Ministry of Trade and Industry  
Department of Energy  
P.O. Box 32  
FI-00023 GOVERNMENT


STATEMENT OF POSITION BY THE FINNISH RADIATION AND NUCLEAR SAFETY AUTHORITY REGARDING THE CONSTRUCTION OF THE THIRD UNIT AT OLKILUOTO NUCLEAR POWER PLANT

In accordance with section 23 of the Nuclear Energy Act (NEA), the Ministry of Trade and Industry (MTI) has requested a statement of position from the Finnish Radiation and Nuclear Safety Authority (STUK) about the construction permit application of Teollisuuden Voima Oy (TVO), concerning the third unit at Olkiluoto nuclear power plant.

TVO has provided to the Ministry of Trade and Industry the construction permit application and the additional documentation, as required according to section 32 of the Nuclear Energy Decree (NED). STUK has received further necessary documentation from TVO, according to section 35 of the NED. This documentation was the primary basis of the inspections carried out by STUK. Additionally, at the request of STUK, TVO submitted for review a preliminary Probabilistic Safety Analysis (PSA), and safety evaluations concerning the entire plant and its systems.

The above-mentioned documentation and reports were delivered to STUK in batches, and updated or otherwise complemented during the application process period. This was as a result of comments by STUK and progress with the design.

The third nuclear power plant unit at Olkiluoto is based on the French-German European Pressurised water Reactor (EPR) concept. The thermal output of the reactor is 4300 MW with a net electric power output of approximately 1600MW. STUK has found that this power output is slightly higher than the larger nuclear reactors of today. This includes the original Pressurised Water Reactors, the German Konvoi and the French N4, which operate in the range of 1300-1450 MW of power output.

Compared to its predecessors, the EPR concept’s safety has improved, applying defence-in-depth more systematically.
Significant safety enhancements are, among others, the following:

- Special provisions in containment design for a severe reactor accident (core meltdown)
- provisions for a large aircraft crash
- safety systems implemented with subsystems carefully separated from each other (principles of redundancy and segregation)
- increased use of the diversity principle in safety systems (for example, in safety automation, using both programmable (digital) and hardwired (analogue) technology)
- simplification of emergency coolant recirculation and design of associated filters by experiment to cope with the worst-estimated load, and provision of a backflushing capability to ensure long-term operation.

STUK has prepared a safety evaluation of the project, the first attachment of this document. The second attachment is a summary of the assessment of the documents provided according to section 35 of the NED, prepared by STUK. Attachment number 3 is the statement from the Advisory Committee on Nuclear Safety as requested by STUK.

In the safety evaluation, STUK states the following:

The safe utilisation of nuclear energy is stipulated by the Nuclear Energy Act (NEA, 990/1987) in sections 5-7 as follows:

5§, The use of nuclear energy, taking into account its various effects, shall be in line with the overall good of society.
6§, The use of nuclear energy must be safe; it shall not cause injury to people, or damage to the environment or property.
6a§, Nuclear waste generated in connection with or as a result of the use of nuclear energy in Finland shall be handled, stored and permanently disposed of in Finland [...], and
7§, Sufficient physical protection and emergency planning as well as other arrangements for limiting nuclear damage and for protecting nuclear energy against illegal activities shall be a prerequisite for the use of nuclear energy.

A license is required to use nuclear energy (NEA, section 8)

The third unit at Olkiluoto nuclear power plant is, in accordance with the NEA, section 11, of considerable general significance, so granting a construction permit requires the Government’s decision in principle. The Government made its decision in principle on 17.1.2002 and the Finnish Parliament confirmed its validity on 24.5.2002. According to section 19 of the NEA, in order to grant a construction license, in addition to a valid
decision in principle, the following 10 conditions must be fulfilled. In the evaluation in attachment 1, STUK has evaluated the points indicated by bold type. Matters which are outside of STUK’s mandate have been checked by other authorities.

A permit can be granted to construct a nuclear facility in accordance with the following points of section 19 of the Nuclear Energy Act

1. if the design concerning the nuclear facility, its central systems and components entail sufficient safety and protection of workers and the population's safety has otherwise been taken into account appropriately when planning activities;
2. if the location of the nuclear facility is appropriate with respect to the safety of the planned operations and environmental protection has been taken into account appropriately when planning activities;
3. if physical protection has been taken into account appropriately when planning activities;
4. if a site has been reserved for constructing a nuclear facility in a town plan or building plan in accordance with the Building Act (370/58), and the applicant has possession of the site required for the operation of the facility;
5. if the methods available to the applicant for arranging nuclear waste management, including the final disposal of nuclear wastes and the decommissioning of the facility, are sufficient and appropriate;
6. if the applicant's plans for arranging nuclear fuel management are sufficient and appropriate;
7. if the applicant's arrangements for the implementation of regulatory control by the Radiation and Nuclear Safety Authority (STUK) as referred to in subsection 1, point 3 of section 63 in Finland and abroad, and for the implementation of control as referred to in subsection 1, point 4 of section 63 are sufficient;
8. if the applicant has the necessary expertise available;
9. if the applicant has sufficient financial prerequisites to implement the project and carry on activities; further
10. if the applicant is otherwise considered to have the prerequisites to engage in activities safely and in accordance with the obligations under Finland’s international treaties; and the planned nuclear facility otherwise fulfills the principles prescribed in sections 5–7.

The plans and arrangements that TVO has presented for points 1-3 are, from a safety point-of-view, adequate and appropriate for the purpose of a construction permit, taking into account the following observations and limitations:

- instead of the 50 MWd/kgU discharge burnup upper limit given in the Preliminary Safety Analysis Report (PSAR), an upper limit of 45
MWd/kgU shall be used, unless the higher value can be experimentally demonstrated to fulfil all pertinent safety criteria

- detailed design of the plant’s systems continues during construction. STUK has required that TVO delivers detailed, system-specific pre-inspection material to STUK for approval.

The plans and arrangements that TVO has presented for points 5-8 are, from a safety point-of-view, adequate and appropriate, taking into account the following observations and limitations:

- The safety analysis of the final repository of power plant waste, the VLJ cave, is to be revised in 2007. The revision shall include also the waste from the third unit at Olkiluoto nuclear power plant, as the current analysis only covers waste from units 1 and 2

- In attachment 12 of the construction permit application, the report on handling spent fuel is quite general. The adaptation of the design for the final repository by Posiva Oy shall begin such that more detailed plans, taking into account the needs of the third unit at Olkiluoto, are available for the nuclear waste management review TKS-2006 in 2006

- In order to facilitate STUK’s regulatory oversight during construction, adequate time needs to be reserved. STUK will require, in good time, necessary details of the manufacturing schedules of important safety-related components, structures and systems. On this basis, STUK can ensure that the procedures required in YVL guides, are carried out

- TVO must ensure that adequate expertise is available when the plant is operational. Due to the new plant’s features and characteristics and the technology used, TVO must ensure that expertise built up during the construction period is retained when the operational phase begins. This is especially important in the nuclear safety and mechanical and automation technology fields

- In the long run, use of nuclear energy can only be in line with the overall good of society, if society is in turn prepared to maintain all the prerequisites of safe nuclear energy utilisation, especially, education and research infrastructure and other safety-relevant societal structures (security authorities, emergency preparedness systems and so on). It is important to take measures to maintain domestic expertise in nuclear technology, with basic and advanced higher-education, together with securing basic and high-level research.

As to part 9, STUK notes that the Finnish electricity market was deregulated 10 years ago, but this does not seem to have had a detrimental effect on TVO’s safety-related investments.
As to part 10, STUK’s mandate includes international treaties which deal with the safeguard of nuclear material, questions of nuclear responsibility, the international nuclear safety convention, and the international nuclear waste convention. The requirements of international treaties are fulfilled through Finnish legislation and current practices.

No factors have been observed during STUK’s regulatory review which would prevent the planned nuclear power plant unit from fulfilling the principles set out in sections 5-7 of the Nuclear Energy Agreement.

In conclusion, STUK’s overall evaluation is that the third unit at Olkiluoto nuclear power plant can be built safely, in accordance with sections 5-7 of the Nuclear Energy Act.

Director General          Jukka Laaksonen

Director                  Lasse Reiman

FOR INFORMATION
Ministry of Social Affairs and Health, Teollisuuden Voima Oy
JL, HaK, LR, MIJ, AT, ER, EM, KV, RV, MaO, OVl, VR, PT, JHy

ATTACHMENTS
1. New nuclear power plant project safety evaluation 21.1.2005
2. Summary of assessment of documents according to section 35 of the Nuclear Energy Decree, checked by STUK, 21.1.2005
3. Statement by the Advisory Committee on Nuclear Safety "Construction permit application by Teollisuuden Voima to construct a third unit at Olkiluoto nuclear power plant" 21.1.2005