

**Jonathan Rowley - Fwd: Questions about Vermont Yankee's reactor vessel nozzle fatigue**

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**From:** Jonathan Rowley  
**To:** dmannai@entergy.com; hmetell@entergy.com  
**Date:** 01/09/2008 11:00 AM  
**Subject:** Fwd: Questions about Vermont Yankee's reactor vessel nozzle fatigue

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Dave/Mike

I am forwarding to you a letter from Dave Lochbaum. It contains the comments he made during the January 8, 2008 meeting in writing.

>>> "Dave Lochbaum" <dlochbaum@ucsusa.org> 01/09/2008 8:50 AM >>>

Dear Mr. Rowley:

Attached is an electronic letter with the three questions I asked during yesterday's public meeting. I don't have the e-mail addresses for the Entergy representatives who attended the meeting. At your discretion, feel free to forward the letter along to them.

If possible, I'd like to have this letter included in the meeting summary package prepared by the NRC for yesterday's meeting. If that's not possible, I'd like to see the letter placed in public ADAMS.

I don't plan to mail in a hard copy unless you request one.

Thanks,

Dave Lochbaum  
Director, Nuclear Safety Project  
Union of Concerned Scientists  
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**Mail Envelope Properties** (4784EF82.8B6 : 12 : 35182)

**Subject:** Fwd: Questions about Vermont Yankee's reactor vessel nozzle fatigue  
**Creation Date** 01/09/2008 11:00:02 AM  
**From:** Jonathan Rowley  
**Created By:** [JGR@nrc.gov](mailto:JGR@nrc.gov)

<b>Recipients</b>	<b>Action</b>	<b>Date &amp; Time</b>
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TEXT.htm	1380	
20080109-vy-ucs-nrc-nozzle-fatigue.pdf		
AM	49544	01/09/2008 10:45:00

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# Union of Concerned Scientists

Citizens and Scientists for Environmental Solutions

January 9, 2008

Jonathan G. Rowley  
Office of Nuclear Reactor Regulation  
US Nuclear Regulatory Commission  
Washington, DC 20555-0001

**SUBJECT: QUESTIONS RAISED DURING JANUARY 8, 2008, PUBLIC MEETING  
ON VERMONT YANKEE REACTOR VESSEL NOZZLE FATIGUE**

Dear Mr. Rowley:

During public comment period of yesterday's Category 1 meeting on reactor vessel nozzle fatigue during the proposed license renewal period at Vermont Yankee, I asked three questions. You invited me to submit those questions in writing to ensure they were captured in the NRC's process. It was a fine idea and I am following up on it. Here are my three questions:

1. Early in his presentation, Gary Stevens of Structural Integrity Associates stated that the nozzle fatigue analysis performed for Vermont Yankee included a projection of the water chemistry conditions over the remainder of the plant's operating lifetime. Were the water chemistry conditions assumed in the analysis linked to or more conservative than the technical specification limits?
2. At slide 17 of the presentation, Entergy's representatives explained that the stress time history for the nozzles had been developed from a thorough accounting of past operational transients. Were past water chemistry excursions equally captured and accounted for in the analysis?
3. Ken Chang of the NRC staff probed Entergy's representatives at some length regarding the ongoing counting program for operational cycles and the related need to confirm or update the thermal stress calculations. Does a comparable program exist to count water chemistry transients?

Water chemistry is an important factor in nozzle fatigue because it is an input to the  $F_{cn}$  term. The Cumulative Usage Factor (CUF) for each nozzle is multiplied by the  $F_{cn}$  term.

A very similar issue arose over a decade ago at Nine Mile Point Unit 1 in New York. The issue was reactor vessel core shroud weld cracking rather than reactor vessel nozzle fatigue, but in each case the evaluation of future safety relied heavily on water chemistry assumptions. On April 8, 1997, Niagara Mohawk submitted to the NRC its evaluation (available in the NRC's Public Document Room under Accession No. 9704100242) of the core shroud weld cracking issue. This evaluation relied on a GE analysis of crack growth rates that had assumed water chemistry parameters significantly better than the technical specification limits. On April 17, 1997, UCS submitted a letter (available in the NRC's PDR under Accession No. 9704210098) with the concern that Niagara Mohawk had violated 50.59 by relying

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on non-conservative water chemistry parameters that had not been reviewed and approved by the NRC. In short, Nine Mile Point Unit 1 could be operated with water conditions permitted by its technical specifications that would invalidate the basis of its core shroud cracking evaluation. On July 2, 1997, Niagara Mohawk submitted to the NRC a license amendment request (available in the NRC's PDR under Accession No. 9707110350) to incorporate the appropriate water chemistry limits from its core shroud cracking evaluation into the technical specifications.

At this time, I cannot contend that the water chemistry parameters assumed in Entergy's reactor vessel nozzle fatigue assessment are not bound by the water chemistry limits established by Vermont Yankee's technical specifications. Neither can I conclude that the water chemistry assumptions are bound by the technical specification limits. Unlike Niagara Mohawk, Entergy has not placed the details of its assessment on the docket for the NRC and UCS to independently review.

In asking the questions above, UCS hopes that the NRC staff will ensure the right answers exist before issuing its safety evaluation report on reactor vessel nozzle fatigue.

There was considerable discussion between the NRC and Entergy during yesterday's meeting about the future process for monitoring reactor vessel nozzle fatigue. The talk included current practices and future expectations. Absent from this discussion was a vital element – Entergy's legal obligations under 10 CFR 50.71(e) to incorporate information from evaluations performed at the NRC's request into the Vermont Yankee Updated Final Safety Analysis Report (UFSAR). Assuming that Entergy complies with this federal regulation (albeit an unverifiable assumption at this time), a summary of the methodology and results from the reactor vessel nozzle fatigue assessment will be incorporated into applicable sections of the UFSAR. By complying with this federal regulation, the UFSAR will capture and reflect key aspects of the reactor vessel nozzle fatigue assessment, making it more likely that workers five or ten years from now will not inadvertently undermine safety margins.

UCS therefore hopes that the NRC staff will also ensure that Entergy complies with 10 CFR 50.71(e) by incorporating essential information from the reactor vessel nozzle fatigue assessment into the UFSAR for Vermont Yankee.

Sincerely,

A handwritten signature in black ink, appearing to read "David O. Lochbaum". The signature is written in a cursive, flowing style.

David Lochbaum  
Director, Nuclear Safety Project  
Washington Office