

Report of the National Scientific Expert Group on the RPV Doel 3 v2 – 7 May 2013

The National Scientific Expert Group (further termed NSEG) has been installed by the scientific council of the Nuclear Safety authorities (FANC) with the aim of providing an independent technical and scientific assistance for the critical assessment of the technical reports prepared by the license holder regarding the structural integrity of the Doel 3 and Tihange 2 reactor pressure vessels (RPV) containing a very large number of multiple nearly-laminar embedded flaws, occurring in different planes. These flaws were discovered in July 2012.

The NSEG report dated on the 26 April 2013 discussed the results of the additional tests and analyses undertaken by the licensee after the submission of the NSEG report issued on 11 January 2013 for the case of Tihange 2. As requested by the FANC, the NSEG has studied in that report the results of the material property tests (actions #9 and #15).

The FANC has requested the NSEG to provide a similar report in the case of Doel 3, which is the object of the present document.

The NSEG concludes that the results related to actions #9 and #15 hold for both Doel 3 and Tihange 2 and that the same conclusions hold.

General conclusions

After thorough and careful analysis of the documents that have been provided by the licensee, the NSEG concludes for the safety case on Doel 3:

- 1) that the origin of the recently detected flaw indications in the Doel 3 RPV is manufacturing related and that the indications were not detected/reported by the inspection equipment/procedure using during manufacturing; and that these indications did not grow significantly during the operations;
- 2) that the methodology and fracture mechanics calculations that are performed and/or ordered by the licensee are sound and reflect the current state-of-the art;
- 3) that all assumptions and the numerical values of input parameters - other than the size, orientation and position of flaws - which are used in the fracture mechanics calculations are conservative;
- 4) that, as a result of 2) and 3), the predictions on the structural resistance of the RPV of Doel 3 should be considered to represent a worst case scenario;
- 5) that, as a result of 4), the restart of operations on the nuclear reactor Doel 3 would have to be taken into consideration;
- 6) that, after the licensee has successfully subjected the RPV of Doel 3 to a pressure test, all reasonable verifications and validations have been concluded successfully; note hereby that this observation is based on the fact that none of the members of the NSEG is familiar with the operational aspects of NDT inspection and hydro-tests;
- 7) that, as a result of 5) and 6), the restart of operations on the nuclear reactor Doel 3 can be justified provided the authorities have received sufficient guarantees about the procedures that have been followed to determine the real number, size, position and orientation of the flaws.