

## **CRITERIA TO BE MET BY INVESTORS WHO WILL CONSTRUCT AND OPERATE NUCLEAR POWER PLANTS**

Turkish Atomic Energy Authority (TAEK) Criteria that are referred to in Article 3 of the Law on Construction and Operation of Nuclear Power Plants and Energy Sale (no. 5710), published in the Official Gazette dated November 21<sup>st</sup>, 2007, are given below. The TAEK Criteria were prepared within the frame of duties and responsibilities given by the TAEK Law, no. 2690. The Criteria set the general principles that should be complied with by the investors. The Criteria are not listed in order of priority. In case of any misinterpretation or conflict, Turkish text of the TAEK Criteria shall prevail.

- 1) **Nuclear safety:** The nuclear power plant should include up-to-date and proven technological improvements. It should comply with the international norms, especially the norms of the International Atomic Energy Agency. Design features that consider preventive measures to reduce radiological consequences against accidents that fall under the category of “severe accidents” shall be taken into account during evaluation.

### **Explanations:**

- a) The plant should have state-of-the-art technological features related to nuclear safety; and the regulations of the International Atomic Energy Agency falling under the “Fundamentals” and “Requirements” categories of the Safety Standards Series should be complied with.
- b) In provision of nuclear safety, introduction of up-to-date and proven improvements shall be ensured.
- c) A nuclear safety approach commonly accepted today is adopted by considering “severe accidents” in design, in addition to design basis accidents. It is necessary to submit information and documents to clarify design features related to severe accidents, which comply with the requirements given in the Nuclear Standards Series, NS-R-1, of the International Atomic Energy Agency.
- d) Severe accident means an accident, that goes beyond the accidents specifying the limits of safety systems (design basis accidents), that could cause significant core degradation.

**2) Licensing:** The nuclear power plant shall comply with the up-to-date nuclear safety regulation effective in the designer's country, except for site-related requirements and conditions. A licensed power plant, currently under operation and representing the most recent example of the same technology, shall be presented as a reference plant. In case there is no operational reference, a representative of the same technology that has been approved or authorized for construction by a regulatory body shall be presented as the reference. Turkish legislation related to licensing, and conditions that will be requested by the national nuclear regulatory body are reserved.

**Explanations:**

- a) By compliance with up-to-date regulations of designer's country in addition to national regulations and the International Atomic Energy Authority regulations at the licensing phase, ensuring both home country licensibility and up-to-date technological features is aimed. Compliance of the power plant with the regulations of the designer's country, except site related requirements and conditions, is required to be demonstrated via supporting information and documentation.
- b) The aim by the reference plant consideration is to make a comparison between the proposed power plant and the presented reference power plant during licensing. In case there is no reference, a representative one with design approval (certificate) or at the stage of construction may be accepted.
- c) The requirements of national legislation and conditions that may be requested by TAEK are reserved and it is emphasized that TAEK is the final authority for any decision regarding licensing. Regulations related to nuclear safety, which will form part of the basis for TAEK's decisions during licensing, in order of priority, are national regulations and the International Atomic Energy Agency regulations given in "Fundamentals" and "Requirements" of Safety Standards Series.

**3) Reactor type:** The reactor types that will be taken into consideration are pressurized heavy water reactors that utilize natural uranium and pressurized light water and boiling light water reactors that utilize enriched uranium. Other reactor types (light water cooled and graphite moderated reactors, gas cooled reactors, fast breeder reactors etc.) will not be taken into consideration.

**Explanations:**

- a) The objective is to build reactor types that are widely used in the world.
- b) It is aimed that the reactor types for nuclear power plants to be constructed be proven and reliable.

**4) Plant life-time:** The design life-time of the nuclear power plant shall be at least 40 years.

**Explanation:**

- a) It is aimed that the power plant has been designed by the provision of major components designed for at least 40 years life-time.

**5) Proven technology:** The reactor types that will be taken into consideration shall be technologically proven. Plants that are under development and requiring installation of a prototype/demonstration plant shall not be permitted.

**Explanations:**

- a) Construction of second generation nuclear power plants with up-to-date features and improvements, and third generation nuclear power plants are possible.
- b) The fourth generation nuclear power plants or similar plants that are under development, requiring installation of prototype/demonstration plants to prove their technology shall not be taken into consideration.

- 6) Fuel technology:** The fuel technology shall be proven. The reactors that utilize natural uranium and enriched uranium shall be taken into consideration. In addition, it is acceptable to have the capability for MOX fuel utilization. A plan and program for domestic production of fuel shall be proposed.

**Explanations:**

- a) It is aimed that the investor considers selecting the fuel technology amongst the technologies currently used worldwide. Fuel technologies under development will not be allowed.
- b) It is necessary to propose a plan and program for domestic fuel production. The investor is expected to construct more than one unit in the frame of a long-term nuclear program. It is clear that economics for domestic fuel production will be meaningful if multiple units are constructed.
- c) The plan and program for domestic fuel production may comprise natural and enriched fuel manufacturing depending on the type of the power plant. Enriched UF<sub>6</sub> or UO<sub>2</sub> needed for the manufacturing of enriched uranium fuel will be imported from a fuel supplier country. The manufacturing of natural uranium fuel will begin from UO<sub>2</sub> powder.
- d) MOX means Mixed Oxide.

- 7) Localization:** A plan and program for localization of nuclear power plant shall be proposed. The phases for reaching at least 60% of localization shall be shown in the plan and program.

**Explanations:**

- a) It is clear that the localization will be increased by the number of units constructed.
- b) The proposed plan and program will include the increase of localization *pro rata* with the number of units.
- c) The localization percentage will be cost based.
- d) It is aimed that private investment will contribute to the development of domestic reactor and fuel technology.

**8) Operational record:** The operational record of the power plant technology will be taken into consideration. Operational record of the reference example(s) is required to be documented for the second generation power plants. Similarly, operational record of the reference example(s), if any, is required to be documented for the third generation power plants.

**Explanations:**

- a) Existence of the operational record of a nuclear power plant is important to demonstrate the performance of the technology.
- b) The operational record shall include annual frequency and period of planned/unplanned shutdowns, load factor, availability, produced energy and similar parameters of the given reference power plant(s).

**9) Electrical power:** The net guaranteed electrical output of each unit of the nuclear power plant shall be greater than 600 MW<sub>e</sub>.

**Explanations:**

- a) Today the majority of the operating plants worldwide have installed capacity greater than 600 MW<sub>e</sub>.
- b) There is no upper limit assigned for the net electrical output for each unit.