

**D. Ashley - FW: Bolting follow-up**

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**From:** <john.hufnagel@exeloncorp.com>  
**To:** <vmr1@nrc.gov>  
**Date:** 05/25/2006 11:00:32 AM  
**Subject:** FW: Bolting follow-up  
**CC:** <djal@nrc.gov>

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Veronica,

I know Donnie is heading out shortly or maybe has gone for the week. Would you please forward this to the reviewer (John Ma) if you can't confirm Donnie was able to do so? Also, if you get any feedback regarding the usefulness of this information prior to Donnie returning, perhaps you could let me know. Also, if appropriate, we could set up a call to discuss further with the reviewer. Thanks.

- John.

-----Original Message-----

**From:** Hufnagel Jr, John G  
**Sent:** Thursday, May 25, 2006 10:55 AM  
**To:** Donnie Ashley (E-mail)  
**Cc:** Ouaou, Ahmed; Polaski, Frederick W  
**Subject:** Bolting follow-up

Donnie,

Per our discussion, I wanted to forward to you a copy of the question/answer that covered this topic during the Audits. As you'll recall, this information has previously been docketed as part of the Q&A database information.

A few points to note:

- Monitoring of bolting including high strength bolting was discussed extensively during the AMP/AMR audits. CMTRs and other information was reviewed on-site during the process. The result was that the Auditor was satisfied with the monitoring program/activities as described in the LRA, and as noted in the response to Question AMR-176.
- The LRA provides quite a bit of information in the Appendix A FSAR supplement sections on Bolting Integrity and Structural Monitoring, and the Appendix B Program description sections on those same two programs, making it clear that AmerGen uses and plans to continue to use the Structural Monitoring program to manager/monitor bolting of all types.

Hopefully the attached Q&A will provide the reviewer with some useful information. Please pass this on to the reviewer and let me know if we want to discuss further. We can certainly set something up. Thanks.

- John.

<<Q&A 176.pdf>>

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Thank You.

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**Mail Envelope Properties (4475C678.7F0 : 19 : 59376)**

**Subject:** FW: Bolting follow-up  
**Creation Date** 05/25/2006 10:59:43 AM  
**From:** <[john.hufnagel@exeloncorp.com](mailto:john.hufnagel@exeloncorp.com)>

**Created By:** [john.hufnagel@exeloncorp.com](mailto:john.hufnagel@exeloncorp.com)

**Recipients**

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<b>Files</b>	<b>Size</b>	<b>Date &amp; Time</b>
MESSAGE	2856	25 May, 2006 10:59:43 AM
TEXT.htm	4823	
Q&A 176.pdf	65078	
Mime.822	100062	

**Options**

**Expiration Date:** None  
**Priority:** Standard  
**ReplyRequested:** No  
**Return Notification:** None

**Concealed Subject:** No  
**Security:** Standard

**Junk Mail Handling Evaluation Results**

Message is eligible for Junk Mail handling  
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Junk Mail handling disabled by User  
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***NRC Information Request Form***

<i>Item No</i>	<i>Date Received:</i>	<i>Source</i>
AMR-176	10/31/2005	AMR Audit
<i>Topic:</i>	<i>Status:</i>	Closed
Bolting Materials Used in Structural Applications		

***Document References:***

3.5.1-38

***NRC Representative*** Morante, Rich***AmerGen (Took Issue):*** Hufnagel, Joh**Question**

More information is needed about bolting materials used in structural applications at OCGS, including Group B1.1 applications. What are the bolting materials used? What are the nominal yield strengths and upper-bound as-received yield strengths? Describe the OCGS resolution of the bolting integrity generic issue, as it relates to structural bolting. Was any structural bolting identified as potentially susceptible to cracking due to SCC? Was any structural bolting replaced as part of the resolution?

***Assigned To:*** Ouaou, Ahmed**Response:****Response:**

More information is needed about bolting materials used in structural applications at OCGS, including Group B1.1 applications.

a) What are the bolting materials used?

**Response:**

The review of plant design drawings, specifications, and NRC correspondence indicates that ASTM A-307, A-325, A-193 Gr.B7, A-193 Grade B8M, and A-490 bolts were used in structural applications. The ASME Class 1 piping and component supports (Group B1.1), other than reactor vessel skirt support bolts, were furnished by Grinnell Corporation and identified on the hanger drawings as (H.S.) without material designation. These were assumed to be A-193 Grade B7 or equivalent based on compatibility with Grinnell materials and support standards. The bolts for the reactor vessel skirt support are indicated as ASTM A-325 on the drawings.

b) What are the nominal yield strengths and upper bound as-received yield strengths?

**Response:**

In response to IE Bulletin 87-02, GPU performed chemical, hardness, and physical testing on sample of safety and non-safety related bolting and transmitted the results to NRC (Ref. 1). The test results for yield strengths are shown below:

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Bolt Material	Nominal Yield (PSI)	Actual Yield (PSI)
A-193 Gr B7	105,000	121,212
	105,000	140,000
	105,000	139,030
	105,000	132,113
	105,000	127,858
	105,000	125,418
	105,000	151,960*
	105,000	122,646
	105,000	128,318
	105,000	129,081
	105,000	117,617
105,000	107,601	
A-193 Gr B8M	30,000	67,961
	30,000	84,577
	30,000	84,210
	30,000	86,248
	30,000	63,157
A-193 Gr B8	30,000	85,539
A-193 Gr B8	30,000	96,938
A-307	36,000	Not tested
A-325	81,000	127,842
A-490	130,000	See Below

\*This test sample is not used in structural applications.

Since the response to the bulletin was provided, a review of the stocking of A-490 bolting was performed. Based on the history of stocking of A-490 bolting, it was determined bolts of this material were installed as part of a modification in the year 2000. These bolts were procured in accordance with the established specifications and installed as part of the Reactor Building Single Failure Proof Crane Modification. The 7/8 inch diameter bolts were installed to secure a new stiffener clip between the reactor building superstructure column and the Reactor Building Crane Rail Beam. The bolting was installed to snug tight thus not subject to high prelad.

c) Describe the OCGS resolution of the bolting integrity generic issue, as it relates to structural bolting.

Response:

Oyster Creek implemented the following actions to resolve the bolting integrity generic issue:

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1. In response to IE Bulletin 87-02, "Fastener testing to determine conformance with applicable material specifications", GPU performed chemical, hardness, and physical testing on a sample of safety and non-safety related bolting to determine material conformance and transmitted the results to NRC (Ref. 1).
2. In response to IE Bulletin 87-02, Supplement 1, GPU performed an extensive review of the Supplier Quality Classification List (SQCL) and Contractor Classification List (CCL) and submitted the result to NRC (Ref. 2).
3. Oyster Creek established procedures that are based on the guidance and recommendations provided in NUREG-1339, "Resolution of Generic Safety Issue 29: Bolting Degradation of Failure in Nuclear Power Plants", EPRI NP-5769, "Degradation and Failure of Bolting in Nuclear Power Plants", and EPRI 5067, "Good Bolting Practices". These include,

All safety related fasteners are bought from vendors on GPUN QA approved vendor's list.

Fasteners are subject to receipt inspections designed to identify substandard/fraudulent items. Suspect bolts are tested before they are released for use.

Approved lubricants are controlled by procedures. The primary lubricant at Oyster Creek is Chesterton, a nickel based lubricant that does not contain Molybdenum sulfate (MoS<sub>2</sub>).

Installation procedures provide instructions for proper tightening of bolted connections.

d) Was any structural bolting identified as potentially susceptible to cracking due to SCC?

Response:

No. The reviewed documentation on the resolution of the generic bolting issue did not identify any structural bolting that is potentially susceptible to cracking due SCC.

e) Was any structural bolting replaced as part of the resolution?

Response:

No. The reviewed documentation on the resolution of the generic bolting issue did not identify any instances where structural bolting was replaced to resolve the bolting issue.

Reference:

1. Letter from P. B. Fiedler (GPU) to W. T. Russell (NRC), "Response to NRC Compliance Bulletin 87-02; Faster Testing to Determine Material Conformance", dated February 26, 1988.
2. Letter from E. E. Fitzpatrick (GPU), "GPUN Response to Bulletin 87-02, dated February 26, 1988, NRC Bulletin 87-02, Supplement 1", dated July 25, 1988.
3. NUREG-1339, "Resolution of Generic Safety Issue 29: Bolting Degradation or Failure in Nuclear Power Plants", June 1990.
4. Generic Letter 91-71, Generic Safety Issue 29, "Bolting Degradation or Failure in Nuclear in Nuclear Power Plants".
5. EPRI NP-5769, "Degradation and Failure of Bolting in Nuclear Power Plants", Volume 1 & Volume 2, April 1988.

***NRC Information Request Form***

6. EPRI NP-5067, "Good Bolting Practices", Volume 1 & Volume 2, December 1990.

*LRCR #:*

*LRA A.5 Commitment #:*

*IR#:*

*Approvals:*

*Prepared By:* Ouaou, Ahmed 2/16/2006

*Reviewed By:* Quintenz, Tom 2/16/2006

*Approved By:* Warfel, Don 2/16/2006

*NRC Acceptance (Date):*