

14a

Alley, David

From: Hiland, Patrick *PH*
Sent: Thursday, August 16, 2012 9:51 AM
To: Lupold, Timothy; Cumblidge, Stephen; Alley, David
Subject: FW: REQUEST: Belgium - Meeting on 8/16 re Flaw indications in Doel 3 Reactor Pressure Vessel
Attachments: image001.gif; Technical Information concerning Reactor Vessel Doel 3[1].pdf

fyi

From: Thomas, Eric *ET*
Sent: Thursday, August 16, 2012 9:30 AM
To: Boger, Bruce; Dorman, Dan; McCree, Victor; Hiland, Patrick; Hardies, Robert; Dean, Bill; Casto, Chuck; Collins, Elmo; Brown, Frederick; Leeds, Eric; Evans, Michele
Cc: Nieh, Ho; Lubinski, John; McHale, John; Chernoff, Harold; Garmon, David; Sigmon, Rebecca
Subject: RE: REQUEST: Belgium - Meeting on 8/16 re Flaw Indications in Doel 3 Reactor Pressure Vessel

All,

The attached document contains additional details regarding the indications recently discovered at Doel Unit 3. INPO/WANO has approved distribution of the attachment to NRC-only at this point. Please limit distribution accordingly. My guess is that Bob Hardies will receive this information and more at today's meeting in Belgium.

Any questions feel free to contact me.

Thank you, Eric

Eric Thomas
U.S. Nuclear Regulatory Commission
NRR/DIRS/IOEB
OWFN-7E24
eric.thomas@nrc.gov
301-415-6772 (office)

(b)(6)

From: Boger, Bruce *BR*
Sent: Monday, August 13, 2012 2:55 PM
To: Thomas, Eric; Lubinski, John
Cc: Chernoff, Harold
Subject: RE: REQUEST: Belgium - Meeting on 8/16 re Flaw Indications in Doel 3 Reactor Pressure Vessel

Thanks Eric. My itch has been scratched—INPO and WANO are aware and working the issue from their perspective.

From: Thomas, Eric
Sent: Monday, August 13, 2012 2:36 PM
To: Lubinski, John; Boger, Bruce
Cc: Chernoff, Harold
Subject: RE: REQUEST: Belgium - Meeting on 8/16 re Flaw indications in Doel 3 Reactor Pressure Vessel

Bruce,

CS/56

I just spoke to my INPO contact. INPO and WANO seem to have the same information as us right now. INPO is looking for any related OpE to share with WANO, but at this point, they don't have anything additional to report.

Eric

Eric Thomas

U.S. Nuclear Regulatory Commission
NRR/DIRS/IOEB
OWFN-7E24
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301-415-6772 (office)

(b)(6)

From: Lubinski, John *MLR*
Sent: Monday, August 13, 2012 7:22 AM
To: Thomas, Eric
Subject: FW: REQUEST: Belgium - Meeting on 8/16 re Flaw Indications in Doel 3 Reactor Pressure Vessel

I see that Harold is out and you are acting. Can you please take the lead for this.

From: Lubinski, John
Sent: Monday, August 13, 2012 7:20 AM
To: Chernoff, Harold
Cc: Nieh, Ho
Subject: FW: REQUEST: Belgium - Meeting on 8/16 re Flaw Indications in Doel 3 Reactor Pressure Vessel

Harold,

Please handle the action below.

From: Boger, Bruce
Sent: Monday, August 13, 2012 6:32 AM
To: Evans, Michele; Lund, Louise; Coffin, Stephanie; Nieh, Ho; Lubinski, John
Subject: FW: REQUEST: Belgium - Meeting on 8/16 re Flaw Indications in Doel 3 Reactor Pressure Vessel

DORL--Please see the email thread below. I'd like the PMs for the sites listed to contact the sites and advise them of the issue and media interest. Thanks.

DIRS—Please have the OpE folks make contact with INPO to see if the INPO/WANO pipeline is working the issue. Thanks.

From: McCree, Victor *RV*
Sent: Saturday, August 11, 2012 7:49 AM
To: Boger, Bruce
Cc: Wert, Leonard; Croteau, Rick; Jones, William; Rels, Terrence; Christensen, Harold; Brown, Frederick
Subject: Re: REQUEST: Belgium - Meeting on 8/16 re Flaw Indications in Doel 3 Reactor Pressure Vessel

Thanks Bruce!

From: Boger, Bruce
To: McCree, Victor; Dorman, Dan
Cc: Johnson, Michael; Wert, Leonard; Leeds, Eric; Brenner, Elliot; Casto, Chuck; Collins, Elmo; Dean, Bill

Sent: Sat Aug 11 07:35:09 2012

Subject: Re: REQUEST: Belgium - Meeting on 8/16 re Flaw Indications in Doel 3 Reactor Pressure Vessel

I like your thoughts. We'll reach out to the sites that have been identified and NEI. I'm interested in how the international OpE network will address this issue. Will the WANO/INPO system get the word out? Of course, if the issue moves into a technical concern, we'll engage differently. Stay tuned.....thanks for sharing your thoughts.
Sent from my BlackBerry

From: McCree, Victor

To: Boger, Bruce; Dorman, Dan

Cc: Johnson, Michael; Wert, Leonard; Leeds, Eric; Brenner, Eliot; Casto, Chuck; Collins, Elmo; Dean, Bill

Sent: Fri Aug 10 17:06:48 2012

Subject: RE: REQUEST: Belgium - Meeting on 8/16 re Flaw indications in Doel 3 Reactor Pressure Vessel

Dan/Bruce,

Given the media exposure this issue has already received, and the likelihood for heightened interest in the potential impact on U.S. plants, what's our near term strategy for engaging the affected licensees (and/or NEI)? In my opinion, we should at least let them know that we are aware of the issue and that we plan to send an expert to participate in a regulator-to-regulator meeting next week to learn more.

Your thoughts?

Vic

From: Boger, Bruce

Sent: Friday, August 10, 2012 4:48 PM

To: McCree, Victor

Cc: Dean, Bill; Lew, David; Wert, Leonard; Dorman, Dan; Hiland, Patrick; Casto, Chuck; Collins, Elmo

Subject: FW: REQUEST: Belgium - Meeting on 8/16 re Flaw Indications in Doel 3 Reactor Pressure Vessel

If you scroll down to the bottom of this email you'll see the initiating request from the Belgium regulator on the Doel situation. We'll know more next week.

From: McIntyre, David *DM*

Sent: Friday, August 10, 2012 10:03 AM

To: Burnell, Scott; Hiland, Patrick

Cc: Evans, Michele; Boger, Bruce; Dorman, Dan; Hopkins, Jon; Hardies, Robert; Brenner, Eliot

Subject: RE: REQUEST: Belgium - Meeting on 8/16 re Flaw indications in Doel 3 Reactor Pressure Vessel

Pat - the Dow Jones reporter is asking for details on our "fact finding". Have we, or will we, ask our licensees on the list whether their RPV's were from the vendor in question?

Thanks.

Dave

From: Burnell, Scott

Sent: Friday, August 10, 2012 7:51 AM

To: Hiland, Patrick

Cc: Evans, Michele; Boger, Bruce; Dorman, Dan; McIntyre, David; Hopkins, Jon; Hardies, Robert

Subject: RE: REQUEST: Belgium - Meeting on 8/16 re Flaw Indications in Doel 3 Reactor Pressure Vessel

Understood, thanks.

From: Hiland, Patrick
Sent: Friday, August 10, 2012 7:50 AM
To: Burnell, Scott
Cc: Evans, Michele; Boger, Bruce; Dorman, Dan; McIntyre, David; Hopkins, Jon; Hardies, Robert
Subject: RE: REQUEST: Belgium - Meeting on 8/16 re Flaw indications in Doel 3 Reactor Pressure Vessel

I'm not aware that we've done any "Independent" verification of the list of plants whose vessels were reportedly made at RDM. However, the list appears to indicate U.S. RPVs that were manufactured in the 60's and 70's (may not have been operational till the 90's). Bob Hardies is NRR/DE's Senior Level Advisor for Materials and will be on a fact finding mission next Thursday. You should be free to state that one of our experts in the field of Reactor Vessel Materials, has been asked to meet with the Belgian and other regulators next week. As Bruce cautioned, this info is regulator to regulator.

From: Burnell, Scott
Sent: Friday, August 10, 2012 7:28 AM
To: Hiland, Patrick; Boger, Bruce; Dorman, Dan; McIntyre, David
Cc: Evans, Michele
Subject: RE: REQUEST: Belgium - Meeting on 8/16 re Flaw indications in Doel 3 Reactor Pressure Vessel

Pat;

Thanks very much, that's helpful. Have we had the time to verify Electrabel's list, and how much detail can I share on both that list and Bob's participation in the meeting? Thanks again.

Scott

From: Hiland, Patrick
Sent: Friday, August 10, 2012 7:21 AM
To: Burnell, Scott
Cc: Hiland, Patrick; Cheok, Michael; Terao, David; Nieh, Ho; Lubinski, John; Rosenberg, Stacey; Chernoff, Harold; Dudes, Laura; Luehman, James; Evans, Michele; Dorman, Dan; Holahan, Gary; Bergman, Thomas; Hopkins, Jon; Boger, Bruce
Subject: FW: REQUEST: Belgium - Meeting on 8/16 re Flaw indications in Doel 3 Reactor Pressure Vessel
Importance: High

Scott, the below info is pretty clear and it includes a list of U.S. plants (at bottom of string) whose RPVs were manufactured by same vendor. The Belgians have asked 7 countries to attend a meeting next Thursday, August 16, and we're sending Bob Hardies from NRR/DE. This would just be a one-day discussion of what type of NDE techniques were used, where the inspections were performed, etc. Looks like a 2nd meeting is being lined up for September.

From: Hiland, Patrick
Sent: Monday, August 06, 2012 11:06 AM
To: Boger, Bruce
Subject: FW: REQUEST: Belgium - Meeting on 8/16 re Flaw Indications in Doel 3 Reactor Pressure Vessel
Importance: High

Bruce, I've asked Bob Hardies to attend this meeting in response to formal invitation. It's short notice as meeting is next week in Brussels.

From: Hopkins, Jon *MR*
Sent: Friday, August 03, 2012 9:34 AM
To: Fairbanks, Carolyn; Hardies, Robert
Cc: Roquecruz, Carla; Hiland, Patrick; Chernoff, Harold; Cheok, Michael; McGinty, Tim; Muessle, Mary; Bahadur,

Sher; Regan, Christopher; Astwood, Heather; Rodriguez, Veronica; Tehrani, Navid; Sangimino, Donna-Marie; Dehn, Jeff; Fehst, Geraldine; Nieh, Ho; Lubinski, John; Stahl, Eric
Subject: REQUEST: Belgium - Meeting on 8/16 re Flaw indications in Doel 3 Reactor Pressure Vessel
Importance: High

Carolyn & Bob,

Belgium's regulator, FANC, has invited nuclear regulators from the 7 countries that also have RPVs manufactured by RDM (list below, includes U.S.) to participate in a technical working meeting on Aug. 16 in Brussels to discuss recent UT inspection indications found on the Doel 3 RPV.

France's regulator, ASN, has already responded and said that they would attend ("ASN will participate to this meeting. The representatives will be: Sébastien CROMBEZ Director of the Nuclear pressure Equipment Department and Jean-Luc LACHAUME Deputy Director General.")

Please let me know if we should/can attend this meeting. Note that FANC plans another meeting in Sept. on this issue.

Thank you, Jon

From: VAN WONTERGHEM Frederik [mailto:Frederik.VANWONTERGHEM@FANC.FGOV.BE]

Sent: Friday, August 03, 2012 5:05 AM

To: Andre-claude.lacoste@asn.fr; Jean-luc.lachaume@asn.fr; francois.balestreri@irsn.fr; Sebastien.CROMBEZ@asn.fr; info@arn.gob.ar; gerald.hennenhoefer@bmu.bund.de; martina.palm@bmu.bund.de; Ulrich.Erven@grs.de; Carla.Schwaeger@grs.de; a.vanlimborgh@mineleni.nl; kees.desbouvrie@minvrom.nl; bert.verweij@minvrom.nl; Roeland.Nieuweboer@minvrom.nl; cmt@csn.es; fjarana@mityc.es; jcb@csn.es; ann-louise.eksborg@ssm.se; Anders.Hallman@ssm.se; Lars.Skanberg@ssm.se; perolof.hagg@ssm.se; petteri.tlippana@stuk.fi; hans.wanner@ensi.ch; georg.schwarz@ensi.ch; markus.straub@ensi.ch; dietmar.Kalkhof@ensi.ch; Hopkins, Jon; Kirk, Mark; Hardies, Robert; Collins, Jay
Cc: WERTELAERS An; SCHRAUBEN Manfred; DE ROOVERE Willy; TOMBUYES Beatrice; pierre.barras@belv.be; pierre.briegleb@belv.be; benoit.deboeck@belv.be; aweyn@vincotte.be; hvandriessche@vincotte.be
Subject: URGENT Message on Nuclear Safety: Flaw indications in Doel 3 Reactor Pressure Vessel

Dear all,

This week, a preliminary IRS Incident Report was published by Belgium related to the detection of a large number of flaw indications in the reactor pressure vessel of Doel 3 (PWR - Framatome Design). (Reference IRS Number 8244: "FLAWS INDICATIONS IN THE REACTOR PRESSURE VESSEL"). In attachment you can find a copy of this IRS report.

As indicated in the IRS report, the Doel 3 NPP outage has been extended to allow further inspections and to perform additional studies by the licensee to analyze and, if possible, to validate and confirm the structural integrity of the vessel. At the moment, the licensee supposes that the flaw indications were already present at the moment of forging of the vessel, which was done by Rotterdam Droogdok Maatschappij (also referred to as Rotterdam Dockyards or RDM). Both a deterministic approach (in accordance with ASME XI Appendix A) and a probabilistic approach (in accordance with 10CFR50.61a) are being considered by the licensee to justify the structural integrity of the reactor vessel.

Some additional information on the types of flaw indications and other possible reactor vessels forged by this company can be found below.

Considering the potential consequences of this event, the Belgian regulatory body would like to organise on short notice a technical working meeting in Brussels on this issue for those regulatory bodies which could be interested by these findings, specifically those regulatory bodies of countries where RPVs forged by RDM can be present. During this technical working meeting, additional information on the results found at Doel 3 NPP and the on-going licensee investigations and calculations will be made available by the Belgian regulatory body (FANC, its

technical support organisation Bel V and the Authorized Inspection Authority AIB Vinçotte International). In addition, a roundtable discussion between regulatory bodies will be held to discuss relevant experiences with this kind of inspections and flaw indications. Specific topics/questions to be discussed during this roundtable discussion are mentioned in an email by Bel V which was sent last week (see attachment). We are especially interested to know if this type of ISI was already performed in your countries on the reactor vessels forged by this company, and if so, what the results have been. May we kindly invite every country to present additional available input and thoughts to our working meeting .

This technical working meeting shall take place in Brussels (FANC offices, Ravensteinstraat 36, 1000 Brussels) on Thursday 16 August between 10h00 and 16h00.

We would be very grateful if one or more technical experts of your organisation could be present during this working meeting.

To confirm your participation, please send me a reply by email to frederik.vanwonderghem@fanc.fgov.be (tel. ++32 2 289 2082) before Friday 10 August.

If you have further technical questions on this event, you can contact pierre.briegleb@belv.be (tel ++32 2 528 0245).

A second technical working meeting could be held in the near future (presumably early September) to discuss the available results of the additional inspections at Tihange 2 and the results of the licensee investigations and calculations aiming to confirm the structural integrity of the reactor vessel. Further actions in your countries can also be discussed during this second meeting. We will inform you as soon as possible of the timing of this second working meeting.

Best regards,

Frederik Van Wonderghem

Department of Nuclear Facilities and Waste
Federal Agency for Nuclear Control
Ravensteinstraat 36, 1000 Brussel, Belgium
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Fax: +32 (0)2 289 21 12

Additional information on the types of flaw indications and other possible reactor vessels

- Preliminary results from additional inspections

- o As described in the IRS message, considering the limitations of the inspection method which revealed the presence of those defects, an inspection of the whole height of the RPV with the UT-qualified method used to control the beltline welds has subsequently been performed. This inspection covers the whole thickness and the whole height of the RPV of Doel 3.
- o The preliminary results from those additional inspections confirm the presence of several thousand (up to 10000) flaw indications in the reactor vessel base material. These flaw indications seem to be laminar in shape and have average diameters of 25 mm.

- Reactor Pressel Vessels forged by Rotterdam Droogdok Maatschappij (also referred to as Rotterdam Dockyards or RDM)

- o The Doel 3 and Tihange 2 RPVs were forged by RDM, which according to the Licensee Electrabel provided some 20+ vessels in Europe and the US.
- o The table below gives an overview of these RPVs (this list has been established by the licensee and could contain errors or omissions).

Atucha 1	PHWR		335	1980	Siemens
Doel 3	PWR	3	1000	1982	Framatom
Tihange 2	PWR	3	1000	1982	Framatom
Brünsbittel	BWR	-	770	1977	KWU
Phillippsburg 1	BWR		890	1980	KWU
Dodewaard	BWR	-	52	1968	RDM
Borssele	PWR	2	515	1973	KWU
S ^{te} Maria de Garona	BWR		450	1971	General El
Cofrentes	BWR	-	1064	1984	General El
Ringhals 2	PWR	3	813	1974	Westinghc
Leibstadt	BWR	-	1165	1984	General El
Mühleberg	BWR	-	373	1971	General El
Catawba 1	PWR	4	1129	1985	Westinghc
McGuire 2	PWR	4	1100	1983	Westinghc
North Anna 1	PWR	3	903	1978	Westinghc
North Anna 2	PWR	3	973	1980	Westinghc
Quad Cities 1	BWR	-	882	1972	General El
Sequoyah 1	PWR	4	1162	1980	Westinghc
Sequoyah 2	PWR	4	1126	1981	Westinghc
Surry 1	PWR	3	839	1972	Westinghc
Surry 2	PWR	3	800	1973	Westinghc
Watts Bar 1	PWR	4	1123	1996	Westinghc

FANC & AFCN

Federatie van Nucleaire Centrales
Association Française des Centrales Nucléaires

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