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Poehler, Jeffrey

**From:** Hardies, Robert  
**Sent:** Thursday, August 23, 2012 9:12 AM  
**To:** Poehler, Jeffrey  
**Subject:** FW: Potential problem on the reactor pressure vessel (RPV) of the Belgian Doel 3 NPP  
**Attachments:** RPV control in France\_2.doc

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**From:** CROMBEZ Sebastien [mailto:Sebastien.CROMBEZ@asn.fr]  
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**Subject:** RE: Potential problem on the reactor pressure vessel (RPV) of the Belgian Doel 3 NPP

Dear all,

Please find enclosed ASN answers to your questions. We focused on French manufacturing experience feedback because, in a few cases, large amount of flaws which seem quite similar to those detected in Doel 3 were observed in France. These flaws were detected and the components rejected before end of manufacturing.

Do not hesitate to ask in case you have something to clarify or to ask additional questions.

ASN will attend the meeting planned on 16<sup>th</sup>.

Best regards

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C/61

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**Objet :** RE: Potential problem on the reactor pressure vessel (RPV) of the Belgian Doel 3 NPP

Dear all,

please find our answers to your four questions in the attached file. Do not hesitate to ask in case you have something to clarify or to ask additional questions.

Unfortunately, due to regulatory activities related to outage at Loviisa NPP, we are not able to send our expert to the proposed meeting on the 16<sup>th</sup>. Anyhow, we would be interested on any follow-up on this issue.

Best regards

Petteri Tiippana  
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**From:** Briegleb Pierre [<mailto:pierre.briegleb@belv.be>]  
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**Subject:** Potential problem on the reactor pressure vessel (RPV) of the Belgian Doel 3 NPP

Dear Sirs,

We are now facing in Belgium a potential problem on the reactor pressure vessel (RPV) of the Doel 3 NPP.

Non-destructive examination revealed a lot of "indications" that need to be confirmed by another inspection technique (ongoing).

We would like to have your feedback, experience and advice regarding this potential problem. You will find hereunder a more comprehensive background and some questions we would like to answer.

Best regards,

Pierre Briegleb  
National Project Coordinator  
Bel V – Subsidiary of the Federal Agency for Nuclear Control (Belgium)

[Potential problem on the reactor pressure vessel](#)

Belgian pressure vessels are inspected according to ASME XI. Volumetric inspections of the beltline zone are normally limited to the circumferential welds and surrounding heat affected zone and base material, within the limits settled by the code.

Additionally, as a result of the experience at Tricastin, inspections aiming at detecting possible underclad defects in the pressure vessel beltline region are planned for all Belgian plants. The first inspection of this kind took place at Doel 3 this summer.

These inspections are performed with a qualified method and encompass the whole height of the vessel beltline region. This means that we inspect clad base material in zones where no volumetric in-service inspection was performed up to now.

At Doel 3, according to the Owner, no underclad defects were detected.

Nevertheless, lot of defect indications of an apparently different type were detected by this UT-inspection aiming at detecting underclad defects, especially in one of the three forged rings (SA-508-cl.3). These indications appear to be laminar flaws, more or less parallel to the inner/outer surface of the pressure vessel, located in- and outside the inspected zone where underclad defects were looked at. Obviously, it is not possible to justify those indications on a one-by-one basis by means of an analytical evaluation according to the App. A of ASME XI code requirements.

The inspection method which revealed the presence of those defects has been qualified for detecting underclad defect.

An inspection of the whole height with the qualified method used to control the beltline welds started on the 16<sup>th</sup> of July; the results should not be available before begin of August. Similar inspections will be performed at Tihange 2 during the month of August.

In the absence of any other explanation at this stage, the Owner supposes to be in presence of fabrication defects.

The Doel 3 and Tihange 2 RPVs were forged by Rotterdam Dockyards (RDM), which according to the Owner provided some 24 vessels in Europe and the US. NUREG 1511 – Suppl. 2, p. 7-3, identifies 8 US units with RDM forged rings. Other European countries possibly concerned are Spain, Switzerland, the Netherlands (Borssele, Dodewaard), and probably others, not identified by Bel V at this stage.

Some questions:

1. Are there in your country RPVs (forged rings) fabricated by Rotterdam Dockyards (RDM)?
2. Is there any known concern with respect to fabrication defects in those rings?
3. Did you perform volumetric inspections in the beltline region which could have detected laminar defects in the beltline base material (a) during fabrication (b) in-service? If the answer is yes, describe which inspection (type, extent, frequency) and the corresponding results.
4. Do you perform inspections aiming at detecting underclad defects? If so, describe which inspection (type, extent, frequency) and the corresponding results.