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[Publication](#) | 14.01.2016

Flawed Reactor Pressure Vessels in the Belgian NPPS Doel 3 and Tihange 2

Comments on the FANC Final Evaluation Report 2015

The nuclear power plant Doel 3 started operation in 1982, Tihange 2 started operation in 1983. Both PWR (pressurized water reactor)-type NPPs are operated by Electrabel, part of the French GDF-Suez Group.

In the frame of ultrasonic inspections in 2012 thousands of flaws were detected in the base metal of the reactor pressure vessels (RPV) in both reactors.

The owner Electrabel claimed that the flaws were “most likely” hydrogen flakes introduced during manufacture, no growth had occurred during operation of the reactor. The Belgian Regulatory Authority approved restart of both units in May 2013. The approval included requirements of irradiation experiments using samples from a rejected steam generator block AREVA VB395 that contained hydrogen flakes.

These samples cannot be considered to be representative for the affected reactor pressure vessel shells since the manufacture and heat treatment history is certainly not the same. Electrabel considered the samples as representative due to the similar flaw appearance, FANC accepted this argument.

The results of the first irradiation campaign showed an unexpected high neutron embrittlement. As a consequence both reactors were shutdown in March 2014. Further irradiation campaigns were performed using also samples from German FKS (Forschungsvorhaben Komponentensicherheit) experiments (KS02).

On November 17, 2015 FANC authorized the restart of both plants.

In December 2015, Rebecca Harms, Co-President of the Greens/EFA Group in the European Parliament, asked the author to evaluate the available documents published by FANC in connection with the authorization for restart with special emphasis to the irradiation results and their interpretation by the different expert groups working for Electrabel and FANC.

The evaluation of the published documents was aimed to clarify the scientific arguments that are supposed to justify the authorized restart.

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