the Ministry proposes that regional environment centres conduct a separate assessment of the sufficiency of the said additions before the Ministry of Employment and the Economy appends them to the application for a decision-in-principle.

The Ministry of the Interior (Department for Rescue Services): No particular comments on the sufficiency of the EIA report.

Ministry of Social Affairs and Health: The EIA report only comments indirectly on any situation contrary to the Regulatory Guide on Nuclear Safety 1.10 of the Radiation and Nuclear Safety Authority (STUK), where the number of permanent inhabitants (1,200 people) within the protective zone (5 km) exceeds the limit specified in the Guide (not in excess of 200 people). On the other hand, the legal effect of the Guide has been taken into account when discussing the numbers of inhabitants permitted by land use plans, and when emphasising the improvement of rescue routes. The statement also points out that, in fact, the question of the final disposal of spent nuclear fuel remains unresolved in Fennovoima's project.

Ministry of Agriculture and Forestry: No particular comments on the EIA report. As concerns the various site alternatives, 'the selection shall take particular account of the impacts of condensation waters on fish stocks and fishing'.

The Ministry of Finance: The EIA assesses the key issues of the project comprehensively. In further preparation of the project, the Ministry finds more specific analyses necessary concerning e.g. the project's significance in terms of emissions, electricity prices and ensuring the availability of electricity.

Municipality of Pyhäjoki: No particular comments on the sufficiency of the EIA report in general. As concerns Pyhäjoki and the cape of Hanhikivi, in the municipality's view there are no obstacles to

implementing the nuclear power plant project in terms of ecological values and requirements concerning protected areas.

Municipality of Ruotsinpyhtää: The EIA report is comprehensive and 'provides some of the background information required for possible decision-making'. However, the route of the required new power line leading from Jomalsund is not described to a sufficient extent, nor does the report contain a sufficiently clear map of the placement of permanent settlement and holiday residences in the areas of Vahterpää and Gäddbergsö, and the impact area of the roads and power lines needed.

Municipality of Simo: No comments on the EIA report.

City of Raahe: The statement draws attention to the major differences in maps depicting protected areas and other valuable areas as concerns the site alternatives of Pyhäjoki and Ruotsinpyhtää (both concern a similar cape) and states: 'The EIA report does not reveal the extent to which e.g. information on species is based on previous information and that to which the areas have been examined by experts due to this project.' Depending to any significant extent on old material may lead us to false conclusions when comparing the site areas. A more detailed map template would have been required in order to present the plant's protective zone (5 km as stated in the EIA report) restricting land use, or other protective zones. These restrictions, with an influence on e.g. construction, should be disclosed during the more specific land use planning of the area at the latest (specific local master plan and local detailed plan). In addition, the City states the following: 'The environmental impacts of new power lines and roads shall also be assessed in the same context as the environmental impacts of the plant itself. To facilitate the assessment of more specific impacts, it is particularly important that aspects influencing land use be presented with sufficient accuracy, such as the placement of the power plant's key operations (the area mentioned in the EIA report approximately 10 ha.) and the placement of the plant's other operations on-site (cooling water intake and discharge structures, quays and accommodation and parking areas within a total area of some 100 ha.) The EIA report displays some of the activities it mentions in conceptual drawings only, without displaying them on a map. These should be indicated clearly, during the land use planning stage at the latest'.

Municipality of Vihanti: No comments on the EIA report.

Municipality of Siikajoki: The statement asks to what extent e.g. information on species is based on previous information, and to what extent on information gained in connection with this project. The 'age' and quality of background information on each site area can apparently lead to the wrong conclusions when prospective site areas for the project are compared with each other. More specific siting of the plant's key operations is presented deficiently (partly without map images).

City of Oulainen: No comments on the EIA report as concerns the site alternative of Pyhäjoki.

City of Kalajoki: As concerns the Pyhäjoki site alternative, environmental impacts, considering the planning stage of the project, have been

assessed in a diverse manner. Adverse impacts impacting on Kalajoki during plant operation can be assessed as relatively minor.

Municipality of Pernaja: As concerns spent nuclear fuel management, Fennovoima should present a solution in the EIA report, which, at present, does not reveal where the nuclear waste in question would actually be placed in final disposal. The statement draws attention to the need for a Natura assessment, and the requirements of the nature directive. With reference to the requirements in the statement by MEE on the EIA programme, the municipality points out that no new biological basic surveys on the aquatic ecosystem have been conducted. Without any further specification, it is stated that the impact assessments in terms of the cultural environment and underground locations are deficient. The traffic emission calculations contained an error, which the municipality has already discussed with the expert responsible for the calculation. In general, 'the report has complied with the law and significant impacts are revealed to a sufficient extent'.

City of Loviisa: No comments on the assessment report.

City of Anjalankoski: Fuel sourcing and the final disposal of waste using the related transports should be jointly assessed, in connection with the nuclear power plant project (not included in this EIA report). The general outlook of the report created positive images, which is not appropriate for an objective report.

Municipality of Keminmaa: Insufficient account is taken of project impacts reflecting on the municipality of Keminmaa (for the site alternative of Simo), in comparison with the site alternative of Pyhäjoki, in which areas at a similar distance have been assessed in more detail.

Municipality of Tervola: The impact of condensation waters should be assessed to a sufficient extent in terms of the migrating fish stock swimming upstream into the river Kemi-Tornio, in order to secure e.g. fish pass projects. The project's impacts on air traffic in the area remain completely unassessed. Moreover, the impacts on reindeer farming and reindeer husbandry as a livelihood are not discussed. No period is determined for the radioactive decay into a safe state of nuclear waste in final disposal.

Municipality of Ii: No comments on the EIA report.

City of Kemi: No comments on the EIA report. The statement mentions e.g. impacts on housing construction in the vicinity and the possibility for utilising cooling waters for keeping the dock basins of Ajos and Veitsiluoto free of ice. Furthermore, the statement reflects the finding included in the summary: 'no environmental impacts found that would be unacceptable or which could not be subject to mitigation to an acceptable level'.

City of Ylivieska: The statement mainly concerns the site alternative of Pyhäjoki. While the EIA report is extensive and illustrative, the inventory of information concerning natural values and the state of the marine environment in particular is deficient, which calls the reliability of the assessment into question. Moreover, it is inappropriate that the nuclear

power project would result in new, separate EIA projects (power lines). In such a case, the first project (nuclear power plant) would impose significant restrictions on the siting options of future projects (in this case, the power lines). The EIA of the nuclear power plant must clearly present potential future 400kV power line alternatives.

State Provincial Office of Oulu: Regional economic surveys targeted at public services are fairly inaccurate and exiguous. The survey of traffic noise should have extended, in Pyhäjoki, to the north and south of highway 8. Partial ambiguity is evident (as concerns Pyhäjoki) on the impacts on fishing conditions. The method and location for acquiring the additional masses required in construction, and attention to them in the impact assessment, remains unclear. Sufficiently detailed specification of the plant's protective zone, and the time of specification should be clear because this has land-use related and social impacts. Aspects of acquiring clean water are only handled on a general level, at least as concerns Pyhäjoki. Future work on the project should also take account of pressures on municipal and regional services, particularly during the construction period of the plant.

State Provincial Office of Southern Finland: The statement applies to the site alternative of Ruotsinpyhtää. Household water wells potentially in use within the impact area of the project should be charted and the quality of household water secured if the project proceeds. Correspondingly, impacts on water quality along public beaches should be examined. The report only cursorily touches on the many kinds of impacts caused by road construction and use. Furthermore, the combined effects of construction should be assessed for the scenario according to which the construction of the Loviisa 3 unit and the Fennovoima plant coincide. Social impact assessments should be conducted in more detail by utilising the expertise of municipal social authorities within their respective fields.

State Provincial Office of Lapland: The statement pays attention to the discrepancy concerning the maximum numbers of inhabitants allowed by the Regulatory Guide on Nuclear Safety 1.10 of the Radiation and Nuclear Safety Authority (STUK) in certain neighbouring zones of the nuclear power plant, and the number of inhabitants within the protective zone of the intended plant site in Simo.

Regional Environment Centre of North Ostrobothnia: The EIA report is insufficient, particularly as concerns the Hanhikivi area in Pyhäjoki. Indeed, it includes serious deficiencies in general as well as with respect to issues stressed by the Environment Centre in its statement on the assessment programme, and in later contexts. Particularly deficient are the coverage of the assessment of impacts on waterways, subaquatic nature and an inventory of other natural diversity, and the usage of areas. (The statement of the Environment Centre is detailed, and Fennovoima has presented the Ministry with a separate reply to it, available on the Ministry's website. Fennovoima has also notified the Ministry of its having sent a direct response to the Environment Centre concerning the latter's comments.)

Uusimaa Regional Environment Centre: The statement focuses on EIA accounts concerning the Ruotsinpyhtää site alternative. The Regional

Environment Centre proposes that, with a view to further planning of the project, the EIA report be supplemented by the following overall topics: 1) the possibilities of cogenerating power and heat or process steam, 2) dispersion of cooling waters and the significance of potential back flow in various circumstances (Ruotsinpyhtää), 3) impacts on ice conditions during different winters (Ruotsinpyhtää), 4) a precise and more extensive Natura assessment review (Ruotsinpyhtää), if the project proceeds, including special requirements if the Loviisa 3 project is also implemented, 5) reassessment of the height of the plant's buildings (Ruotsinpyhtää), 6) final disposal of spent nuclear fuel, 7) transportation of nuclear fuel with the environmental risks involved, 8) a thorough and understandable analysis of the environmental and health impacts of low and intermediate level waste final disposal, 9) planning of the management of radioactive waste generated operationally and during accidents, alongside environmental restoration measures, 10) combined effects, if the nuclear power plant projects proceed both in Loviisa and Ruotsinpyhtää, 11) impacts on the nesting of osprey in the area (Ruotsinpyhtää). (This list is included in the statement's summary, but has been partly simplified and, on the other hand, completed by the Ministry on the basis of the actual statement text.)

Lapland Regional Environment Centre: On the whole, the EIA report is extensive and sound, but there are also insufficiencies. If the utilisation of cooling waters remains deficient, a more thorough review of alternative cooling techniques will be necessary. The impacts of cooling waters on the ecology could have been modelled e.g. using the Bay of Bothnia model for the cases of Karsikkoniemi and Pyhäjoki. Moreover, the assessment of the magnitude and significance of ecological impacts remains unfinished, and the impacts on waterways as a consequence of construction and dredging are inadequately assessed. Chain reactions caused by rising temperatures in aquatic and waterside vegetation and the proliferation of algae and the growth conditions of other vegetation in the area, are not presented in sufficient detail. In addition, the impacts on bird life should have been presented in more detail.

Safety Technology Authority (Tukes): No comments on the EIA report. Potential dangers posed to areas outside the plant by chemicals, and preparation for such hazards, should be assessed in more detail, and such an assessment should be included in the licence application and safety analysis report submitted to Tukes.

Southeast Finland Regional Environment Centre : In the project's life cycle survey, closure of the plant and, in particular the treatment and final disposal of radioactive waste, require separate special assessments using EIA procedures.

Occupational Safety and Health Inspectorate of Uusimaa: No particular comments on the adequacy of the EIA report.

The Radiation and Nuclear Safety Authority (STUK):

The environmental impact assessment report of Fennovoima Oy's nuclear power plant project covers key issues falling within STUK's authority at this stage of the project.

STUK will give its views on the acceptability of the plant sites in conjunction with its preparation of the preliminary safety assessment referred to in Section 12 of the Nuclear Energy Act concerning Fennovoima's application for a decision-in-principle.

When preparing this statement, STUK assessed the following descriptions contained in the EIA report:

- Planned power plant areas
- The population, commercial and industrial activities and traffic in the surroundings
- Natural conditions
- Emission of radioactive materials in normal operating conditions
- Radiation impacts and monitoring in the surroundings
- Radiation impacts of emissions due to a severe accident
- Emergency response arrangements and rescue operations
- Intake and discharge of cooling water
- Nuclear waste management

STUK considers it necessary that the radiation dose assessments presented for a severe accident be supplemented (in a separate supplement to the EIA report), the default being an emission of radioactive substances whereby the emission of noble gases comprises a significant share of the noble gases contained in the reactor nuclear fuel. The selection of typical weather conditions and those increasing the radiation dose should be revised, and radiation dose results presented also as concerns unfavourable weather conditions.

Otherwise, in STUK's opinion, the observations presented below do not require any supplement to the EIA report.

Planned power plant areas

Current land use, the land use planning situation and potential impacts of the project in the prospective alternative sites are described with respect to their key elements as concerns planning of the project. STUK finds the description sufficiently detailed in order to form the basis for the assessment of nuclear safety.

STUK will issue separate statements on site-specific land use plans. The actual assessment of plant sites as regards safety will be conducted at the decision-in-principle stage.

The section of the EIA report that concerns licensing of the project does not include the decree of the Ministry of the Interior concerning the power plant site, issued under section 52 of the Police Act (493/1995), which is the area in use by the nuclear facility and the surrounding area, where movement and sojourn is restricted. This area will be defined at the construction licence stage as concerns physical protection and nuclear safety.

The population in the surrounding area

Population descriptions are presented in the EIA report by e.g. describing the number of permanent inhabitants at a range of 5 km, 20

km and 100 km, and the number of holiday residences at a range of 5 km and 20 km. The text describes schools, health centres, sheltered homes and beaches in the immediate surroundings, and the report also includes information on industrial and business activity in the vicinity.

STUK finds the information given on the current status of the communities in the prospective areas sufficient. This information, including any changes thereto, will be taken into account when, at the decision-in-principle stage, STUK assesses the possibilities of planning efficient emergency response arrangements in preparation for accidents.

Commercial and industrial activities and traffic

Herein, the handling of external operations and site-specific conditions is reviewed insofar as they may be of significance in terms of plant safety.

According to the statement issued by the contact authority, the EIA report should examine the relationship between the nuclear power plant and Kemi airport.

Section 4.5 of the EIA report states the following: ‘According to the Aviation Act, a no-fly zone can be prescribed in the vicinity of nuclear power plants through a Government decree… However, the no-fly zone is not a direct requirement for nuclear power plants and its size is not prescribed by law. The surrounding areas of the Loviisa and Olkiluoto nuclear power plants are prescribed as no-fly zones through a Government decree. A no-fly zone will also be defined for Fennovoima’s nuclear power plant.’

Section 8.10.1.3 (EIA page 262) states that ‘the Karsikkoniemi location is within the area of the controlled airspace of the Kemi-Tornio airport. No-fly zones have been established with four kilometre radiuses around the present Finnish nuclear power stations, reaching up to 6,500 feet or 2,000 metres (Government decree 929/2006). These no-fly zones have been established in order to facilitate surveillance of the plant site. The no-fly zone of the new nuclear power plant will be defined in a way that does not interfere with the operation of the Kemi-Tornio airport.’

In STUK’s view, the flight restrictions required by the nuclear power plant, and its impacts on the operations of the Kemi-Tornio airport, shall be examined at the decision-in-principle stage so that air traffic in the vicinity of the prospective site and over it, and the need for further development of the approach methods used at the Kemi-Tornio airport, are analysed.

According to the EIA report, import and export ports are located in the vicinity of all of the prospective plant sites (Valko, Raahe, Ajos). The Ajos harbour lies closest to a prospective plant site, at an approximate distance of 8 km from Karsikkoniemi. The EIA does not examine the significance of harbour traffic and transports of hazardous substances from the viewpoint of the power plant. At the decision-in-principle stage, the main issues related to the transportation of hazardous substances and oil products via the ports shall be analysed, alongside warehousing in the vicinity of the ports, as well as the transportation of hazardous and

flammable substances by road and rail, and via pipelines in the vicinity of the plant sites.

Ruotsinpyhtää is located on the coast of the Gulf of Finland, in the vicinity of shipping routes to oil harbours in Russia. Therefore, the risk of an oil spill influencing the intake of cooling water is higher in Ruotsinpyhtää than in the alternative plant sites located on the coast of the Gulf of Bothnia. A potential oil spill will be taken into account in the technical design of the plant, and preparations for oil spills shall be reviewed in materials submitted to STUK in connection with the application for a decision-in-principle.

Natural conditions

Section 6.3, ‘Implementation of nuclear safety requirements and principles in the design, construction and operation of a nuclear power plant’, presents general principles for preparing for external threats in plant design. Site-specific information is also included in the description of the current status of plant sites, included in chapter 8, ‘Environmental impact assessment for the project’.

Reviewed aspects related to external threats include the weather conditions at the site, exceptional sea water levels, the quality of cooling water and ice conditions, alongside the geology and seismicity of the area. The scope of the review is sufficient for an EIA report.

Weather conditions

Chapter 6.3 of the EIA report states that the probability of the occurrence of extreme weather conditions may increase as a consequence of climate change. In cooperation with the Finnish Meteorological Institute, Fennovoima has site-specifically analysed extreme values for e.g. air temperature, wind speed, precipitation and snow load. The values selected for the assessment are those corresponding to a recurrence period of one thousand years.

The scope of assessment is sufficient for an EIA report, and the information given is based on analyses performed by a Finnish expert organisation in the field. However, for the potential application for a construction licence, more specific analyses will be required concerning the selected site, on the basis of which sufficient design bases will be defined.

Sea water levels and elevations of prospective sites

The EIA report analyses the variations in sea water levels at the alternative plant sites under the current conditions, and assesses potential changes during the useful life of the plant. The information given is based on surveys by the Finish Institute of Marine Research. Source information used for the assessments entails long-term sea water level observation series at measurement sites close to the prospective sites. The assessments take account of post-glacial rebound and the impacts of climate warming on ocean water levels in accordance with the 2007 report by the UN’s Intergovernmental Panel on Climate Change (IPCC). According to the analyses, in all locations

the altitude of the site should be approximately +4 m based on N60 coordinates. The EIA report states that the Hanhikivi area in Pyhäjoki is low-lying and, in order to achieve the required altitude, extensive land-filling operations would be necessary at the site.

The EIA report handles extreme sea water level values sufficiently, but the assessments concerning extreme sea water levels must be updated at the construction licence stage, and taken into account in plant design.

Cooling water quality

During power operation, a nuclear power plant needs extensive quantities of sea water for turbine condenser cooling. Alternatively, cooling can be implemented through outflows via cooling towers into the atmosphere, but this option has never been utilised in Finland and is not included in Fennovoima's EIA. During outages and accidents, sea water is utilised for cooling decay heat removal systems, and devices and rooms important to safety. An alternative method for such cooling is outside air. According to current safety requirements, the design of a nuclear power plant must prepare for a loss off sea water cooling lasting at least three days.

Uninterrupted supply of sea water is vital both in terms of undisturbed production and the safety of a nuclear power plant. The supply of sea water to a plant could be disturbed by a variety of factors, including natural sea water impurities (algae and other aquatic plants, fish, mussels and other marine life), ice conditions (frazil ice and pack-ice), and impurities released into the sea due to accidents, mainly large quantities of oil as a consequence of sea accidents. Moreover, the thermal load caused by a nuclear power plant can influence the biological status of sea water.

According to the EIA report, water quality in the Hanhikivi area of Pyhäjoki is high, and the impact of the nuclear power plant would remain minor (p. 165), whereas the status of waters in the sea area in front of Karsikko in Simo is satisfactory, while that of the outer coastal area is good (p 197). All in all, the impact of cooling waters on water quality in the discharge area should remain minor in Simo (p. 207).

As concerns Ruotsinpyhtää, the EIA report states the following: 'According to the classification of the ecological state of waters carried out by the environmental authorities in 2008, the ecological state of Klobbfjärden and Hästholmsfjärden is poor. The state of other surrounding area has been classified as satisfactory.' This information is somewhat inaccurate, since according to the classification, the state of the rest of the surrounding sea area is tolerable or satisfactory such that to the west of Gäddbergsö, the state of coastal waters, e.g. off Loviisanlahti, the state of sea water is tolerable and that of the open sea area satisfactory, and further to the east, the state of coastal waters is satisfactory and that of the open sea area tolerable. (Environmental administration's website: www.ymparisto.fi/vesienlaatu, October 2008).

With respect to mussels, chapter 8.4.2.5 on page 176 of the EIA report maintains that 'It should be noted that these [Mytilopsis leucophaeata, the false dark mussel] and other bivalvia can be fended off mechanically

or chemically and, as a result, they will not cause any impacts on safety or production at power plants.' Mussels have caused incidents in nuclear power plants in Finland, and affected the supply of sea water. At present, designers know how to prepare for the harm caused by mussels effectively at the planning stage of nuclear power plants.

In terms of nuclear safety, the report describes the status of waterways adequately.

Ice conditions

The sites of Simo and Pyhäjoki are located by the open sea, in an area sometimes subject to massive pack-ice formation. The underwater part of pack-ice walls can extend to a depth of over twenty metres. The Ruotsinpyhtää site is more protected, and less pack-ice forms there. However, account can be taken of the occurrence of pack-ice in the detailed design of water intake structures.

Geological and seismological conditions

The EIA report provides a general description of the geology and seismology of the sites.

Finland is a seismically stable area, but the occurrence of earthquakes varies slightly by area. In seismic terms, the neighbouring area of Simo has been somewhat more active than the areas of Ruotsinpyhtää and Pyhäjoki, but such differences are of no practical significance in terms of plant safety, since the plant alternatives assessed by Fennovoima were originally designed for more seismologically active areas.

The description of geological and seismological conditions in the EIA report is sufficient. More detailed descriptions of the conditions and their impact on plant design will be handled in connection with the application for a decision-in-principle, and the potential application for a construction licence.

Radioactive emissions during normal operation

The EIA report assesses emissions of radioactive substances during the normal operation of a nuclear power plant, and meeting the safety requirements in force.

Radioactive emissions during normal operation are presented based on the emissions of the nuclear power plants of Loviisa, Olkiluoto, Isar 1 and 2 as well as emission limits for 2004–2006 as examples. The estimated maximum emissions of Fennovoima's nuclear power plant are based on experience gained from current nuclear power plants, and the design data of new plants.

The STUK points out that the reactivities of noble gases in table 3-10 are expressed as total reactivity, but the current release limits of the Olkiluoto and Loviisa power plants for noble gases concern modified, so-called Kr87 equivalent reactivities. This is a practice assumed in the early days of power plant operation, which does not change the comparison of magnitude.

Short descriptions are given on restricting the releases of radioactive substances, while another section of the report contains a highly comprehensive description of the potential health impacts of ionizing radiation.

Restriction of releases of radioactive substances from the nuclear power plant would be handled at the construction licensing stage, after the plant type has already been selected. The solutions would require the best available technology, and release limits for the new nuclear power plant, into the air and water, would be defined during commissioning.

Emissions from Finnish nuclear power plants which subject the population to radiation exposure have remained markedly below the specified limits. There is therefore reason to expect that the emissions from the new nuclear power plant unit would remain at least as low and would have no detrimental effects on humans, nature or commercial and industrial activity.

Radiation impacts and control in the environment

The EIA report describes the impact of a nuclear power plant on the radiation status of the environment under the current conditions, and assesses the impacts of a new nuclear power plant with reference, in the literature section, to comprehensive publications on radiation monitoring in the surroundings of nuclear power plants in Finland, e.g. STUK- A227, E. Ilus et al. (2008). The reports in question give a detailed description of the sampling and analysis methods of the Olkiluoto and Loviisa nuclear power plants, and examine monitoring results covering a period of several years.

As concerns the impacts of radioactive releases into water from Finnish nuclear power plants, the reports states e.g. the following: ‘The tritium content of sea water has mainly been natural, or comprised tritium originating from nuclear weapon tests.’ The so-called background concentration levels of tritium in the Baltic Sea, previously resulting in particular from fallout from nuclear weapon tests in the atmosphere, are presently below the detection limit of monitoring measurements (4 kBq m^{-3}), which means that any reported tritium concentrations above that limit in sea water samples taken in the vicinity of Finnish nuclear power plants originate mainly from water releases from nuclear power plants.

Detailed requirements for radiation monitoring in the vicinity of nuclear power plants are specified in the Regulatory Guide on Nuclear Safety YVL 7.7 (2006). Chapter 11.2.2 of the report presents the key contents of this Guide.

Accident conditions

The contact authority’s statement on the EIA programme required that the EIA report describe various occurrences and accidents. Correspondingly, the report describes the consequences of a severe accident, both on the basis of theoretical analyses and the impacts of the fallout from the Chernobyl accident.

The report also illustrates accident consequences by describing the radiation doses caused by the long-range transport of airborne pollutants to a distance of 1,000 km. In such a case, the results depend largely on the assumptions used for emission dispersion and dose calculation, and it is impossible to present any unambiguous miscalculation margins for them.

Dose calculation is based on methods according to the German practice, which, as such, are comparable with Finnish requirements (Regulatory Guides on Nuclear Safety YVL 7.2 and YVL 7.3). According to the report, the typical Finnish diet has been taken into account, but no observation is made of the dose route lichen-reindeer-human, significant with respect to the population of Lapland.

For the purpose of the environmental impact assessment of nuclear power plant accidents, the report examines a severe accident of level 6 (INES 6) on the international nuclear event scale, and a smaller postulated accident of level 4 (INES 4). This can be considered adequate as regards the EIA procedure. Considering such accidents and their impacts, the need for radiation protection measures, for example, is described to the appropriate extent. However, the calculated assessment of radiation doses caused by the selected accidents is described rather narrowly and there is no reference to a public support report that would present the details of the assessment. Other observations are handled hereafter.

The release of radioactive materials into the environment from a severe accident has been treated on the basis of the limit specified in the Government Decision (395/1991, now Government Decree 733/2008). This is an appropriate criterion, since the underlying decision posits that a higher emission would be extremely unlikely. In such a case, the resulting release of Cs-137 would be 100 TBq directly, on the basis of the given limit. Releases of other radionuclides are calculated on the basis of the ratio between them and Cs-137 in the nuclear fuel, considering the shares based on which they are released from the fuel. In STUK’s opinion, this calculation method gives relatively low emission values for the radioactive noble gases resulting from a severe accident. The dimensioning of the emission of noble gases is clearly evident in table 8-48 (p. 333) of the report, showing radiation doses on the basis of distance. In a severe accident, the highest radiation doses would be possible, particularly in the immediate vicinity of the plant. On the other hand, weather conditions are of major significance as regards the dispersion of radioactive materials, as rain in particular can increase the radiation dose markedly, even further away from the plant.

Pictures 8-109 and 8-110 (p. 329) mention the term ‘early release’, which is not explained in the text. The radiation dose tables do not mention that the weather conditions in question are ‘typical weather conditions’. No radiation dose tables are presented for unfavourable weather conditions. The selected weather conditions are described briefly. As far as STUK is aware, their calculation is not based in all respects on information that would describe the actual situation in the best possible way. Instead, working material has been received from the Finnish Meteorological Institute, which needs to be verified in connection with the potential construction licence.

STUK considers it necessary that the radiation dose assessment presented for a severe accident be supplemented (a separate supplement to the EIA report) based on an assumed emission of radioactive substances whereby the emission of noble gases constitutes a significant share of the noble gases contained in the nuclear fuel. The selection of typical and rarer weather conditions which would increase doses should be revised, and radiation dose results also presented for unfavourable weather conditions.

Emergency response arrangements and rescue operations

The EIA report describes accident conditions and the preparation and operations with respect to situations requiring an emergency response for key operators (power company - rescue authorities - STUK) and the most important contingency and rescue plans and their realisation in practical exercises.

According to Government Decree 735/2008 and the Regulatory Guide on Nuclear Safety YVL 1.10, the protective zone extends to a distance of approximately 5 km. In this area, rescue planning should be dimensioned so that the population can be evacuated if necessary at the early stages of a severe accident, prior to any release of radioactive materials.

According to Fennovoima’s EIA report, the permanent population level is clearly higher in the prospective protective zone of the Simo site than in the other alternatives. However, the number of holiday residences is markedly lower in the environs of Simo and Pyhäjoki than, for instance, in the protective zones of the Olkiluoto and Loviisa nuclear power plants. In Simo, the closest city is Kemi, while in Pyhäjoki it is Raahe and in Ruotsinpyhtää, Loviisa.

STUK will comment on the arrangements for regional rescue services in its preliminary safety assessment pertaining to the decision-in-principle. However, it is essential that the rescue plan be drawn up so as to secure the reliable and safe evacuation of inhabitants in the immediate vicinity, in case of a severe accident.

Intake and discharge of cooling water

The report includes a description of cooling water intake and discharge solutions that are sufficient at this stage in terms of nuclear safety.

The report presents comprehensive model calculations on the dispersion of warm cooling water in waterways. Naturally, no comparative data in support of these calculations is available for new plant sites.

The most significant biological impact of a nuclear power plant on the aquatic environment comprises the warming of water in the sea area to the fore of the power plant, caused by cooling water discharged into the sea, and particularly evident in the form of the eutrophication of aquatic vegetation in the cooling water discharge area. The possible shallowness of the discharge area, and slower water turnover due to the archipelago, are likely to enhance the thermal impacts of cooling water

and advancing eutrophication in the immediate vicinity of the discharge site. On the coasts of Finland, aquatic vegetation rooted to the sea-bed usually appears only in the topmost shore zone, extending to a depth of about 5 metres, which means that the detrimental effects of the thermal load could be prevented or significantly alleviated by discharging the cooling water farther away from the coastline, e.g. into the open seas beyond a depth zone of 10 metres. No such distant discharge option is presented for any of the site alternatives.

Descriptions of the current status of water systems in the sea areas to the fore of Hanhikivi and Karsikkoniemi and their environmental impact assessments are largely based on the same general information concerning the entire Bay of Bothnia. Information on local special characteristics is scarce, and although there is a wealth of information on the seas off Ruotsinpyhtää during the 30 year history of the Loviisa power plant, the description of the special characteristics of this area also remains fairly inaccurate.

With respect to a scenario in which both the Loviisa 3 project and Fennovoima's project in Ruotsinpyhtää were implemented and the cooling waters of both were discharged into the same area south of Gäddbergsö, the report states (p. 313) the following: 'The basic production, sedimentation and the consumption of oxygen in the layers near the sea-bed will increase in these sea areas (Orrengrundsfjärden and Vådholmsfjärden) compared to a situation in which only cooling water from Fennovoima's power plant were discharged into the area.'

Nuclear waste management

Chapter 3.10.2.2 of the report describes the management of operating waste and chapter 8.13.3 assesses the resulting environmental impacts. Handling and treatment methods are described verbally, and in addition to currently used methods, the report refers to methods which considerably minimise the volume of waste. The assessed maximum quantities of completely treated waste are provided for each of the three reactor types.

As concerns the final disposal of operating waste, a final disposal solution concerning the bedrock of the site, corresponding to those of the Olkiluoto and Loviisa plant sites, is given. In addition, the report refers to the possibility of constructing a final disposal repository in the ground for very low-level waste.

The descriptions of operating waste management can be considered appropriate, even though a geological site survey, necessary for the implementation of final disposal, and the licensing procedure required for the project, have not been handled in this context. In connection with the application for a decision-in-principle, STUK will assess the geological information available on Fennovoima's prospective sites in this respect.

Chapter 8.14 of the report handles the decommissioning of a nuclear power plant, giving a general description of the various stages of decommissioning, assessing the quantities of waste generated and reviewing possible environmental impacts. The strategic options

mentioned include both immediate and delayed decommissioning. According to the report, preparations will be made for the placement of radioactive waste generated by decommissioning in extensions to the facilities constructed for operating waste.

As concerns the safety of decommissioning a nuclear power plant, the EIA report can be considered adequate at this stage.

The management of spent nuclear fuel is handled in chapters 3.10.2.3 and 8.13.4 of the report.

This describes the final disposal of spent nuclear fuel in bedrock. Reprocessing is also described in brief, but deemed unrealistic on the basis of the current Nuclear Energy Act.

As concerns interim storage of spent nuclear fuel, short-term storage in fuel pools in the reactor building is described first. The storage method described thereafter is e.g. storage in dry containers in a concrete building in the site area, as implemented in Germany. Such a solution would endure the impact of a large aeroplane, for example. The report also refers to the possibility of storing fuel for decades in water pool storage, but this option is not described in more detail. However, both solutions represent a proven technology and could be implemented acceptably as concerns nuclear safety. The storage time span is not disclosed clearly by the report: storage would last for the operating life of the nuclear power plant, which would be approximately 60 years, and another 50 years thereafter, if the fuel were placed in final disposal.

The transportation of spent nuclear fuel (either to the final disposal site or reprocessing plant) is described briefly. Possible transportation methods mentioned include road, rail or sea transport or combinations thereof.

The report concerning the final disposal of spent fuel is based on plans and reports by Posiva and SKB in Sweden. However, no consideration is given to the issue of the final disposal location for Fennovoima's spent nuclear fuel.

Fingrid Oyj: No comments on the EIA report. Fingrid's statement gives a brief description of the measures required for connecting a nuclear power plant to the main grid.

Posiva Oy: The EIA report is potentially misleading with respect to the final disposal of spent nuclear fuel generated by the plant. Posiva's final disposal project does not cover the needs of Fennovoima Oy's nuclear power plant. The main conclusion to be drawn from the EIA report would therefore be that the plan is to place spent nuclear fuel in intermediate storage for an undefined period.

Fortum Power and Heat Oy ('FPH'): It is regrettable, 'that the nuclear power projects of FPH and TVO are not mentioned in the EIA report e.g. in chapters 1.5.4 'Other power plant projects' or 1.8 'Connection to other projects'. Some mention of FPH's project would have been particularly apppropriate, since the contact authority has required Fennovoima Oy to

conduct an environmental impact assessment of cooling waters should three nuclear power plant units be located on the island of Hästholmen.

Teollisuuden Voima Oyj (TVO): 'References to Posiva Oy's final disposal project for spent nuclear fuel could provide the false impression that Posiva Oy would be responsible for managing even the final disposal of spent nuclear fuel generated by Fennovoima Oy.'

TE Centre for Kainuu: This statement primarily concerns the site alternative of Pyhäjoki, because it is located within the jurisdiction of the TE Centre's fishery unit. For the purpose of the licence application: information on fishing should also be presented in the form of maps, indicating fishing locations in relation to the impact area of cooling waters. Populations of European grayling that spawn in the sea should be examined alongside the impacts of the project on this; impacts on the breeding and breeding areas of fish species spawning in the spring should be examined; dredging damage should be assessed and instructions for the dredging and banking of sediments must be taken into account (Ministry of the Environment, 19 May 2004). The fact that the assessment is solely based on existing information, without any additional analyses, undermines the credibility of the EIA report.

TE Centre for Northern Ostrobothnia: The statement in the EIA report, that any uranium production in Finland would not be connected to the project, is superficial, considering the plant's prospective 60 years of operational life and Finland's uranium resources. The statement mentions the final disposal plan for spent nuclear fuel in relation to the somewhat unclear cooperation arrangements between Posiva and Fennovoima. The EIA report presents the project and nuclear power in general in very positive terms without revealing any negative aspects, on the basis of which some industrialised countries have chosen to abandon nuclear power.

TE Centre for Lapland: The statement highlights the project's financial benefits for the Kemi-Tornio region, Simo and the whole of Lapland, if the nuclear power plant is built in Simo. *Fishery unit; separate statement* The EIA report is partly deficient as regards impacts on the fish stock. Field investigations would have been necessary in order to establish the spawning areas of various fish species. Furthermore, the provision of further information would have been necessary in order to conduct a sufficiently comprehensive assessment of the impacts on the fishing industry. Therefore, the preparation of supplementary reports on the fish stock should commence immediately.

TE Centre for Uusimaa: The EIA report does not include the reports required by the TE Centre in its statement on the EIA programme (i.e. fishing survey and mapping of fish spawning areas, or at a minimum, an expert assessment by the Finnish Game and Fisheries Research Institute). On the whole, the fishing industry is given no detailed consideration, at least to the level of detail required by the contact authority's statement on the EIA programme (cf. requirement 19 on page 56 of the EIA report).

Regional Council of North Ostrobothnia: In the main, the EIA report is sound and praiseworthy, but its usability suffers from a certain lack of

clarity in the outline, as well as technical errors (numbering, names of localities etc.) The Council refers to its statement on the EIA programme, and states that the project's relationship to the rim of the Bay of Bothnia (incl. the economic region of Oulu) in terms of the regional economy, industry and commerce has not been given due consideration. Moreover, 'although it has been established that the project would clearly weaken the cape of Hanhikivi's character as a model for the successive development of post-glacial rebound, the impact assessment has neglected to analyse the impact of such a deterioration in terms of the preservation of the area's regional representativeness in this respect. This defect is significant, because national land use guidelines and the design provision concerning the rim of the Bay of Bothnia in the current regional land use plan would have required clarification of the issue. As regards further preparation of the nuclear power regional land use plan, such an additional clarification would be essential'. 'The landscape rock area indicated in the regional land use plan, and the project's relationship to it, should have been analysed in more detail.'

Further surveys of subaquatic nature are required at the eventual construction stage. The project's significance in terms of image and tourism is narrowly handled. With respect to energy economy, the impact of an increase in nuclear power capacity on the need for power production from peat-fuelled condensing power plants should be forecast (in Northern Ostrobothnia, this type of power production has an important position). The problem with the final disposal of spent nuclear fuel produced by the facility has not been resolved. Connections between the nuclear power plant project and power grid solutions and the impacts of power line routes (incl. impacts on agriculture and forestry) should be acknowledged, even though the last two aspects are handled in their own, special EIA procedures.

Operation of the nuclear power plant (neutrinos produced by fission reaction) would disturb the operations of the neutrino research station pending in the Pyhäsalmi mine. The assessment of such detrimental effects should be specified before any decision is made, in cooperation with the parties responsible for the research project.

Regional Council of Ostrobothnia: The EIA report does not consider the survey required by the MEE, on its statement on the EIA programme concerning phenomena due to possible climate change, and preparation for such phenomena. Neither does the report describe the transportation of spent nuclear fuel away from the alternative sites, as required by the MEE's statement.

Regional Council of Lapland: The impacts on regional economy and employment are not handled site-specifically. It is unclear, and in light of the figures, questionable, whether the economic and employment figures include figures other than those resulting directly from the plant's construction. Operational and economic impacts (which are probably significant) are not given more extensive consideration was concerns the entire rim of the Bay of Bothnia, and Northern Finland. In terms of the environmental impact monitoring programme, the information given on how to act if radioactive limits are exceeded is insufficient. Furthermore, the Council wonders about the basis for the time limit

according to which emissions into the environment would begin 6 hrs after an accident. The migration routes of salmonoids and their relation to temperature changes should be shown on a map. In addition, the impacts on the landscape could be illustrated more effectively. The Council therefore proposes that the abovementioned remarks be taken into account in further planning.

The Regional Council of Itä-Uusimaa: The aggregate impacts of cooling waters from the Fennovoima project and the current and potential future Loviisa plant units should be analysed. Moreover, wider impacts on trade and industry, the economy and social structure shall be analysed for the zero option.

The National Board of Antiquities: This statement highlights targets and localities requiring protection, or an archaeological inventory conducted in the area and environs of each site alternative, should the nuclear power plant project proceed at the site in question.

The Finnish Association for Nature Conservation: Contrary to the claims presented in the EIA report, nuclear power is not free of carbon dioxide emissions with respect to the entire production chain (incl. the excavation and manufacture of nuclear fuel). Due to the warming of waterways, and the resulting lower carbon dioxide solubility, the carbon dioxide emissions caused should be assessed precisely. The nuclear waste report is insufficient/unfinished, as are the final disposal plans. E.g. the Radiation and Nuclear Safety Authority of Germany has submitted undisputable proof of the cancer risk posed by nuclear power plants.

Greenpeace: The EIA serves no purpose, since it does not review any of the key environmental impacts of the plant (the emission of high-level nuclear waste into the environment and groundwaters over a certain period, the sourcing and production of nuclear fuel, a potential, severe nuclear accident). Moreover, no credible plan is put forward for nuclear waste management. In support of its dismissal of the EIA, the statement gives more detailed consideration to e.g. the final disposal issue, the risks involved and claims presented on final disposal, which the statement claims are incorrect. Moreover, 'the EIA report's description of the environmental impacts of uranium excavation consists of embellished, inaccurate claims for which no sources are given in the main.' The project's impact on Finland's energy sector and climate emissions fails to comply with the EIA report, and the company's ability to bear financial responsibility if a nuclear accident occurs should be described in the report. The higher than usual discharge burnup presented in reactor operations, and potentially used MOX mixed fuel, pose additional risks. The statement notes that this was not taken into account in the EIA report. Furthermore: 'The description of the impacts of the accident scenario assessed in the EIA report is inadequate, because the total number of deaths caused by extra radiation exposure is not given.' An even more serious defect lies in the EIA report not even attempting to assess the impacts of a severe nuclear accident' (uses incorrect, optimistically low emission figures).

Confederation of Finnish Industries EK: No comments on the EIA report.

The Finnish Energy Industries: No comments on the EIA report.

Federation of Finnish Enterprises: No comments on the EIA report.

Central Organisation of Finnish Trade Unions SAK: When the final site location of the plant has been chosen from the three alternatives, there will be reason to review the aspects highlighted in the environmental impact assessment of the project for the locality in question.

AKAVA, Confederation of Unions for Professional and Managerial Staff in Finland: No comments on the EIA report.

Lapland Fire and Rescue Services: In its statement primarily concerning the Simo site alternative, the Lapland Fire and Rescue Services give detailed consideration to the impacts and challenges of the project for the planning of rescue and evacuation measures. No comments as concerns the EIA report as such.

Eastern Uusimaa Fire and Rescue Services: The statement primarily applies to the site alternative of Ruotsinpyhtää. The plans must also take account of the safety and functionality of areas outside the actual construction area (incl.) in accident and evacuation conditions. The combined effects of two nuclear power plants have not been assessed from the viewpoint of exceptional and accident conditions to a sufficient extent; a more detailed analysis should be conducted.

Jokilaaksot Fire and Rescue Services: The EIA report is quite thorough, but on the other hand the project's total impact on the operations of the rescue services is not disclosed.

Finnish Game and Fisheries Research Institute: Moderately sound information is available on fishing, and the direct impacts on fishing are assessed fairly thoroughly. However, the impacts of cooling waters on fish stock and the breeding of fish are inadequately assessed and the conclusions are based on insufficient data. No reliable assessments of the aforementioned issues can be conducted without breeding area mapping in the field. The methods presented for alleviating the adverse impacts on fish stemming from cooling water intake cannot be considered plausible until supported by clear research results or information based on practical experience from other sources. In the near future, attention must also be paid to possible so-called invasive species.

Metsähallitus: The EIA report is very comprehensive, but the concrete environmental impacts and natural values it proffers are partly inaccurately and deficiently assessed. Impacts on the endangered biotopes of the coast and sea area must be taken into account (incl. forests on the coast with post-glacial rebound). The assessments of local ecological impacts are deficient as concerns the combined effects of rising water temperature, rising sea water levels and increasing winds due to climate change, as well as thermal load caused by cooling waters.

On Hanhikivi as a site: The EIA report either fails to consider the following topics at all, or in a remarkably insufficient manner: The

position of the Hanhikivi area as a region of particular importance in terms of natural diversity, in compliance with the regional land use plan, and its major significance to the nature of the post-glacial rebound coast of the Bay of Bothnia; the impacts of spreading reed and the elimination of the mechanical abrasion of the ice coat on endangered populations, e.g. vascular plants in Appendices I and II of the nature directive, and bird life assessments. Placement of infrastructure (e.g. power lines) in relation to ecological values, including the flight routes of birds, the future of the *Primula nutans* and *Hippuris tetraphylla* populations in Arkkukari. Contrary to the findings of the EIA report, a Natura assessment should be conducted (spreading of reed, impacts on bird life).

On Karsikkoniemi in Simo as a site: The EIA report makes no mention of the creation of an inventory of the subaquatic biotopes or benthic organisms in the sea area. This renders the assessment of the impacts of the project on subaquatic biotopes impossible. Moreover, the report contains conflicting information on the bird life assessment method employed. There are a number of endangered species and those mentioned in Appendices II and IV of the nature directive, but due to the insufficiency of species mapping, a comprehensive impact assessment cannot be carried out. No account has been taken of the results of the assessment of the extent to which biotypes are endangered while, correspondingly, the impacts of the project on endangered biotopes are difficult to assess. Impacts on the traditional biotope of Peltoheitto in Karsikko, and its natural values, should be assessed in more detail. Moreover, no account is taken of the impact of dredging and construction on coasts, or that of an embankment road, on endangered flora.

On Ruotsinpyhtää as the site: The statement draws attention to the Natura area located south of the site alternatives, and the Eastern Gulf of Finland National Park, alongside ecological aspects, landscape, recreation and nature tourism.

The Regional District of Northern Ostrobothnia of the Finnish Association for Nature Conservation: The statement concerns the project's impacts on Hanhikivenniemi in Pyhäjoki. The project strongly conflicts with the regional plan's indication of areas as reserved and belonging to a nature multipurpose area. Moreover, the report presents the incorrect conclusion that, at the actual site, no significant change would occur, because no special form of land use has so far been designated.

The assessment of the impacts of power line routes on bird life goes particularly awry. Because field work is neglected, no actual impacts are revealed. The risk of collision is mentioned but its significance remains unassessed. The report also fails to take account of the movements of birds from one area to another. Due to insufficient surveys performed, the reports conclusions are incorrect.

The report attaches no value to changes in land use. As concerns the special task of protecting the uninterrupted successive development of the coast with post-glacial rebound, the report confines itself to a brief

statement that the significance of the area as a model of this type would markedly decline.

Since the author of the impact assessment has confined himself to collecting existing information, it marred by insufficient analysis e.g. the area's possible *Moor Frog (Rena arvalis)* population is not surveyed or taken into account. A mere reference to non-existent observation data is insufficient. The obligation to survey applies to other species in Appendix IV of the nature directive, such as the *Northern bat (Eptesicus nilssonii)* and possible other bat species or beetles and dragonflies, whose potential habitats are located in Hanhikivi.

There are no analyses of subaquatic nature. In connection with the environmental impact assessment, the organisation responsible for the project should have been obliged to have the status of subaquatic nature analysed at potential project sites. Without site-specific information, the assessment of the impacts on aquatic nature remains general, at the level of mere guesswork. Correspondingly, the programme undertook to analyse the impacts of cooling and wastewaters particularly on migrating fish stock, but no actual survey has been conducted.

According to the report, the organisation responsible for the project has conducted a Natura assessment review, coming to the conclusion that no separate Natura assessment is necessary. However, on the basis of analyses and other information on the area it can be conclusively stated that a separate Natura assessment ought to be conducted. Contrary to the claims presented in the EIA report, for instance the habitats of *Primula nutans* and *Hippuris tetraphylla*, although preserved outside constructed areas, may become threatened in the immediate vicinity of a nuclear power plant due to drastic changes in land use. The assessment has assessed neither the possibility nor the probability of continued grazing, nor the question how the management of the area might be arranged in the future.

The analyses so strongly advocated by residents, of the health impacts of radioactive releases, should have been surveyed as part of the impact assessment.

Assessment of the impacts and safety of low and intermediate level waste is nowhere near sufficient to facilitate further consideration of the project, and the risks involved are underestimated in the report. The final disposal of spent nuclear fuel remains unresolved.

Furthermore, impacts on the regional economy are entirely absent from the accident analysis.

Pro Hanhikivi ry: Since the report is defective and incorrect, no decisions can be made on its basis by the municipality nor can it be used as basic material for land use planning, without further analyses. In its final conclusions, the impact assessment should reveal e.g. that the intention is to destroy significant natural resources in Pyhäjoki.

Comparison of the implementation alternatives should have taken into account the impact of constructing power lines. Prior to consideration

being given to the issue of licensing, the entire nuclear energy production chain should be planned (including excavation for uranium and the final disposal of nuclear waste). International research has established that nuclear power plants involve health hazards, but the EIA report makes the unsubstantiated claim that there are no risks involved.

The extent of Fennovoima's responsibilities and duties and the issue of what remains the responsibility of the municipality or any other such body (for instance, roads, water pipelines and other such infrastructure, rescue services etc.) remain unexplored. Moreover, the impacts of civil engineering remain unanalysed, while the impacts of cooling waters have not been given adequate consideration. In the absence of biological subaquatic research, there is a complete lack of basic information on the aquatic nature of the area. The impacts on fishing and fish species are considerably understated. The statement casts doubts on the suitability of the local bedrock for the storage of nuclear fuel, because the EIA report provides no assessment e.g. of crevices in the bedrock, through which radioactive leaks might spread into groundwater. Questions are posed on how to ensure that future generations are aware of what has been placed in final disposal in the ground, and on where spent nuclear fuel will be transported and placed under final disposal.

Concurring with the statement of the Regional Environment Centre of North Ostrobothnia, Pro Hanhikivi finds the assessment of nature extremely deficient: the development sequences of forests on the coast with post-glacial rebound and the endangered status of forests has not been taken into account, vegetation has only been surveyed on the basis of literature without field studies, no research has been conducted on e.g. the polypore species of moulder wood, the variety of lichen species, insects or micro-organisms. Furthermore, the survey of bird life is highly inadequate, utilising outdated information, and the detrimental impacts of power lines in relation to bird life and the landscape have been handled either insufficiently or not at all.

The archaeological surveys conducted, and those of historical monuments and relics, are deficient (e.g. Vanha kartano (Old Manor), kapteenien talo (house of captains), likely relics of seafaring in the neighbouring water area etc.)

The consideration of 'the worst possible accident scenario' underestimates and downplays the risks and consequences. It is not true that the impacts of nuclear fuel sourcing are not evident in Finland, since uranium mines are being planned there. Moreover, it would irresponsible to neglect the impacts of uranium excavation and further processing abroad.

It is misleading to claim that consumer prices of electricity would decrease due to the nuclear power plant. Negative scenarios of the zero alternative are based e.g. on the incorrect assumption that other energy forms will not develop. The increment prognoses of energy consumption in the EIA report do not take account of the shutdown of the paper industry and global warming.

Raahe Area Nature Conservation Association: The statement mainly concerns the site alternative of Hanhikivi in Pyhäjoki. Inadequate consideration is given to the topic of 'Connection to other projects' (e.g. the Rajakiiri wind park project outside Raahe, the research institute planned for the Pyhäsalmi mine). The zero alternative must be a genuine option for electricity saving and enhancing the consumption of electricity, alongside renewable energy. Handling of the zero alternative (EIA) does not include the EU's obligations with respect to increasing the share of renewable energy, alongside an assessment of how the project would influence/hamper the fulfilment of this obligation. The impacts of uranium mining operations should be taken into account. At least in the case of Hanhikivi, connections to the main grid constitute such a significant issue in terms of land use, that they should have been considered in this EIA. Clarifications on wastewaters and condensation waters must be specified, observing the requirements of the Water Resources Management Act. According to Fennovoima's internet pages, the company does not construct anything close to nature conservation areas, but in the case of Hanhikivi in Pyhäjoki, the plant would actually be situated in the middle and on top of conservation areas. The statement includes remarks on preserving relics and antiquities, and proposes that surveys examining subaquatic relics or antiquities be conducted. The vegetation survey should be extended to cover the area of Kultalahti, where endangered species grow. The survey omits, or is deficient concerning, fungi, polypores, moss, lichen and insects. Geological research results are very poorly presented. Furthermore, comprehensive surveys of subaquatic organisms should be conducted. The birdlife surveys conducted are insufficient and too narrow in regional terms, while the source material is deficient and partly outdated. The impacts of accidents should be described in more detail and for a wider area, and the requirements of the Nuclear Liability Act should be presented.

Northern Ostrobothnia Ornithologic Association and Raahe Area Bird Club Surnia: No adequate account has been taken of surveys concerning bird life, and the material used is insufficient. Also, no survey has been carried out of the overall significance of local bird life. Important bird species either remain unnoticed or superficially handled. The area subject to the assessment of ecological impacts was far too restricted, e.g. by placing the power plant's support functions in land use plans for areas not included in the EIA assessment area. No reference is made to the impacts of alleviating measures. The conclusion that no Natura assessment is necessary (Parhalahti-Syölätinlahti-Heinikarinlampi) is unacceptable. Furthermore, no commensurate criteria are presented for the comparison of site options. Only very brief mention is made of the impacts of condensation waters on bird life (such as waders and waterfowl). On the other hand, the impacts of road routes and traffic on bird life should have been taken into account for all route options. Impact assessments of traffic emissions and noise remain almost completely absent.

Parhalahti Fishing Club: The Club is extremely concerned about the project's impacts on indispensable, naturally generated fish stock thriving in cool waters, and the detrimental effects on winter fishing.

Pyhäjokialue Nature Conservation Association: The justifications based on electricity consumption, cited in the EIA report as the basis for the necessity of the project, are questionable. The statement proposes that the submarine cable option Kemi-Oulu-Hanhikivenniemi-Kokkola-Vaasa be reviewed as when considering the various projects for the reinforcement of power lines. The credibility of warm water emission modelling results, and the results presented on ice modelling, are questionable, and sea currents must be taken into account. Furthermore, the fuel sourcing chain should be given a transparent explanation.

Pro Karsikko Association (Karsikon puolesta ry): This statement mainly concerns the site alternative of Simo. Impacts on the fish stock and fishing are insufficiently presented and analysed, with even incorrect information on the behaviour of salmon being given. Strong condensation water flows and dredging operations would disturb detrimental materials, pumped into the sea by Veitsiluoto Oy's operations and already settled and sedimented on the bottom. According to the EIA report, the Finnish Institute of Marine Research has only conducted research on sea level variations in the nearby water areas. The matter should be thoroughly researched, and Fennovoima obliged to transfer toxic earth masses away from the sea bed. This statement contains a great deal of criticism citing the lowering of the quality of recreational dwelling, the reduction of possibilities for collecting wild berries and mushrooms and the fog caused by meltwater on flight routes, and the worsening travel image for the Simo-Kemi-Tornio region. The incomplete state of the final disposal plan for spent nuclear fuel is also criticised, while doubt is cast on the claim that the plant will be located (in Simo) in a sparsely populated area, far from any significant population centres.

Pages 199-210 of the EIA report – including e.g. pictures 8-34 and other pictures on pages 200-206 – contain an inconsistency concerning the intake and discharge options of cooling waters, currents and thermal effects. These errors may have caused confusion with respect to the comments by citizens, both on the EIA and land use planning matters. (Remark by MEE: this matter has been discussed with the organisation responsible for the project: this is a misprint, in which two alternative discharge locations are indicated 'across' one another in the picture.)

Stora Enso Veitsiluoto Mill: No comments on the EIA report. The statement draws attention to e.g. maintaining undisturbed shipping traffic during the construction period of the prospective nuclear power plant, in view of the needs of the Veitsiluoto Mill. It also remarks that the distance between the Veitsiluoto Mill and (Karsikkoniemi) nuclear power plant would only be around 6 km, which means that mill employees must be taken into account in safety planning.

Kemi Area Nature Conservation Association: The EIA report, prepared in a hurry, attempts to use beautiful pictures to divert attention to secondary issues. Significant environmental impacts are unexplored, and therefore acknowledged only through general statements that underestimate the actual impacts, while the special conditions of the site alternatives are ignored since they are handled as a single entity.

Since the impacts on waterways and the fishing industry are not examined, the statement is confined to general surveys already conducted, cherry picking the factors favourable to Fennovoima. The following is either insufficiently examined or not examined at all: impacts on aquatic nature, impacts on the endangered biotypes of the coast with post-glacial rebound and its organisms (e.g. Primula nutans), and the Natura assessment concerning Murhaniemi at Ajos.

It is misleading to claim that an industrial zone would spread from Kemi to Karsikkoniemi for reasons other than the power plant. The EIA report confines itself to stating that holiday residences would be removed from the southern shore of Karsikkoniemi, but in fact other holiday and permanent residences would also be removed. In addition, the collection of natural produce and reindeer husbandry would decline in the neighbouring areas.

The Ministry should not approve the EIA report with its present contents. For the assessment procedure to seem credible in the eyes of citizens, the EIA report's contents must be appropriate.

Regional District of Lapland of the Finnish Association for Nature Conservation: The statement mainly concerns the site alternative of Karsikkoniemi in Simo, highlighting e.g. the special characteristics of the area, ecological and recreational values and the acceptability of the project as concerns the site alternative in question. Some remarks are included, particularly concerning the EIA report:

The plan entails building an embankment road for the purpose of constructing the cooling water structures and servicing, whose impacts on water currents remain unsurveyed. The impacts of an embankment road or bridge and water intake on currents and migration routes should be examined in detail, since the fate of wild salmon in the Baltic Sea is at stake.

The assessment report mentions that 'The impacts of road traffic noise are insignificant'. However, traffic noise will increase at Karsikko in Simo on certain road sections and at crossroads, and influence the wellbeing of residents. In addition to the noise, the junction of the Karsikontie road and highway 4 will involve safety risks.

As concerns Karsikko, the suitability of the bedrock for the interim storage of radioactive waste or final disposal of low and intermediate level waste remains unexamined. The chromium mine of Elijärvi will

probably expand, and blasting at the mine will create more crevices in the bedrock.

The nuclear power plant would damage the market reputation and sales of fish from the nearby area and that of reindeer meat from Lapland, alongside the area's image amongst tourists, for years to come.

No transport volumes of spent fuel are mentioned. Neither are the environmental impacts, nor the risks involved in fuel transportation and the impacts of a potential accident, assessed. In addition, Fennovoima has not presented a solution of its own for the final disposal of spent nuclear fuel.

Dismantling the plant will require massive waste transport operations, and no detailed information has been provided on the method of implementation with respect to such operations. Any comparison of benefits and disadvantages should include an assessment of the environmental and image-related impacts following the closure of the plant.

Hepola Residential Association: This statement mainly concerns the site alternative of Simo. The Association pays attention to possible evacuation needs and population numbers that exceed the restrictions provided in STUK's guidelines for the plant's protective zone. However, it remains unclear where spent nuclear fuel will actually be placed under final disposal, although the report refers to the final disposal project prepared by Posiva.

Perämeri Fishing Area: This statement concerns the site alternative of Simo. The entire assessment is conducted almost solely on the basis of existing, insufficient material, and does not provide an overall impression of the impacts on fish stock and fishing. No account is taken of the probable proliferation of cyprinids, which would affect the profitability of fishing. The same applies to seals, which spend the winter in meltwaters and would help prevent winter fishing (in addition to the weakening of the ice). The EIA report's statement that the fish stock of Baltic herring, special whitefish species Coregonus lavaretus widegreni, and vendace, would not be affected, is based on insufficient information.

Nature Association of Kuivaniemi: A thorough zero alternative remains unanalysed. The project's justifications in terms of energy strategy are misleading. Therefore, the EIA report is merely a brochure advertising the benefits of the project. For instance, ethical impact assessments across the generations, related to nuclear waste, are absent. The impacts on fish stock and fishing (salmon in particular) are underestimated and neglected.

Huntsmen of Loviisa Region: The marginal terms of the cooling water modelling do not take account of the residual/resultant current predominant in the Gulf of Finland and the Baltic Sea. Furthermore,

the report's temperature measurements are deficient. The EIA report does not mention possible flow measurements. Consideration should be given to the channelling of cooling waters farther away than so far suggested.

Miljöringen rf:-Ympäristörengas ry Loviisa: It is questionable whether energy consumption, and, correspondingly, the need for additional nuclear power, will increase in the manner suggested by the EIA report, and any greater need could be satisfied through other measures. Other parts of the statement apply mainly to the Ruotsinpyhtää site alternative. The association does not regard as credible the EIA report's claim that the adverse impacts of the plant on the environment and wellbeing of people would be of minor significance. The EIA report does not take the resistance of residents in the area seriously. With reference to STUK's reports and statements made by STUK's experts, the association concludes that it is 'fairly clear already' that the discharge of cooling waters into nearby waters, i.e. construction of the nuclear power plant in Ruotsinpyhtää, would be unacceptable. The association also calls into question the starting points and conclusions (extent of protective zones, evacuation needs, maximum quantities of emissions etc.) concerning a potential major accident.

Itä-Uusimaa Association of Nature and Environmental Protection:
Overall, the EIA report is superficial and contains severe defects and errors in places, and should not be approved without major additions and a clearer and more detailed impact-specific and site-specific analysis. The entire lifecycle of the project until after the termination of energy production, and as concerns fuel, the entire production chain from the excavation of uranium to final disposal, should be taken into account in more detail. Usage of the terms 'energy' and 'electric energy' is inaccurate/confusing in places. The report emphasises that Fennovoima is a Finnish company, which is not entirely true (according to the articles of association, in certain situations the right to acquire free shares transfers to E.ON Nordic Ab in practice). In most respects, the association's statement is based on the EIA report's information on Ruotsinpyhtää in particular.

The resident survey was not conducted in the manner stated by Fennovoima.

The report's description of the current status is deficient with respect to many aspects of the programme. The survey on, and research into, the quality of the environment or local conditions have not been conducted to the necessary extent. For instance, the impacts on waterways of the thermal load resulting from cooling waters is only surveyed in comparison with the current status, and condensation water modelling is implemented on the basis of information from the Orrengrund weather observation site only, taking account of the wind direction and force, and air temperature. As concerns impacts on waterways (incl. impacts on the fish stock), the EIA report is largely dismissive and deficient. The thermal load caused by the present

Loviisa nuclear power plants and the potential thermal load of the new Fortum power plant project must be included in the thermal load caused by condensation waters. In the assessments and spreading model calculations, full account must be taken of the combined effects.

The present information on currents does not provide sufficient basic information for spreading calculations.

The assessment of the eutrophication impact caused by the thermal load should take account of the geomorphology of the receiving waterway. Other impacts include the creation of favourable conditions for invasive species which, in turn, could have extensive impacts at ecosystem level in the Gulf of Finland. Certain mussel species could also influence the safety of cooling water intake.

On the whole, in terms of the impacts on nature, the EIA report is dismissive, deficient and partly incorrect (e.g. the migration route of arctic bird species is not completely over open sea etc.) Furthermore, there is no list of vegetation. The bird life survey does not utilise the best available source material, and the observations of the Porvoo bird life association have not been used as source material. In particular, the impacts on the nutrition of the Razorbill (Alca torda), Caspian Tern (Hydroprogne caspia) and Common Guillemot (Uria aalge) should be taken into account. The EIA report contains no survey on the spawning sites of fish species and the impacts on them. In general, the impacts on the fish stock are poorly examined.

According to the lifecycle approach, the report should include an assessment of the emissions during the operating life of the nuclear power plant, including releases from mining operations and final disposal, and a more complete survey of the air quality and climate-related impacts of the actual plant project throughout its lifecycle.

The programme’s exclusion concerning impacts on the ground and bedrock is far too confined. Specific account should be taken of the assessments of the comprehensive project entitled POSKI, surveying the protection of groundwaters and rock material management, in this EIA procedure. Rock material would most probably be acquired from sources located dozens (even a hundred) kilometres away, which would influence traffic volumes, costs and emissions while increasing the quantities of noise and dust in the living environment. As concerns groundwaters, the report neglects possible impacts during the construction period.

In terms of health impacts, those caused by long-term low radiation levels should be examined alongside a review of recent research into the high frequencies of leukaemia cases in the vicinity of nuclear power plants in Germany.

The project’s impacts on the local economy should be examined in more detail, for instance as concerns taxation impacts.

The adverse effects of increasing noise are handled too cursorily by the report, which partly neglects the special characteristics of the area. The survey of land use and landscape impacts is too narrow and dismissive.

At a distance of around 1 km from the Gäddbergsö site are the homes of 7 permanent and 26 summertime residents, and on the island of Kampuslandet there is a total of some 140 summer residents. In practical terms, the report utterly ignores all of this as well as the socioeconomic impacts on these areas, and even neglects to review other residents/villages within the impact area of land use restrictions.

The construction of power lines is directly connected to the nuclear power project, which means that the environmental impacts thereof should be described, with respect to the connection from the power plant to the connection point with the current national grid. A separate EIA on expanding the national grid, commissioned by Fingrid, is not an acceptable way of accounting for the adjoining impacts directly related to the project.

Assessment of the impacts of exceptional and accident situations should also assess the risk and management of, and preparation for, an actual situation stemming from an extensive oil spill, in terms of the intake of cooling waters into the power plant.

Furthermore, the risks posed by the centralised location of nuclear power plants to Finland’s electricity supply in accident conditions should be taken into account. How would it be possible to ensure the safe operation of power plants located close to one another, or the shutdown of operations in severe accident conditions, and how might substitutive electricity production be arranged rapidly?

The text handles the environmental impacts involved in treatment of operating waste, but no mention is made of the quantity of the remaining radioactive components and structures in connection with the decommissioning of the power plant, and their location. This should be included in the environmental impact assessment.

Fennovoima Oy’s report on the final disposal solution for spent nuclear fuel should be included in the EIA report, even if Fennovoima Oy is denied access to the Onkalo final disposal repository in Eurajoki.

A major defect lies in the small-degree handling of the so-called zero alternative and the actual omission of alternative power production methods.

The Regional District of Uusimaa of the Finnish Association for Nature Conservation: The purpose of the project is not given sufficient grounds. Contrary to the claims made in the EIA report, carbon dioxide emissions are generated during the lifecycle of nuclear power plant operations. Chapter 5 does not acknowledge the

emissions from e.g. the excavation of raw material, enrichment and transports. Final disposal of nuclear waste remains unresolved, particularly for the Fennovoima project.

Regardless of the EIA contact authority's statement on the programme stage (incl. Ruotsinpyhtää), no new field studies have been conducted on water issues, which renders the EIA report's overview of the situation insufficient. The assessment of cooling water impacts is deficient in many ways (water layering phenomena and the resulting effects, chemical hydrology, impacts of increasing evaporation).

The sea level assessment for Ruotsinpyhtää is too narrow. Assessments should be made for a 50-year longer period, up to 2125.

'With respect to the assessment concerning nature (EIA report 8.6.2), the report does not disclose whether e.g. the occurrence of endangered biotopes is surveyed in the field. Biotopes mentioned in the Forest Act and the Water Act are not examined to a sufficient degree.' A Natura assessment would be indispensable to granting a licence for the project. Contrary to what is stated in the EIA report, islets and islands are protected as a biotope without birds. No subaquatic biotopes are surveyed through field research, representing a defect.

Power lines are not handled to a sufficient degree, even though the contact authority separately mentioned this in its statement. As concerns radioactive releases, the impacts of any nuclide degradation products released into the air are not included.

The change in land use, from 'M' and 'holiday residence area' into an area designated for nuclear power industrial usage is significant, contrary to the claims made in the EIA report. The Kampuslandet site alternative would require a new bridge, and its impacts on currents should have been examined.

Summary concerning Ruotsinpyhtää: 'In particular, the survey of waterways is insufficient and a related Natura assessment would be essential.' Also, power lines and endangered biotopes should have been assessed in more detail at this stage.

ProSaaristo (ProArchipelago): Apparently, the EIA report covers the content requirements as per EIA legislation. The report's major defect lies in its superficial and cursory nature, lack of specific analyses, outright errors and, above all, the vaguely expressed conclusions on the impacts of a nuclear power plant on the surrounding nature and people. Adverse effects are admitted to, but the conclusion is always the same: 'no significant impacts' etc. The report is compiled almost entirely on the basis of partly outdated source material, or mere assumptions. No subjective supplementary surveys and measurements have been conducted and no external experts used.

It is remarkable that more detailed consideration has not been given to aspects related to the national grid. Fennovoima's EIA report fails to make sufficient reference to power line routes (incl. pictures).

The EIA report claims the following: 'Since the major part of the nuclear power plant's protective zone is already located within the Hästholmen plant's protective zone, no significant changes will occur in land use restrictions.' This claim is at the very least misleading, since for instance the whole of Vahterpää and most of Kampuslandet remain outside the protective zone in question. This entails that permanent residences remaining inside the Ruotsinpyhtää sites and under road and power line routes are not mentioned.

Strömfors & Pernå Fiskeområde, Strömfors & Pernå Fiskargille:
Cooling water intake and the thermal impacts of condensation water are handled deficiently as concerns the decades-long impact of the nearby Loviisa nuclear power plant units. The modelling is based on assumptions only, as no field observations e.g. concerning long-term currents, have been carried out. Field observations on the impacts of water intake on the fish stock are not included. The technologies presented by Fennovoima for preventing the inclusion of fish in water intake, being based on literature only, are thus unconvincing - for example, such technologies are not even used in Finland. The impacts of higher temperatures on the fish stock are understated and assessed on the low side in many respects. Enclosed with the statement is a comment by Sakari Kuikka, Professor of Fisheries Science. As the research data utilised on professional fishing dates back to 2005, it is outdated. It has been claimed that so-called invasive species might proliferate to a detrimental degree as the water temperature rises; this has not been examined in the EIA. The EIA report version in Swedish deviates from the Finnish version (the statement lists examples of this). The correction of these issues is called for alongside the possibility of a statement being issued in Swedish before the project proceeds.

Östra Nylands Fågel- och naturskyddsförenings r.f. ÖNFN: The nature surveys conducted during the EIA are insufficient, as is the usage of the information available in terms of its extent and detail, in view of the scope and significance of the project. The flora, and protected/endangered vegetation in particular, as well as their status, is insufficiently assessed. Similar defects apply to the birdlife surveys in many respects and parts of the analyses of the Ruotsinpyhtää site alternative. Field observations were timed for May-early July only, while the optimal time for an inventory of e.g. woodpecker species would have been August-October. A serious defect lies in the failure to mention Marvik as a protected area (e.g. chapter 8.6.2.2).

Pyhtää Nature: This statement mainly applies to the site alternative of Ruotsinpyhtää. The EIA process was conducted on too rapid a schedule. Furthermore, the nature surveys are deficient, e.g. the situation of Bladder Wrack (fucus vesiculosus) seaweed should have been examined. Issues raised by the association before the EIA

monitoring group, negative in terms of the project, are omitted e.g. in the protocols. Impacts on local wellbeing should have been assessed by gaining more basic information of the practical experience of Olkiluoto and Loviisa. The report is not impartial as concerns text and images, but constitutes an advertisement for the project. Information on uranium sourcing and fuel production with the related impacts, and clear data on the final disposal of spent fuel, are missing. Examples of negligence in nature and culture inventories include the omission of kettle holes, insufficient surveys of bats in Ruotsinpyhtää and the fact that no comments from the National Board of Antiquities have been obtained on the destruction of islander villages. The destruction of landscape areas and the significance thereof is downplayed.

Association of Professional Fishers in Finland: The background information given on fishing is partly outdated and no assessments by independent expert bodies are presented. E.g. the assessment of salmon is cursory and apparently carried out without research data. Incorrect conclusions are presented on the impact of condensation water on fishing, since no account is taken of the adverse impacts of seals. Full account is not taken of the total thermal load in Ruotsinpyhtää (incl. the current Loviisa plant units and the potential new one). More attention should be paid to water flow conditions. No account is taken of possible restrictions on fishing due to construction or the impacts of constructions affecting waterways (bridges, routes, dredging etc.) on the fish stock and fishing.

BirdLife Finland ry.: Background material on the impacts on nature is insufficient, the conclusions often incorrect, no actual use has been made of the source materials cited, and the evidence cited is insufficient since the possible impacts are underestimated and their description comprises mere speculation. A Natura assessment would be necessary for instance because Natura areas are located nearby, and the project is very extensive. The zero alternative is insufficiently surveyed, while the impacts of uranium production and that of nuclear fuel should be taken into account alongside those of power lines. The impacts of dredging on nature remain unassessed - they may be of significance in terms of aquatic nature.

Professional Fishermen of Northern Bay of Bothnia, Ii Environmental Association, Popular Movement of Lapland against Nuclear Energy, Women against Nuclear Power and Women for Peace in Finland, Edelleen Ei Ydinvoimaa Popular Movement against Nuclear Power, the Swedish 'Miljöorganisationernas kärnavfallsgranskning MKG', Wiener Plattform 'Atomkraftfreie Zukunft', 'Atomstopp-Atomkraftfrei leben!':

The abovementioned associations and popular movements have also submitted their critical comments on the project to the Ministry. In addition to concerns over local environmental impacts, the following aspects were mentioned: the EIA must take account of the

entire lifecycle of nuclear power, including excavation for uranium, the production of nuclear fuel, and nuclear waste management.

Comments by private persons: In addition to the abovementioned organisations, private persons sent a total of 65 comments to the Ministry on the EIA report. Many of them oppose the use of nuclear energy in general or additional construction thereof, or oppose the construction of the plant due to reasons related to the likely environmental impact, particularly on the alternative sites proposed by Fennovoima. The EIA process as such was also criticised in legislative terms, or with respect to the way in which it has been implemented in this project as regards the schedule or other aspects. Some people expressed their discontent with the lack of possibilities to influence decision-making or be heard during the EIA. The unsuccessful resident survey, in which not everyone who should have been included was heard, was a source of irritation.

However, many opinions of private citizens received by the Ministry examine and consider the EIA report itself in detail, the actual subject of the hearing. In many cases, the authors of statements have either themselves possessed or had access to high-quality expertise and knowledge of local conditions. The contents of all of these comments were negative, opposing the project.

The most detailed statements refer to the same defects as those cited by expert organisations: Surveys of nature are conducted deficiently, without sufficient field observations and sufficiently recent and comprehensive background material. Several species of both flora and fauna appear to be missing from the assessment. Furthermore, the hydroecological surveys conducted are insufficient in many respects. Water modelling is deficient in terms of observing currents and winds.

The EIA report's defects concerning nuclear waste management, including the final disposal and transport of spent nuclear fuel and the treatment of decommissioning waste, are highlighted alongside the claim that even the sourcing of nuclear fuel, all the way from the excavation of uranium, must be included in the EIA reports. Many statements find the omission of power lines from this stage of the EIA an fundamental defect both as concerns nature, the landscape and later decision-making stages of the project. The impacts of road routes, land use and aspects concerning the disappearance of recreational areas, noise impacts and civil engineering are not handled to a sufficient extent.

The inhabitants of the Simo and Pyhäjoki region in particular are concerned about the impacts on fishing (incl. salmon) in general, and especially in the winter. In other respects, too, comments express the opinion that the impacts of vanishing and thinning ice are not handled to a sufficient extent, or their significance even acknowledged. It is also stated that the impacts of seismic activity on the project have not been assessed. Attention is paid to the sea level

assessments and a storm that occurred in which the sea level rose by 4 metres, while the comments call for a sea level analysis in relation to global climate scenarios.

In particular, it is mentioned that the subaquatic ancient relics of Hanhikivenniemi have been neglected by the survey. Commentators also ask how access to Hanhikivenniemi will be secured, since the EIA report contains contradictory information on the issue.

The question of who will pay for maintaining rescue preparedness is also raised. Similarly, it is noted that the report does not reveal whether the impact assessment applies to one or two reactors. Furthermore, the combined social effects of the Loviisa plant and Fennovoima's plant for the Ruotsinpyhtää option are neglected. The Finnish and Swedish EIA reports deviate from one another, an actual example given being the salmon spawning depth: Finnish, below 3 m, Swedish, over 3 m. An example is also included of inaccurate terminology.

The EIA report is characterised as containing complacent understatements of the environmental impacts, as being a purposeful advertisement, while it is claimed that many pictures distort images through the scale used, or in some other way, thereby serving the company's interests. Examples of this are included.

Opinions from the international hearing

Sweden's environmental authority, *Naturvårdsverket*, has held a public hearing forming the basis of its statement. It received comments from 24 authorities (some municipalities sent their statement to their provincial authority) and seven organisations, and two comments or opinions from private individuals. The statements and opinions and other material on the circulation for comments in Sweden are available on the internet at:

http://www.naturvardsverket.se/sv/Nedre-meny/Aktuellt/Remisser/Sammanstallning-av-remissvar/Finland-planerar-nytt-karnkraftverk/Remissvar-om-synpunkter-pa-miljokonsekvensbeskrivning-for-ett-nytt-karnkraftverk-i-Finland-Fennovoima-Oy/

Naturvårdsverket has not prepared a summary of its own on the statements received, but refers to comments given in them. In its statement, the authority mentions that it has focused on the project's impacts on the sea. The authority finds the EIA report sound, but emphasises that the introduction of fish, fry and fish spawn into the power plant within cooling water should be prevented using the best available technology (reference to chapter 10.2.2.4 of the EIA report).

Furthermore, Naturvårdsverket refers to certain invasive species such as the Zebra mussel (Dreissena polymorpha) and states that no

plans have been laid for the control of such species, which are also possibly detrimental to the power plant. The authority considers this a defect (part 11 of the EIA report).

The Swedish radiation safety authority Strålsäkerhetsmyndigheten (SMM) maintains in its statement that the EIA report essentially meets all requirements under directive 97/11/EC. However, it considers the fact that no specific information is given on the treatment of radioactive waste and spent nuclear fuel a defect. Therefore, under the circumstances the authority cannot comment on the assessment of the environmental impacts of the treatment of nuclear waste and spent nuclear fuel.

Sweden's state provincial offices (Skåne, Norrbotten, Västerbotten, Västernorrland, Norrbotten and Uppsala) draw attention to the impacts of any severe accident on Sweden. According to the State Provincial Office of *Västernorrland*, the accident analyses presented should be specified so as to pay more attention to the actual circumstances, alongside countermeasures to the spread of radioactive materials.

According to the statement of the State Provincial Office of *Norrbotten*, the siting of the nuclear power plant in Pyhäjoki or Simo would alter the risk scenario of the area, which must be taken into account in the future planning of emergency response arrangements and rescue services. Moreover, the provincial office included more minor comments and questions concerning certain details of the EIA report.

The majority of municipalities and cities that submitted a statement (Kalix, Kiruna, Piteå, Skellefteå, Timrå, Jockmokk, Överkalix, Gällivare, Piteå, Luleå and Haparanda) comment on the assessment of the impacts of a potential accident at local level in Sweden. Some municipalities (including *Timrå, Överkalix, Kiruna, Luleå*) are of the opinion that the EIA report does not survey the use of renewable energy sources to a sufficient extent and that the report should be supplemented with an analysis of this.

The Municipality of Ylitornio requires a more specific analysis of the chemical and ecological status of the Bay of Bothnia and the river Tornionjoki, and as concerns the river Tornionjoki, an assessment of the impacts of the Simo plant alternative on the Natura 2000 site on the river. Like the city of *Haparanda*, several municipalities are of the opinion that the environmental impacts on the migration routes of salmon outside Simo should be assessed to a greater extent.

Other comments and opinions received by the Swedish environmental authority emphasise the assessment of radioactive emissions from several perspectives. In particular, the organisation's or person's view on the general use of nuclear energy has underpinned their comments and opinions. These comments and opinions draw attention to the weakness of the assessment of

alternative energy production options, the long-range transport of, and preparedness for, possible radioactive emissions, the mitigation of possible adverse effects in Sweden, and the impact of cooling water and waste management on the Gulf of Bothnia and the Baltic Sea.

The Norwegian Ministry of the Environment received two statements upon request, both of which approve of the assessment of the impacts of radioactive emissions from a potential severe accident within a range extending to 1,000 kilometres, and consider it a positive aspect that the potential impacts at this range are minor and the probability of such an accident minimal. The statement issued by the Norwegian radiation safety authority, *Statens Strålevern*, considers the presentation of accident scenarios in the EIA report to be diverse and sound.

The Ministry of Environment of Lithuania received statements from four official organisations, and presents some comments and questions to Fennovoima.

According to Lithuania, certain information in the EIA report on the output figures, and on the other hand emissions, of the assessed alternatives do not tally. Moreover, some assessments of radioactive material releases are very low in the Ministry's opinion, and certain other information on emissions is unclear. Lithuania requires responses to these unclear points.

Furthermore, in Lithuania's opinion, the EIA report should have included the cities of Klaipeda and Siauliai, and assessed the aquatic environment of the Baltic Sea region in more detail, including measurements of radioactive materials in water, as well as benthic sediments and organisms. Finally, Lithuania states that, according to the statements issued by its authorities, Simo is a more acceptable site for the power plant from the viewpoint of Lithuania than other sites, because even in accident conditions no such emissions would result that would require immediate protection measures concerning the Lithuanian population.

The Ministry of the Interior of the State of Mecklenburg-Vorpommern, *Innenministerium Mecklenburg-Vorpommern of Germany* states that, according to the EIA report, in the case of a severe accident, radiological impacts would not extend to the state in question. The state refers to articles 4 and 5 of the Espoo Convention and sets forth the following questions/demands:

How can it be ensured that the selected plant alternative meets the requirements set in Finland vis-à-vis the probability of a core melt accident, the probability of failure of the containment building, and the emission limit set? The analysis should also take account of the risk by the crash of a large civil airplane and potential terrorist activity.

Moreover, the bearing capacity of the planned technical solutions for the storage of spent nuclear fuel should be presented, including a clarification of the external threats for which the solutions are designed, and if so-called dry storage methods are utilised, the kind of storage containers to be used. Also, the external threats for which the containers are designed should be specified.

The statement by the *Polish Ministry of the Environment* maintains that, according to the EIA report, the project will probably not cause any significant environmental impacts on the area of the Republic of Poland. However, the statement maintains that the citizens of Poland will continue to show an interest in foreign nuclear power projects and wish to be kept informed about them. Poland arranged a national hearing procedure for the project, and received comments e.g. on the significance of nuclear waste management, the differences between the nuclear power plant types presented, and the comparison of various forms of energy.

The Estonian Ministry of the Environment circulated the EIA report for comments, and arranged a public hearing in Tallinn on 10 December 2008. The Estonian Ministry of Foreign Affairs and the health authority submitted comments.

Estonia requests that Fennovoima provide additional clarification on the following issues: 1) the possibility for blue-green algal inflorescence on the northern coast of Estonia due to the condensation waters of the Ruotsinpyhtää plant alternative, 2) environmental impact assessment of sea transports, 3) how neighbouring countries will be informed in case of accidents, and 4) compensation for any costs resulting from evacuations and other measures due to potential accidents (nuclear liability arrangements).

In Austria, the Federal Ministry of Agriculture, Forestry, Environment and Water Management is the national representative in the process pursuant to the Espoo Convention. The Ministry has sent a letter to the State of Finland, dated 8 January 2009, in which Austria states that it will participate in the consultation procedure in compliance with Article 5 of the Espoo Convention.

Appended to the letter is a report issued by the Österreichisches Ökologie Institut, ‘Expert Statement on the EIA report’, Expert Statement, Vienna 2008. The report comments on the EIA report and contains 13 special questions on the project. Moreover, Austria submitted comments to Finland issued by Land Salzburg, Amt der Niederösterreihischen Landesregierung, Wiener Umweltanwaltscahft and several private persons or organisations. These comments and opinions oppose the project on various grounds.

The consultation procedure between Finland and Austria under the Espoo Convention was arranged in Helsinki on 28 January 2009. This procedure replies to the 13 questions put by Austria. Thereafter, on 4 February 2009, Austria submitted its final statement to Finland.

According to Austria, an assessment of the impacts of a potential severe accident in Austria would be critical. In this context, the so-called source term (quantity of emissions) of accidents, and the analysis methods used would be important. Hence, in compliance with Article 6 of the Espoo Convention, Austria requests that the viewpoints it presents in the final statement be taken into account in the EIA procedure and the subsequent licensing process. The viewpoints concern accident scenarios, the source term, the various stages of the licensing process and Austria's possibilities to influence them, and the final disposal of spent fuel.

4 Contact authority's statement

The statement by the Ministry of Employment and the Economy is based on the requirements laid down in the EIA Act and Decree (EIAA Section 1, EIAD Sections 9 and 10), the contact authority's statement on the EIA programme (MEE 7131/815/2008, 7 May 2008) and the statements requested on the EIA report, and other comments.

The contact authority is obliged to express its opinion on the sufficiency of the EIA report, for which reason the presentation of statement material above primarily highlights the criticism of the EIA report expressed in the statements. Furthermore, the contact authority's statement itself considers the weight of the criticism and the sufficiency of the report in light of the requirements laid down in the EIA Act. The entire statement material is available for viewing on the Ministry's website. Therefore, it should be noted that in addition to, or instead of, remarks, many of the original statements commend the EIA report as praiseworthy, expert, extensive etc.

4.1 General remarks

In the Ministry's opinion, as stated by many of the organisations that gave statements, the EIA report is an extensive expert report on the assessed environmental impacts of Fennovoima Oy's project. In relation to the scope of the project, and its complex impacts, the report gives a good overall view. Moreover, considering the schedule of the entire EIA process, the nature of the project and the fact that project impacts are assessed for three alternative sites – of which two would be situated in completely new areas in Northern Finland, as regards the construction and operation of nuclear facilities – the EIA report is both informative and comprehensive.

If implemented, the nuclear power plant project will have major far-reaching significance for society, which makes its environmental impact assessment a key procedure prior to decision-making, and the assessment must therefore be appropriate in every respect. The minimum requirements for the contents of an EIA report are provided in the EIA Act, the EIA programme of the project in question, and the statement issued by the contact authority on the programme.

In addition to the aforementioned requirements, based on the deficiencies and supplementation requirements presented in the statement material on the EIA report, the Ministry issues the following contact authority's statement on the adequacy of the EIA report, alongside a number of additional clarification requirements for the organisation responsible for the project, and a schedule for submitting the reports to the Ministry.

The Ministry points out that, on 14 January 2009, Fennovoima Oy submitted an application for a decision-in-principle on its nuclear power project. The application material contains information that, to some extent, contains replies to the questions with respect to which the Ministry requires clarification in this contact authority's statement. Nevertheless, all additional clarifications required in this statement shall be explicitly presented in separate reports according to the guidelines provided by the Ministry herein.

4.2 The project and the processing of its alternatives in the EIA report

Information on the project and project alternatives, including the non-implementation of the project, the purpose of the project, alongside all other key general information on project implementation, included in chapter 1) of this statement, are described to a sufficient extent in the EIA report. In the MEE's view, the description meets the requirements of EIA legislation.

Some commentators express their dissatisfaction with the examination of the so-called zero alternative (non-implementation of the project). Similarly, the project's implementation criteria tied to the need for electricity production are criticised.

The MEE maintains that, considering its contact authority's statement on the EIA programme and the fact that Fennovoima Oy's plan specifically involves only the implementation of the nuclear power plant project, the EIA report examines the zero alternative and resulting impacts sufficiently. The justifications for the implementation of the actual project are linked to the examination of the zero alternative. In the Ministry's view, the justifications provided by the organisation responsible for the project, for the need for electricity production as stated in the EIA report, are acceptable. The grounds for implementing the project, and its acceptability, will be separately reviewed in connection with the handling of the application for a decision-in-principle.

The EIA report mentions the various types of reactor options in various size categories that the applicant is considering. The Ministry of the Environment finds that the EIA report handles the differences between the reactor options presented by the applicant insufficiently as regards nuclear safety. Moreover, with reference to the statement by the Radiation and Nuclear Safety Authority, the MEE states that the assessment of the project's environmental impacts, including

impacts on radiation safety, is adequate without the cited separate comparison of reactor types. The EIA report's starting point was the conservative assessment of the nuclear safety related impacts of reactor options, according to the so-called highest risk. The plant project's nuclear safety will be examined in detail at later stages of the decision-making process.

As a plant variation, the EIA report presents the combined production of power and heat (cogeneration option). Heat could possibly be utilised, for instance as district heat. The exploitation of heat, and in particular the environmental impacts of cogeneration and/or impact mitigation phenomena resulting from the lower thermal load on the environment, is handled very generally and incoherently. On the other hand, the EIA report states that 'if the utilisation of waste heat or implementation of the cogeneration option proves viable, environmental reports or environmental impact assessment procedures as required by the scope of the project will be carried out for these.

The viability of the cogeneration option has mainly been handled in the report's chapters 1.8 'Connections to other projects' and 10.2.2.1 'Decreasing the thermal load caused on waterways'. The Ministry points out that since the cogeneration option is one of the project's alternatives, the EIA report should have assessed the environmental impacts of the alternative in question in a more uniform manner.

In the EIA programme, Fennovoima Oy maintains that it will conduct environmental impact assessment in four alternative site localities. The Ministry asks the company to explain in brief, in its supplementary report, why the environmental impact assessment process was not completed in Kristiinankaupunki.

The plant descriptions present various options for cooling water intake and discharge. As a defect, some commentators, e.g. STUK, cite the fact that the so-called distant discharge option for cooling waters is not presented. Therefore, the Ministry requests that Fennovoima submit an explanation of why the EIA report does not bring up the distant discharge option.

4.3 Land use

The land use needs of the new nuclear power plant unit are presented in the EIA report. However, the Ministry of the Environment and several private commentators express the opinion that the EIA report underestimates the impacts on land use in many ways. Moreover, they also maintain that the report should have referred to national land use guidelines and the relationship of the project plan to them.

The MEE finds the report on land use needs and the project's impacts sufficient in terms of decision-making at this stage. However,

the Ministry agrees with those opinions that state that the EIA report to some extent under-represents the impacts on land use, and does not deem the review very high-grade. Because the project's site alternatives include completely new areas in terms of nuclear power construction, the Ministry requests that Fennovoima Oy explain how the project fulfils national land use guidelines.

4.4 Nuclear waste management, sourcing of nuclear fuel and final disposal

In addition to the option of power and heat cogeneration, other projects related to the new nuclear power plant mentioned in the EIA report include the spent nuclear fuel final disposal project prepared by Posiva Oy.

The Ministry's statement on the EIA programme maintained that the EIA report 'must also include any possible spent nuclear fuel transports from all alternative sites using transport methods deemed appropriate by Fennovoima.' The Ministry's statement did not require a definitive plan for the final disposal of spent nuclear fuel at this stage, or a specific assessment of the environmental impacts of transports. On the basis of the EIA report it can be concluded that such transport plans are still at a very early stage, as the report makes only a very brief mention of alternative transport methods and does not actually assess their environmental impacts and risks.

Many statements criticise a) the fact that the EIA report provides the misleading impression that Fennovoima has a licence for, or an agreement on, the final disposal of its spent nuclear fuel in the facility planned by Posiva in Eurajoki or b) the fact that the preparation of the nuclear power plant project will continues with no actual solution to the final disposal issue. Many statements also criticised the lack of an assessment of the impacts of spent nuclear fuel transportation in the EIA report.

The Ministry maintains that Fennovoima Oy has shown no conclusive evidence on the feasibility of the plans for the final disposal of spent nuclear fuel generated by its potential nuclear power plant. However, at this stage of the project, the EIA report is sufficient in this respect. As concerns the transportation of spent nuclear fuel, the Ministry will require a more specific account than the current one, in order to provide decision-makers with an outline for decision making concerning the risks and environmental impacts involved in the transportation for each alternative site, and, correspondingly, of alternative routes from the site to the neighbouring area in the direction of the possible final disposal site.

Interim storage of spent nuclear fuel, the management and final disposal of low and medium-level radioactive waste, and the decommissioning of the nuclear power plant alongside the related environmental impacts, are described in general. On the basis of the report, the plant's nuclear waste management and the construction

and use of a final disposal facility for radioactive waste would not entail any significant detrimental environmental impacts.

The Ministry maintains that the final disposal repository for radioactive waste, intended for construction in bedrock adjacent to Fennovoima Oy's nuclear power plant, would constitute a separate nuclear facility. Therefore, detailed plans and reports, including in terms of the environment, concerning such a facility would have to be completed later on in any case to facilitate the licensing of the final disposal facility. At this stage, the Ministry requires that Fennovoima Oy provide a supplementary report concerning the final disposal facility, disclosing in more detail the fundamental environmental impacts of the facility, and, in particular, presenting the evidence on the basis of which the company finds the proposed emplacement in bedrock safe, within the geological environment of each respective site, in more detail.

As concerns the sourcing of nuclear fuel, in its statement on the EIA programme the MEE was of the view that the EIA report should indeed review, on a general level, the environmental impacts of the entire fuel sourcing chain, alongside the company's possibilities for influencing this chain.

The MEE is of the opinion that the general review of the environmental impacts of the entire fuel supply chain and the company's opportunities to influence this chain, drawn up by the organisation responsible for the project, is adequate.

4.5 Assessments concerning radiation impacts and nuclear safety

The Radiation and Nuclear Safety Authority finds that 'the EIA report covers key issues related to STUK's sphere of authority at this stage of the project'. STUK also mentions the procedures it will implement to assess the radiation and nuclear safety of the project at the handling stage of the application for a decision-in-principle.

On the other hand, STUK states the following on the EIA report: 'the radiation dose assessments presented for a severe accident need to be supplemented, based on the assumption of an emission of radioactive substances whereby the emission of inert gases entails a significant share of the inert gases contained in the reactor nuclear fuel. The selection of typical weather conditions and those increasing the radiation dose should be revised, and radiation dose results also presented for unfavourable weather conditions.'

The Ministry requires that Fennovoima Oy provide the aforementioned supplement, according to the schedule included at the end of this statement.

4.6 Cooling waters and wastewaters

The MEE is of the view that the impact of cooling waters would have the most significant environmental impact during the normal operation of the nuclear power plant. Indeed, the statements material pays a great deal of attention to the assessment of environmental impacts resulting from the thermal load caused by cooling waters.

The contact authority's statement on the EIA programme pointed out that the state of the aquatic ecology in the affected area must be investigated at all levels of the ecosystem and that, following these basic mappings, the impact of thermal load and waste waters on the aquatic ecosystem, in terms of both individual factors and the overall system, should be assessed. Moreover, the statement required that the calculation cases of cooling water impacts should take account of the full combined effect of the thermal loads of all power plants in the area, both existing and planned.

The Ministry of the Environment's statement refers to the thermal impacts of cooling waters and the nutritional loads caused by wastewaters, and the related assessments in the EIA report, which it considers insufficient in many respects. Also, regional environment centres and several other expert organisations have criticised the impact assessment as regards the insufficiency of background analyses and information used, and the heat dispersion modelling. Assessments within the statements of thermal impacts and their ramifications for fish stock and the fishing industry, alongside e.g. coastal and aquatic vegetation, are considered superficial and partly incorrect.

The STUK's statement suggests that more information was probably available on the special features of the sea areas off each of the sites than has been utilised, judging by the EIA report. According to the STUK's report, the potential combined effects of warm water, should the Loviisa 3 project also be implemented, have not been thoroughly assessed in a quantitative sense.

In the Ministry of the Environment's view, in case Fennovoima's nuclear power plant in Ruotsinpyhtää and Fortum's Loviisa 3 nuclear power plant unit are both implemented, the aggregate thermal load on water should be assessed in considerably more detail than at present.

In conclusion, concerning the impact assessment of cooling and wastewaters, and the related criticism, the MEE requires that Fennovoima Oy supplement the information on the current state of the aquatic ecology at this stage, particularly for the Pyhäjoki site alternative, so as to provide sufficient basic information on the quality and ecological state of water in the impact area.

The impact of cooling water, particularly on salmon fishing in Northern Finland, as well as winter fishing in particular, was a cause of concern among commentators. In the Ministry's opinion, the EIA

report's assessment of a range of impacts on e.g. fishing, caused by the warming of water and thinning or vanishing ice cover, are narrowly based and superficial. However, at this stage the assessment report provides a sufficient view of the project's environmental impacts on fish stock and fishing. As a particular detail, the Ministry points out that the EIA report does not mention lamprey fishing, which is significant in Pyhäjoki. Therefore, the MEE requests that Fennovoima Oy supplement the EIA report's information in this respect.

4.7 Flora, fauna and ecological values

The Ministry of the Environment, Regional Environment Centres, Metsähallitus and certain other expert organisations, alongside various local associations and private persons, have pointed out a number of deficiencies in assessments concerning nature and fauna. According to the Ministry of the Environment, this particularly concerns the biotopes, vegetation and bird life on Karsikkoniemi in Simo, and Hanhikivi in Pyhäjoki. The Ministry of the Environment maintains that a balanced and reliable comparison of the project's site alternatives requires supplementation and specification.

On the basis of the statement's material, the Ministry maintains that with respect to the assessment of impacts on nature and fauna, more recent reported information would have been available on certain topics than the information now used, and that for certain sectors, site and project specific field observations would have been necessary.

In the EIA report, a Natura assessment review was conducted for all three site alternatives. The conclusion for all locations is that no actual Natura assessment as referred to in the Nature Conservation Act is necessary, because it is not thought that the project would have a significant detrimental effect on the reasons underlying the conservation of Natura 2000 area(s).

However, the Ministry of the Environment's statement recommends that 'an assessment be conducted on the options of the cape of Hanhikivi in Pyhäjoki and Ruotsinpyhtää, in order to ensure that the impacts are non-detrimental'. The statements issued by regional environment centres and Metsähallitus draw attention to the uncertainties of the analyses and modelling used. However, the statements issued by Regional Environment Centres do not require a Natura assessment as referred to under the Nature Conservation Act, although the Uusimaa Regional Environment Centre proposes more specific Natura means testing concerning the site alternatives in Ruotsinpyhtää.

Furthermore, the Ministry of the Environment's statement maintains that, on the basis of recent case law concerning Union legislation, the licences, permits or other official decisions required for the project under the Nuclear Energy Act, Land Use and Building Act, or

Environmental Protection Act cannot be granted unless the authorities in question have first ensured that the project would have no significant adverse effects on the Natura 2000 site. Moreover, the Ministry of the Environment finds that if the prospective nuclear power plants are considered for implementation in both Ruotsinpyhtää and Loviisa (Fortum Power and Heat Oy, Loviisa 3 plant unit), the possible combined effects on the Natura 2000 site should be taken into consideration in the assessment.

In its statement summary, the Ministry of the Environment maintains that ‘a Natura assessment should be conducted for the cape of Hanhikivi in Pyhäjoki, and for Ruotsinpyhtää’ and that ‘not until all of the aforementioned supplements have been completed and submitted to the contact authority, should consideration of the application for a decision-in-principle commence.’ Furthermore, the Ministry of the Environment states the following: ‘Insofar as the completions concern impacts on nature and waterways, the Ministry proposes that regional environment centres conduct a separate assessment of the sufficiency of the completions before the Ministry of Employment and the Economy attaches them to the application for a decision-in-principle.’

The EIA programme statement of the Ministry of Employment and the Economy stated that the project's impacts on the ecological values of the Natura 2000 areas must be investigated in detail and to a sufficient extent, by habitat and species, in order to provide an appropriate assessment of whether the project will undermine, either alone or combined with other projects, those natural values which have formed the basis of the areas’ selection for the Natura 2000 network.

The MEE finds that no implementation of an actual Natura assessment was required for the EIA report, and that the report’s Natura assessment review fundamentally meets the requirements set on the organisation responsible for the project by law and the contact authority’s statement on the EIA programme. However, it is necessary that the background information for a Natura assessment review be specified in any case. Both the statements of the Ministry of the Environment and regional environment centres cited reasons on the basis of which the MEE would also consider supplementing the information on impacts on nature as required in other respects.

On the basis of the abovementioned, the MEE requests additional clarification from Fennovoima Oy on chapter 8.6 of the EIA report ‘Flora, fauna and natural values’ according to what is laid down in chapter 4.13 (Summary and adequacy of the assessment report) herein.

4.8 Social and financial environmental impacts

According to the EIA Act, an environmental impact assessment should also include the project’s social and financial impacts. On the

basis of the statement material, the Ministry concludes that, as reviewed on the basis of the EIA Act and the contact authority's statement on the EIA programme, the social and financial environmental impacts presented in the EIA report are assessed to a sufficient extent at this stage of the project.

4.9 Comparison of alternatives and viability of the project

The project's primary alternatives concern a) the location, b) reactor types and c) in addition to nuclear power, possible power and heat cogeneration option and d) the potential zero-alternative, i.e. non-implementation of the project. The EIA report shall review the alternatives and the project's viability as regards environmental impacts.

The review of the power and heat cogeneration option and the zero option, alongside that of the reactor type options, is handled herein in chapter 4.2 'The project and processing of its alternatives in the EIA report'.

Chapter 9 of the EIA report presents a comparison of all three site alternatives in light of the environmental impacts contained in the assessment, and their significance.

The Ministry of Employment and the Economy finds that the EIA report includes a sufficiently comprehensive and detailed comparison of project alternatives, and the project's viability from the viewpoint of the initial data otherwise included in the EIA report. Correspondingly, the comparison included in the EIA report provides sufficient starting points in terms of the decision-making process concerning the project. However, the Ministry points out that this contact authority's statement requires that Fennovoima Oy provide further clarification that may, in terms of its content, influence the comparison, particularly as concerns the alternative sites. Therefore, it would be necessary for the organisation responsible for the project to revise the comparison in chapter 9, and the contents of the comparison table 9.1, and report on any changes if necessary.

Moreover, the Ministry points out that, as mentioned in chapter 4.2 and later herein, the party responsible for the project is requested to provide a specification of the environmental impact assessment concerning the cogeneration option.

4.10 Other environmental impacts presented in the EIA report

As the contact authority, the MEE has inspected the project's environmental impacts, assessed in the EIA report, outside the ones described above, during the project's construction and operation period. The inspection's criteria are based on EIA legislation, and the contact authority's statement on the project's EIA programme. In

addition, the Ministry has taken into account the comments presented in the statement material.

Commentators have brought up aspects that have not been handled in sufficient detail in the EIA report, such as the impact of nuclear power plants' power lines on the landscape, land use and bird migration. Likewise, the superficial nature, in certain respects, of the environmental impact assessment of road routes is criticised. In the opinion of some commentators, the noise and dust impacts at the plant's construction stage are not disclosed with sufficient clarity in the EIA report. More detailed mapping of ancient relics, and their endangered nature, particularly on Hanhikivenniemi, has been emphasised. The EIA report's description concerning the numbers of inhabitants in the Simo - Karsikkoniemi site alternative in relation to the Radiation and Nuclear Safety Authority's guidelines on protective zones, are criticised, and the suitability of the area as a site is called into questioned on this basis. Some statements call for a more thorough assessment of the social and financial impacts, or the use of a wider geographic area.

Some criticism of the statement material is targeted at aspects concerning the acceptability of the project, which will actually be handled in connection with the processing of the application for a decision-in-principle. Such criticism is partly targeted at impact assessments, handled in other EIA procedures (e.g. power lines), or at the licensing stage. In addition, the EIA process as a procedure is criticised.

Considering the statements of expert authorities on topics within their administrative sectors, the Ministry of Employment and the Economy finds that the EIA Act and the statement on the project's EIA programme, in light of the fact that no decisions on the project are made during the EIA procedure, will require no additional clarification at this stage of the project for aspects of it other than the environmental impact assessments handled in chapters 4.1 - 4.9 of this statement.

4.11 Interaction and participation arrangements in the EIA process

The EIA report describes interaction and participation arrangements. The Ministry finds that the description and actual interaction procedures and participation arrangements meet the requirements of the EIA Act.

Local popular movements and private persons cite individual causes for criticism related to these procedures, the key issue being the partial failure of the resident survey (delivery deficient).

The Ministry requests that Fennovoima Oy explain the error made in this respect, the reasons for it and how the mistake has been taken into account in the final conclusions of the survey, and its possible impacts on them. This account will form part of the additional

clarification mentioned in chapter 4.13 of this statement by the contact authority.

The key participation arrangement is the actual hearing concerning the EIA report, conducted via statements. On the basis of the so-called Espoo Convention, the Ministry of the Environment has, in turn, arranged the possibility to participate for other states. The latter international hearing and participation of nations is handled elsewhere in this statement.

4.12 Mitigation and monitoring of detrimental environmental impacts

The EIA report describes the project and its assessed environmental impacts, the possibilities for alleviating those impacts, and the key contents of the monitoring programme.

Due to the nature of the project (radiation and nuclear safety requirements), for instance the risk of health impacts caused by radiation will be minimised and monitoring ensured on the basis of relevant regulations at the licensing and implementation stage of the project.

The project's most significant environmental impact during normal operation is the thermal load of condensation waters, the intake of cooling water and the number of resulting effects. The MEE draws attention to the methods of mitigating adverse effects on fish stock, established in the EIA report, the background information on which e.g. the Finnish Game and Fisheries Research Institute finds insufficient. Therefore, the Ministry requires that Fennovoima Oy provide a more detailed account of the matter in the manner laid down in paragraph 7 of chapter 4.13.

The cogeneration of power and heat, presented as an alternative in the project, which would entail the utilisation of waste heat and a lower thermal load on the environment, is presented in the EIA report as a method of mitigating impacts. Other parts of this contact authority's statement comment on the cogeneration option.

The MEE finds that the EIA report describes the methods for mitigating adverse environmental impacts and the impact monitoring programme sufficiently in respects other than those concerning the impacts on fish stock as stated above, and the content of the description is acceptable and sufficient at this stage of the project.

4.13 Summary and adequacy of the EIA report

4.13.1 Environmental impact assessments and their adequacy

The Ministry of Employment and the Economy finds that the EIA report on Fennovoima Oy's nuclear power plant project is exceptionally extensive due to the nature of the project, and the

number of site alternatives. Its content meets the requirements of EIA legislation and takes account of the contact authority's statement on the EIA programme.

In the Ministry's view, the EIA report can be attached to the handling process of the application for a decision-in-principle on the project as a document that describes the project's environmental impacts, and the possibilities of mitigating them, to a sufficient extent. However, certain topics require additional clarification before the handling of conclusive parts of Fennovoima's application for a decision-in-principle, submitted on 14 January 2009, can commence. At the eventual later decision-making stages of the project, such as the handling of the construction licence, in accordance with the Nuclear Energy Act, and the consideration of construction and environmental permits thereafter, several aspects now highlighted in the EIA process will arise for more specific consideration by various authorities.

Most statements given deemed the EIA report appropriate and comprehensive. However, e.g. the Ministry of the Environment, regional environment centres and Metsähallitus suggest that the EIA report is insufficient particularly as concerns certain accounts on nature, whereas the Radiation and Nuclear Safety Authority suggests that the accident survey should be supplemented.

Additional clarifications required

In particular, on the basis of the statements by the aforementioned commentators, and the other statement material, the MEE requires, further to the consideration of the application for a decision-in-principle on the project, that Fennovoima Oy provide the Ministry with a supplementary report by 9 April 2009, including the following aspects:

1. A plan and schedule for specifying the information on water quality and the current status of the aquatic ecosystems in various site alternatives and impact areas, so as to provide comparable and sufficiently commensurable information on the site alternatives in order to facilitate decision-making on the project. In particular, information concerning the Hanhikivi cape area in Pyhäjoki should be specified. The actual specification project should be carried out and reported to the Ministry in the main by 31 August 2009. If the acquisition of field observations is postponed too far in view of the abovementioned deadline due to reasons pertaining to natural cycles, this should be explained in the report alongside a schedule for completion of the work.

2. An account of the method and accuracy of adapting the utilised cooling water model to local conditions at each alternative site, and how sea currents and back flow have

been taken into account in modelling, or on what basis they have been ignored.

3. An account of whether the changes in initial data, mentioned in point 1 on the specifying report on the current status of aquatic ecosystems, influence the final results of water modelling, and if they do, how, and/or what kinds of changes will the specified data of point 1 cause in other environmental impact assessments.

4. The so-called distant discharge option for cooling waters, the implementation criteria thereof and impacts in each site alternative in comparison with the discharge options presented in the EIA report. The significance of distant discharge option for each site alternative should be illustrated, at least roughly by means of a minimum of one model calculation case.

5. An account of how the combined effects of wastewaters and cooling waters are taken into account when assessing the impacts on waterways, vegetation and fish stock.

6. An account of birdlife analysis methods for the Hanhikivi and Karsikkoniemi site alternatives and justifications for the line transect bird census method now used locally on the coast, since this method is usually applied in the main for gaining an overall impression of the bird population over a large inland area. Moreover, a more specific assessment of bird populations concerning the sites in question and their environment should be carried out, taking account of the impact of power lines on bird migration, and more recent information on bird life in wetlands. The aforementioned more specific assessment of bird populations should, as per the account on aquatic ecosystems in point 1, respectively, be submitted by 31 August 2009 and, if necessary, a more long-term future plan for the survey should be provided. Possible specifications or changes to the EIA report's assessments concerning impacts on bird life due to these more specific assessments should also be reported.

7. An account and plan of how the deficiencies in background information referred to in the statement by the Finnish Game and Fisheries Research Institute, particularly concerning the spawning of fish and reliable spawning area observations, should be completed. In addition to this, a specifying report should be submitted by 31 August 2009, including a mapping of the spawning areas of key fish species in the project's impact areas, in such way that the mapping is supported by local field observations. If necessary, a more long-term future plan for the part of the report containing field observations should be provided. Possible specifications or changes to the EIA report's assessments concerning the impacts on fish

stock, due to the more specific assessments, should also be reported.

8. A more detailed report on the position of the Hanhikivi area as a region of particular importance in terms of the diversity of nature, in compliance with the regional land use plan of Northern Ostrobothnia. This report should take account of the significance of the region with respect to the nature in the Bay of Bothnia coast with a post-glacial rebound.

9. A uniform and comprehensive listing and report on the endangered biotopes, flora and fauna found in the impact areas of the Hanhikivi and Karsikkoniemi site alternatives and a more detailed account of how endangered species will be protected in the project. As a detail, the MEE requests that the report take account of the possible impacts that dredging and the construction of an embankment road in Karsikkoniemi would have on endangered coastal species. Insofar as observations after 9 April 2009 are required for the report, the Ministry requires that the working plan be explained and the actual results reported by 31 August 2009.

10. A uniform report and overall assessment for each site alternative on how the project fulfils national land use guidelines.

11. An assessment of whether, and to what extent, it would be possible that the estimated rise in water temperature as a consequence of climate change and increasing winds together with cooling waters during the operating life of the nuclear power plant might influence local ecology, in such a manner that the environmental impact assessments included in the EIA report would be rendered questionable.

12. An overall assessment of the key environmental impacts of heat and power cogeneration (including any dissenting impacts on nuclear safety) in comparison with the production of nuclear power only at the plant in each site alternative.

13. A more specific account of the risks and environmental impacts posed by spent nuclear fuel transportation for each alternative site, and, correspondingly, those posed by alternative routes from the site to the neighbouring area in the direction of the possible final disposal site.

14. A supplementary account of the fundamental environmental impacts during the construction and operation of a final disposal facility for radioactive waste, and an account of the proof and reasons on the basis of which the company finds the proposed emplacement in bedrock safe within the geological environment of each site area.

15. A supplementary assessment in which the radiation dose assessments for a severe accident are completed, based on the assumption of an emission of radioactive substances whereby the emission of inert gases accounts for a significant share of the inert gases contained in the reactor's nuclear fuel. The selection of typical weather conditions and those increasing the radiation dose shall be revised, while radiation dose results should also be presented for unfavourable weather conditions.

16. An account of how the additional clarifications mentioned in points 1-15 will influence the comparison of alternatives, and the comparison table presented in chapter 9 of the EIA report.

17. Amendments, in which a) the misprints in the pictures on pages 199-210 of the EIA report concerning cooling water intake / discharge are explained and rectified and b) the spawning depth of salmon is checked, since this is different in the Finnish and Swedish language versions of the report.

18. An account of the partial failure of resident surveys and the impacts thereof on the final result of the assessment.

19. An account of the reasons for the failure to complete the environmental impact assessment process in Kristiinankaupunki, as planned in the EIA programme.

The Ministry urges the organisation responsible for the project to pay attention in the requested additional report to other questions included in the statement material gained on the EIA report, and to provide answers to a sufficient extent within the framework of the additional report due.

The MEE maintains that the additional accounts mentioned above in points 1-19 constitute the minimum requirement for considering the application for a decision-in-principle. When the appropriate additional report has been received on 9 April 2009, the hearing procedure concerning the application can be launched.

Chapter 4.7 'Flora, fauna and ecological values' of this statement gives more detailed consideration to the necessity of a Natura assessment in the decision-making process concerning the project. With reference to the Ministry of the Environment's statement, and in view of the decision-making process under the Nuclear Energy Act, other licensing procedures and Community law, the MEE urges the organisation responsible for the project to negotiate with the Ministry of the Environment and regional environment centres, and seriously consider conducting a full Natura assessment in Pyhäjoki and Ruotsinpyhtää.

The possible performance of a Natura assessment will not change the aforementioned schedule for submitting additional reports and plans. Information on all additional reports postponed after 31 August 2009, and the related schedule, must be submitted to the Ministry on that day.

Responses to the comments and questions of foreign countries

On the basis of the Espoo Convention, Austria, Sweden, Norway, Germany, Estonia, Lithuania and Poland participated in the international hearing on the EIA report. The questions and comments included in the statements of these countries mainly pertain to the project's radiation and nuclear safety, the acceptability of the project and its justifications, and other such aspects to be handled later in connection with the application for a decision-in-principle on the project. Sweden and Estonia have also raised questions related to environmental impact assessment. These countries have, for instance, requested additional clarification concerning the migration routes of salmon, the chemical and ecological status of the Bay of Bothnia and river Tornionjoki, and the possibility of blue-green algae inflorescence off the coast of Estonia.

MEE requires that Fennovoima Oy submit responses to the questions related to the statements issued by these countries in English, to the Ministry, by 9 April 2009. The MEE will deliver these responses to the Ministry of the Environment, which is responsible for the international hearing.

4.13.2 Summary

The Ministry of Employment and the Economy has inspected the EIA report in terms of the requirements laid down in the EIA Act and Decree. The Ministry maintains that, for the aspects other than those mentioned above, at this stage there is no reason to require the organisation responsible for the project to provide additional clarification of the assessed environmental impacts of the project.

This contact authority's statement concludes the assessment process referred to in the EIA Act. In due course, the specifications and supplementary reports provided by the organisation responsible for the project will be appended to other project material, already submitted on the project, during the Government's consideration of the application for a decision-in-principle.

Moreover, the Ministry states that during the procedure concerning the application for a decision-in-principle, environmental authorities will also be requested to comment on the project. During the hearing concerning the application, the MEE will also request key environmental authorities to provide comments on the content and adequacy of additional clarifications required of the organisation

responsible for the project, as set forth in this statement by the EIA contact authority.

4.14 Communicating the statement

The Ministry of Employment and the Economy will deliver the statement on the EIA report to those authorities that have submitted comments. The statement will also be available on the Internet at www.tem.fi All comments and opinions received by the Ministry will be published on the Internet. The original documents will be stored in the Ministry's archives.

Mauri Pekkarinen

Minister of Economic Affairs

Anne Väätäinen

Senior Adviser

FOR INFORMATION: Authorities having submitted comments