

## FANC PROVIDES BENCHMARK ON NUCLEAR REGULATION TO FEDERAL GOVERNMENT

### Regulations in examined countries call for similar level of safety, but implementation in practice differs

At the request of the federal Belgian government, the Federal Agency for Nuclear Control (FANC) carried out a benchmark exercise on nuclear reactor safety standards at home and abroad. FANC decided to make that exercise for the Netherlands, France, Germany and Switzerland because those countries use similar nuclear technology. The benchmark mainly shows that it is not a black-and-white story. While there are many similarities internationally, there are also a lot of differences that make comparison difficult. The overall conclusion is that all countries included in this report ensure a high level of safety for their nuclear facilities. Regulations are at a similar level everywhere, although their implementation in practice differs from country to country and even from reactor to reactor. This means that Belgium is stricter than other countries in some areas, but then other countries are more demanding in other areas. Everything depends on the local situation, such as the geographical location of the reactor and the specific local risks.

#### Safety requirements

The Western European Nuclear Regulators' Association (WENRA), of which all countries in this report are members, published a set of WENRA Safety Reference Levels in the period 2006-2008, with the aim of harmonising safety standards in all member states as much as possible. Those reference levels were updated several more times over the years. The aim of nuclear regulation is to protect the population and the environment from the risks of ionising radiation. Therefore, nuclear safety must continuously improve and existing regulations were therefore not watered down. On the contrary, WENRA standards came on top. Moreover, in the nuclear sector, the principle of **ten-yearly safety reviews (Periodic Safety Reviews, PSRs)** applies. These examine the extent to which each reactor can be improved, based on new insights and experiences.

In Belgium, the majority of the original WENRA standards were already being complied with in the field at that time, but were not yet explicitly stated in the regulations. Therefore, in 2011, our country decided to make them binding in the Royal Decree on safety regulations for nuclear installations (KB/AR VVKI). Since then, those standards have applied to both new and existing reactors.

#### Evaluation Belgium - abroad

Because the WENRA standards are a set of common minimum requirements, different countries go beyond the WENRA regulations in some respects, depending on their own specific situation.

When the WENRA Safety Reference Levels (version 2014) were transposed into Belgian regulations in 2020, taking into account the specific situation in Belgium, additional safety requirements and clarifications were included, such as **plane crash resistance, shared systems and automatic/autonomous operation**. Those topics, together with **earthquake resistance**, are important known concerns, in terms of design, for potential further operation of the first generation of Belgian reactors (Doel 1&2 and Tihange 1). Therefore, this report only discusses the regulations on those four ‘key topics’ for the different countries.

Of those four themes, **three** (plane crash resistance, shared systems and automatic/autonomous operation) **are more stringent in Belgian regulations than the WENRA Safety Reference Levels**. The reason for this is twofold:

- The **specific Belgian situation** was taken into account. One example is the location of the nuclear power plants: in our country, the sites are located in a major port area, a few kilometres from densely populated, urban agglomerations or in the vicinity of an airport. For the shared systems, we have a rather unique situation in Belgium with the “twin reactors” Doel 1 & Doel 2, making that an additional concern not applicable to other reactor designs.
- As far as FANC is concerned, nuclear regulations must be improved as and when necessary to ensure the **highest possible level of safety**. FANC therefore wants all reactors, including those of the oldest generation, to approach the safety level of the most recent reactors (Doel 4 and Tihange 3).

If continued operation after 2025 of Doel 1&2 and/or Tihange 1 is desired, a PSR by the operator is required. **Only through such a periodic safety review can FANC determine whether a possible operation after 2025 is permissible in terms of safety.**

Regulations stipulate which risks must be covered, but do not prescribe how this should be done. As the oldest Belgian reactors would in principle no longer be operational after 2025, no (further) studies were conducted to determine whether they could still meet state-of-the-art standards. Consequently, **additional studies are needed** to determine what would have to be done to comply with the regulations in force. Those studies also include many other aspects, which were not in the scope of this report, such as the ageing of the facilities, the availability of personnel for safe operation, and so on. It is the **responsibility of the operator of the reactor** to carry out such studies and propose actions, which are then assessed by FANC and its affiliate Bel V in terms of nuclear safety.

FANC delivered the benchmark report to the federal government on 31 March 2025 and remains available to policymakers to provide further interpretation on its contents.