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## NRC INTERNATIONAL TRAVEL TRIP REPORT

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### Subject:

Travel to Brussels, Belgium to meet with the Federation Agenschap voor Nucleaire Controle (FANC), and other international regulators to discuss reactor pressure vessel forging inspection findings on the Doel-3 and Tihange-2 plants and to meet with AIB-Vincotte International to discuss nondestructive examination of forged reactor vessels.

### Dates of Travel and Countries/Organizations Visited:

October 13-18, 2012  
Brussels, Belgium  
Federation Agenschap voor Nucleaire Controle (FANC)  
AIB-Vincotte International

### Desired Outcome:

Acquire information on the results found at Doel-3 and Tihange-2 nuclear power plant reactor pressure vessel ultrasonic inspections and the on-going licensee investigations and calculations from FANC, Bel V and AIB Vincotte International. Participate in a roundtable discussion between regulatory bodies regarding relevant experiences with reactor pressure vessel inspections and flaw indications.

### Results Achieved:

The NRC acquired information about the defects identified during ultrasonic inspection of the Doel 3 nuclear power plant, about the possible metallurgical origin of the defects, and about fracture mechanics analyses of the indications. The NRC will use the information received to address the potential for similar indications to exist in U.S. plants.

### Summary of Trip:

The purpose of this trip was to support FANC's request for NRC participation<sup>1</sup> on three technical expert working groups in support of Belgian nuclear safety authority's assessment of the indications recently detected in the beltline shell region of the Doel Unit 3 reactor pressure vessel (RPV). Similar indications were also found at Tihange Unit 2. The objectives of these working group meetings were:

<sup>1</sup> Relevant ADAMS Accession Nos.: FANC Request for NRC support (ML1224A335), NRR request for RES assistance (ML1224A258), and RES response to NRR request for assistance (ML1224A108).

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- Share information and experience between nuclear safety authorities on regulatory approaches and actions in relation with the Doel 3 issue.
- Taking into account the lessons learned from the Doel 3 issue, discuss actions to be considered in other countries.
- Provide technical advice to Belgian nuclear safety authorities (FANC, Bel V, AIB Vincotte) on specific topics / questions related to the Doel 3 & Tihange 2 RPV issue. However, the actual evaluation of potential continued operation of the Doel 3 and Tihange 2 reactors remains the responsibility of the Belgian nuclear safety authorities.

The meeting consisted of three expert working groups composed of expert members proposed by foreign nuclear safety authorities or related organizations (NRC, IAEA, NEA, JRC Petten, etc.) that were willing to participate in this issue. The three expert working groups were as follows:

- Expert Working Group 1 - Non-destructive Examination Techniques, NRC Participant = Carol Nove (RES/DE/CIB)
- Expert Working Group 2 - Metallurgical Origin / Root Causes of the Flaw Indications, NRC Participant = Jeff Poehler (NRR/DE/EVIB)
- Expert Working Group 3 - Structural Mechanics and Fracture Mechanics – Approach for Justification, NRC Participant = Gary Stevens (RES/DE/CIB)

In addition, Bob Hardies (NRR/DE) acted as an NRC Liaison to all three working groups.

The chairman and technical secretary for each working group were provided by Belgian nuclear safety authorities.

On October 17, 2012, NRC staff met with personnel from AIB-Vincotte International for detailed discussions of the nondestructive examination evolutions at Doel and Tihange.

**Additional Information/Discussion:**

Summaries of the individual working group meetings are attached. This meeting was the second in a series of meetings with FANC. The trip report for the initial meeting is available at ADAMS number ML12236A307.

**Pending Actions/Planned Next Steps for NRC:**

The NRC is establishing a plan to address the findings. Proposed activities include:

(b)(5)

**Points for Commission Consideration/Interest:**

(b)(4)	
(b)(4)	(b)(5)
(b)(5)	

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