

Lupold, Timothy

**From:** Hardies, Robert *NRR*  
**Sent:** Wednesday, July 25, 2012 4:37 PM  
**To:** Lupold, Timothy; Hopkins, Jon  
**Cc:** Gonzalez, Hipolito; Sheng, Simon; Fairbanks, Carolyn  
**Subject:** RE: REQUEST: Potential problem on the reactor pressure vessel (RPV) of the Belgian Doel 3 NPP

Carolyn and I sent the original email. Please coordinate with us.

Robert Hardies  
Senior Level Advisor for Materials Engineering  
Division of Engineering  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission

Office Phone 301 415 5802  
Cell (b)(6)

**From:** Lupold, Timothy *NRR*  
**Sent:** Wednesday, July 25, 2012 1:51 PM  
**To:** Hopkins, Jon  
**Cc:** Gonzalez, Hipolito; Sheng, Simon; Fairbanks, Carolyn; Hardies, Robert  
**Subject:** RE: REQUEST: Potential problem on the reactor pressure vessel (RPV) of the Belgian Doel 3 NPP

Jon, I will forward this to EVIB. They are responsible for Rx Vessels. The branch chief for EVIB is currently Stacey Rosenberg, but she is on leave for at least another week. Simon Sheng is her alternate today, and Carolyn Fairbanks, I believe will be her alternate next week.

Simon or Carolyn, please provide support to Jon. Also, coordinate with Bob Hardies on responses.

**From:** Hopkins, Jon ; *NRR*  
**Sent:** Wednesday, July 25, 2012 1:46 PM  
**To:** Gonzalez, Hipolito; Lupold, Timothy  
**Cc:** Fairbanks, Carolyn; Hardies, Robert; Roquecruz, Carla; Collins, Jay; Regan, Christopher; Rodriguez, Veronica; Astwood, Heather; McGinty, Tim; Muessle, Mary; Bahadur, Sher; Hiland, Patrick; Cheok, Michael; Chernoff, Harold; Lubinski, John; Nieh, Ho; Franovich, Rani; Berrios, Ilka  
**Subject:** REQUEST: Potential problem on the reactor pressure vessel (RPV) of the Belgian Doel 3 NPP  
**Importance:** High

Hipolito and Tim,

Belgium has directly contacted NRR staff with some questions because RPV NDE inspection have shown some indications on the Doel 3 NPP RPV (below thread).  
The issue may have generic implications including U.S. plants.

Can you have staff develop responses to the questions in a relatively short time? And/or would you rather have a phone call to discuss? Let me know.

I will be the liaison with Belgium and in coordination with OIP will contact/inform them of what information/assistance that we can provide them.

*C/43*

All effort should be charged to TAC ME3707.

Thank you,  
Jon Hopkins  
Senior Project Manager for International Activities  
NRR/DIRS

**From:** Hardies, Robert  
**Sent:** Wednesday, July 25, 2012 11:24 AM  
**To:** Fehst, Geraldine  
**Cc:** Fairbanks, Carolyn; Collins, Jay; Kirk, Mark  
**Subject:** FW: Potential problem on the reactor pressure vessel (RPV) of the Belgian Doel 3 NPP

Gerry, I received this email and am unsure of the protocol. So I've forwarded it to you. I have not met the gentleman, and do not know his organization. At least one NRC addressee has provided a response. We would be happy to coordinate a response but want to make sure IP is in the loop. We can talk next week or, if you would like to talk sooner, Carolyn Fairbanks is the person to call...x6719. I will be travelling the rest of this week.

Robert Hardies  
Senior Level Advisor for Materials Engineering  
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Cell (b)(8)

**From:** Briegleb Pierre [mailto:pierre.briegleb@belv.be]  
**Sent:** Wednesday, July 25, 2012 3:40 AM  
**To:** Sebastien.CROMBEZ@asn.fr; CRESPO BRAVO JULIO; Hardies, Robert; Collins, Jay; Kirk, Mark; petteri.tilppana@stuk.fi; dietmar.Kalkhof@ensi.ch; kees.desbouvrie@minvrom.nl  
**Cc:** De Boeck Benoit; Barras Pierre; Hoebeeck Simon; Fonkwa Christelle; Deledicque Vincent; SCHRAUBEN Manfred; WERTELAERS An; VAN WONTERGHEM Frederik; TOMBUYSES Beatrice; aweyn@vincotte.be  
**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.

