

**From:** [Michael Mulligan](#)  
**To:** [NRC Allegation](#)  
**Subject:** 2.206: Belgium Nuclear Plant Vessel Cracks in USA Plants  
**Date:** Thursday, March 26, 2015 10:56:12 AM  
**Attachments:** [Final Version 2.206 Belgian Cracks in USA Nuclear Power Plants.docx](#)

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Dear Sir,

In the attachment to this e-mail I am requesting a 2.206 on events surrounding the Belgium Doel 3 and Tihange 2 nuclear power plants. I am asking for an emergency inspection on the Kewaunee Power Station and Vermont Yankee vessels. I am requesting a preliminary notification in this of all dockets and if serious flaws are discovered I am requesting all domestic USA nuclear power plant's vessels be inspected within six months.

Sincerely,

Mike Mulligan

Hinsdale, NH

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March 25, 2014

Mr. Mark A. Satorius  
Executive Director for Operations  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

Dear Mr. Satorius:

**SUBJECT:** 10 CFR 2.206 Petition requesting emergency ultrasonic inspection test or best available flaw detection technology for USA reactor plants similar to the thousands of cracks discovered in Belgium nuclear power plants.

*"The discovery of the cracks in the reactors "could be a problem for the entire global nuclear industry," says Jan Bens, general director of the Belgian Federal Agency for Nuclear Control (FANC), speaking on."*

This is a 2.206 on all US nuclear plants. Please place on all plant dockets especially Vermont Yankee and Kewaunee Power Station.

I don't even think a LOCA in a vessel is even a consideration in plant licensing and this could be our Fukushima style accident in the USA.

**Doel 3 and Tihange 2**

["Cracks appear in the nuclear industry"](#)

Cracks discovered in the walls of Belgian nuclear reactors are causing unease among experts. The reason: a previously unknown phenomenon - material fatigue. There are fears that many more reactors could be affected.

Several thousand cracks have been discovered by corrosion experts in the pressure vessels of two

reactors at the Belgian nuclear power stations Doel 3 and Tihange 2. Caused by a previously unknown phenomenon, material fatigue, it is feared the finding could have implications outside of Belgium.

The discovery of the cracks in the reactors "could be a problem for the entire global nuclear industry," says Jan Bens, general director of the Belgian Federal Agency for Nuclear Control (FANC), speaking on.

### **Examination of nuclear reactors demanded**

Of most concern are the cracks that have been found in the walls of pressure vessels, the part of reactors where the highly radioactive chain reaction takes place. During such a process, the vessel is under extreme stress and instability caused by the cracks could cause a potentially catastrophic release of radioactive contamination.

It is already known that pressure vessels can become fatigued as a result of stress caused by pressure, temperature and radioactive materials. But the Belgian Nuclear Research Center in Mol has only just found out "that the material is mechanically weakened through radiation much more than previously thought," says Heinz Smital, nuclear physicist and expert at Greenpeace.

Nuclear material corrosion expert Walter Bogaerts, of Belgium's University of Leuven says that corrosion factors have until now been "underestimated", globally. He adds: "I would be really surprised if it had not also occurred elsewhere."

### **Reactors could be shut down**

Digby MacDonald, an expert in corrosion at the University of California, Berkley, analyzed the cracks together with Bogaerts and has advised nuclear reactor operators and government regulators that they

should use ultrasound equipment to carefully examine reactors for cracks. "All reactor operators should be require under the leadership of regulatory authorities," says MacDonald. He adds that the results of such detailed investigations "could be insignificant, or so strong that all the reactors must be shut down."

According to nuclear experts, hydrogen from the reactor can penetrate the reactor wall and there in the steel increase the interior pressure causing small bubble and cracks from just a few millimeters in size "up to seven centimeters", says Smital.

Using special ultrasound equipment, experts discovered 13,047 cracks in total in the Belgian reactor Doel 3 and 3,149 in Tihange 2. The reactors have been shut down, as a result. Whether they will once again be connected to the network is, as of yet, unclear.

### **Danger for the nuclear industry**

The appearance of the cracks as a result of material fatigue has caused a tide of reaction. Safety checks are being demanded all over world and "could lead to a wave of reactor closures", says Smital.

Greenpeace successfully sued the Belgian nuclear authority FANC in January following the publication of the detailed investigative documents. "It's a very delicate matter and could indeed have a huge impact on the whole nuclear industry," says Smital. Greenpeace is demanding that all reactors worldwide are closely examined.

The German Environment Ministry has also reacted and is seeking to have immediate contact with the Belgian authorities to see whether the findings could be applicable to German reactors.

But according to Greenpeace, the Belgian findings confirm the growing threat posed by old nuclear power plants. The world's reactors now have an average age of 29 years. "That is no longer state-of-the-art, which can be dangerous, even when you upgrade," says Smital. "What are now needed are scenarios for a shut down of plants. Every country needs a get-out plan."

1) I request exigent and immediate full scale ultrasonic inspections similar or with better technology (as was done on the Belgian Doel 3 and Tihange 2 nuclear plant discovering 13,047 recent cracks) on the following US nuclear power plant:

BWR: Vermont Yankee (June 1974)

PWR: Kewaunee Power Station (Nov 1972) (preferred to be first)

Both these plants are permanently shut down so it won't disrupt plant operations. An emergency ultrasonic inspection could occur very quickly based on the plants permanently shut down status and the Kewaunee plant is similar to the Belgium PWRs and its age. The nuclear fuel is out of the core and the surroundings would have lower doses. You could quickly strip off the vessel insulation and you wouldn't need to replace it for lower doses. You wouldn't have to replace the core interior components either?

2) I request large bore holes samples be cut out of both vessel at the worst place similar to the "Davis Besse hole in the reactor head" event. Then transport the vessel specimens to a respected metallurgic laboratory for comprehensive off site testing.

3) Request an immediate NRC report and public meeting on the vulnerabilities with US reactor cracking and these mysterious weakened vessels.

4) If distressing and unsafe results are discovered at Vermont Yankee or Kewaunee, I request that within six

months all USA plants be ultrasonically tested or better technology.

5) How has the average concentration of hydrogen in the coolant changed over the recent decades? Would an increasing concentration of hydrogen in the coolant lead to more hydrogen ions getting injected into the vessel iron?

6) Does noble chemistry increase or decrease this kind of corrosion?

7) Are there other chemicals added to the coolant that could make this kind corrosion worst?

8) What are they talking about here:

"However, as Belgian continues to debate the fate of the reactors, prolonged studies on the steel used in the construction of the reactors revealed unprecedented embrittlement - unusual swelling - that can compromise the integrity of the plant and possibly cause ruptures, spewing dangerous radioactive material equivalent to an atomic bomb."

9) I understand all US nuclear plants have coupons and I consider them irrelevant to this problem.

10) Request the NRC coordinate with the Belgian Federal Agency for Nuclear Control (FANC).

11) Request detailed inspection on the condition of the reactor cladding and a explanation of any defects.

Sincerely,

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