

## IPRenewal NPEmails

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**From:** Haagensen, Brian  
**Sent:** Monday, May 23, 2016 7:32 AM  
**To:** Rich, Sarah; Newman, Garrett  
**Subject:** FW: Blog Item Re: Indian Point Baffle Bolts  
**Attachments:** ATT1-Baffle-Former Bolts2\_520.docx

FYI

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**From:** Pickett, Douglas  
**Sent:** Monday, May 23, 2016 7:18 AM  
**To:** Rihm, Roger <Roger.Rihm@nrc.gov>  
**Cc:** Tifft, Doug <Doug.Tifft@nrc.gov>; McNamara, Nancy <Nancy.McNamara@nrc.gov>; Dentel, Glenn <Glenn.Dentel@nrc.gov>; Haagensen, Brian <Brian.Haagensen@nrc.gov>; Gray, Mel <Mel.Gray@nrc.gov>; Sheehan, Neil <Neil.Sheehan@nrc.gov>; Screnci, Diane <Diane.Screnci@nrc.gov>  
**Subject:** Blog Item Re: Indian Point Baffle Bolts

Roger –

You might find the attached blog item useful in your Congressional responses regarding the Indian Point baffle bolt issue.

Doug

Douglas V. Pickett, Senior Project Manager  
Indian Point Nuclear Generating Unit Nos. 2 & 3  
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**Hearing Identifier:** IndianPointUnits2and3NonPublic\_EX  
**Email Number:** 6733

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**Subject:** FW: Blog Item Re: Indian Point Baffle Bolts  
**Sent Date:** 5/23/2016 7:31:36 AM  
**Received Date:** 5/23/2016 7:31:37 AM  
**From:** Haagensen, Brian

**Created By:** Brian.Haagensen@nrc.gov

**Recipients:**

"Rich, Sarah" <Sarah.Rich@nrc.gov>  
Tracking Status: None  
"Newman, Garrett" <Garrett.Newman@nrc.gov>  
Tracking Status: None

**Post Office:** R1PWMSMRS02.nrc.gov

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MESSAGE	780	5/23/2016 7:31:37 AM
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**Options**

**Priority:** Standard  
**Return Notification:** No  
**Reply Requested:** No  
**Sensitivity:** Normal  
**Expiration Date:**  
**Recipients Received:**

## More on Baffle Bolts

*By John Lubinski  
Director, Division of Engineering  
Office of Nuclear Reactor Regulation*

We described [degradation in baffle-former bolts at Indian Point Unit 2](#) in an April 27 blog post. The damaged bolts were discovered by Entergy, the plant operator, while inspecting the bolts during a refueling outage. Since then, PSEG, the operator of the Salem nuclear power plant in New Jersey, discovered some degraded bolts while inspecting the baffles of Unit 1.

To recap, the bolts hold in place a series of vertical metal plates. Known as baffle plates, they help direct water up through the nuclear fuel assemblies, where it is heated and subsequently used for power production. The baffle plates are attached to eight levels of horizontal plates called baffle-former plates, which are in turn connected to the reactor core barrel.

Because of these findings, the NRC has initiated its process for dealing with emerging issues to evaluate the extent of the problem and assess possible responses.

Here's what we know so far:

We are confident this issue lacks an immediate safety concern that would lead us to shut down U.S. nuclear power plants or prevent the startup of plants in refueling outages.

The phenomenon is not a surprise. Degraded baffle-former bolts were detected in French reactors in the late 1980s and 1990s, and the NRC published an Information Notice in 1998 alerting the U.S. industry.

That prompted several plants to inspect their bolts, and some even made adjustments to their baffles or replaced bolts as a result. Guidance from the Electric Power Research Institute, evaluated and approved by the NRC and adopted by the industry's own materials management program, calls for visual and ultrasonic inspections during a certain period in a reactor's lifespan. The current findings at Indian Point and Salem resulted from this operational experience.

As we said earlier, degradation of the baffle-former bolts poses little safety risk during normal operations. If bolt parts come loose during normal operations and damage fuel, the condition will be detected by routine monitoring of radioactivity in the reactor coolant water. During refueling outages, plant operators look for debris on the bottom of the reactor vessel as another indication of potential issues. Even during an accident, the danger of core damage would be minimal. For these reasons, the NRC does not believe it necessary to shut down any additional plants and order immediate inspections.

That doesn't mean we can ignore the condition, of course. Plants with degraded bolts are required to perform analyses and/or replace the damaged bolts before restarting. Missing bolt parts (such as a bolt head) must be accounted for or recovered, or the licensee must perform a

“loose-parts evaluation” prior to restarting. The NRC staff will independently assess the root-cause and safety significance of the bolt degradation at each reactor and take appropriate regulatory action.

So how many plants might have this problem? Only Westinghouse-designed pressurized-water reactors with four reactor coolant loops have reported significant bolt damage. Although there are 29 such plants in the United States, the issue appears to be further limited by two factors: The damaged bolts have all been of a certain type of stainless steel, and they’ve all been in reactors with baffles in a “downflow” configuration, meaning the water entering the reactor is pushed downward between the baffle and the core barrel, which creates more pressure across the plates and stress in the bolts.

There are only seven four-loop Westinghouse reactors at four sites with both the susceptible bolt material and a downflow configuration: Indian Point Units 2 and 3, Salem Units 1 and 2, D.C. Cook Units 1 and 2, and Diablo Canyon Unit 1. (Diablo’s Unit 2 has been reconfigured to an upflow baffle.) We are asking the operators of D.C. Cook and Diablo Canyon to consider the recent findings and implications for their plants, including their plans for future bolt inspections.

Bolt degradation starts to appear sometime after 25 “effective full-power years” of operation (based on actual operation, not calendar years since licensing). So the NRC-approved EPRI guidance advises PWR operators to inspect their baffle-former bolts sometime between 25 and 35 effective full-power years. The NRC requires the inspections as part of aging management plans for reactors with renewed licenses.

As a result of the findings at Indian Point 2, Entergy decided it will conduct detailed ultra-sonic testing of baffle-former bolts in Indian Point 3 during its next outage in spring 2017, instead of March 2019 as previously scheduled. PSEG had been conducting visual inspections every other outage, and because of their discovery of degraded bolts during the current inspection of Salem 1, they decided to conduct the ultrasonic test now rather than in 2023 as previously planned. PG&E indicated to the NRC that it will inspect the baffles on Diablo Canyon 1 during its next scheduled outage in spring 2017.

While the industry is reacting to the recent findings at Indian Point 2 and Salem 1, the NRC will continue to assess baffle-former bolt degradation for any potential implications to the rest of the U.S. commercial reactor fleet.