

## Peach Bottom 2

# 4Q/2012 Plant Inspection Findings

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## Initiating Events

**Significance:** G Mar 31, 2012

Identified By: NRC

Item Type: NCV NonCited Violation

### **Untimely Corrective Actions Resulted in Spent Fuel Pool Boraflex Degradation Exceeding Design Limits**

The inspectors identified a PD that was determined to be a finding of very low safety significance (Green) involving a NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for the failure by PBAPS to take timely corrective action to correct a condition adverse to quality and the inability to comply with Design Technical Specification (TS) 4.3.1.1.b which requires, in part, that spent fuel pool (SFP) storage racks are designed and maintained with keff less than or equal to 0.95. Specifically, although PBAPS was aware of degradation of neutron absorbing material (Boraflex) within the SFP storage racks since at least 1996, PBAPS did not take effective measures to adequately monitor or manage the degradation to assure sufficient margin to criticality was maintained. Rather, in 2010, PBAPS deferred corrective actions in the SFPs until 2014 based on an operability determination (OD) that concluded sufficient margin would exist until that time. However, the NRC concluded that the OD did not accurately project the rate of boron degradation, and used several non-conservative assumptions. In June 2011, after addressing the errors in the OD, PBAPS declared 117 spent fuel bundle rack storage cells inoperable since the estimated Boraflex degradation indicated that PBAPS had exceeded design TS 4.3.1.1.b.

The PD was more than minor because it was similar to IMC 0612, Appendix E, "Examples of Minor Issues," Example 3.j, which considers that an issue is more than minor if an engineering calculation error results in a condition where there is now a reasonable doubt on the operability of a system or component, or if significant programmatic deficiencies were identified with the issue that could lead to more significant errors if uncorrected.

Using IMC 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," the inspectors attempted to evaluate the risk significance of this issue. Applying the guidance in Table 3b, the inspectors made the assumption that the risk associated with this PD most appropriately impacted the Initiating Events cornerstone. A Region I Senior Reactor Analyst (SRA) determined that there were no probabilistic risk assessment tools currently available to adequately assess the risk of a SFP criticality event. Consequently, the inspectors followed the guidance in the Phase 1 SDP screening worksheet, Table 3b, Step 6, which states, in part, that where the SDP guidance is not adequate to provide reasonable estimates of a finding's significance, use IMC 0609, Appendix M, "SDP Using Qualitative Criteria."

Using Appendix M, the inspectors identified criteria and associated considerations that supported the overall qualitative risk assessment. On April 3, 2012, a Significance and Enforcement Review Panel (SERP) was conducted involving staff from Region I, the Office of Nuclear Reactor Regulation, and the Office of Enforcement to discuss the significance of this event. The SERP determined the PD and subsequent consequences resulted in a condition of very low safety significance (Green), based on an assessment using Appendix M attributes. This finding was also determined to have a cross-cutting aspect in the area of Problem Identification and Resolution - Evaluation [P.1(c)]. Specifically, Exelon did not properly evaluate a condition adverse to quality for operability in that the 2010 OD did not accurately predict the rate of Boraflex degradation and whether the issue challenged current SFP operability [P.1(c)]. (Section 4OA2)

Inspection Report# : [2012002](#) (*pdf*)

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## Mitigating Systems

**Significance:** G Sep 30, 2012

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

### **Inadequate Preplanning and Performance of Maintenance/Modifications Resulted in Unavailability of RHR 'B' Loop.**

The inspectors identified a Green, self-revealing non-cited violation (NCV) of Technical Specification (TS) 5.4.1, "Procedures." The inspectors determined that PBAPS did not properly preplan and perform maintenance/modifications to the Unit 2 low pressure coolant injection (LPCI) swing bus 'B' motor control cabinet (MCC) while energized. Specifically, PBAPS did not appropriately consider the potential plant impact due to sensitive energized components within the MCC that could be activated and did not utilize sufficient physical barriers to prevent such activation. Consequently, on July 25, 2012, the 'B' loop of the residual heat removal (RHR) system was declared inoperable and unavailable after workers pulling an electrical cable into the Unit 2 energized LPCI swing bus 'B' MCC inadvertently contacted and actuated the LPCI inboard injection valve motor relay. The motor operated valve (MOV) relay actuation caused a potential over-thrust event and had the potential to impact the valve's qualification and reliability. PBAPS conducted detailed examinations and diagnostic stroke testing on the MOV assembly and concluded that the design limits of the MOV assembly were not exceeded.

This finding was more than minor because it was associated with the equipment performance attribute of the Mitigating System cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors determined that this finding was of very low safety significance (Green) because it did not represent an actual loss of safety function of a single LPCI train for greater than its TS allowed outage time. The inspectors determined that this finding had a cross-cutting aspect in the area of Human Performance, work control, because PBAPS did not appropriately incorporate risk insights and job site conditions that could impact plant structures, systems, and components (SSCs) into its work activities. Specifically, PBAPS did not appropriately consider and reduce the potential for an over-thrust event on the 'B' loop LPCI inboard injection valve MO-2-10-25B when performing work in the LPCI swing bus 'B' MCC while it was energized. [H.3(a)] (Section 1R13)

Inspection Report# : [2012004](#) (*pdf*)

**Significance:** G Jun 30, 2012

Identified By: NRC

Item Type: NCV NonCited Violation

### **Inadequate Test Control to Demonstrate RCIC System Design Basis Start-up Response Time**

The inspectors identified a NCV of very low safety significance of Title 10 Code of Federal Regulation (CFR) 50, Appendix B, Criterion XI, "Test Control," because Exelon conducted unacceptable pre-conditioning of the reactor core isolation cooling (RCIC) system during response time testing. The performance deficiency was related to Exelon's surveillance test (ST) procedure which required cold startup of RCIC to reach the rated pump discharge pressure and flow rate within 50 seconds. Exelon procedures required a 72 hour standby period between pump starts to ensure the pump cold start design criteria are satisfied without pre-conditioning. On numerous occasions, when the pump design parameters were not reached in less than 50 seconds on the first attempt, control room operators would routinely perform a second start attempt within a short period of time, typically less than one hour, to adjust the RCIC pump controls and attain the design values in less than or equal to 50 seconds. Exelon performed an extent of condition review of Units

2 and 3 RCIC cold start test data to ensure the current pump, valve, and flow results satisfied the response time testing requirements. The violation was entered into the corrective action program (CAP) as issue report (IR)1364066.

The performance deficiency was more than minor because it was similar to IMC 0612, Appendix E, "Examples of Minor Issues," example 2.a. Specifically, the RCIC cold start ST procedure was not implemented adequately to ensure that the RCIC pump design discharge pressure and flow were reached within the 50 second requirement on the first attempt. The inspectors evaluated the finding using IMC 0609, Attachment 4, "Initial Screening and Characterization of Findings," and determined the finding was of very low safety significance (Green) because all of the mitigating system barrier questions in Table 4.a resulted in a "no" response. The finding included a cross-cutting aspect in the area of Work Practices, Human Performance component, because Exelon did not effectively communicate expectations regarding procedural compliance and personnel following procedures. Specifically, Exelon took credit for the Unit 2 ST performed on April 7, 2011, which started and shutdown RCIC three times in less than 72 hours to satisfy the response time testing acceptance criteria. On January 20, 2011, the same test was performed for Unit 3, when the RCIC system was run two times prior to satisfying the acceptance criteria. Exelon did not identify the unacceptable pre-conditioning of the RCIC system start-up time for either test because personnel did not follow the In-service Testing (IST) Program Corporate Technical Position procedure. (Section 1R22) [H.4(b)]  
Inspection Report# : [2012003](#) (pdf)

**Significance:**  Mar 31, 2012

Identified By: NRC

Item Type: NCV NonCited Violation

### **Inadequate Corrective Action to Address Emergency Diesel Generator Control Power Circuit Chronic Internal Faults**

The inspectors determined that PBAPS did not establish measures to promptly identify and correct a condition adverse to the quality related to the emergency diesel generator (EDG) control power circuit. The performance deficiency (PD) constituted a Green, self-revealing NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action." Specifically, measures established to identify and correct chronic control power light socket assembly internal faults were inadequate. Consequently, on February 18, 2012, the E-1 EDG local control power station experienced a short circuit event during control power indicating light bulb replacement. PBAPS entered into this issue into the corrective action program (CAP) via issue report (IR) 1328736.

This finding was more than minor because it was associated with the equipment performance attribute of the Mitigating System cornerstone, and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events and prevent undesirable consequences. Using IMC 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," the inspectors determined that this finding was of very low safety significance (Green) because it did not represent an actual loss of safety function for a single EDG train for a duration greater than its Technical Specification (TS) allowed outage time, and did not screen as potentially risk significant due to an external initiating event.

The inspectors determined that this finding had a cross-cutting aspect in the area of problem identification & resolution (PI&R), CAP, because PBAPS did not take appropriate corrective actions to address the adverse trend associated with chronic EDG control power circuit faults in a timely manner, commensurate with its safety significance [P.1(d)]. (Section 1R19)

Inspection Report# : [2012002](#) (pdf)

**Significance:**  Mar 31, 2012

Identified By: NRC

Item Type: NCV NonCited Violation

### **Inadequate Corrective Action to Address Residual Heat Removal Heat Exchanger Graphite Gasket Leaks**

The inspectors determined that PBAPS did not promptly identify and correct residual heat removal (RHR) heat exchanger (HX) graphoil gasket leaks. The PD constituted a Green, self-revealing NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action." Specifically, measures established to identify and correct previous graphoil gasket leaks were inadequate to correct the condition adverse to quality. Consequently, on February 16, 2012, the Unit 2 'C' RHRHX shell cover lower flange graphoil gasket failed during testing, rendering the 'C' RHR subsystem inoperable. PBAPS entered this issue into CAP via IR 1327477.

This finding was more than minor because it was associated with the equipment performance attribute of the Mitigating System cornerstone, and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events and prevent undesirable consequences. Using IMC 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," the inspectors determined that this finding was of very low safety significance (Green) because it did not represent an actual loss of safety function for a single RHR train for greater than its TS allowed outage time, and did not screen as potentially risk significant due to an external initiating event.

The inspectors determined that this finding had a cross-cutting aspect in the area of PI&R, CAP, because PBAPS did not thoroughly evaluate previous graphoil gasket failures used in RHR HX applications to ensure the resolution addressed the cause and extent of condition [P.1(c)]. (Section 1R19)

Inspection Report# : [2012002](#) (*pdf*)

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## **Barrier Integrity**

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## **Emergency Preparedness**

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## **Occupational Radiation Safety**

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## **Public Radiation Safety**

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## **Security**

Although the Security Cornerstone is included in the Reactor Oversight Process assessment program, the Commission has decided that specific information related to findings and performance indicators pertaining to the Security Cornerstone will not be publicly available to ensure that security information is not provided to a possible adversary. Other than the fact that a finding or performance indicator is Green or Greater-Than-Green, security related information will not be displayed on the public web page. Therefore, the [cover letters](#) to security inspection reports may be viewed.

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## **Miscellaneous**

