



## **ANVS General Opinion of Outcomes of NPP Technical Feasibility Studies**

24/03/2025

Three reactor designers were asked by the Ministry for Climate Policy and Green Growth (KGG) to study the technical feasibility of building their type of nuclear power plant in the Netherlands. As part of this assignment, they assessed their design against the Guidelines to the Safe Design and Operation of Nuclear Reactors (VOBK, 2023 version). They identified various areas in which the design deviated from the exact text in the Guidelines and provided justification to show that the underlying safety objectives would still be met. At KGG's request, the Authority for Nuclear Safety and Radiation Protection (ANVS) has reviewed the outcomes of these independent studies and shared its general opinion thereof for use by KGG in the tendering process. The ANVS has also taken the opportunity to note some broader points of attention. This should be regarded as a first impression only, not a final position, as the ANVS has not yet had a chance to carry out its own in-depth assessment. It absolutely does not pre-empt any future licensing decisions.

### **Framework**

The ANVS uses the Guidelines to the Safe Design and Operation of Nuclear Reactors as a frame of reference for design assessments in preparation for licensing. Based on recommendations by the International Atomic Energy Agency (IAEA), a recent evaluation of the Nuclear Energy Act and the results of these self-evaluations, the ANVS has decided to revise these Guidelines in order to bring them into closer alignment with the international state of the art, improve international harmonisation and reduce dependence on technology. See also the [consultation report](#). Insofar possible, the ANVS has included all changes that are already known in its weighting of identified points of attention.

### **AP-1000**

The AP-1000 design by American-based company Westinghouse relies heavily on the use of passive safety systems. Such systems function without active intervention, based on principles of physics such as natural circulation. In theory, this enables the achievement of a higher degree of safety than designs dependent on the effectiveness of active safety systems. To be able to obtain a license however, detailed evidence will be required of the principles and passive systems being sufficiently reliable in practice to ensure safety in all accident scenarios. This item can be expected to receive a lot of attention from the ANVS during the design assessment. Furthermore, the ANVS notes that the AP-1000 safety dossier focuses largely on compliance with prescriptive American standards. In the Netherlands, the applicable legal standards are more goal-oriented. Under this system, applicants must provide extensive substantiation of how a design aims to achieve these goals. This carries the risk of a longer lead time, as thorough revision of the safety documentation will be required. It also affects the licensing risk, as the American context can result in different choices compared to the IAEA and European Union contexts. Examples include the approach to and implementation of defence in depth, and stricter requirements on radiation protection for workers.

### **APR-1400**

The presented APR-1400 design by Korea Hydro and Nuclear Power (KHNP) is a specific adaptation of the standard APR-1400 design for use in the European market. The modifications that were implemented appear to fulfil the expectations in Western- and other European countries, including the Netherlands, regarding nuclear power plants. They involve such changes as additional safety system redundancies, stronger containment and a generally closer alignment with European codes and standards. It does mean the design differs from previously implemented projects. This creates risks in the implementation which will need to be specifically addressed by the applicant. KHNP also plans to rely heavily on components from South Korea, creating additional challenges regarding the assessment of on-site quality assurance and monitoring of the manufacturing process by the ANVS. A final potential point of attention is the focus on the reactor core in the safety analysis – the

Netherlands expects consideration of all sources of radioactivity, including, for example, the storage of spent nuclear fuel.

### **EPR**

The design of the EPR by the French company Électricité du France (EdF) has taken Western European standards and concerns into account from the earliest stages. Due to the relatively high power of the reactor core, active safety systems are of particular importance, for example to enable reactor aftercooling in case of an emergency. As the implementation of these safety systems is extremely redundant and robust, the cooling can be expected to be sufficiently reliable. The design incorporates many safety and other systems, making it robust, but also complex. That creates challenges during the licensing process, the construction and its oversight, regarding both the amount of work involved and the ability to maintain a good overview. Another area of concern is the designer's current focus on further development of the EPR2; a different design than the standard one on offer to the Netherlands at this time. The initiating party must ensure that does not affect the quality of the design for the Netherlands. Various configurations of this reactor are already operational or under construction in Finland, France and the UK. That means the ANVS can also benefit from the efforts of other European authorities in its design assessment.

### **Conclusion**

Based on the self-evaluations as carried out by the designers, the ANVS currently sees no indications that any of these designs would not qualify for licensing in the Netherlands. Regarding safety, there is no reason to exclude a specific design from tendering or to require modifications to the standard design in the context of this process.

### **Provisos**

The above does not in any way guarantee that these three designs will be licensed. At this point, the ANVS has only reviewed the items included in the designers' self-evaluations. The ANVS has not yet had a chance to carry out its own in-depth assessment. Furthermore, the information provided in the self-evaluations is limited and does not include detailed safety analyses, for example. It is the impression of the ANVS that none of these designs currently give reason to believe they cannot be safely implemented in the Netherlands. Before potentially granting a license however, the ANVS will of course painstakingly assess the design's compliance with Dutch laws and regulations, to which end the applicant will need to provide much more extensive information on the design and safety analyses than these self-evaluations currently contain. The licensing process also includes public participation. Moreover, it is not possible to assess relevant location-specific safety aspects until the location is known. This concerns both those aspects affecting the installation itself, such as flood risk and nearby industry that could endanger the installation, and aspects relating to the installation's impact on local residents, such as the ability to implement adequate protective measures in an emergency.