

Fortum Power and Heat Oy  
Loviisa Nuclear Power Plant  
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Fortum letters LO1-A4-18360, 15 April 2015; LO1-A4-18117, 22 December 2014; LO1-A4-17995, 16 September 2014; LO1-A4-17628, 27 February 2014; LO1-A4-18800, 13 November 2015; LO1-A4-19007, 22 February 2016

## **Period safety review PSR2015 concerning the Loviisa nuclear power plant Background**

The Government has, in its decision 6/330/2006, 26 July 2007, granted to Fortum Power and Heat Oy's Loviisa Nuclear Power Plant a licence, as referred to in Section 20 of the Nuclear Energy Act (990/1987), to operate and use the nuclear power plant units Loviisa 1 and Loviisa 2 as well as the buildings and storages necessary for the management of nuclear fuel and nuclear waste.

Condition 1 for the operating licence states that the licensee must prepare comprehensive periodic safety reviews for the Radiation and Nuclear Safety Authority by the end of 2015 and 2023, including interim assessments of the power plant's security and emergency plan.

Fortum Power and Heat Oy (hereinafter "Fortum") delivered to the Radiation and Nuclear Safety Authority (hereinafter "STUK") the documentation necessitated by Guide YVL A.1 in separate letters LO1-A4-17628, 27 February 2014; LO1-A4-17995, 16 September 2014; LO1-A4-18117, 22 December 2014 and LO1-A4-18360, 15 April 2015, which were submitted in four phases.

Fortum updated and supplemented the documentation based on STUK's decisions 1/A42213/2014, 16 June 2014 and 3/A42213/2014, 4/A42213/2014 10 June 2015. Fortum provided the additional clarifications in letters LO1-A4-18800, 13 November 2015 and LO1-A4-19007, 22 February 2016 and LO1-A4-19729, 28 December 2016. The clarifications and updates pursuant to request for clarification 1/A42213/2014, 16 June 2014 were incorporated by Fortum in the documents delivered with letters LO1-A4-17995, 16 September 2014 and LO1-A4-18117, 22 December 2014.

In the context of the period safety review assessment, STUK utilised the results of its continuous monitoring efforts, alongside the documents submitted by Fortum.

### **The general base requirements for the assessment**

STUK has used the nuclear energy and radiation safety legislation, and the regulations issued by virtue thereof, as the basis of its assessment.

The following is laid down in Sections 5-7 of the Nuclear Energy Act (990/1987):

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*Section 5: The use of nuclear energy, taking into account its various effects, shall be in line with the overall good of society.*

*Section 6: The use of nuclear energy must be safe; it shall not cause injury to people, or damage to the environment or property.*

*Section 6a: Nuclear waste generated in connection with or as a result of use of nuclear energy in Finland shall be handled, stored and permanently disposed of in Finland [...], and*

*Section 7: Sufficient physical protection and emergency planning as well as other arrangements for limiting nuclear damage and for protecting nuclear energy against illegal activities shall be a prerequisite for the use of nuclear energy.*

The use of nuclear energy is subject to a licence (Nuclear Energy Act, Section 8). According to Section 20 of the Nuclear Energy Act, the granting of an operating licence requires the following conditions to be met:

*1) the nuclear facility and its operation meet the safety requirements laid down in this Act, and appropriate account has been taken of the safety of workers and the population, and environmental protection; (23 May 2008/342)*

*2) the methods available to the applicant for arranging nuclear waste management, including final disposal of nuclear waste and decommissioning of the facility, are sufficient and appropriate;*

*3) the applicant has sufficient expertise available and, in particular, the competence of the operating staff and the operating organisation of the nuclear facility are appropriate;*

*4) the applicant is otherwise considered to have the financial and other prerequisites to engage in operations safely and in accordance with Finland's international contractual obligations; and the planned nuclear facility and the operation thereof otherwise fulfils the principles laid down in sections 5-7.*

*Operation of the nuclear facility shall not be started on the basis of a licence granted:*

*1) until the Radiation and Nuclear Safety Authority (STUK) has ascertained that the nuclear facility meets the safety requirements set, that the physical protection and emergency planning are sufficient, that the necessary control to prevent the proliferation of nuclear weapons has been arranged appropriately, and that the licensee of the nuclear facility has, as provided, arranged indemnification regarding liability in case of nuclear damage; and*

*2) until the Ministry of Economic Affairs and Employment has ascertained that provision for the cost of nuclear waste management has been arranged in accordance with the provisions of chapter 7.*

In conjunction with its revision in 2008, the Nuclear Energy Act was supplemented with more detailed safety-related requirements in Sections 7 a-p. Thereafter, specifications and additions have been made to many parts of the Act with regard to security arrangements and related authorisations, and the Act has been refocused to provide better coverage for final disposal activities.

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In the 2015 amendment to the Nuclear Energy Act, issuing general safety regulations was added to the duties of STUK. The beginning of 2016 saw the implementation of STUK regulations on the following:

- safety of a nuclear power plant (STUK Y/1/2016).
- emergency arrangements of a nuclear power plant (STUK Y/2/2016)
- security in the use of nuclear energy (STUK Y/3/2016)
- safety of disposal of nuclear waste (STUK Y/4/2016).
- safety of mining and milling operations aimed at producing uranium or thorium (STUK Y/5/2016).

Fortum has not complied with the effective provisions in delivering the periodic safety review as it has taken into account the YVL Guides implemented in the autumn of 2015 but not the new STUK regulations that came into force on 1 January 2016.

STUK has evaluated the fulfilment of the new regulations in connection with their implementation based on the clarifications provided by the licence holder and by comparing the differences between the STUK regulations and the Government Decrees effective in 2015. The differences between the STUK regulations and Government decrees were not found to be significant from the perspective of periodic safety review.

### Assessment result

In the safety assessment in Appendix 1, STUK has evaluated compliance with Section 20 of the Nuclear Energy Act as part of the periodic safety review.

As regards Sections 20(1)(1-3) of the Nuclear Energy Act, the arrangements of the Loviisa 1 and 2 nuclear power plant units and of the buildings and storages belonging to them required for the management of nuclear fuel and nuclear waste are sufficient and appropriate in terms of safety.

In reference to Section 20(1)(4) of the Nuclear Energy Act, STUK indicates that it lacks the authority and competence to assess the licence holder's financial capacity for operating the power plant. In this statement and its appendices, STUK's assessment has focused particularly on the licence holder's capabilities to conduct the operations safely and, in this regard, in accordance with Finland's international agreement obligations.

STUK's assessments and inspections has not revealed any issues that would keep the licence holder and the Loviisa NPP from meeting the principles laid down in Sections 5-7 of the Nuclear Energy Act.

As regards Section 20(2)(1) of the Nuclear Energy Act, STUK states that the Loviisa nuclear power plant of Fortum Power and Heat Oy meets the safety requirements, the security arrangements and emergency response arrangements are sufficient, and the control necessary to ensure to non-proliferation of nuclear weapons has been organised appropriately, with due consideration to the specifying comments presented below. STUK further states that the licensee's liability for nuclear damage has been arranged according to the relevant regulations.

STUK has evaluated the safety of the Loviisa NPP based on the Radiation and Nuclear Safety Authority Regulation on the Safety of a Nuclear Power Plant (STUK Y/1/2016),

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which was implemented in 2016. This regulation takes into account that operating plants do not need to meet all requirements laid down for new plants (STUK Y/1/2016, Section 27, Transitional provision). In accordance with the principles set forth in Section 7 a of the Nuclear Energy Act, the safety of nuclear energy use must be maintained at as high a level as practically possible. For the further development of safety, measures shall be implemented that can be considered justified considering operating experience, safety research and advances in science and technology.

During this periodic safety assessment, STUK has simultaneously prepared an extensive implementation of the YVL Guides revised at the end of 2013 for operating nuclear power plants. As a result of the implementation process, STUK has, based on clarifications and presentations from the licence holder, defined the acceptable deviations from the new YVL Guides as well as the necessary licence holder measures to meet the requirements of the new YVL Guides.

These measures have been considered in the safety assessment and follow-up arrangements for the measures will be consolidated with other necessary measures that were highlighted as a result of the period safety review.

The design bases applicable to the Loviisa NPP have been primarily laid down in the 1970s. The goal for the operating period of the plant has been to ensure the continuous improvement of plant safety. Fortum has updated and renovated the Loviisa NPP significantly and implemented extensive modifications of the components, systems and structures in order to improve safety over the course of the plant's operating history. Based on the documentation submitted to STUK in conjunction with the periodic safety review, Fortum is committed to continuing the efforts to improve plant safety during the current operating licence period. Based on the periodic safety review, Fortum Power and Heat Oy has presented action plans for the observed improvements to ensure the safe operation of the Loviisa NPP until the next periodic safety review and until the expiry of the operating licence. STUK has taken the measures defined by the licence holder into account in the safety assessment in Appendix 1 and the Appendix 2 assessment of the documents specified in Section 36 of the Nuclear Energy Decree.

STUK finds the presented plans sufficient to ensure the safe operation of the Loviisa nuclear power plant.

## Conclusion

STUK has processed the licensee's reports and descriptions pertaining to the periodic safety review, which were delivered as enclosures to reference letters. According to Guide YVL A.1, STUK will make an approval decision on the periodic safety review required of the licensee and attach to it its own safety assessment.

Fortum Power and Heat Oy's Loviisa power plant has met the licence conditions specified in the current operating licence:

1. Fortum has prepared a periodic safety assessment as prescribed in Guide YVL A.1 (formerly YVL 1.1) and submitted it to STUK by the end of 2015.
2. The licensee has held, produced, handled, used and stored nuclear waste and nuclear materials and other nuclear commodities at the plant site without reaching the maximum limits laid down in licence condition 2. Furthermore, the licensee has ad-

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hered to the provisions of the Nuclear Energy Act and Nuclear Energy Decree in the import of all nuclear materials, devices and equipment at the plant site.

In summary with regard to the inspections and reviews of matters and documents related to the periodic safety review and the results of continuous monitoring, STUK states that Fortum Power and Heat Oy has ensured the safety of the Loviisa 1 and 2 nuclear power plant units in accordance with the effective provisions, for the parts that are applicable to operating facilities. The licensee has presented measures to further improve safety at the Loviisa nuclear facility during the current operating licence period. In STUK's assessment, the licensee has the required capabilities, procedures, competence and resources to continue safe operations. STUK will monitor the timely and compliant implementation of Fortum's safety-improving actions.

STUK approves the following descriptions supplied by Power and Heat Oy as enclosures to letter LO1-A4-18360, 15 April 2015: "Summary of the periodic safety review", LO1-K8043-00054 and "Programme for developing safety by 2023", LO1-K8043-00055. The specifications resented in requirement 9 of STUK's request for clarification 3/A42213/2014, 4/A42213/2014 10 June 2015 and requirements 1-3 of request for clarification 3/A42213/2016, 9 November 2016 apply.

At the same time, STUK approves the periodic safety review prepared by Fortum Power and Heat Oy as a comprehensive safety assessment as referred to in licence condition 1 of the operating licence for the Loviisa 1 and 2 nuclear power plant units and Guide YVL A.1.

Fortum Power and Heat Oy must take into account the issues presented in Chapter 12 of Appendix 1 of the safety assessment and, in the next periodic safety review, prepare a description for STUK on the measures performed based on them. The description must be delivered to STUK in conjunction with the next periodic safety review.

Director General

Petteri Tiippana

Director

Kirsi Alm-Lytz

## Appendices

Presentation memorandum 5/A42213/2015, 3 February 2017

Appendix 1: Safety assessment of the Loviisa 1 and 2 power plant units

Appendix 2: Assessment of the documents prescribed in Section 36 of the Nuclear Energy Decree

Appendix 3: Statement of the Advisory Committee on Nuclear Safety

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For information Ministry of Employment and the Economy, Ministry of Social Affairs and Health

Any demand, with related justifications, for rectifying a mistake in this decision shall be submitted to the Radiation and Nuclear Safety Authority in writing as laid down in Chapter 8 of the Administrative Procedure Act (434/2003).

This decision by the Radiation and Nuclear Safety Authority may be appealed to Helsinki Administrative Court within 30 days from notification of the decision. The day of notification is not part of the appeal period. The appeal addressed to Helsinki Administrative Court must indicate which decision is being contested, which aspect of the decision the appeal concerns, what changes the appellant is calling for, and on what grounds the changes are called for. The appeal must also state the name and place of residence of the appellant. If the appellant has appointed a legal representative or agent to speak for him/her or the appeal has been drafted by a third party, the appeal must also indicate the name and place of residence of the representative, agent or third party. The appeal must also give a postal address and telephone number that can be used to communicate with the appellant on matters relating to the appeal. The appeal must be signed by the appellant, representative or agent. The appeal must include as appendices the decision appealed, in original or copy form, proof of the date on which the decision has been notified of or some other account on the start date of the appeal period, and any documents supporting the appellant's demands not yet submitted to the authorities. The agent must append to the appeal a power of attorney as laid down in Section 21 of the Administrative Judicial Procedure Act.