Brunswick 1
4Q/2007 Plant Inspection Findings

Initiating Events

Mitigating Systems

Significance: G Oct 15, 2007
Identified By: Self-Revealing
Item Type: NCV NonCited Violation
Inadequate Corrective Action for Fisher Model 9100 Unbonded Butterfly Valve Failures
The inspectors identified an NCV of 10 CFR 50 Appendix B, Criterion XVI, for failure to promptly identify and correct a condition adverse to quality related to foreign material in the service water system (SW) resulting from Fisher butterfly valve rubber lining failures. There had been a number of failures of Fisher butterfly valve rubber linings since 1985 including a Unit 1 failure in 2004 and a Unit 2 failure in 2005. The examples in 2004 and 2005 were examples where valve lining material was missing from Fisher valves and all the material was not accounted for and removed from the SW system. On August 16, 2007, the licensee detected reduced flow from the 1B Residual Heat Removal (RHR) room cooler and on August 18, 2007, identified foreign material in the inlet piping to the cooler. Additional rubber lining material was also found in the 1 A RHR room cooler. An additional example of Fisher valve foreign material in the SW system was noted in 2005 in the Unit 2 2B Turbine Building Component Cooling Water Heat Exchanger. The licensee entered this issue into the corrective action program.

The failure to maintain the SW system free of foreign material was considered a performance deficiency and a finding in the mitigating systems cornerstone. This finding is greater than minor because it affected the availability and reliability of the RHR room coolers which support the emergency core cooling equipment used to mitigate the consequences of an accident. Although related to degradation in the service water system, the finding is of very low safety significance because the licensee detected the change in SW flow and removed the material prior to the flow reduction reaching the minimum required flow for accident mitigation. There was no loss of safety function from either train of service water. This finding has an appropriate and timely corrective action aspect in the cross-cutting area of problem identification and resolution because the licensee failed to recognize the foreign material as a condition adverse to quality and implement timely corrective action to locate the source of and remove all the material from the SW system
Inspection Report# : 2007011 *(pdf)*

Significance: G Oct 15, 2007
Identified By: NRC
Item Type: NCV NonCited Violation
Inadequate Loose Parts Analysis / Operability Evaluation for Fisher Butterfly Valve Taper Pin
The inspectors identified an NCV of 10 CFR 50 Appendix B, Criterion V, for an inadequate loose parts analysis / operability evaluation performed following the failure of SW valve 1-SW-V105 to open on July 26, 2005, due to the loss of both taper pins which connected the stem to the valve disc. Inadequate testing of the impact of a butterfly valve taper pin on an operating RHR SW booster pump and incorrect communication of the results of this testing led to returning the SW system to service without retrieving the second taper pin. The pin was later retrieved when on August 21,2007, the pin caused a failure of the 1D RHR SW booster pump. The licensee entered the issue into the corrective action program, removed the pin from the pump, replaced the motor and returned the pump to operable status.

The inadequate loose parts analysis / operability evaluation for the missing SW butterfly valve taper pin was considered as a performance deficiency and a finding in the mitigating systems cornerstone. This finding is greater than minor because it affected the reliability and availability attribute of one RHR SW booster pump, a mitigating

system component. The finding was of very low safety significance because only one RHR SW booster pump was affected, it did not represent a loss of a safety function of either train of service water. This finding has a thorough evaluation of an identified problem in the cross-cutting area of problem identification and resolution because the licensee failed to thoroughly evaluate the condition adverse to quality which resulted in additional unavailability of the 1D RHR SW booster pump.
Inspection Report# : 2007011 *(pdf)*

Significance:  Aug 30, 2007
Identified By: NRC
Item Type: NCV NonCited Violation
Goal Setting and Monitoring not Performed for an Emergency Diesel Generator
The team identified a Green non-cited violation (NCV) of 10 CFR 50.65 (maintenance rule) for failure to demonstrate that the performance or condition of structures, systems, or components is being effectively controlled through the performance of appropriate preventive maintenance. An inadequate maintenance rule evaluation was performed after an emergency diesel generator exceeded its maintenance rule (a)(2) performance criteria and, as a result, goal setting and monitoring was not performed as required by Paragraph (a)(1) of the maintenance rule.

This finding was more than minor because it was associated with the equipment performance attribute and affected the Mitigating Systems Cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The lack of proper attention by the maintenance rule program to the degraded performance of Emergency Diesel Generator 3 allowed degraded performance to continue for all emergency diesel generators. This finding was of very low safety significance because it was not a design or qualification deficiency, did not directly result in an actual loss of safety function for a system or train, and was not risk significant due to a seismic, fire, flooding, or severe weather initiating event. The cause of the finding directly involved the cross-cutting area of human performance, in the decision making component under the aspect of using conservative assumptions because the expert panel decided to keep Emergency Diesel Generator 3 under maintenance rule Paragraph (a)(2) without fully supporting that conclusion. The licensee made this decision even though other evidence indicated that preventive maintenance was not effectively controlling Emergency Diesel Generator 3 performance [H.1(b)].

Inspection Report# : 2007010 *(pdf)*

Significance: N/A Apr 13, 2007
Identified By: NRC
Item Type: FIN Finding
95001 Supplemental Inspection
The U.S. Nuclear Regulatory Commission (NRC) performed this supplemental inspection in accordance with Inspection Procedure 95001, to assess the licensee's evaluation associated with the Unit 1 and Unit 2 performance indicators in the mitigating systems cornerstone. The mitigating systems performance indicator (MSPI) for emergency AC power systems crossed the threshold from Green (very low risk significance) to White (low to moderate risk significance) in the second quarter of 2006. Specifically, the licensee's emergency AC power systems MSPI value reached 2.01E-6 for Unit 1 and 1.50E-6 for Unit 2. The MSPI becomes White when the value reaches 1.0E-6. The MSPI for Units 1 and 2 consist of an unreliability index based on emergency AC power system function failures and an unavailability index based on emergency AC power system unavailability. Since the vast majority of the contribution to the MSPI for Units 1 and 2 is from the unreliability indexes, the inspection focused on the emergency AC system functional failures.

The inspector determined that the licensee performed a comprehensive evaluation of the conditions that led to the MSPI exceeding the Green/White threshold. Performance deficiencies were identified by the NRC during previous inspections and are listed in subsequent sections of this report. In addition, the licensee adequately analyzed the circumstances associated with those issues and, where appropriate, took effective immediate corrective action. Also, the licensee developed corrective actions to prevent recurrence. The inspector noted that additional failures of the emergency diesel generators have occurred subsequently to the failures included in the scope of this inspection. These failures will be further evaluated by the NRC outside of this inspection.

Inspection Report# : 2006008 *(pdf)*

Significance: W Feb 28, 2007
Identified By: NRC
Item Type: VIO Violation
Failure to Meet TS 3.8.1, AC Sources-Operating
A preliminary White finding with an apparent violation (AV) of Technical Specification (TS) 3.8.1, AC Sources-Operating, was identified for Unit 1. The finding involved inadequate corrective actions to prevent a repeat failure of the #9 main crankshaft bearing on EDG #1, a failure to follow the foreign material exclusion control procedure during maintenance performed on EDG #1, and the failure to promptly identify and implement adequate actions to prevent emergency diesel generator (EDG) #1 from tripping on low lubricating oil pressure. The finding was determined to be a Green non-cited violation for Unit 2. The difference in risk significance between the units is due to differences in electric bus loads. This finding has a cross-cutting aspect in the area of Problem Identification and Resolution, in that lubricating oil strainer high differential pressure due to clogging by fibrous lint material was not promptly identified as a condition adverse to quality in a timely manner commensurate with the potential safety significance.

This finding is more than minor because it is associated with the availability and reliability of EDG #1 to mitigate events such as a loss of offsite power (LOOP) and primarily affected the Mitigating System Cornerstone for Units 1 and 2. Because the finding also affected the Initiating Events Cornerstone (i.e., LOOP with Loss of One AC Division) and represented an actual loss of safety function of EDG #1 for greater than the TS allowed outage time for one EDG (i.e., seven days), a Significance Determination Process Phase 2 analysis was performed. The dominant core damage sequence in the Phase 2 was LOOP and LOOP with Loss of One AC Division. The results of the Phase 2 analysis required a Phase 3 evaluation. Phase 3 assessments for Units 1 and 2 were performed with the assumption that EDG # 1 was out of service for 130 hours. The Phase 3 analysis results for the internal event initiators calculated a change in Core Damage Frequency (delta CDF) of 1.3E-6 / year for Unit 1 and CDF of 1.57E-7 for Unit 2. In addition, evaluation of external event initiators and large early release frequency (LERF) for both units did not change the color. The finding is of low to moderate safety significance (White) for Unit 1, and is of very low safety significance (Green) for Unit 2.
(IR 05000325,324/2007-008 dated February 28, 2007)

The finding was determined to be of low to moderate safety significance (White) based on assuming a loss of offsite power initiating event and EDG #1 being in a degraded condition for approximately 3 days and in a nonfunctional condition for approximately 5 days.
(IR 05000325, 324/2007-009 dated April 20, 2007)

Inspection Report# : 2007008 *(pdf)*

Barrier Integrity

Emergency Preparedness

Occupational Radiation Safety

Public Radiation Safety

Physical Protection

Although the NRC is actively overseeing the Security cornerstone, the Commission has decided that certain findings pertaining to security cornerstone will not be publicly available to ensure that potentially useful information is not provided to a possible adversary. Therefore, the cover letters to security inspection reports may be viewed.

Miscellaneous

Significance: N/A Feb 23, 2007
Identified By: NRC
Item Type: FIN Finding
Corrective action program
The team concluded that in general, problems were adequately identified and evaluated, and effective corrective actions were implemented. The team found that established thresholds for identifying and classifying issues were appropriately low. However, several instances were identified where adverse conditions were not adequately evaluated and corrective actions were not implemented in a timely manner to prevent recurrence of equipment related problems. Corrective action program goals for completing evaluations and implementing corrective actions were sometimes not met because of competing priorities and lack of management enforcement of timeliness goals. One NCV was identified involving ineffective and untimely corrective actions associated with the failure of a conventional service water pump due to shaft corrosion.

Operating experience was adequately evaluated for applicability to the plant, however, several examples were identified where external operating experience was not used effectively, such as with industry material corrosion controls, which resulted in service water pump and valve stem equipment failures prior to the implementation of appropriate preventive maintenance. The licensee's audits and self-assessments were effective at identifying issues and entering them into the corrective action program. These audits and assessments identified issues similar to those identified by the NRC with respect to repetitive significant equipment failures due in part to untimely and ineffective implementation of preventive maintenance. Based on discussions with licensee employees during the inspection, personnel felt free to report safety concerns.

Inspection Report# : 2007007 *(pdf)*

Last modified : February 04, 2008