Rantamäki Reko

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Replaces

SUPPLEMENTING FORTUM POWER AND HEAT OY'S LOVIISA NUCLEAR POWER PLANT WITH A THIRD PLANT UNIT, ANSWERS TO THE QUESTIONS POSED AS PART OF THE INTERNATIONAL HEARING RELATED TO THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT

1 INTRODUCTION

On 28 March 2007, Fortum announced that it would initiate an environmental impact assessment procedure concerning a new nuclear power plant unit (Loviisa 3) planned south of the existing Loviisa power plant units on the island of Hästholmen. The objective of the Loviisa 3 project is to build a nuclear power plant unit with a thermal output of 2800 – 4600 MW and an electrical output of 1000 – 1800 MW. The environmental impact assessment programme of the project (EIA programme) was submitted to the Ministry on 26 June 2007. The Ministry issued a statement on the EIA programme on 16 October 2007. The EIA report drawn up on the basis of the plan described in the EIA programme and on the comments made in the statements was submitted to the coordinating authority on 3 April 2008.

The coordinating authority, the Ministry of Employment and the Economy, stated in its statement on the EIA report (7536/815/2008) issued on 15 August 2008 that the contents of the EIA report on the Loviisa 3 nuclear power plant unit fulfilled the requirements established in EIA legislation and that the EIA report had been considered in a way required by EIA legislation.
In its statement, the Ministry of Employment and the Economy stated that the questions posed by the authorities of Sweden, Norway, Germany, Estonia and Lithuania would be answered in writing.

This report contains the questions posed during the international hearing concerning the environmental impact assessment report (EIA report) of Fortum Power and Heat Oy's Loviisa 3 plant unit and Fortum's answers to these questions.

2 NORWAY

Det Kongelege miljøverndepartement of Norway asked the following question:

The radiation dose that will be brought upon the inhabitants of the neighbourhood in the event of a serious accident is, according to table 13-1 in the Environmental Impact Assessment Report, relatively low. We would like to see an environmental impact assessment of the possibility of the destruction of five isolating barriers in the reactor system and the likeliness of such worst case scenario.

Fortum's answer:

Finnish legislation requires that provision be made for a severe accident. The licensee shall demonstrate that the containment system prevents very reliably a release that exceeds the release limit set in the legislation (see EIA report, Section 13.1). The accident case described in the environmental impact assessment report corresponds to this release limit. The described accident is exactly such a severe accident in which all of the barriers retaining active materials from a nuclear power plant have at least partially broken or leak for one reason or other. If even one of the barriers remained unbroken and tight, no release would occur. The containment building is designed to perform even in severe accidents in such a way that amounts of radioactive materials greater than the release described in the EIA report (100 TBq Cs-137) are released into the environment extremely rarely ($< 5 \cdot 10^{-7}$ a^{-1}).

3 GERMANY

Innenministerium Mecklenburg-Vorpommern of Germany made the following requests and asked the following questions:

a) with regard to the reactor's safety container

Following the choice of a particular Project (Pressure or Boiling water reactor) I ask you to submit specifications that are understandable, such that a terrible accident occur, even that of a big civilian aircraft crashing or of a terrorist attack, the probability of the chosen safety container failing is $\leq 5 \cdot 10^{-7}$ a^{-1}.

b) with regard to the wet or dry storage of burnt fuel elements

1. What external influences determine the choice of design for the building?

2. Which storage containers, designed against which external influences, are to be used, should a dry storage be required?

Fortum's answers:

a) Finnish legislation requires that a nuclear power plant be designed to withstand various transients and accidents. Furthermore, the design takes into account complex failure combinations and rare events. These also include a big passenger aeroplane crash. Fulfilment of the requirements linked with the aeroplane crash with adequate certainty is demonstrated by means of different analyses. The central principles will become public in the safety assessment by the Radiation and Nuclear Safety Authority, which will be made in the construction licence phase. Provision will be made for illegal action when designing the security systems of the plant.

b) In storing the spent fuel temporarily, either wet or dry storage method can be applied safely. Worldwide experience has been gained with both methods. Detailed concepts of neither storage method have been discussed at this stage of the project. A decision on the spent fuel storage method will be taken as part of the decision to acquire the power plant unit. In designing the spent fuel interim store, for instance, a big passenger aeroplane crash and earthquakes and other potential external threats are taken into consideration.

4 ESTONIA

The Ministry of Environment of Estonia made the following comments:

Based on the EIA report, the Radiation and Nuclear Safety Authority (STUK) will report possible accident situations to the International Atomic Energy Agency (IAEA). We would kindly ask you to specify in the report how the neighbouring countries will be informed of any exceptional situations and accidents, how this activity is planned to be carried out and who is responsible for that.

Chapter 17 of the EIA report describes the environmental impact monitoring programme. We would kindly ask you to point out who carries out monitoring of impacts of the power plant and whether accredited laboratories are used for that as well (and which).

Fortum's answers:

In Finland, the Radiation and Nuclear Safety Authority is responsible for informing the neighbouring countries. It has the 24-hour readiness to make and receive reports. The duty to report and the responsibility to inform are based on the IAEA's international conventions, which Finland has ratified, and on the EU Council decision about a rapid exchange of information in the event of a radiation emergency. In addition, Finland has ratified bilateral agreements with the neighbouring countries. At present in Estonia, the coordinating authority that receives reports is the Estonian Radiation Protection Center.

The monitoring and surveillance of radiation and releases are based on the radiation surveillance programme approved by the authority; the licensee is responsible for the costs of drawing up and implementing the programme. The radiation surveillance programme includes sampling (for instance, from the air, water, soil and food products), dose measurements, whole body activity measurements of residents in the plant vicinity and real-time dose rate measurements. Information on the radiation situation in Finland, e.g., eastern Uusimaa, is available on the web site of the Radiation and Nuclear Safety Authority http://www.stuk.fi/sateilytietoa/sateilytilanne/itauusimaa/en_GB/itauusimaa/.

The licensee, the Radiation and Nuclear Safety Authority and other subcontractors collect environmental samples. The samples are analysed by the Radiation and Nuclear Safety Authority, whose laboratory operations have been accredited. The Radiation and Nuclear Safety Authority carries out whole body activity measurements of residents in the plant vicinity annually. The licensee installs the disposable dosimeters and it also carries out and analyses the dose measurements. The licensee is responsible for the real-time dose rate monitors in the vicinity of the power plant. The measurements form part of the national radiation measurement network, which also serves the regional monitoring and which can be monitored in real time in, for instance, the Ministry of the Interior and the Radiation and Nuclear Safety Authority.

5 AUSTRIA

The Federal Ministry of Agriculture, Forestry, Environment and Water Management of Austria proposed the following:

It is recommended to provide a worst case accident scenario and the related source term in order to assess transboundary impacts.

Fortum's answer:

In accordance with the requirements set in Finnish legislation, the possibility that a release more serious than the accidental release described in the EIA report (100 TBq Cs-137) would occur is extremely small ($\leq 5 \cdot 10^{-7}$ a^{-1}). The fulfilment of the requirement is demonstrated by means of various analyses.

Occurrence of the accidental release described in the EIA report presupposes that all of the barriers preventing the spread of radioactivity have at least partially broken or leak for one reason or other. There is no generally applicable method to define the worst possible accident.

6 SWEDEN

The statement provided by Sweden included several fairly similar comments on various issues dealt with in the EIA report. Answers to the main comments made in the statement are provided collectively.

Fortum's answers:

Both Fortum and the Finnish authorities monitor technological progress. Fortum employs well-tried and reliable methods approved by the authorities for reducing the releases of radioactive materials. In the EIA report, Table 9-1 shows the releases of radioactive materials into the air and Table 9-4 shows the releases of radioactive materials into the sea.

Sea, train or road transports of nuclear fuel have no environmental effects in Sweden. Both fresh fuel and spent fuel are transported in durable containers specifically designed for this purpose.

The weather conditions used to calculate the radiation doses are based on the data obtained from the weather mast of the Loviisa Power Plant. Extending the assessment of weather conditions and making a reliable estimate of the weather conditions under which the releases from an accident would end up in Sweden would require a different approach. The EIA report describes the deposition caused by a potential severe accident at different distances to enable radiation doses and necessary measures to be assessed, considering the local conditions and food chains.

7 LITHUANIA

The ministry of environment of the republic of Lithuania made the following comments and posed the following questions:

1) Relationship of the proposed project to the Helsinki Commission (HELCOM) Baltic Sea Action Plan (15 November 2007) should be discussed in chapter 6 of EIA report, as one of the ecological objectives of HELCOM Baltic Sea Action Plan is pre-Chernobyl radioactivity level of the Baltic Sea.

2) On page 103 table 9-1 information on releases from existing power plant units (2002-2006) and estimated releases from the new power plant unit, and the release limits are presented. These limits are only for noble gases and iodine but not for aerosols, tritium and radiocarbon. Could you please explain, if release limits for these radionuclides are settled? If yes, what are the limits? If not, what is the base for evaluation of impact of these radionuclides?

Additionally, estimated releases from new unit are higher than from existing two units, for example for tritium even till 50 times. Can you explain, what approach was used for estimating of releases from new unit? What reasons are for such increase?

3) Could you explain what limits of activity for releases of waste waters of the laundry to the sea are used? What approach for establishing the limits is used? (103 page)

4) In page 185 short description of requirements for radiation control of the environment and description of radiation monitoring program is presented. It is stated that radiation monitoring program is approved by the Radiation and Nuclear Safety Authority and results are reported to it. In page 186 it is written, that "the samples are analysed by the Radiation and Nuclear Authority." Could you please explain existing monitoring systems in details. What is done by operator and what by regulatory body?

Fortum's answers:

Information on the results of the monitoring of radionuclides and on the releases of 2002-2004 is available, for instance, from the publication Ilus E, Klemola S, Vartti V-P, Mattila J, Ikäheimonen TK. Monitoring of radionuclides in the vicinities of Finnish nuclear power plants in 2002–2004. STUK-A227. STUK, Helsinki 2008. http://www.stuk.fi/julkaisut/stuk-a/stuk-a227.pdf

1) The releases from normal operation of the planned Loviisa 3 nuclear power plant unit do not affect the activity level of the Baltic Sea, nor do they have an effect on achievement of the HELCOM protection targets.

2) The authorities have imposed limits on the releases of noble gases and iodine into the air (Table 9-1), which as such apply to the Loviisa nuclear power plant area. The release limits also include the new nuclear power plant unit to be built. The authorities have not set limits on the releases of tritium, aerosols and carbon-14 into the air. With regard to releases into the sea (Table 9-4), the authorities have imposed limits on

tritium and other active materials. The authorities have set no limit on the releases of carbon-14 into the sea.

All releases are being monitored continuously. The releases have been so small that no nuclide-specific limits have been set separately on all of them. The upper limit on the annual dose caused to the residents in the plant vicinity, 0.1 mSv, concerns all releases. The radiation doses caused by all the detected releases from the plant, including tritium and carbon-14 releases, to the residents in the plant vicinity are calculated annually and reported to the authority. The authority, the Radiation and Nuclear Safety Authority, assesses the calculations and publishes the information annually.

The amount of tritium produced at a nuclear power plant depends primarily on the plant type and the plant efficiency. At this stage, it is not possible to assess the distribution of tritium releases into the air and into the sea accurately, since the plant type and detailed technical design are not known yet. For this reason, only a rough estimate of the amount of releases has been given. However, the largest releases result from pressurized water plants. Upon selection of the plant type, the total release of tritium and the distribution of releases will be assessed more accurately.

3) Waters that may contain radioactivity are within the scope of the monitoring system. The release limits imposed by the authorities in the operating licence phase will apply to releases into the sea.

4) The monitoring and surveillance of radiation and releases are based on the radiation surveillance programme approved by the authority; the licensee is responsible for the costs of drawing up and implementing the programme. The radiation surveillance programme includes sampling (for instance, from the air, water, soil and food products), dose measurements, whole body activity measurements of residents in the plant vicinity and real-time dose rate measurements. Information on the radiation situation in Finland, e.g., eastern Uusimaa, is available on the web site of the Radiation and Nuclear Safety Authority http://www.stuk.fi/sateilytietoa/sateilytilanne/itauusimaa/en_GB/itauusimaa/.

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