

Article	Reference	Question	Comment	Answer
General	Executive Summary	Finland may like to share the details about the characteristics being considered for case-by-case basis to determine the PAZ of NPP instead of predetermined 5 Km.		<p>PAZ – Actions may be needed to avoid or minimise severe deterministic effects of radiation</p> <ul style="list-style-type: none"> - Capability for effective evacuation requires land-use restrictions within PAZ. - No need for evacuation outside PAZ expected. - For sizing of the area, the dose outside PAZ shall not exceed 1 Sv within 10 hours. <p>UPZ – Actions may be needed to reduce risk of stochastic effects</p> <ul style="list-style-type: none"> - External rescue plan is prepared for. - For sizing of the area, the dose outside UPZ shall not exceed 10 mSv within 48 hours. (Dose criterion for sheltering indoors in Finnish protection strategy) - For practical arrangements, the size can be limited to 20 km from the plant.
General	Executive Summary	Finland may like to share examples of some exceptions introduced under derogation clause included in the draft Nuclear Energy act considering emergency conditions such as war like situation.		According to draft Nuclear Energy Act, exceptions to technical requirements of STUK regulations are possible during exceptional circumstances defined in Emergency Powers Act. These exceptions would be in force for a limited amount of time and they would be considered case by case. According to justification of the draft law, these exceptions could contain exceptions to spare parts requirements. They could also contain exceptions for training requirements for staff. The nature of the exceptions can be different depending in the nature of the emergency situation.
General	Page 131	The Loviisa long-term operation programme covers modernisation projects focussed on safety improvements and ageing management to ensure the safe operation of the facility until the end of the operating licence. It is made up of 7 subprogrammes one of which is 'Heat, Ventilation, A/C, HVAC, for the Primary and Secondary side'. Can you please share some more information about this sub-programme and how it contributes to the Long Term Operation of the Loviisa plant?		<p>The purpose of the VAMO portfolio is to ensure the safe and reliable operation of ventilation and cooling systems until 2050. Reliable operation is achieved by carrying out necessary replacements and repairs of existing components. The portfolio also includes projects that improve the failure tolerance of selected systems.</p> <p>Example of projects already started projects in this portfolio are:</p> <ol style="list-style-type: none"> 1) adding or renewing chilled-water units to the power plant. The chilled-water units provide cooled water for cooling the control rooms and rooms containing automation cabinets that are part of safety systems and safety features. 2) The aim of modernization of turbine island ventilation systems is to secure the reliable use and availability of spare parts until 2050.
Article 10	pages 48-49 (Measures taken by licence holders, Loviisa NPP)	Which assessment model is applied to evaluate the level of safety culture within the organization?		At Loviisa NPP they have used the five safety culture characteristics defined by the IAEA (GS-G-3.5). They are currently also carrying out an assessment where the harmonised model of safety culture (10 traits) is used. Loviisa NPP has also used a stage/maturity model of safety culture described in the IAEA-TECDOC-1329 to summarise and communicate internally their assessment.
Article 10	page 48 (Regulatory requirements regarding safety culture and safety management)	Does the regulatory body carry out the specialized safety culture controls and assessments?		Yes, STUK carries out systematic oversight of safety culture of the nuclear facilities. It is based on multiple data collection and analysis steps and it includes also annual inspections on organisational performance, including leadership, safety culture development etc. The oversight process allows STUK to establish an overall view on the safety culture of the licence holders and to assess the compliance with the regulations.
Article 16	page 12	Considering the upcoming comprehensive reform of the Finnish nuclear energy legislation, is STUK planning to take any specific regulatory measures to assure consistency of compliance for stakeholders/licensees in regard to emergency preparedness and response during the transition? (e.g. grace period, ad hoc inspections, etc.)		Practical changes for existing licencees will be small as safety level in the new legislation will be same. There will also be 5 years transition period to fulfill new legislation demands. During that time existing licencees will be need to review their emergency plans and update them according to new legislation.
Article 16	page 91	Considering the rather unique situation of Finland, Finnish sites and neighbouring countries, does the cross-border cooperation extend beyond the shared emergency preparedness planning, exchange of information, emergency notification and early warning, to mutual assistance in emergency response? (i.e. concrete mechanisms, protocols and actions, e.g. providing material, personnel or other capabilities to combat the immediate consequences of an emergency)		There are agreements on mutual assistance among Nordic countries and regular cooperation on measurement teams and capabilities between the countries. However, the mutual assistance would mostly be expected to occur after the immediate phase has passed when the need for large-scale measurements is greatest. The size and type of assistance would be decided on the basis of the actual situation and would also depend on whether the other Nordic countries are impacted by the accident.
Article 19.3	page 112	How does the Loviisa Nuclear Power Plant ensure that the personnel are aware of the current state and configuration of the unit during maintenance and repair activities?		There is a daily outage report and meeting every morning during outage, where we introduce the plant current state. The daily outage report is sent to the whole plant personnel. A shorter version is sent to the contractors. Information is also presented in the info TV.
Article 19.2	page 110	"The OLCs for the Olkiluoto unit 3 were reviewed and approved by STUK as a part of the operating license documentation." Q1: Are the approved OLC documents for the Loviisa NPP and the Olkiluoto-3 NPP conceptually similar (if not, are there plans to harmonize them)?		OLC documents of OL3 and Loviisa NPPs are not conceptually similar. There are no requirements or plans to harmonize them. Both OLCs comply with the Finnish requirements.
Article 19.4	page 116	"STUK publishes information concerning significant events as press releases/newsletters on STUK's website." Q1: How quickly after a reported event does STUK publish information about significant events in the form of press releases/newsletters on its website? Q2: Are there differences in the publication of events assessed according to INES?		<p>A1: Same day or in the following day(s), depending on the event / information available.</p> <p>A2: Safety significance of the event is crucial. Safety significance and INES scale of the event are in line with each other. In the recent years INES 0 and INES 1 events have occurred - in these cases INES scale is not / is not the only threshold for press release, newsletter.</p>

Article 14.2	page 72	<p>The following statement is made for Loviisa NPP: "At shutdown the most significant initiating events are drop of heavy loads".</p> <p>In the Czech Republic, supporting deterministic analyses have recently been performed, the results of which have led to the screening of this risk contributor for NPPs with VVER reactors, after many years when it was also the dominant contributor to the FDF.</p> <p>Q: Could you state which phenomenon included in the given issue constitutes the main contribution to the FDF at Loviisa NPP – i.e. whether it is the mechanical damage of the fuel itself after a heavy load drop into the reactor or spent fuel storage pool, or perhaps the destruction of other equipment, e.g. a pipeline, as a result of pieces of broken concrete falling from the ceiling onto it, which can occur as a result of a heavy load drop onto the reactor hall floor?</p>		<p>The main contributors to fuel damage are the heavy load drops, which lead to direct spent fuel pool (refueling pool) damage or loss of spent fuel pool cooling. There is a small possibility that drop of heavy load to the reactor cavity breaks to reactor vessel or loops connected to vessel.</p> <p>Strength analyses have been performed in Finland as well. Lifting routes and heights have also been optimized. As a result of these analyses and changes, the risk of heavy load drop scenarios has been reduced.</p>
Article 14.2	pages 73-76	<p>The following main results of the PSA are presented in this chapter, FDF [per year]/ LRF [per year]: Loviisa: 6.8·10⁻⁶ / 3.2·10⁻⁶ Olkiluoto 1 and 2: 3.4·10⁻⁶ / 1.7·10⁻⁶ Olkiluoto 3: 1.7·10⁻⁶ / 1.2·10⁻⁷</p> <p>Q1: Could you please indicate the contribution of LERF and LLRF to the given values for LRF?</p> <p>Q2: From the given results it can be seen that if a fuel damage occurs, the measures to prevent large releases of radioactive substances for the first two cases do not have much effect, while in the third case they do. It is clear that these are different designs, however, this finding is interesting from a risk perspective.</p> <p>Q2a: It was usually stated that systems related to the containment function should reduce the risk by approximately one tenth, which is clearly not the case in the first two cases. Is this due to the fact that the main contributors to large releases are events associated with containment bypass?</p> <p>Q2b: Could you please indicate which devices or measures in the third case contribute most significantly to reducing the risk of large releases after a fuel damage?</p>		<p>Q1: LERF and LLRF are not specified/defined in Finnish legislation. The limit for early releases is defined in Reg. Guide YVL A.7 as such: "the accident sequences, in which the containment function fails or is lost in the early phase of a severe accident, have only a small contribution to the reactor core damage frequency." In other words, early release frequency ERF is compared to CDF, not to large release frequency (LRF).</p> <p>Q2: Severe accidents were not addressed in the original design and safety case for older NPPs such as Loviisa (LO1/LO2) and OL1/OL2. Therefore the plant modifications implemented later could not resolve all design weaknesses related to severe accidents mitigation.</p> <p>Q2a: Containment by-pass sequences and loss of containment integrity (and SAM systems) e.g. due to an external hazard are the main contributors.</p> <p>Q2b: Severe accidents were taken into account in the original design of OL3. LRF of OL3 includes also large release scenarios from the spent fuel pool (approx. 32% of the LRF).</p> <p>Main SAM measures of OL3 are:</p> <ul style="list-style-type: none"> • The primary depressurization system reduces the probability for vessel failure under high pressure • Core melt cooling in a separate corium spreading
General	General		Just a comment on Finland's comprehensive NR that effectively presents detailed information on legislative and regulatory developments, safety frameworks, and regulatory practices, while maintaining clarity on key aspects and priorities.	Thank you for the comment.
General	Summary, page 9	Could you explain the rationale behind legislative and regulatory renewal, particularly regarding the increase in regulations and the transition from legally binding YVL Guides to non-binding guidance documents?		Rationale has two main elements. First one being the modernization of legislation and regulation to be in line with constitution. Current YVL-guides are not anymore seen as correct place for requirements and therefore binding requirements will be given in act, decree or regulations. STUK has also observed that detailed, partially prescriptive, requirements can hinder safety developments. STUK's strategy aims for licensee responsibility and enhancement of risk informed oversight. Legislation renewal is needed this to succeed.
General	Summary, page 9	Given the extensive and demanding nature of the ongoing legislative and regulatory renewal, including the introduction of 23 new regulations and the transition from legally binding YVL Guides to more risk-informed, goal-oriented guidance, could you please provide an update on the current status of this legal and regulatory upgrade?		The planned schedule for the parliamentary debate of the Nuclear Energy Act proposal is during 2026. At the moment, 24 regulations are under preparation. The external consultation round for STUK's regulations is scheduled for spring 2026, and the regulations are expected to be completed by the end of 2026. If the planned schedule is met, the Nuclear Energy Act and STUK's regulations will enter into force at the beginning of 2027.
Article 16	Summary, page 11	Could you please share the feedback and experiences gained so far from implementing the joint regional emergency preparedness strategy, particularly regarding its effectiveness in enhancing cross-border information exchange, situational awareness, and mutual assistance capabilities? Based on these experiences, do you consider it advisable or feasible to implement similar joint regional emergency preparedness efforts in other EU regions?		<p>Joint regional preparedness strategy allows better understanding and predictability of decision making of neighboring countries during emergencies. It also assist in avoiding misunderstandings during emergency as the basis for decision making is understood and similar.</p> <p>Similar joint regional emergency preparedness efforts can be useful. However, they need good cooperation and frequent discussions on emergency preparedness issues between the organizations. The joint strategy is just one facet of cooperation arrangements between the Nordic countries.</p>
Article 8	Regulatory body, page 43	Could you please elaborate on the specific changes or updates introduced to the nuclear regulatory framework, currently being renewed, as part of STUK's SMR Roadmap, intended to address the upcoming oversight of SMRs?		E.g. defining UPZs is now more flexible instead of fixed distances (already in force), more flexible organisational arrangements and business models will be allowed, enabling use of standardized components and serial production even for components at high safety classes, enabling remote operation of the plant in normal operation modes (not allowing operation of safety functions).
General	11	What are the main recommendations could be taken as lessons learned from STUK's plans and strategies related to strengthening emergency preparedness for extraordinary circumstances		The work on the issue is still ongoing. However, one important point worth mentioning is that to be effective, strengthening preparedness of extraordinary circumstances has to integrate organization's risk management functions (that deal with threats to organizations) and emergency preparedness (that deals with response to society at large). Emergency preparedness for extraordinary circumstances combines parts of both.

Article 8	43	What is STUK's role and contribution within the SAFER2028 project		<p>STUK participates as an end user in the evaluation of the research proposals and selecting the project to be funded. STUK has a strong position in this process.</p> <p>STUK holds the chair and vice chair of the Management Board with an additional member in the board. The Management Board makes the ultimate selection of the funded projects.</p> <p>Also STUK holds chairs of the research project related Steering Groups. The Steering Groups make the pre-selection of the funded projects in their thematic areas.</p> <p>STUK has several participants in all Technical Advisory Groups, as well. The Technical Advisory Groups follow closely the advancement of the projects and reaching of the goals defined in the project plans, as well as give practical guidance on research projects.</p> <p>See also https://safer2028.fi/organisation/.</p>
Article 11	57	Which organizations and institutions participated in developing the National Competence Review Report? What were the main findings, conclusions, and recommendations, and how are these being implemented to strengthen national competence in nuclear and radiation safety?		<p>The National Competence Review Report was developed by a broad coalition of Finnish nuclear sector stakeholders under the Ministry of Economic Affairs and Employment (MEAE). The organizations were:</p> <ul style="list-style-type: none"> - MEAE — owner and process/project leadership. - Nuclear industry licensees and license applicants (operators of existing and project organizations of planned NPPs at the time). - Research institutes (including the main TSO, VTT Technical Research Centre of Finland). - Universities providing nuclear engineering and related scientific education (e.g. Lappeenranta University of Technology, Aalto University). - Regulatory body (Radiation and Nuclear Safety Authority - STUK). - A wide range of additional organizations were surveyed for background data. <p>The report (2012) indicated e.g. needs for strengthening nuclear education and training pathways, ensuring long-term research program funding, enhancing cooperation across the industry, developing a national research strategy and securing adequate research infrastructure for testing and analysis. These recommendations were put in action plans and implemented through national strategies, enhanced research programs (incl. legislation), stronger cooperation networks, and strengthened regulatory</p>
Article 14	88	Design basis assumes a simultaneous accident across all units; new scenarios were analyzed. Which new scenarios were added for multi-unit events and what procedural changes resulted?		<p>Events where accidents did not happen at the same time appeared to be more challenging for the emergency organization compared to simultaneous accidents. Especially access to the site was more challenging during not simultaneous severe accidents. Also some emergency operations were longer not feasible during accidents that started at different times. Changes were made to arrival arrangements and to the radiation experts manuals.</p>
Article 8	37	What are the qualifications and selection criteria of the selected committee members?		<p>There are no strict qualification or selection criteria. Generally members with various backgrounds are selected to view topics from all sides. In the government decree on Advisory Committee on Nuclear Safety it is stated that the members have to represent high level of nuclear safety expertise. Independency is also held in high value when selecting the members for the committee.</p>
Article 8	42	How does STUK perform succession plans to ensure the preservation of the knowledge capital?		<p>STUK uses several practices to retain its knowledge and expertise.</p> <p>In terms of succession planning, retirements and other forms of staff turnover are monitored, discussed and anticipated at both the departmental and unit level. When an experienced expert approaches retirement, their knowledge is identified and transferred in advance—for example through paired work, documentation of work and collaborative team practices. Recruitments are not always aimed at hiring a direct replacement for the retiree. Instead, one of the remaining experienced experts within the competence area usually assumes the substantive role of the retiring specialist. New recruitments then often may focus on bringing in someone slightly less experienced, who can start their growth in the organization over time. In some cases, however, this approach is not feasible, and a direct replacement must be hired. In such situations, particular attention is paid to initiating the recruitment process early enough to ensure a smooth transition.</p> <p>Succession planning also emphasizes long-term pair and collaborative work to support the transfer of know-how and tacit knowledge. This ensures that expertise is passed on naturally through real work situations and ongoing (oversight etc.) activities.</p>

Article 7	27	What specific plant characteristics (e.g., reactor type, containment design, population distribution) will be the primary factors in determining the new case-by-case size of the Precautionary Action Zone (PAZ)?		<p>The plant characteristics are essentially based on the risk profile of the plant. In this the potential of the release plays also a role. The population distribution is related to the possibility of effectively evacuate the PAZ.</p> <p>PAZ – Actions may be needed to avoid or minimise severe deterministic effects of radiation</p> <ul style="list-style-type: none"> - Capability for effective evacuation requires land-use restrictions within PAZ. - No need for evacuation outside PAZ expected. - For sizing of the area, the dose outside PAZ shall not exceed 1 Sv within 10 hours.
Article 7	35	Beyond requests and orders, how frequently in the last decade has STUK had to resort to its strongest enforcement tools, such as imposing fines or legally enforcing a shutdown?		These have not taken place. In some occasions the plant startup has delayed, as STUK has requested finalisation of some modifications or carrying out additional checkings before the startup.
Article 14	80	What specific regulatory requirements or guidance is STUK developing or strengthening to ensure licensees adequately address the identified challenges of spare parts availability and knowledge management for long-term operation?		Adequate regulatory requirements are in place, and these matters have also been addressed in the ongoing renewal of nuclear safety legislation and regulations. The most important thing is to focus continuous oversight activities on these issues and to detect any potential deterioration in the situation in a timely manner and when necessary, require the licensees to take appropriate actions.
Article 19	125	What are the main lessons learnt from the commissioning of the Posiva disposal facility? What are the national plans related to waste management and the current R&D efforts?		<p>First, the demonstration equipment and systems required for disposal should be designed, manufactured, and tested well in advance of constructing the final equipment. This reduces the need for modifications during commissioning, helping to keep technical risks and scheduling challenges under control. Thorough pre testing has proven essential in ensuring a smooth commissioning phase. Second, commissioning plans should be prepared with sufficient detail at an early stage, and it is important that the organisation commits to following the approved plans. A clear and consistent process helps avoid delays and ambiguities during commissioning. Third, the licensee responsible for commissioning must have sufficient competence in both the system test runs and the facility being commissioned. The licensee's technical expertise, operational experience, and ability to identify and manage risks during commissioning are crucial to ensuring that the process is carried out safely, efficiently, and in accordance with the plans.</p> <p>All operational wastes except spent nuclear fuel will be disposed of in the existing LILW disposal facilities and soon to be operational VLLW disposal facility at the NPP-sites. Also, the wastes from decommissioning of the facilities will be disposed of in the same facilities. Spent nuclear fuel will be encapsulated and disposed of in the Posiva disposal facility in Olkiluoto in the future. Posiva facilities are under operating license review at the moment.</p>
Article 7	p9	The report states that a public consultation on the new legislative and regulatory framework was conducted in June 2025. How were the outcomes of this consultation taken into account into the final regulatory texts?		Proposed nuclear energy act was in public consultation during summer 2025. Ministry received 72 statements from different stakeholders. Overall the proposed act was seen as a step to right direction. Statements raised several general and detailed remarks of the draft act. These has been consired by the ministry and taken accout in developing the proposal sent to format evaluations and finally to the parliament. STUK has continued to support ministry in these actions.
Article 16	p11	The report mentions a derogation clause allowing the operation of nuclear facilities under emergency conditions. Could you provide any recent examples of such derogations?		This derogation clause will be introduced in the upcoming legislation. The current legislation does not have such a clause, so there are no past examples of such a situation.
Article 14	p14	The report mentions that, to ensure a structured evaluation of licensees' safety performance, you systematically collect oversight data (e.g., reports, meetings, inspections, reviews). Could you explain how these data are collected (which tools are used) and analyzed (dashboards, indicators, etc.)?		STUK has developed and implemented a systematic model for the continuous assessment of the overall safety of nuclear facilities. The model includes a total of 36 different areas to be assessed and areas are based on STUK's Regulation on the Safety of a Nuclear Power Plant (STUK Y/1/2018). STUK has developed a database in which oversight data are processed and analyzed (Requirement management database). Relevant oversight data is mapped to the assessment areas. Entering and analyzing the data currently requires manual work and is based on expert judgment. The individual areas are assessed on a three-point "traffic light" scale.
Article 11	p9		Challenge : Strengthening STUK's capabilities to manage small modular reactor projects.	Thank you for the proposal.
Article 7	p27		Area of good performance : Finland has launched a modernisation of its nuclear energy legislation and regulations especially with the Nuclear Energy Act	Thank you for the proposal.

Article 17	page 94	How will the general principle of locating nuclear power plants in sparsely populated areas and far away from population centers be achieved in the case of SMRs for non-electricity applications, e.g., for district/process heat, which require a certain proximity to customers? Will this principle be retained in the new legal framework?		<p>A flexible dimensioning of UPZs will enable defining the zones based on their individual risk profiles.</p> <p>PAZ – Actions may be needed to avoid or minimise severe deterministic effects of radiation</p> <ul style="list-style-type: none"> - Capability for effective evacuation requires land-use restrictions within PAZ. - No need for evacuation outside PAZ expected. - For sizing of the area, the dose outside PAZ shall not exceed 1 Sv within 10 hours. <p>UPZ – Actions may be needed to reduce risk of stochastic effects</p> <ul style="list-style-type: none"> - External rescue plan is prepared for. - For sizing of the area, the dose outside UPZ shall not exceed 10 mSv within 48 hours. (Dose criterion for sheltering indoors in Finnish protection strategy) - For practical arrangements, the size can be limited to 20 km from the plant.
Article 6	page 23	The National Report describes that TVO plans to uprate the thermal power and to extend lifetime of Olkiluoto-1 and -2. Could Finland please provide some more information if TVO plans to apply accordingly for a new operating license?		According to the legislation in force both lifetime extension and the uprating of the thermal power require a new operating license, but the studies are ongoing and decisions related to these have not been made.
Article 8	page 41	Figure 8 in the National Report shows an increase of resources used for regulatory oversight in Loviisa 1 & 2 and Olkiluoto 1 & 2 in the year 2023. Could Finland please give some more information on this increase?		In early 2023, STUK completed its statement and safety assessment on the continued operation of the Loviisa NPP and the low- and intermediate-level waste disposal facility. In Olkiluoto the big issues were the commissioning of Olkiluoto 3 and periodic safety review of the low- and intermediate-level waste disposal facility at the Olkiluoto in 2023.
Article 16	Page 89	Is the new data transfer system put into service/operational at the Loviisa Nuclear Powerplant?		Data transfer system is currently operational from plants training simulator - for transferring exercise scenarios. From power plant units the data should be operational after 2026 maintenance outages in the autumn as some work needs to be done during the outages.
General	Page 12	What mechanisms are in place to ensure that knowledge gained through participation in international expert groups is integrated into STUK's regulatory practices?		<p>When selecting participants for international expert groups, STUK considers both the individual's role within the organization (including supervisory or oversight duties) and their specific competence background.</p> <p>STUK has internal guidance stating that anyone participating in an international expert group—whether through e.g. a meeting, workshop, mission, or other assignment—must prepare a travel/meeting report on their participation. The reports may cover e.g. general background, key events, major outcomes and considerations from STUK's point of view. These reports are then shared internally within STUK.</p> <p>Key insights and relevant topic area news are communicated to the appropriate teams or specialists for further discussion and use. Consequently, the knowledge and key lessons gained from international cooperation are transferred into internal discussions - into STUK's practices and daily operation.</p>
General	Page 12	Considering the preparations for the oversight of SMRs and the corresponding roadmap, does STUK plan on increasing personnel numbers in the coming years?		Not at the moment. The need for increase will be evaluated as the new build projects are actually initiating. STUK will probably use consultants and TSOs during the highest work load periods, and the change in the legislation and in the oversight activities will enable more flexible use of inspector resources.
Article 7	Page 27	It is mentioned that new business and organisational models will be taken into account. Could you provide some examples of these new business and organisational models, and what kind of changes will be needed to accommodate them?		<p>New business models refer to development where for example key safety related functions of licensee are outsourced or produced in co-operation model. A concrete example would be a smaller city energy company producing district heat with nuclear. They would not have nuclear organisation of their own. The current regulation is written expecting that licensee has more key personnel and functions in its own organisation.</p> <p>Another example would be change of licensee, which is now more clearly addressed in legislation. These are new elements in Finland but seen already more commonly in other countries.</p>
Article 10	Article 10. Priority to safety, p. 49	To whom is the independent nuclear safety committee operating at Loviisa NPP subordinate?		The licensee's (Fortum Power & Heat Oy) board of directors nominates the independent nuclear safety committee members. The committee reports to Loviisa NPP station manager.
Article 10	Article 10. Priority to safety, p. 49	What criteria are used to assess the state of safety culture at the Loviisa NPP?		Loviisa power plant has typically assessed their safety culture using the five IAEA characteristics and related attributes described in the IAEA GS-G-3.5. They are currently also carrying out an assessment where the IAEA harmonised model of safety culture (10 traits) is used. Loviisa NPP has also used a stage/maturity model of safety culture described in the IAEA-TECDOC-1329 to summarise and communicate internally their assessment.

Article 12	Article 12. Human factors, p. 61	What can be the basis for STUK to conduct a human factors dedicated inspection? What is the methodology for such an inspection?		STUK has conducted human factors dedicated inspections the basis of which have varied depending on the situation with the licensee. For example and typically, when the licensee develops or significantly changes its approach to human factors STUK conducts an inspection. For example licensees have developed the HFE programmes and STUK has inspected the HFE approach after the programme has been operational for some time. In such an inspection national level requirements are used as reference basis. Methodology of the inspection is typically multimethod containing document reviews, personnel interviews, observations etc. Inspection is documented and if gaps are identified STUK oversees that appropriate corrective actions are taken.
Article 7	System of regulatory oversight and assessment, page 33 "...the aim is to have more flexible inspection program to optimize its effectiveness and focus and to be able to conduct inspections in the areas and at times considered necessary"	Does the regulatory authority (STUK) evaluate the effectiveness of its supervisory activities and how is this evaluation carried out?		The evaluation of the effectiveness of supervisory activities is based primarily on expert judgment. This assessment is conducted, among other contexts, as part of the annual planning process. No dedicated indicators exist for this purpose. In practice, the assessment focuses on whether the regulatory actions have resulted in the correction of identified deficiencies. This, in turn, is reflected in the overall safety assessment model as positive development (traffic lights). STUK can monitor trends, identify deviations, and evaluate whether its supervisory activities are achieving their intended safety outcomes. Lack of dedicated indicators for the effectiveness of regulatory oversight has been under discussions at STUK and is has been raised as one of the topics in ongoing oversight development program.
Article 7	System of regulatory oversight and assessment, page 33 "...in addition, unannounced inspections are included in the annual inspection program..."	What are the grounds for conducting unannounced (unannounced) inspections?		The grounds for an unannounced inspection must be that it provides benefits compared to a normal, pre-announced inspection. An unannounced inspection can provide a more realistic picture of the situation, as the licensee does not have the opportunity to prepare for the inspection. An unannounced inspection is an inspection that has not been announced to the licensee in advance in the annual plan, but the need for which has been identified during the year.
Article 6	Loviisa NPP units 1 and 2, p. 22	The report states that "One specific issue with the Loviisa plant units is the risk of reactor pressure vessel brittle fracture. Several modifications to reduce this risk have been implemented, and some further improvements were introduced in 2022–2023." Who assessed the sufficiency of the implemented modifications? What measures are planned to be taken if a reduction in safety margin is detected before the next periodic safety assessment in 2030?		In the periodic safety review in 2015, Fortum's deterministic safety analyses showed that the safety margin to the brittle failure fracture would not be sufficient for LO2 pressure vessel in 2030. The situation was better with LO1 reactor pressure vessel. The safety of the LO2 pressure vessel was justified with crack arrest capability but it was also identified that improvements to increase the brittle failure fracture safety margin are needed to mitigate the risk of severe damage in an accident situation. STUK concluded that merely improving calculation methods would not resolve the issue, as the problem was a real lack of physical margin rather than an analytical inaccuracy. Therefore, STUK issued a request for clarification, requiring concrete measures to restore the safety margin. Fortum has designed and implemented modifications to significantly enhance the safety of reactor pressure vessels with respect to brittle fracture. The modification documentation has been submitted to STUK for information. STUK evaluated the impact of these changes on safety and determined that they restored an adequate safety margin. Based on this assessment, STUK concluded that the reactor pressure vessels' safety margin had been restored, and the request for clarification was closed in 2017. Based on the deterministic safety analyses submitted to STUK, the current safety margins of the reactor pressure vessel are assessed as adequate up to 2030. Additional justification for the adequacy of the margins is provided by crack arrest
Article 15	Radioactive effluents, p. 85	The report states that "STUK confirms upon the licensee's application the release limits for radioactive effluents during the normal operation of a nuclear power plant." Could you please describe in more detail the procedures for the licensee to develop and the regulatory body to approve the standards for permissible emissions and discharges of radioactive substances?		The licensee shall define the release limits for the nuclides or nuclide groups and present them in the Operational Limits and Conditions. The licensee has to show by deterministic analysis that the public dose constraint of 0,1 mSv is not exceeded as far as the effluent values are within the release limits. The release limit need not be set for radionuclides, such as C-14, whose release can be reasonably expected to remain below a certain value. However, also these nuclides have to be included in the dose analysis. STUK confirms the release limits in connection with the approval process of the Operational Limits and Conditions. It should be noted, that the release limits for liquid tritium in Loviisa and Olkiluoto are much stricter than the dose constraint of 0,1 mSv would require.

Article 15	Radioactive effluents, p. 85	Tables 8 and 9 list liquid radioactive discharge values without tritium. Have the standards for permissible tritium discharges been established for the Loviisa and Olkiluoto NPPs? What are the actual annual liquid tritium discharge values?		There are limit values for tritium liquid discharges. The annual liquid tritium effluents (The proportion of the releases as compared to the limit values is given in parenthesis): Loviisa 2022 1,54E13 Bq (10,3%), 2023 1,45E13 Bq (9,7%), 2024 1,42E13 Bq (9,5%). Olkiluoto: 2022 2,24E12 Bq (2,86%), 2023 2,28E13 Bq (29,1%), 2024 1,70E13 Bq (21,7%). The increase in the Olkiluoto liquid tritium releases, and in the limit value, is due to the new operational unit Olkiluoto 3. Tritium is not included in the tables 8 and 9 because the tritium emissions are proportional mainly to the reactor type and power level, and therefore not a good indicator for the implementation of the BAT principle.
Article 15	Radioactive effluents, p. 86	Figure 17 shows the calculated annual effective radiation doses for the representative person living in the vicinity of the Finnish nuclear power plants. Was the contribution of tritium taken into account in the dose calculations?		The contribution of tritium is taken into account in the dose calculations. However, the most significant nuclide contributing to the dose has been C-14, also in the PWRs.
Article 16	Emergency preparedness on-site of NPPs, p. 89	The report states that "At Loviisa NPP plants process computer system has been under overhaul for several years. New data transfer system to STUK is predicted to be put into service by the end of 2025. Data transfer system will expand significantly as all process computer data from plants and training simulator will be available at STUK's emergency centre." Has the new data transfer system been commissioned? If so, what data is being sent to STUK?		Data transfer system is currently operational from plants training simulator - for transferring exercise scenarios. From power plant units the data should be operational after 2026 maintenance outages in the autumn as some work needs to be done during the outages. Full set of process data, more than 80k values, will be visible at STUK.
Article 19	Management of spent fuel and radioactive waste on the site, p. 121	Please indicate the functions of a nuclear power plant in providing final isolation of very low-level waste in the country.		As mentioned in the national report, TVO submitted license application for VLLW surface disposal facility in 2024 and the license was granted in the end of 2025. Earlier TVO disposed of the VLLW in LILW disposal facility. VLLW disposal facility is not yet constructed but TVO has a separate interim storage area for the VLLW to be disposed of in the future in the VLLW disposal facility. The isolation function in the VLLW disposal facility is based on water isolating base and surface layers for approximately 200-300 years, which should be sufficient time frame for the disposed waste inventory to be decayed on the level of clearance limits. In Loviisa, Fortum disposes the VLLW in the LILW disposal facility.
Article 15	Article 6. Existing nuclear installations, p. 19	What are the results of long-term environmental monitoring around the existing near-surface low-level waste (LLW) and intermediate-level waste (ILW) repositories in Olkiluoto and Loviisa? Have any trends or deviations from predictive models been identified?		The Loviisa and Olkiluoto LILW repositories have been in operation since the 1990s, and during their design and construction phases there were no widely used methods for predicting environmental impacts through modelling and it was not required in the regulation either. In addition, both repositories are located within active nuclear power plant sites, which makes it difficult to distinguish the specific environmental impacts of the LILW- repositories from those of other plant operations. The most significant impacts occurred during construction, when water leaking into the excavated rock facilities affected the groundwater level and flow routes in the surrounding bedrock and soil. However, these effects have gradually stabilized over time, the facilities are now very dry, and the current impact on groundwater is minimal. Monitoring of the operational LILW- caverns currently includes hydrological and hydrogeochemical groundwater monitoring at groundwater stations and within the tunnel facilities. In addition, the geomechanical stability of the rock caverns is monitored. The assessment of environmental impacts is based on tracking predefined threshold values (i.e. alert and action limits), as well as identifying long-term trends by comparing new monitoring results with data from previous years. Most monitoring data in Olkiluoto traces back to late 80's ja early 90's ja and in Loviisa early 90's.
General	Page 13	Regarding the challenge to manage the renewal of nuclear energy legislation: Are there any specific impacts of this task that you can share?		An extensive renewal of nuclear energy legislation is a huge task to do. STUK has organised its work internally into a project led by a separate director. This has been a very good decision, because there are a lot of things that need to be decided and led. Although the aim was to estimate the workload of the project as well as possible in advance, it has nevertheless been an even greater task than expected, especially the part of the reform of Nuclear Energy Act. In addition, the workload is heavily focused on the management of the oversight departments and the heads of the units. The reform is also a reform of STUK's oversight practices, which the unit heads of the line organisation should be able to take forward at the same time. It is a good idea to prepare a risk assessment for the reform together with the above-mentioned to minimise the risks involved. It has also been essential that ministry and STUK have regular interaction mostly weekly or daily basis regarding differing subject matters. Ministry has also organised steering group to address politically motivated topics already during the development. This has allowed safety related aspects to be discussed more in depth with political side.

General	Page 15	Regarding the systematic requirement management at STUK: Can you share any experiences from the use of this new tool?		<p>Requirement management database is used for systematic requirement management. For the current YVL guides, the database provides a centralized location of requirements, the changes made to them, as well as the approved deviations and their justifications per licence holder. In the regulatory reform the database will be used more extensively. It will also include subsection-specific justifications for the sections of regulations, the legal mandate (including links to Nuclear Energy Act), and the fulfillment of international requirements (including links). Centralizing this information on a single platform facilitates the work.</p> <p>One of the major benefits has been having all essential information collected in one place and accessible to everyone in STUK. The database also enables systematic comparison against international requirements. Moreover, the requirements and their associated information can be shared with licensees, who can utilize the data into their own applications.</p>
Article 14	p.67	Sentence "According to the STUK Regulation (STUK Y/1/2018)..." In which STUK regulation consider obsolescence management? Are obsolescence management programmes also part of management system and procurement programmes?		<p>The provisions related to obsolescence of nuclear facilities are presented in the ageing management dedicated guide YVL A.8. The management of non-physical ageing or obsolescence in Finnish regulations is based on the concept of managing obsolescence for the whole facility, thereby adding a management type of layer to the procedures described for SSCs in IAEA regulations like SSG-48. The management of obsolescence is required to be a part of the ageing management program for the facility. There is a general requirement for regular reviews to assess the conformity of SSCs with safety requirements through the defined procedures for obsolescence management. Thus, each licensee has defined its own procedures for systematic management of physical degradation and potential obsolescence of the nuclear facility. From the Finnish regulation perspective, management of obsolescence is not required to be a part of the licensee's management neither procurement system. However, both are influenced by the procedure for management of obsolescence. If STUK wants to see these procedures, they can be accessed in the oversight inspection programme.</p>
Article 18	p.105	Sentence: "At the Olkiluoto units 1 and 2, changes in I&C systems have been made gradually." What approach is used regarding Electromagnetic compatibility (EMC) validation & verification for electrical SSC in NPPs? Sentence: "At the Olkiluoto units 1 and 2, changes in I&C systems have been made gradually." How you analyze electromagnetic environment in NPP rooms? For which electrical SSC exist EMC test reports?		<p>Existing EMC background have been measured and resolved before modifications. Requirements for new equipment has been set based on that data. Mostly normal industrial EMC standards are adequate for new components and installations with addition of some plant specific requirements. New systems are then tested to fulfill those requirements. The EMC requirements base of old systems is usually not known because EMC standards has been developed after decades of the designing of those old systems. But there have been some original design and testing principles and classes for the original I&C platforms and main electrical components. These requirements are based on how vulnerable the devices are to external interference and how much interference they themselves cause.</p>
Article 16	p. 88	What means of communication do the on-site emergency response teams use to inform the off-site authorities and organizations? Additionally, what redundancy measures exist to ensure communication continuity in case of technical failures?		<p>There are multiple communication channels between the on-site and off-site organizations. Primary contact systems are email to specific addresses triggering alert and TETRA phone network. Other channels used or in reserve are access to organizations' log systems, regular phones, satellite phones, and fax.</p>
Article 16	p. 92	To what extent are your current EPR arrangements in line with the HERCA-WENRA Approach concept? Could you outline any main challenges and obstacles to apply the HERCA-WENRA approach?		<p>The arrangements in Finland are in line with the HERCA-WENRA approach. However, it is worth noting that there are no Finnish or neighboring nuclear power plants that would have emergency planning zones crossing the borders. Thus, the cross-border coordination challenges Finland faces are lesser than for many other European countries.</p>
Article 19	Chapter 2, Article 19, page 117	One of the INES 1 classified events at the Loviisa 2 NPP, refers to a Deviation from Operational Limits and Conditions (OLCs) concerning containment underpressure system, October 2024. Other INES 1 classified event at Olkiluoto 3 refers to an unplanned exposure to high radiation dose rate during dummy lifting, June 2024. Some INES events are further explained in Annex 2 but cannot find additional information about these two. Could you briefly explain/introduce some additional information for them?		<p>Loviisa 2 was in a state of power operation. On 3 October 2024 there was an inspection and replacement of V-belts on the fan for the supply air in the containment building. During the weekly test on Monday 7 October 2024, Fortum noticed that the fan was still separated, and electricity had not been switched on after the inspection and replacement work on the V-belts. The separations of the equipment were disengaged immediately after this observation and the fan was tested. As a result of the event, the fan was not operational contrary to the OLC from 3 to 7 October 2024. In the event of a fault, there is a 3-day repair time, which was also exceeded. During the event, the fan of the parallel supply air line was in use as normal, and there was no need to use the line that was the subject of the event. It would also have been possible to quickly deploy the electrically separated fan, should it have been needed, as long as the cause of the malfunction had been clarified and the separation disengaged. The event is classified as INES 1 as similar events have happened before.</p> <p>Olkiluoto 3: Teollisuuden Voima Oyj (TVO) used a test fuel element that does not contain radioactive fuel as the test weight of the auxiliary lifting equipment. However, inside the test element lifted above the water was a radioactive control rod used in the reactor, which caused a sharp increase in dose rates in the fuel building. Employees' electronic dosimeters alerted them to elevated dose rates, whereupon the lifting of the test element was immediately suspended and lowered back</p>

General	general	How did the allocation of staff-workdays by STUK specifically contribute to the transition towards a more risk-informed and performance-based regulatory approach?		The distribution of the use of working hours was not discussed as such when deciding on the legislative reform and its guidelines. Rather, the reasons for the reform were changes in the operating environment and the related feedback received from stakeholders on the need to develop regulations that would be better applicable to different plant and operating/business models and to different applications of nuclear energy. In addition, STUK's strategy, which emphasises the licensee's responsibility and risk informed oversight, was a significant guiding factor. With the amendment, STUK aims to target its oversight and choose its oversight methods in different situations so that it achieves the greatest possible impact in terms of ensuring safety.
General	general	How does the technology-inclusive nature of the new Nuclear Energy Act facilitate the integration of innovative technologies, such as small modular reactors (SMRs)?		Nuclear energy act is written in manner to be technology inclusive. It was decided that requirements are written to all type of nuclear facilities, meaning that there is no separate set of regulations for SMRs. Act includes graded approaches that considers the risks of different facilities.
Article 14	general	What specific indicators are used to assess the effectiveness of ageing management programs implemented by TVO and Fortum?		The dedicated guide YVL A.8 on ageing management has a section with provisions on ageing management reporting, where it's specified what information related to the ageing management program shall be included in the annual report submitted to STUK. Information (i.e. indicators) to be included in the reporting is specified in A.8.905 a) - f), such as failure type trends, summary of service and inspection activities, status of TLAs and spare part challenges and licensees own assessment of operability trends. According to YVL A.8.1004 STUK is assessing the effectiveness of the management of the nuclear facility as part of operational events, the periodic inspection programme and other inspections, and in connection with the processing of the periodic safety reviews. Altogether STUK is assessing the effectiveness of the ageing management through a combination of reviewing design plans, operation reports and conducting oversight management activities such as inspections.
Article 14	general	How do digital tools and criticality classification contribute to prioritising investments and maintenance for safety-significant equipment at the plants?		At TVO, all equipment is assigned a criticality and maintenance classification. This classification governs preventive maintenance programmes, fault correction priorities, spare parts stocking, and the prioritisation of activities supporting equipment reliability, including analyses, modifications, spare part changes, and major investments. Both fault repair priority and Equipment Reliability (ER)-related prioritisation are used to manage and control risks to plant safety and availability. These priorities are transparently embedded in the relevant information systems, namely the maintenance management system and the investment management system, where they actively guide decision-making. For example, if an equipment failure threatens compliance with the plant's Technical Specifications (LCOs), the fault is corrected immediately in accordance with its criticality classification. Similarly, if significant ageing is identified in safety-significant equipment, its replacement or refurbishment investment is prioritised at the highest level based on the classification. Similar approach is used at Loviisa NPP. Plant Health Committee is responsible for prioritizing investments in the plant's systems, structures and components, and the prioritization criteria take into account criticality classification and safety significance. In maintenance activities, the criticality classification steers the prioritization of maintenance work and the scope of the maintenance program.
Article 14	general	What mechanisms are in place to detect and address new or unexpected ageing mechanisms that may emerge during long-term operation?		The Finnish regulations for nuclear facilities have a dedicated guide YVL A.8 on ageing management. There are several provisions on detecting foreseen degradation mechanisms at different plant stage, such as desing, construction and operation. There is a general requirement A.8.304 to define systematic procedures for identifying new degradation mechanisms. The requirement is not only targeting long term operation but at least equally important it targets the objective to deal with possible new mechanisms during design life operation. Each licensee has defined its own procedures to respond to this requirement.
General	General	Could you elaborate which specific mechanisms or practices you consider transferable to non-nuclear countries, particularly those dealing with cross-border nuclear risks and limited national technical capacity?	Finland has a highly developed nuclear regulatory and EPR system.	All-hazards approach and cross-sectoral cooperation within government and between authorities during preparedness would be transferable. Any nuclear or radiological emergency will have major impacts affecting all functions of society, meaning that efficient coordination of all usable resources is important for effective response.
General	Executive Summary		The forthcoming reform of nuclear energy legislation, scheduled to enter into force in 2027, introduces a fundamental shift from prescriptive requirements to a more goal-oriented and risk-informed approach. This transition affects all stakeholders, including licensees and supply chains, making shared understanding and risk management during the implementation phase a critical challenge.	The point is a correct observation. Large change in legislation means that implementation needs to be done carefully. The ministry and STUK have involved current licensee and other stakeholders closely in the development of new legislation and regulation. All stakeholders have the possibility to provide comments during the public consultation. These processes support the implementation phase. STUK has also started internal process the prepare for the implementation of new legislation.

General	Executive Summary		Significant changes in the nuclear sector—such as the cancellation of the Hanhikivi project, growing interest in SMRs, and evolving regulatory frameworks—have rendered the 2017 national competence review outdated. Updating this review is challenging and essential to align skills and capabilities with future needs, including planning for the next research programme beyond 2028.	<p>This is a very important point. However as mentioned in our report this competence review from 2017 showed some signs of ageing already in 2022 being only 5 years old. The shift on needs for expertise can happen very quickly and therefore competence reviews cannot be held as an only source for information when predicting future needs.</p> <p>Open dialogue with authorities and different stakeholders and active stakeholder involvement in all the processes from legislation reform to nuclear safety research and national training courses are essential to ensure that all organizations have the latest information available when making their skill developments for the future and long term planning. This is especially important in relatively small country as Finland with limited resources and where no single organization holds the complete roadmap for the future. By fostering continuous collaboration among all organizations and stakeholders, the sector can proactively aim the educational and research activities to meet the demands of future technologies and traditional nuclear industry.</p>
Article 7	p27		This is considered to be a good performance as STUK has implemented a structured process for continuous safety assessment of nuclear facilities. By systematically integrating data from resident inspectors, inspections, and operational events, and analyzing them in regular multidisciplinary meetings, STUK achieves a holistic view of licensee performance and enables risk-informed prioritization of regulatory resources.	Thank you for the proposal.
Article 7	p29		This is considered to be a good performance because STUK uses a dedicated requirement management system (Polarion) to link all regulatory requirements to legislation, licensing stages, and facility-specific compliance data, including approved exemptions. This approach ensures transparency, traceability, and supports the ongoing comprehensive renewal of nuclear safety regulations.	Thank you for the proposal.
Article 8	p43		SAFER2028 National Research Programme is considered to be a good performance as Finland maintains an integrated research programme on nuclear safety and waste management, strengthening regulatory competence and preparedness. Results are published in English, promoting global knowledge sharing.	Thank you for the proposal.
General	Executive Summary		Strategic Adaptation and Vision "Radiation-Safe Well-being" is considered to be a good performance because STUK's 2024 strategy emphasizes societal impact and proactive engagement. Through early consultations and roadmaps for new technologies such as SMRs, STUK enhances regulatory predictability while supporting innovation and maintaining high safety standards.	Thank you for the proposal.
Article 7	Executive Summary		In transitioning from prescriptive to goal-oriented regulations, what specific training or guidelines are being developed within STUK to prevent inconsistency in inspectors' judgements and to maintain regulatory consistency?	STUK has focused resources more to the development of new legislation and regulations. As regulations are getting ready, focus can be shifted towards guidance and training. STUK will develop also guidance for licensees and internally to support implementation and use of new regulation. Training and management processes will also be needed to maintain regulatory consistency during implementation. STUK has also started internal process to prepare for the implementation of new legislation.
Article 6	p22		The report mentions the installation of 12 additional shielding elements (dummies) to reduce the risk of reactor pressure vessel (RPV) brittle fracture. What is the estimated quantitative reduction in neutron fluence achieved by this measure, and what is the plan for monitoring and verifying its effect throughout the LTO period up to 2050?	<p>The estimated total cumulative fluence for the year 2050 at the most limiting direction and at the elevation of the 4th weld, compared to the previous fluence analysis performed without the additional shielding elements, decreased around 10 %. The effect of shielding elements was higher than this but updates to the calculation program and input data had an effect to the opposite direction. There is no plan at this point for directly monitoring (measure) the effect of shielding elements throughout the LTO period up to 2050, instead the effect is estimated in analyses.</p> <p>Extensive material studies have been done during the whole lifetime of the Loviisa NPP. There is still untested material from the irradiation chains with longer irradiation time. Studies continue to verify the expected fracture toughness of reactor pressure vessel material with higher doses.</p>
General	p7		Regarding the conceptual assessments for district heating reactors (e.g., LDR-50), what specific flexible approaches or graded approaches are being considered for applying traditional large LWR requirements (e.g., regarding safety distances or the size of the emergency planning zone) to these urban-sited SMRs?	In general, in the on-going renewal of regulations, the requirements are developed to be more goal setting and technology neutral than the present requirements, and oversight will be more risk-informed. The graded approach is one of the main principles that is included in the legislation. Regarding the emergency planning zones, STUK made a change already in 2024 to allow a case-by-case definition of the needed zone size, instead of the previous fixed 5 km and 20 km zones. This change was made to enable locating small district heating reactors closer to population (if safety and fulfillment of related radiological limits can be demonstrated). Another example that will facilitate licensing of small district heating reactors is that remote operation (with some limitations) and monitoring are made possible.

Article 10	page 51	<p>Article 10 of the National Report (page 51) notes that STUK has been implementing a Comprehensive Safety Culture Programme since 2020, which includes elements such as continuous safety culture observation and monitoring, networking, training activities, and surveys. The following specific information is requested:</p> <p>(1) Description of the specific components (activity content, operating frequency, responsible organization, etc.) of STUK's Safety Culture Programme.</p> <p>(2) Elaboration on the process by which the results of safety culture monitoring or surveys are integrated into organizational improvements.</p>		<p>Safety culture program consist of the following areas of main components/activities:</p> <ul style="list-style-type: none"> - Safety culture principles and STUK's focus areas/themes - Program owners and core organization who are STUK's safety culture experts - supported by internal safety culture network with representatives from STUK's departments - Monitoring activities: these activities cover the use of various methods of information gathering, e.g. observation of unit, department, topical or other meetings, monitoring of the results of different staff surveys, investigations, audits, regulatory experience, other internal events, substantial events and trends in oversight work, various types of STUK feedback etc.. Also, STUK conducts it's own safety culture surveys regularly to monitor the overall status of the fundamentals. - All of the monitoring methods have their own timelines and frequencies. However, over the past couple of years majority of the key information is gathered through documentation, surveys and other 'reports' that are then compared to the overall picture drawn from the observation of the daily life in STUK. - Yearly monitoring and other Safety culture work is summarized into annual safety culture report presenting the general conclusions and key remarks on Safety culture in STUK. The report is presented to STUK's management team and staff. - To integrate the program work into organizational improvements, Safety Culture Reports' key remarks are included into STUK's annual management reviews. Also, if substantial findings are made based on single remarks etc. they
Article 10	page 51	<p>Article 10 of the National Report (page 51) notes that STUK conducted an independent safety culture assessment in 2024 through an external consultant, and that, unlike previous assessments, this evaluation was performed using the OECD/NEA's five safety culture principles and attributes. The following specific information is requested:</p> <p>(1) Identification of the nature of the external organization that performed the 2024 independent safety culture assessment for STUK (e.g., academic institution, consulting firm, etc.).</p> <p>(2) Elaboration on how the 2024 assessment was differentiated from previous assessments.</p> <p>(3) Description of the main assessment results and the corresponding follow-up actions.</p>		<p>The independent safety culture assessment/study was carried out in the last quarter of 2024 and the results were reported in the first quarter of 2025. The assessment was carried out by an external consulting firm. The responsible consultant is a senior expert in safety culture and has an extensive knowledge of the Finnish nuclear industry - as well as other safety critical domains.</p> <p>The previous assessment used VTT's (TSO) DISC-model as it's evaluation framework. Also, the 2024 assessment paid also attention to the STUK's 'change process' - to better understand its influence on STUK's organizational cultural. The 2024 assessment was also aimed to create a more concrete and clear framework for monitoring and progress evaluation in STUK. During the assessment, the NEA model was updated to better support STUK's needs.</p> <p>The main results indicated STUK's strengths and development areas: E.g. STUK has leadership that supports safety on all levels of the organization, openness, safety and collaboration are supported by the cultural attributes. Further development is also needed e.g. to further clarify the 'shared mission' on the STUK level, to better recognize the diversity related to 'safety' (in different operational areas in STUK) - and to bring STUK's strategy, leadership and development of STUK's organizational closer together.</p>
Article 11	page 53	<p>The National Report notes that a financial system is in place to cover the costs of future radioactive waste management and decommissioning, and that license holders submit technical plans and cost calculations for regulatory review every three years. The following specific information is requested:</p> <ul style="list-style-type: none"> - Identification of the technical or economic factors (e.g., progress of the spent fuel final disposal facility [ONKALJO], adoption of new nuclear waste management technology) that resulted in the most significant changes to the total liability estimates or the required size of the fund contributions, based on the periodic reviews conducted during the reporting period. 		<p>The significant changes to the total liability for waste management fund:</p> <ul style="list-style-type: none"> -Progress in the construction and commissioning of the spent nuclear fuel encapsulation plant and disposal facility. -The cost estimations of the spent nuclear fuel engineered barrier system parts are based on real binding contracts, thus enabling to lower the uncertainty reservations -Inflation -Possible changes in plant lifetime
Article 11	58	<p>Article 11 of the National Report (page 58) specifies that various educational programs are operated by universities in connection with entry into industrial organizations. The following specific information is requested:</p> <ul style="list-style-type: none"> - Confirmation of whether specific training programs or courses are available for strengthening the competence of safety regulatory personnel. 		<p>Various educational institutions provide study programs that form the typical pathway for entering nuclear industry organizations in Finland. These organizations are not limited to operating companies; some graduates are also recruited by the regulatory body. After recruitment, graduates receive additional training from their employer organizations according to specific needs and requirements. Consequently, the regulatory body also benefits from the national education programs. However, the further regulatory-body-specific training (e.g. to become a qualified inspector of the regulatory body) is provided by the regulatory body itself.</p> <p>In addition to university-level education, Finland has established a national training course developed as a joint effort among key nuclear-sector organizations. This annual course is intended for early- to mid-career professionals in the industry. The regulatory body has an annual quota that allows a number of its staff members to participate. This shared course is another example of how the regulatory body benefits from national education and training initiatives.</p> <p>Moreover, beyond participating in STUK's internal training programs, it is common for STUK personnel to take part in training events organized by the licensees. Operating organizations have granted STUK access to the majority of their staff training activities. These training opportunities are used to strengthen, for example, inspectors' competence in specific technical areas, as well as to deepen their understanding of the licensee's operations and organizational practices.</p>

Article 12	page 60	<p>The National Report specifies that Loviisa Power Plant uses Human Performance tools (HuP-tools), which are listed as pre-job-briefing, de-briefing, peer checking, and clear communication. The following specific information is requested:</p> <p>- Description of the reasoning and selection process behind choosing the aforementioned four HuP-tools, considering that other commonly used Human Performance tools, such as self-checking and verification, are not explicitly included in the list.</p>		<p>Other Human Performance tools such as self-checking and verification are used (and included in the instructions) but the main focus of development is put on this four areas of HuP-tools.</p>
Article 13	page 63-66	<p>The National Report notes that different operating practices were observed for Olkiluoto Unit 3 compared to Units 1 and 2. The following specific information is requested:</p> <p>(1) Description of the specific differences in operating practices observed.</p> <p>(2) Elaboration on the impact of these differences on quality assurance and safety.</p>		<p>(1) Due to various design criteria, the OL3 plant has a lot of differences in its instructions and activities (e.g. different guideline/periodic test concepts and operations according to them). The differences related to the operating practices of the OL3 and OL1/2 plant facilities are mainly due to the differences between the plant types. At OL3 plant, the management of plant facilities is more visible, and the planning of work is transparent and involves organisations. The management of the plant status has also been strongly inherited from the time of the OL3 project, and it has been seen as a good way of working during the operation phase. The OL1/2 plant units have a strongly established current operating method that has been seen to work in these plants.</p> <p>The differences in operations are also due to the "short operating history" of OL3's Operational Operations. In 2024, when OL3 was preparing for its first annual outage, many practices had not yet been established. For example, TVO said in relation to user experiences that the procedures that have been applied to OL3 have been copied from the OL1/2 plants.</p> <p>(2) Differences in operating methods have been identified and assessed during the OL3 project. Some of the operating methods are based on the same information systems or proven functions that could not necessarily be adapted to the functions of another plant unit. Differences may arise in the observation / supervision of "normal activities", examinations and various</p>
Article 16	page 91	<p>Article 16 of the National Report (page 91) notes that Finland defines the Emergency Planning Zone (EPZ) as a 20 km radius. The following specific information is requested:</p> <p>- Description of the criteria for demarcating sub-zones within Finland's Emergency Planning Zone (EPZ), specifically the Precautionary Action Zone (PAZ) and the Urgent Protective Action Planning Zone (UPZ).</p>		<p>PAZ – Actions may be needed to avoid or minimise severe deterministic effects of radiation</p> <ul style="list-style-type: none"> - Capability for effective evacuation requires land-use restrictions within PAZ. - No need for evacuation outside PAZ expected. - For sizing of the area, the dose outside PAZ shall not exceed 1 Sv within 10 hours. <p>UPZ – Actions may be needed to reduce risk of stochastic effects</p> <ul style="list-style-type: none"> - External rescue plan is prepared for. - For sizing of the area, the dose outside UPZ shall not exceed 10 mSv within 48 hours. (Dose criterion for sheltering indoors in Finnish protection strategy) - For practical arrangements, the size can be limited to 20 km from the plant.
Article 16	page 91	<p>Article 16 of the National Report (page 91) notes that Finland conducted a Full Scale Off-Site Emergency Exercise in 2023 based on the Olkiluoto nuclear power plant accident scenario. The following specific information is requested:</p> <p>- Identification of the initiating conditions that triggered the declaration of an emergency in the accident scenario.</p>		<p>The initiating condition was complete loss of offsite power. This was followed by (at first) unidentified malfunction that prevented all feedwater supply to the primary circuit.</p>
Article 18	page 101	<p>Article 18 of the National Report (page 101) notes that the Loviisa NPP has been equipped with independent air-cooled cooling units as an alternative ultimate heat sink for decay heat removal from the reactor core and from the spent fuel pools. The following specific information is requested:</p> <p>- Description of the detailed configuration and operational strategy of these air-cooled cooling units.</p>		<p>There are in total 4 towers, two for each unit.</p> <p>One of the two cooling towers removes decay heat from the secondary circuit. In VVER-440 decay heat is typically removed from primary to secondary circuit passively. From the secondary circuit the heat is normally removed during the shutdown conditions into the sea, but this heat exchanger can be replaced by cooling tower. When the decay heat has decreased to sufficiently low level, steam generators (often like in normal shutdown 2 steam generators are used) are filled with water and the cooling tower is connected to the reserve residual heat removal system of the secondary circuit. Some steam is released from the secondary circuit before this can be done. This steam release period can last up to a day, depending on outside temperature and if one or two plant units need to be cooled with one tower.</p> <p>The fuel pool cooling system is cooled by the intermediate component cooling system, that is normally cooled by seawater. This circuit cools also other safety and safety-related components and systems such as the emergency core cooling system, containment heat removal system, boron injection system and some air-conditioning systems. The seawater cooling can be replaced by one of the two cooling towers.</p> <p>The cooling towers are normally empty. Before operation they need to be heated up to prevent ice formation in winter and</p>
Article 12	Page 60-61	<p>Do nuclear power plant operators employ in-house specialists for safety assessments, or do they primarily depend on external organizations such as VTT?</p>		<p>In-house specialists are used in operational activities and plant modifications, but in major projects or extensive safety assessments, like PSR, also external organizations are used.</p>

Article 7	Page 26	As Finland modernises its legal and regulatory frameworks (including changing regulations to be more risk-informed and performance-based and redefining the licensing process), what measures are being put in place to ensure regulatory consistency and to avoid safety dilution during this major transition?		The comprehensive renewal is based on our existing regulation and experience, which provides some elements of consistency. The renewal project was preceded with evaluation of existing situation and identification needed changes. The ministry and STUK have involved current licensee and other stakeholders closely in the development of new legislation and regulation. All stakeholders have the possibility to provide comments during the public consultation. These processes support clarity. STUK has also started internal process to prepare for the implementation of new legislation. One key element is maintaining the consistency and this will require continuous efforts. Concerning safety dilution, the main safety objectives are maintained. New regulations are benchmarked against international requirements.
Article 10	page 48	What is the licensee's selection process of the responsible manager (appointed for the construction, operation and decommissioning of a NPP), noting that STUK will have to approve the appointee?		Fortum: Responsible manager and his/her deputies are senior level manager's with extensive nuclear background and extensive experience of station in question. Station director or Chief Nuclear Officer (head of licensee's nuclear operations) nominate person to the training programme. The persons need to fulfil the requirements according to Nuclear Energy Act and finally STUK approve them after assessment discussion. TVO: A person appointed by the CEO who meets the qualification requirements set in the regulation and has the powers required to perform the task, as works close to the operations and maintenance organization.
Article 10	page 51	(Good practice) In 2018–2019, STUK participated in a safety culture focused project by NEA/WANO and in 2024, an independent safety culture assessment was conducted by an external consultant.		Thank you for the suggestion.
Article 11	page 53	Under Articles 11, what minimum regulatory staffing scale, competency mix, and succession planning model does STUK consider necessary to sustain independent nuclear safety oversight across the full lifecycle of nuclear facilities?		In its mapping and maintenance of competence needs, STUK has based itself on the idea 'an independent regulatory body' that has the vast majority of the necessary competence maintained at STUK. In some cases, STUK's own competence can be supported quantitatively or qualitatively with additional resources from external support organisations (TSOs). However, in these cases, the purpose of for the use of external support is to solve a temporary workload peak - or utilize external support for tasks that are not within the core areas of STUK's operations - and rarely needed. STUK's expertise covers both radiation and nuclear safety, as well as security arrangements and safeguards at all stages of the life cycle, each of which STUK has recent experience. Within each of its core operating areas, STUK has identified the needed competencies and ensures the continuity of its operation by managing the regulatory capacity e.g. in terms of its quality (incl. staff demographics) and quantity. STUK regularly assesses changes in the operating environment, assesses the future related to the use of nuclear energy, for example, through scenario analyses, and strives to prepare for these to the extent necessary. Also, STUK evaluates its own organization and staff to foresee the development needs in order to sustain the needed capacity also in the future.
Article 16	page 88	Under Article 16, what technical criteria does Finland apply to define emergency preparedness arrangements and protective action zones, and how adaptable is this framework to very high population-density environments?		For protective action zones, the criteria is that doses to individuals of population have to remain under 1 Sv outside Precautionary Action Zone (PAZ) and 10 mSv in 24 hours outside Urgent Protective Action Zone (UPZ). The releases for evaluating these doses have to be based on possible releases in very severe situations and dispersal modelling based on historical weather data. For emergency preparedness arrangements, rapid evacuation of PAZ must be possible and UPZ must have external rescue plan for implementing needed protective actions. The framework works for population densities present in Finland, up to the highest densities around Helsinki. However, we do not have experiences for implementing this to very high density areas.
Article 17	page 93	Under Article 17, what siting exclusion criteria, population considerations, and external hazard screening factors does STUK treat as absolute versus negotiable for advanced reactors or SMRs, and how were trade-offs evaluated in Finland's siting practice?		There are no absolute criteria. One type of nuclear power plant may be suitable for one site and not for another. At present, the siting is not assessed separately, but the suitability of the plant for the site is assessed. This is a case-by-case assessment, which is also influenced by the characteristics of the plant.

Article 15	Section 4 Page 82	It is mentioned that in 2019 the Loviisa NPP modified the purification system of the primary circuit and this has allowed an efficient purification of e.g. 110mAg. Could Finland share some details about experience with the purification system for effective purification of 110mAg?		<p>Purification of the primary coolant during certain outage conditions was not possible as the primary coolant pumps provided the flow for the purification system. A new small pump was installed, and this allowed the use of purification during these outage conditions. This new pump has been used since the 2020 outage. The purification consists of a separate cation resin bed and anion resin bed (1000 liters each).</p> <p>Based on the observations the purification of 110mAg is most efficient when the radionuclide transitions from a colloidal to an ionic form under oxygenated conditions. Oxygen enters the primary circuit during the reactor pressure vessel head lifting procedure, leading to an increase in the soluble 110mAg activity concentration in the primary coolant. During this phenomenon, the decontamination factor for 110mAg generally falls to 10² magnitude range. As a general trend, the maximal dissolution of 110mAg results to the highest observed purification. As a result of this efficient purification, the 110mAg activity concentrations have been lower during the outages. The purification of silver also leads to reduced concentrations of activated 110mAg during the next cycle and lower 110mAg deposition on the surfaces of the primary circuit.</p>
Article 14	Page no. 70	It is mentioned that the 'accident sequences, in which the containment function fails or is lost in the early phase of a severe accident, have only a small contribution to the reactor core damage frequency'. Could Finland kindly elaborate the criteria for this requirement?		In this context, 'early' refers to a situation in which warning and protective actions could not be implemented prior to the release. Failure or loss of the containment function encompasses failure of containment isolation, containment bypass sequences, and structural degradation. The point of comparison is the plant's core damage frequency rather than the regulatory limit value for core damage frequency. This requirement cannot be fulfilled solely by low initiating event frequencies; the containment function itself must demonstrate a high level of reliability.
General	Executive Summary Page 11	The report states that, in connection with the ongoing renewal of the Nuclear Energy Act, STUK "may approve exceptions to detailed requirements issued under the Nuclear Energy Act... [but] the approved exemptions, viewed as a whole, shall not pose a significant risk to the safety of the nuclear facility.". Under which conditions and how is STUK's decision-making process defined to determine that the resulting level of risk remains acceptable?		At the moment, granting deviations is not possible for STUK regulations but they are possible for YVL-guides that have the detailed technical requirements for nuclear facilities. The deviations to YVL-guides may be granted if the applicant demonstrates that safety level required by the law can be maintained. This same mechanism would be possible for STUK regulations, that will replace YVL-guides, according to new draft law that is currently being processed by the parliament. If there is a need to deviate from the regulation, it would require a thorough investigation and safety analysis from the licensee to achieve a similar level of safety in ways or procedures that deviate from the regulation. In such a case, the decision on the matter would be made by STUK's Director General and it would be discussed extensively at STUK. STUK may, if necessary, use external TSO's support for the assessment, for example, to prepare comparative safety analyses.
Article 9	page 46	It is indicated in the report that "It is the responsibility of the regulatory body to verify that the licensees fulfil the regulations. This verification is carried out through continuous oversight, safety review and assessment as well as inspection programmes established by STUK. In its activities, STUK emphasizes the licensee's commitment to the strong safety culture.". Based on this description, could you explain how STUK evaluates the effectiveness of mentioned verification activities?		<p>The evaluation of the effectiveness of supervisory activities is based primarily on expert judgment. This assessment is conducted, among other contexts, as part of the annual planning process.</p> <p>No dedicated indicators exist for this purpose. In practice, the assessment focuses on whether the regulatory actions have resulted in the correction of identified deficiencies. This, in turn, is reflected in the overall safety assessment model as positive development (traffic lights). STUK can monitor trends, identify deviations, and evaluate whether its supervisory activities are achieving their intended safety outcomes.</p> <p>Lack of dedicated indicators for the effectiveness of regulatory oversight has been under discussions at STUK and is has been raised as one of the topics in ongoing oversight development program.</p>
Article 18	page 101	According to Fukushima Dai-ichi accident, TEPCO has suggested some improvements for the Loviisa NPP. It is indicated that "The flooding protection of the plant was improved and the flood protection of the buildings most important to safety has been strengthened.". Have any new structures been constructed to improve flooding protection? If so, what design considerations were taken into account?		The more detailed description is in Annex 5 p. 147: Loviisa NPP improved in 2012 flood protection during certain annual shutdown states with open hatches in the condenser cooling seawater system; the design water level was increased in stages first from +2.1 m to +2.45 m and further to +2.95 m. The filling method of seawater channel was changed in 2017 (After change there would be only limited water discharge in turbine hall in case of any hatches were left accidentally open) and the last modifications of the hatches were implemented in 2018 outages. The utility submitted a detailed plan of improved flood protection in 2015. The plan was based on strengthening of flood protection of the buildings most important to safety (the auxiliary emergency feedwater and auxiliary residual heat removal buildings. Due the plan, the flood protection of the buildings most important to safety has been strengthened (the auxiliary emergency feedwater and auxiliary residual heat removal buildings). In addition, means to cope with extensive loss of electrical systems are being implemented. The implementation of the new means and related instructions was completed in 2021. The national stress test reports are available in ENSREG pages: https://www.ensreg.eu/EU-Stress-Tests/Country-Specific-Reports/EU-Member-States/Finland

Article 7	Page 27-28	Provision of regulatory guidance, it has been stated that "STUK can approve exemptions from new requirements if it is not technically or economically reasonable to implement respective modifications and if the safety justification is considered adequate. These are case-by-case decisions. For example, Finnish operating NPPs are granted exemptions from the requirements concerning protection against large airplane crashes.". What were the exemptions for airplane crashes? In this case how is nuclear safety verified and ensured against large airplane crash?		Older reactors were not initially designed against large commercial airplane crash. Details of the protection and related analyses are classified information.
General	General	See Comments	Ireland thanks Finland for its national report, which is structured in accordance with the articles as given in the Convention. Ireland commends Finland on the detail provided in highlighting continuous improvement, in terms of education (SAFER2028) and for radiation protection, with recent ALARA action programmes implemented at the two nuclear power plant sites.	Thank you for the comment.
Article 16.2	page 11	Regarding the nordic cross-border cooperation in EPR, what do you mean by "real-time situational awareness"? Please elaborate on that interesting topic.		This is an ongoing topic for improving arrangements. As of yet, there is little in terms of complete work, but there are discussions on common information exchange and cooperation on GIS systems to enhance and speed up information exchange during emergencies to ensure that countries have same understanding of any situations that might impact them.
Article 17	p94	"The general principle in the siting of nuclear power plants is to locate the facilities in a sparsely populated area and remote from large population centres. In the vicinity of the plant, no industrial or other activities are allowed that could pose an external threat to the plant". This principle might be challenging in the case of SMR/MMR, how does Finland intend to address this issue?		These aspect need to be considered when evaluating the suitability of the site, and ultimately when designing the protection against these threats for the facility. As part of the ongoing legislative reform, the specific features related to SMR are intended to be taken into account, including the location of plants closer to settlements and industry.
Article 17	p95	"In Finland, the EIA is conducted at an early stage of an NPP project, prior to the selection of the plant design, based on the power range of the plant and on general information on the available designs. " Has an applicant in Finland ever needed to resubmit an EIA because once the design and safety analysis were completed the results of the analysis were above the consequences mentioned in the EIA? If not how do you ensure it does not happen without being too conservative? Will it be the same for SMRs as some of the design and technologies will be really new?		No renewal has been necessary for following reason. A certain amount of conservatism is justified because the EIA is carried out at such an early stage of the plant project. The process is the same for all nuclear facilities.
Article 7.2.1	p. 27-29	Finland indicates that in the future "IAEA requirements and WENRA Safety Reference Levels will be systematically taken into account in STUK's safety regulation renewal and the linking between them and the sections of STUK regulations will be made." Currently the WENRA SRL have been linked to YVL guides. The status of the YVL guides "will be changed and in the future, they will be purely for guidance, no longer binding requirements." How will the link with the WENRA RL (and the underlying IAEA Requirements) be made in the future?		The linking will be carried out in requirement management database, into which all requirements of STUK's regulations, as well as IAEA requirements (GSRs and SSRs) and WENRA Safety Reference Levels, are imported. Linking can be done in the database on a requirement-by-requirement basis. The links are being created as part of the regulation reform project, which is ongoing. The link can be verified in both directions from the requirements of the IAEA and WENRA as well as from the regulatory requirements in STUK regulations.
Article 9	p46	Finland, as most of the countries, do not accept the responsibility for safety to be delegated or transferred to another party. In the framework of SMR, MMR, it is possible that the operator of the MMR be different from the owner of the land and or industrial site that uses the MMR. Has Finland envisaged this case and how would it be managed?		The licensee has the ultimate and non-delegable responsibility in safety in the new legislative system, as well. The licensee will need to have adequate competence to understand the requirements at an adequate level to be able to bear this responsibility and make necessary agreements when outsourcing activities. The possibility of an organizational configuration where operations are not performed by the license holder but are outsourced has been considered. The new regulations enable different types of organizational arrangements as long as the organizations and their performance fulfill the safety requirements. STUK has recognized that oversight of new more complex organisational arrangements will need new approaches and possibly new competencies or at least arrangements of the oversight. However, the activities to be overseen remain the same, although the organisation carrying them out may differ from what we are used to now.
Article 15	Section 15 (page 85)	Section 15 states: "The Operational Limits and Conditions of a NPP have more stringent requirements applicable for the radioactive substances of primary coolant (fuel integrity), thus practically preventing more significant releases". What radiation parameters are the operational limits for the primary circuit systems established in order to ensure non-exceedance of the standards for permissible emissions of radioactive substances into the atmospheric air?		The parameters include the activity concentrations of noble gases and/or iodine in the primary coolant. Thus, the plant can not be in power operation under severe fuel leakage situation.
Article 16	Page 89	Article 16 of the Report provides information that the technological parameters of the power unit are transferred to the STUK emergency response center. Is it envisaged to transfer the process parameters of the power unit to the STUK emergency response center in real time? Is it envisaged to transfer information about the radiation situation at the NPP site and beyond to the STUK emergency response center?		During emergencies, the process parameter transfer of the facility in emergency is real time transfer. Radiation situation information is transferred in real time from the site and elsewhere in the country both during regular operation and emergencies.

Article 16	Page 89	Article 16 of the Report provides information that feedback from the operating organization obtained from the results of emergency training is assessed within the framework of STUK inspections. Is it envisaged to make changes to the personnel protection action plan based on the results of emergency training?		Yes it is. If the results of the training or exercise show performance that is below expectations, organization needs to improve performance. It may even lead to changing action plans. There have been rare cases that led STUK to demand improvements in some aspects of personal protection plan during emergencies e.g. some contamination control procedures in emergency centers needed updating a few years ago.
Article 13	Page 65	The Report states: "The management systems of the main suppliers were also reviewed and assessed, and their implementation was verified through inspections and audits mainly by the licensee where STUK is taking part as an observer". Question: What are the criteria for evaluating supplier management systems? Does the list of requirements contain the requirements of ISO 19443:2018 "Quality Management Systems - Specific Requirements for the Application of ISO 9001:2015 by Organizations in the Supply Chain of the Nuclear Energy Sector Supplying Products and Services Important to Nuclear Safety (ITNS)"?		When assessing suppliers' management systems, the requirements of the ISO9001 standard are used as criteria. ISO19443 can also be used as criteria in case the auditee has been granted that certificate.
Article 19	Page 116	What is the frequency of geodetic observations of settlements and tilts of buildings and structures of nuclear plants with the subsequent analysis of such observations?		Buildings and heavy structures of nuclear utilities in Finland are founded on hard bedrock. Geodetic observations are needed only during construction period of buildings and structures. Tilting is not expected because of very stable foundation conditions and the fact that structures are on continuous geological blocks. Structural behaviour of containments are monitored by pendulums and stress-strain measurements before, during and after pressure and leak tests. YVL B.6 requires pressure and leak tests. YVL E.6 guides the planning of such tests. The frequency of pressure and leak tests is based on a test plan approved by STUK. A containment pressure test shall be performed prior to the commissioning of the plant to demonstrate the structural integrity of the containment. Leak tests are done every four to eight years depending on previous test results.
General	Appendix 2, Appendix 3	It is indicated that Loviisa NPP power units (VVER-440) are operated at a capacity of 109% of the rated power, Olkiluoto NPP - 115.7%. Is there information in open sources on the technical aspects of increasing power to the specified level for the purpose of possible use at the NPP of the Russian Federation?		Unfortunately such detailed information is not available in open sources concerning Loviisa reactor power uprate 1997 (1375 to 1500 MW) or Olkiluoto 1&2 in 1984 (2000 to 2160 MW) and 1994-1998 (to 2500 MW).
General	-	The Report does not mention the use of BIM technologies in any of the stages of the NPP life cycle. Information modeling technologies are not really applied and are they planned to be applied in the future?		According to YVL B.7 the licence applicant shall submit to STUK for the review of the construction licence application a 3D computer model (building information model, BIM). It shall include a preliminary presentation of buildings, and systems, structures and components to the extent necessary for assessing the layout design of the plant, space reservations, the implementation of separation requirements and protection against internal hazards. During the construction of Olkiluoto 3 unit and Posiva's final disposal, STUK received 3D computer models supporting the oversight and inspections. Posiva's models are the first BIMs, which STUK have received from nuclear utilities, which could be useful also for the rest of life cycle of the utility. It is anticipated that in future, new build projects will be managed by BIM.
General	Page 7	Section "Executive summary" of the National Report of Finland says about STUK's activities in evaluating new designs of LDR-50 and CAL-30 reactors for district heating by Steady Energy. Please, clarify whether we are talking about the development of small modular reactors for heating in Finland? Who is the developer of these designs?		A Finnish company Steady Energy and a French company Calogena are both developing small modular reactor for district heating. Steady Energy's reactor is LDR-50, and Calogena's CAL-30. Both companies have asked STUK to perform a safety assessment of the conceptual design of their design.
General	page 130, Appendix 2	What measures (implemented programs) were taken to improve safety in order to ensure safe and reliable operation of the Loviisa unit (reactor) of power unit No. 2 (except for the experience of operation with the first "dummy" assembly within 2 periods of 2 years), in connection with the transition to the new fuel of Westinghouse Electric Company? The National Report states: "One specific issue with the Loviisa plant units is the risk of reactor pressure vessel brittle fracture". How are the risks of worsening this problem after the transition to new fuel assessed? Has the experience of other NPPs with VVER reactors that switched to the operation of new fuel been sufficiently studied?		The analyses concerning the new fuel and operational experiences are always done as a part of fuel licencing. Loviisa has also own operating experiences due the use of BNFL fuel. New analyses (and the evaluation of the measures needed) concerning the embrittlement margins of the reactor pressure vessel will be made for the 2030 PSR, including the influence of the 12 additional dummy elements in the periphery of the reactor core (the replacement of the 12 additional fuel bundle positions with dummy elements in the periphery of the reactor core was done for Loviisa 2 in 2022 and Loviisa 1 in 2023) to improve the safe operation until the end 2050. These reactor pressure vessel analyses includes also the possible changes in the fuel. STUK approves the results of the utilities PSR.

General	Page 146	What environmental protection measures are carried out at the Loviisa NPP in connection with the so-called "thermal" pollution of water used to cool turbine condensers and returned (heated) to the marine ecosystem of the Baltic basin?		<p>The discharged cooling water is directed to the surface of the water body in the vicinity of the NPP maximising the thermal energy transfer from the discharge water to the atmosphere and thus decreasing the energy stored in the water resulting in smaller thermal load left into the sea water. During summer time the cooling water flow is increased close to to permitted maximum flow, which has no impact on thermal load (in MW), but it helps in reducing the environmental impact (cooling water temperature in degree C). Environmental permit for Loviisa NPP sets limits for maximum annual thermal load and discharge water temperature, and the power of the NPP will be lowered as needed, if the limits set by the environmental permit are to be reached. Such adjustment was done for example in summer 2025 due to long warm period.</p> <p>Ongoing modifications to increase plant thermal efficiency also decrease slightly heat discharge into the sea.</p>
General	-		The text of the Report does not contain a transcript of the frequently used abbreviation YVL.	YVL is name of the regulatory guide series. It originates from a Finnish word for nuclear power plant (ydinvoimalaitos).
General	Resume. Challenges from the joint 8th and 9th Review Meeting	The National Report states: "Regarding Challenge 2, the legislative and regulatory renewal has advanced to the stage where MEAE submitted a draft act for public consultation in June 2025, and the first drafts of STUK's regulations are expected to be ready for public consultation during the autumn 2025. A total of 23 new regulations are planned to replace the current five regulations and 47 YVL Guides". Question: What measures are planned for the Loviisa NPP, commissioned in 1977, in order to comply with the requirements of the new rules?		<p>The transition period for new Regulation is planned to be until the end of 2032 for operating NPPs. Both utilities (Fortum and TVO) have Periodic Safety Reviews (TSO in 2028 and Fortum in 2030) before that. So, the PSRs can be used for this evaluation. STUK approves the results of the utilities PSR. STUK performs all the inspections against the new regulation in full after transition period, but also to some extent before that after the entry into force (2027-).</p> <p>At the moment, the understanding is that the level of the safety requirements will remain the same – many requirements have been written to be more general and goal-oriented than before, and previous solutions can also be assumed to meet it. If necessary, a transitional provision can be drawn up in the regulation for the identified needs.</p>
Article 6	Article 6	The National Report states: "Fortum has an extensive modernisation programme (Loviisa Long-Term Operation Program, LTOP)...". Question: How will the planned change in the legislative and regulatory framework affect the implementation of the specified Loviisa NPP modernization program?		<p>At the moment the new regulation is being drafted. Therefore, the impact can't be fully evaluated yet. There will be a transitional period during which current regulation may be used.</p> <p>The impact can be assumed to be related to component specific requirements. The new regulation changes component specific requirements and makes use of high-quality standard equipment/components possible in a more extensive way than in current regulation.</p> <p>There might be also some impact on safety upgrades as risk based approach may be used in some cases instead of predefined deterministic rules.</p>
Article 19	Article 19	The National Report states: "According to Nuclear Energy Act the dismantling of a nuclear facility and other measures taken for the decommissioning of the facility may not be postponed without a due cause". Question: What are the good reasons to postpone decommissioning activities?		If the decommissioning plan includes postponing the dismantling works, it must be justified by important reasons, such as minimizing the total radiation exposure from the dismantling works. The reasoning is evaluated with overall view since the optimal timing of decommissioning activities depends on several factors, including technical readiness, radiation doses resulting from dismantling operations, the existence of disposal facilities, the availability of skilled labor, the decommissioning of other nuclear facilities in the area, and the other needs for the site.
Article 19	Page 115	It is indicated that emergency operating procedures for multiple units and spent fuel pools are currently being developed. Is the planned completion date for this work known?		Update to the CNS-report: The guidance and procedures are complete and takes into account all units, including OL3.
General	Page 133 , Annex 3	Information about replacing the generator breaker is pointed out. Please specify whether the previous generator breaker also had the ability to shut off short-circuit currents?		In the MODE project between 1994 and 1998, the generator breakers of OL1 and OL2 were replaced, or rather, the "generator disconnectors" were upgraded into generator circuit breakers. In this replacement, the current interrupting capability of the device was increased from the level of rated current to the level of fault current. In other words, the old generator breaker did not have the capability to interrupt fault current (rapidly), whereas the new generator circuit breaker does have this capability. The current generator circuit breakers will be replaced in 2026 (OL1) and 2027 (OL2), and the fault current interrupting capability will be retained in the new breakers as well.
General	Page 143 , Annex 4	It is indicated that the inspection plan provides for 15 inspections. Please elaborate on whether this number depends on the unit or is fixed, and whether it refers only to the average annual number of inspections per unit or for the entire multi-unit power plant. Or perhaps this number refers to the number of inspections per resident inspector?		This refers to inspections carried out under the operational inspection program, which are conducted under the responsibility of inspectors from the head office. On average, there are 15-20 such inspections per license holder each year. The specific inspection program for each license holder varies from year to year according to identified needs and the inspection cycle.

General	Page 148 , Annex 5	The report indicates that biodiesel can be used in exceptional circumstances in Loviisa EDGs (Emergency Diesel Generator). Have such analyses been also carried out for EDGs in other power plants, or are they only intended for use with conventional diesel?		The studies have been made in both Olkiluoto and Loviisa NPP unit's emergency diesels in Finland concerning the use of biodiesel. The issue was first discussed in 2009 in connection with the use of FAME (Fatty Acid Methyl Ester) biodiesel and the solution to secure the possibilities to have diesel without any biocomponent and gather more experiences concerning the newer biocomponents. Today, the HVO (Hydrotreated Vegetable Oil) biocomponent is used for example in Olkiluoto 1,2 and 3, based on the SFS-EN 590 standard. The condition of the fuel is monitored through a regular quality control program.
General	Page 162 , Annex 5	It was indicated that during emergency exercises communication is one of the practiced elements. Are all governmental administration institutions cooperating on a single information exchange and communication system, and how do they ensure a joint and consistent message is delivered?		The main organizations have access to common situation information tool, which provides common information of the current situation. However, the most important tool for ensuring consistent message is frequent and ongoing contacts and discussions directly between the communications groups of responding organizations. The communications units have joint coordination group for preparedness, which discusses and coordinates work to ensure that consistent message can be produced during emergencies.
Article 8	p.39	Could you please elaborate on STUK` s training and qualification programmes: what are the training and qualification requirements for STUK staff, including the periodicity of training programs, their mandatory nature, and the basic competencies required for personnel performing oversight of nuclear power plants?		STUK has revised its training programme in recent years (in line with the IAEA's "Strategic Approach to Training" methodology). The training system is built around thematic training programmes that support the key competence areas needed for STUK's operations. The training system supports STUK's staff to acquire both broad general competence and the expertise required by their areas of responsibility. The training courses include introduction training, basic courses, general inspector training, and advanced training modules. Some of the courses require periodic renewal. Course-specific criteria—such as prerequisite knowledge and renewal requirements—are defined in the training plan for each course. The trainings include e.g. in-person-lectures, online training, workshops and e-learning. These courses form training paths that have been identified and balanced for e.g. certain technical competence areas, specific organizational roles (such as project managers), and cross-functional activities. To be appointed as an inspector at STUK, a recruit/candidate must meet certain educational requirements regarding level and specialization. In addition, the relevance and extent of previous work experience, as well as personal suitability, are assessed during the recruitment process and the subsequent trial period. As part of the qualification procedures, all new personnel receive structured orientation to STUK, their department, their unit, and their specific duties. The inspector qualification process ensures that each new inspector develops
Article 16	Part A - Article 16, Page 90	How often do you take part in them?	What exercises do you take part in, with which international organisations (EU/IAEA/NEA?)	Typically, one exercise with Nordic participation per 1-2 years is held. STUK regularly takes part in ECURIE and Convex exercises and a major national participation in INEX-6 exercise was organized.
Article 16	Part A - Article 16, page 90	Do you exercise the emergency arrangements with the competent authorities of the countries where bilateral agreements are in place?	Emergency Arrangements	Nordic countries participate in many of each others' major exercises. In recent years STUK has both participated in Swedish exercises and other Nordic countries have participated in Finnish exercises. With other countries with bilateral agreements, there are no regular exercises.
Article 8	Part B – Comments on process made on previous Challenges and Suggestions identified at previous Review Meeting	Ongoing support should be in place until implementation of the new regulation.	Challenge 1 - Ensuring resources for and carrying out the implementation of more risk informed, technology neutral and performance-based regulation and oversight including alignment with the renewed legal framework. Finland's National Report states that this challenge has been addressed through the process of developing a new Nuclear Energy Act and STUK regulations. For two years, 5500 person days were dedicated in renewing the Act and regulatory framework. Involving key experts, stakeholders and licensees was very good to include as part of the reform. The contents include more technology neutral approach and more alignment with the new framework.	Thank you for the conclusion.
Article 7	Part B – Comments on process made on previous Challenges and Suggestions identified at previous Review Meeting	Challenge 2 - Change the detailed and prescriptive regulatory requirements to allow more flexible approaches in authorising different solutions related to e.g. plant modifications and maintenance.	As per Finland's National Plan, this challenge has been addressed through the updating of the Nuclear Energy Act that will be significantly more risk-informed and goal-oriented resulting in regulatory requirements that are more flexible and are more focused on safety objectives and performance expectations.	Thank you for the conclusion.
Article 7	Part B – Comments on process made on previous Challenges and Suggestions identified at previous Review Meeting	Challenge 3 - Ensuring safe long-term operation of the NPPs, including retention and renewal of the necessary competencies and tools to address also possible new and unexpected ageing mechanisms.	As per Finland's National Report, this challenge has been addressed through the revised regulatory framework and the continuous development of safety culture. Ageing management has also been integrated into the overall framework of maintenance programmes; this is detailed in Article 11 and 14 of the National Report. There is continuous improvement and taking part in the stress test reviews to ensure ongoing safety.	Thank you for the conclusion.

Article 8	Part C – Proposals of Good Performance - Article 8, pages 37-38	Proposal of Good Performance	STUK has been assigned a new role related to assessing national preparedness and response, strengthening its responsibilities in coordinating and overseeing emergency preparedness at the national level. STUK has demonstrated good performance in communication with the public and media. Efforts include transparent information sharing, based on best available information and researched knowledge and proactive engagement to build public trust in nuclear safety. Using social media platforms for a two-way communication with the public.	Thank you for the proposal.
Article 10	Part C – Proposals of Good Performance - Article 10, pages 51-52	Proposal of Good Performance	STUK's management system places a strong emphasis on safety. A new Safety Culture Programme was launched in 2020, following a collaborative project by NEA and WANO in 2018–2019. Following on from this, the independent safety culture assessment conducted by an external consultant in 2024 could be considered a good performance.	Thank you for the proposal.
Article 10	Proposals of Challenges and Suggestions - Article 10, page 51	Proposal of Suggestion	A suggestion would be to address the outcomes and challenges raised from the 2024 safety culture assessment.	Thank you for the proposal.
Article 11.1	pg. 54	Has your regulatory body recently faced any challenges in recruiting new personnel, particularly regarding their education and expertise?		For the most part, STUK has been able to recruit the new talent it has targeted. However, on certain areas of expertise, recruiting a senior expert with extensive experience in nuclear industry may be challenging in short time period. STUK aims to maintain healthy age structure throughout its organization and prepare for human capacity risks by maintaining adequate number of experts in all key competence areas. Furthermore, STUK pay attention to its employer image and aim to sustain its good image as an employer making it desirable employer in the area of nuclear and radiation safety - and in Finnish labour market in general.
Article 18	pg. 105	Which I&C systems at Loviisa NPP have been upgraded?		During the last years the most major modification has been the I&C renewal project ELSA, for which the installation was finalised in 2018. In ELSA project reactor control and limitation system, reactor protection system and automatic reactor protection back up system were modernised using software-based I&C platform. The new systems taken into use at ELSA project were extended in another two modernization projects, for which the installations were finalised in 2021 and 2022. The scope of these projects were part of the plant protection functions as well as Neutron Flux Monitoring during fuel loading. With these changes, the original systems from the 1970s performing the functions were modernized and one automation platform was taken out of service. Turbine control and protection automation modernization is currently ongoing.
Article 18	pg. 105	What standards did you use when licensing the modernization of I&C systems at Loviisa NPP?		Licensing in Finland is guided by Nuclear Safety Authority STUK and the guidance is given in YVL Guides. Then contents in these guides is based on the international standards as well as IAEA guidance. The vendors applied IEC standards in the system level I&C engineering and this is required also from planned modernizations as well. The vendors also use suitable standards for their product.
Article 19	pg. 117	Have you had any events related to the modernization of the I&C at Loviisa NPP?		4 events have been listed in for those years 2018 and 2021 when major installations were made. None of them were INES-classified. 2 of them were related to dismantling and 2 to component faults.
Article 8	pg. 36ff	Do you have any communication plan that consists of strategic communication activities for internal and/or external communication?		Yes, STUK has an organizational strategy that includes communication priorities. Based on these priorities, STUK prepares annual internal and external communication plans for its activities. STUK also has communication guidelines that are part of STUK's management system manual.
Article 11	11	The report notes that the national competence review is now outdated due to significant developments since then. (1) How will Finland update and maintain national nuclear safety competence in light of sector changes and regulatory reform? (2) What measures are planned to ensure adequate expertise for new and existing technologies?		Open dialogue with authorities and different stakeholders and active stakeholder involvement in all the processes from legislation reform to nuclear safety research and national training courses are essential to ensure that all organizations have the latest information available when making their skill developments for the future and long term planning. This is especially important in relatively small country as Finland with limited resources and where no single organization holds the complete roadmap for the future. By fostering continuous collaboration among all organizations and stakeholders, the sector can proactively aim the educational and research activities to meet the demands of future technologies and traditional nuclear industry.

Article 7	7	<p>Finland is embarking on an overall legislative reform of the nuclear energy legislation to embed risk-informed, technology-neutral, and performance-based approaches into its regulatory framework.</p> <p>What specific strategies and mechanisms is Finland employing to ensure that the new framework maintains regulatory clarity and consistency for licensees and stakeholders?</p>		<p>The comprehensive renewal is based on our existing regulation and experience, which provides some elements of consistency. The renewal project was preceded with evaluation of existing situation and identification needed changes. The ministry and STUK have involved current licensee and other stakeholders closely in the development of new legislation and regulation. All stakeholders have the possibility to provide comments during the public consultation. These processes support clarity. STUK has also started internal process the prepare for the implementation of new legislation. One key element is maintaining the consistency and this will require continuous efforts.</p>
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