



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-8931

March 27, 2009

Mr. Benjamin C. Waldrep
Vice President
Carolina Power and Light Company
Brunswick Steam Electric Plant
P. O. Box 10429
Southport, NC 28461

**SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT - NRC SPECIAL INSPECTION
REPORT 05000325/2009008 AND 05000324/2009008**

Dear Mr. Waldrep:

On February 13, 2009, the US Nuclear Regulatory Commission (NRC) completed the onsite portion of a special inspection at your Brunswick Unit 1 and 2 facilities. The inspection reviewed the circumstances surrounding a potential loss of safety function due to a malfunction of the fuel rack limiting cylinders on Emergency Diesel Generators #3 and #4 on December 29, 2008, through January 1, 2009. A special inspection was warranted based on the risk and the deterministic criteria specified in Management Directive 8.3, "NRC Incident Investigation Program." The determination that the inspection would be conducted was made by the NRC on January 9, 2009, and the inspection started on January 20, 2009. The preliminary inspection results were discussed with you and members of your staff on February 13, 2009. Subsequent in-office reviews were conducted and the enclosed inspection report documents the inspection results which were discussed via telephone with Mr. Michael Annacone on March 6, 2009.

The inspection was performed in accordance with Inspection Procedure 93812, "Special Inspection," and focused on the areas discussed in the inspection charter described in the report. The inspection examined activities conducted under your license as they relate to safety, compliance with the Commission's rules and regulations, and with the conditions of your license. The team reviewed selected procedures and records, conducted field walk downs, and interviewed personnel.

Based on the results of this inspection, no findings of significance were identified. However, two licensee-identified violations which were determined to be of very low safety significance are listed in this report. The NRC is treating these findings as non-cited violations (NCVs), in accordance with Section VI.A.1 of the NRC's Enforcement Policy because of the very low safety significance and because they are entered into your corrective action program. If you contest these non-cited violations, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Brunswick Nuclear Plant.

In accordance with 10 CFR 2.390 of the NRC's Rules of Practice, a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Leonard D. Wert, Director
Division of Reactor Projects

Docket Nos.: 50-325, 50-324
License Nos.: DPR-71, DPR-62
Enclosure: Inspection Report 05000325, 324/2009008
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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Sincerely,

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5

Letter to Benjamin C. Waldrep from Leonard D. Wert dated March 27, 2009

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT - NRC SPECIAL INSPECTION
REPORT 05000325/2009008 AND 05000324/2009008

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 50-325, 50-324
License Nos.: DPR-71, DPR-62
Report Nos.: 05000325/2009008, 05000324/2009008
Licensee: Carolina Power and Light (CP&L)
Facility: Brunswick Steam Electric Plant, Units 1 & 2
Location: 8470 River Road, SE
Southport, NC 28461
Dates: January 20, 2009 through March 6, 2009
Inspectors: R. Berryman, P.E., Senior Reactor Inspector (Lead)
P. Fillion, Senior Reactor Inspector
G. Kolcum, Resident Inspector
Approved by: Leonard D. Wert, Director
Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000325/2009008, 0500324/2009008; 01/20/2009 - 03/06/2009; Brunswick Steam Electric Plant Unit 1 and Unit 2; Special Inspection.

This report documents special inspection activities performed onsite and in the Region II office by two senior reactor inspectors and a resident inspector to review the circumstances surrounding a potential loss of safety function due to a malfunction of the fuel rack limiting cylinders on Emergency Diesel Generators #3 and #4 on December 29, 2008, through January 1, 2009. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealing Findings

No findings of significance were identified.

B. Licensee-Identified Violations

Two violations of very low safety significance that were identified by the licensee have been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. These violations and corrective action tracking numbers are included in section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Events

On December 29, 2008, Emergency Diesel Generator (EDG) #3 experienced a starting time of 9.83 seconds as measured by a multi-amp timer during a monthly Technical Specifications (TS) Surveillance Test. The expected time was 8.4 to 8.8 seconds and the TS requirement was less than or equal to 10 seconds. Subsequent troubleshooting efforts identified that the slow start time was apparently due to misalignment of the EDG #3 right bank air start distributor valve. The licensee re-aligned the air start distributor valve and on December 31, 2008, EDG #3 was started and experienced a start time of 8.78 seconds. During this engine start, the licensee conducted detailed monitoring of EDG #3 and a new problem was observed in that the fuel rack limiter for EDG #3 did not disengage as expected when the engine speed increased to normal running speed. This condition could have limited the load carried by EDG #3 during accident conditions. EDG #3 was declared inoperable and troubleshooting efforts commenced on the EDG #3 fuel rack limiter. EDG #1, #2, and #4 were subsequently tested and it was discovered on January 1, 2009, that the fuel rack limiter for EDG #4 was also not disengaging as expected. EDG #1 and #2 exhibited normal behavior of the fuel rack limiter. The fuel rack limiting cylinder on EDG #3 had been replaced with a new replacement cylinder on November 3, 2008 and the fuel rack limiting cylinder on EDG #4 had been replaced with a new cylinder on June 26, 2007. Troubleshooting efforts revealed that the new replacement cylinders manufactured by the Miller Corporation had an appreciably weaker spring than the old cylinders manufactured by the Milwaukee Corporation that had been removed. The cylinder air bleed off needle valve was adjusted open to allow air pressure to bleed off more quickly to account for the affects of the weaker spring in the fuel rack limiting cylinder in EDG #4 and it was declared operable of January 1, 2009. The fuel rack limiting cylinder on EDG #3 was replaced with an old cylinder with a stronger spring which had been removed from EDG #4 in June 2007. EDG #3 was tested and declared operable on January 2, 2009.

Inspection Scope

Based on the deterministic and conditional risk criteria specified in Management Directive 8.3, "NRC Incident Investigation Program," a Special Inspection was initiated in accordance with NRC Inspection Procedure 93812, "Special Inspection Team." The inspection focus areas included the following special inspection charter items:

1. Develop a complete description of the problems experienced with the fuel rack limiting cylinders on EDG #3 and EDG #4 on December 29, 2008, through January 1, 2009. The description should include a timeline encompassing 2004 to present of fuel rack limiter failures and the circumstances surrounding the failures. The timeline should also include a maintenance history of the fuel rack limiting cylinders.
2. Develop a complete description of the problems with the starting air distributor on EDG #3. The description should include a time line encompassing 2004 to present of air starting distributor failures and the circumstances surrounding the failures.
3. Assess the effects (i.e., Under-voltage trip, etc.) on the ability of the EDG to perform the

Enclosure

intended safety function with the EDG fuel rack limiter not moving properly during an actual design basis accident loading sequence.

4. Review the licensee's corrective actions (CAs), root cause analysis and extent of condition associated with problems with the EDG starting air distributors and the EDG fuel rack limiting cylinders. Assess the adequacy of the licensee's implemented and/or planned CAs to address the root cause and the timeline for completing the CAs for both issues on both units.
5. Assess the adequacy of the licensee's post-maintenance testing after replacement of fuel rack limiter components in EDG #4 in June 2007, and EDG #3 in November 2008. Additionally, assess the licensee's review of extent of condition of any inadequate post-maintenance testing on all four EDGs.
6. Review any vendor documents or support provided regarding the EDG air starting distributor of fuel rack limiting cylinders, and determine if they were implemented effectively. Review industry operating experience (OE) and licensee's actions in response to any related OE items.
7. Review the licensee's actions with respect to compliance with TS requirements for two inoperable EDGs on December 31, 2008, and January 1, 2009.
8. Collect data necessary to develop and assess the safety significance of any findings in accordance with IMC 0609, "Significance Determination Process."
9. Identify any potential generic safety issues and make recommendations for appropriate follow-up actions (e.g., Information Notices, Generic Letters, and Bulletins).

4. OTHER ACTIVITIES

40A5 Other Activities – Special Inspection (93812)

- .01 Description of the problems experienced with the fuel rack limiting cylinders on EDG #3 and EDG #4 on December 29, 2008, through January 1, 2009, and a timeline encompassing previous failures (Charter Item 1)

Background Information

The four installed Nordberg EDGs have a fuel rack limiter that is designed to restrict the motion of the fuel rack to limit the amount of fuel injected into the engine during an engine start. The fuel rack limiter is designed to stop limiting fuel rack movement when engine speed reaches 257 rpm. This speed corresponds to one half of the normal engine running speed of 514 rpm. The fuel rack limiter is a limiting arm attached to a piston in a cylinder which lowers to restrict fuel rack motion when air pressure is applied. The limiter is raised when air pressure bleeds off and a spring pushes the piston upwards. During engine start, air is allowed into the fuel rack limiting cylinders to push downwards against the spring pressure. When engine speed reaches 257 rpm, the engine starting air solenoid valves automatically shut and the air pressure in the air start

Enclosure

header bleeds off. The air pressure in the fuel rack limiter cylinders then bleeds back into the air start header through a needle valve. This allows the piston to move upward and moves the fuel rack limiter out of the way to allow full engine power. The originally installed fuel rack limiter cylinders were manufactured by the Milwaukee Corporation. However, the design documentation of record (which is believed to be original) shows the fuel rack limiter cylinders were manufactured by the Miller Corporation. The procurement documents for replacement parts all reflected the Miller Corporation as the vendor for replacement fuel rack limiter cylinders.

The EDGs are required to be capable of being started and loaded in less than or equal to 10 seconds. The fuel rack limiters are designed to reset approximately 5-10 seconds after start initiation. This allows the EDGs to accept the required loads during accident conditions. A delay in the reset of the fuel rack limiter could potentially prevent the EDG from being able to carry the loads that will start during a design basis loss of coolant accident (DBLOCA) concurrent with a Loss of Offsite Power (LOOP).

Timeline

December 4, 2006

The licensee replaced valve 2-DSA-V179, EDG #3 fuel rack limiting cylinder flow control valve (needle valve) in accordance with work order (WO) 00967621. The replacement of this needle valve was scheduled and conducted as a preventative measure.

June 12, 2007

The licensee replaced valve 2-DSA-V178, EDG #2 fuel rack limiting cylinder flow control valve (needle valve) in accordance with WO 01033602. The replacement of this needle valve was scheduled and conducted as a preventative measure.

June 26, 2007

The licensee replaced the fuel rack limiter cylinder on EDG #4 with a new one from stock manufactured by the Miller Corporation in accordance with WO 01033642. The licensee had previously reviewed the Nordberg design documentation and identified Miller Corporation as the vendor for the fuel rack limiter cylinders from this documentation. The replacement of the fuel rack limiter cylinder was scheduled and conducted as a preventative measure due to component aging. The replacement was part of a reliability improvement effort which identified that the cylinders were original to plant construction and beyond any recommended preventative maintenance interval. No records of any previous fuel rack limiter cylinder failures were identified.

The licensee replaced valve 2-DSA-V180, EDG #4 fuel rack limiting cylinder flow control valve (needle valve) in accordance with WO 01033641. The replacement of this needle valve was scheduled and conducted as a preventative measure.

August 21, 2007

The licensee observed a starting time 0.4 seconds greater than normally observed on EDG #4 during performance of OPT-12.2.D, No. 4 Diesel Generator Monthly Load Test. This still satisfied the TS requirement of less than or equal to 10 seconds. The licensee generated NCR 243739 in response to this concern. The licensee's investigation attributed a stronger spring in the fuel rack limiting cylinder as one possible explanation for the longer EDG #4 starting time. No further analysis was documented regarding a conclusion regarding the strength of the spring in the fuel rack limiting cylinder of EDG #4.

October 23, 2007

The licensee replaced valve 2-DSA-V177, EDG #1 fuel rack limiting cylinder flow control valve (needle valve) in accordance with WO 010335871. The replacement of this needle valve was scheduled and conducted as a preventative measure.

May 27, 2008

The licensee adjusted the setting on needle valve 2-DSA-V180 (EDG #4) one-half turn open as part of the investigation for NCR 243739 after the trend of average EDG #4 start times increased from a range of 8.0 to 8.6 seconds to 8.8 to 9.2 seconds with less than or equal to 10 seconds being the TS requirement. This adjustment was performed in accordance with WO 1122816.

October 27, 2008

The licensee replaced the fuel rack limiter cylinder on EDG #2 with a new one from stock manufactured by the Miller Corporation in accordance with WO 01033603. The replacement was part of a reliability improvement effort which identified that the cylinders were original to plant construction and beyond any recommended preventative maintenance interval. No records of any previous fuel rack limiter cylinder failures were identified.

November 3, 2008

The licensee replaced the fuel rack limiter cylinder on EDG #3 with a new one from stock manufactured by the Miller Corporation in accordance with WO 01033628. The replacement was part of a reliability improvement effort which identified that the cylinders were original to plant construction and beyond any recommended preventative maintenance interval. No records of any previous fuel rack limiter cylinder failures were identified.

December 28, 2008

The licensee started EDG #3 for performance of monthly TS surveillance testing in accordance with procedure OPT-12.2C. The observed starting time was measured to be 9.99 seconds by stopwatch, 9.266 seconds by emergency response facility information

Enclosure

system (ERFIS), and 9.83 seconds by multi-amp with an acceptance criterion of less than or equal to 10 seconds. EDG #3 was not declared inoperable.

December 29, 2008

The licensee initiated NCR 312500 to investigate the slower than expected starting time for EDG #3.

December 31, 2008

(4:35 pm) The licensee started EDG #3 after discovering the right bank air starting distributor valve was 81.5 degrees retarded. The starting air distributor was re-aligned in accordance with WO 1472140 in an attempt to resolve the slower than expected starting time with EDG #3. During the post maintenance testing, several other engine parameters were monitored to verify normal operation. EDG #3 fuel rack limit cylinder was observed to not release (i.e., remained in the limit fuel rack position) until approximately 23 seconds after start initiation. Based on historical troubleshooting data, this cylinder was expected to release about 5 seconds after EDG start initiation (approximately 257 RPM). EDG #3 was declared inoperable in accordance with TS 3.8.1 and NCR 312819 was initiated to address the potential for common cause failure of all four EDGs.

(10:07 pm) The licensee replaced the fuel rack limiting cylinder on EDG #3 with another new one from stock manufactured by the Miller Corporation in accordance with WO 01472328 as part of troubleshooting efforts. The removed fuel rack limiting cylinder was quarantined for further forensic testing.

(10:07 pm) The licensee replaced valve 2-DSA-V179, EDG #3 fuel rack limiting cylinder flow control valve (needle valve) in accordance with WO 010335871 and WO 1472763 as part of troubleshooting efforts. The removed needle valve was not manipulated and was quarantined for further forensic testing.

January 1, 2009

(1:11 am) The licensee started EDG #3 to check for proper operation of the fuel rack limiter after installation of the new fuel rack limiter cylinder and needle valve in accordance with procedure OPT-12.2C. The fuel rack limiter was again observed to take 23 seconds versus the expected 5-10 seconds to reset.

(4:55 am) The licensee started EDG #2 to ensure proper operation of the fuel rack limiter. Operation was determined to be satisfactory.

(10:30 am) The licensee started EDG #1 to ensure proper operation of the fuel rack limiter. Operation was determined to be satisfactory.

(12:02 pm) The licensee started EDG #4 to ensure proper operation of the fuel rack limiter. EDG #4 fuel rack limiter did not release until approximately 14 seconds after the

Enclosure

EDG start was initiated versus the expected 5-10 seconds to reset. NCR 312868 was generated to evaluate the performance of EDG #4.

(2:30 pm) The licensee declared EDG #4 inoperable. In accordance with TS 3.8.1G (2 or more EDGs inoperable), the licensee was required to restore all but one EDG to operable status within two hours or place both units in Mode 3 in 12 hours and Mode 4 in 24 hours.

(2:50 pm) The licensee adjusted the setting on 2-DSA-179, EDG #3 fuel rack limiting cylinder flow control valve (needle valve) in accordance with WO 01472965 under engineering direction to attempt to achieve proper fuel rack limiter operation.

(3:14 pm) The licensee started EDG #3 and again observed unsatisfactory release time for the fuel rack limiter.

(4:00 pm) The licensee adjusted the setting on 2-DSA-180, EDG #4 fuel rack limiting cylinder flow control valve (needle valve) in accordance with WO 01472963 under engineering direction to ensure proper fuel rack limiter operation.

(4:32 pm) The licensee started EDG #4 and observed the fuel rack limiter to reset in 7 seconds which met the acceptance criteria of 5-10 seconds.

(5:55 pm) The licensee declared EDG #4 to be operable.

(9:06 pm) The licensee submitted Event Notification (EN) 44748 to the NRC for two inoperable EDGs.

(10:03 pm) The licensee bench tested the fuel rack limiting cylinder that was removed from EDG #2 on October 27, 2008 in accordance with WO 1472978. This cylinder had excessive seal leakage and was evaluated as not being suitable for re-use.

January 2, 2009

(12:09 am) The licensee bench tested both the fuel rack limiting cylinder manufactured by the Milwaukee Corporation that was removed from EDG #4 on June 26, 2007, and one of the newer cylinders manufactured by Miller Corporation that was received from stock in accordance with WO 1473147. The licensee determined that the spring force of the cylinder received from stock (Miller) was noticeably weaker than the old cylinder (Milwaukee) removed from EDG #4.

(3:46 am) The licensee installed the fuel rack limiting cylinder removed from EDG #4 onto EDG #3.

(7:50 am) The licensee started EDG #3 and observed the fuel rack limiter to reset in 7 seconds which met the acceptance criteria of 5-10 seconds.

(12:00 pm) The licensee adjusted the setting on 2-DSA-178, EDG #2 fuel rack limiting cylinder flow control valve (needle valve) in accordance with WO 01472965 under

Enclosure

engineering direction to ensure proper fuel rack limiter operation. This was conducted based on the determination that the new fuel rack limiting cylinder that was installed on EDG #2 on October 27, 2008, contained a weaker spring than the original cylinders. EDG #2 fuel rack limiting cylinder operation was verified to be proper by licensee observation during subsequent starting of EDG #2.

.02 Description of the problems with the air starting distributor on EDG #3 and a timeline encompassing 2004 to the present (Charter Item 2)

Background Information

The four installed Nordberg EDGs each have two air starting distributors. The air start distributor consists of an air distributor body that is fixed and an air distributor valve that rotates. Each air starting distributor ports air to air start pilot valves on eight of the 16 cylinders. The pilot valve in turn opens the air start valve for the associated cylinder and allows starting air to push down on the cylinder to start engine motion. The air distributor valve rotates to port air via the air distributor body and then to the pilot valves one cylinder at a time. The air distributor valve rotates and is driven by the engine accessory drive. The air distributor valve is designed such that it will port air to a cylinder when the cylinders is passing 5 percent past top dead center on the way down.

The air distributor valve is attached to a drive arm that rotates the valve around the air distributor body. This attachment is actually a shaft from the air distributor valve which fits into a hole in the drive arm and is held in place by an interference fit.

On April 23, 1973, Nordberg issued a design modification to the drive arm (part number 10770009) which modified it from Rev. 2 to Rev. 3. This revision included the addition of a setscrew to help prevent slippage of the air distributor valve shaft relative to the drive arm. Slippage of the air distributor shaft can adversely affect the timing of the introduction of starting air to the engine cylinders and lead to slower starting times or an inability to start the EDG.

During the 1970's, Nordberg sold their nuclear division to Cooper Energy Services. During the late 1980's to early 1990's, Cooper sold the Nordberg nuclear division to NAK, Inc. In 2006, NAK sold the Nordberg nuclear division to a consortium that includes Progress Energy and Engine Systems Inc. BNP received copies of all available original engine design documentation as part of this purchase.

Timeline

April 28, 1994

The licensee conducted troubleshooting on EDG #3 due to slower than normal starting times. The documentation retained by the licensee indicated that the left bank air distributor valve was discovered 80 degrees out of position. However, the licensee later concluded that this was actually the right bank air distributor valve that was affected.

June 3, 1994

The licensee received information from NAK Inc. regarding a design change for an addition of an optional setscrew into the air distributor valve drive arm (part number 10770009). The licensee did not implement this design change at this time.

April 8, 1996

The licensee conducted troubleshooting on EDG #3 due to a starting time of 10.45 seconds. This was determined to be due to a stuck 4L cylinder air pilot valve. The right bank air distributor valve was also discovered 15 degrees out of position. The right bank air distributor valve was returned to the correct position.

February 5, 2003

The licensee inspected the EDG #3 right bank air starting distributor for slippage due to a noted trend of longer starting times for EDG #3. EDG #3 right bank air starting distributor valve was found 20 degrees out of position. The right bank distributor valve was returned to the correct position.

April 28, 2003

The licensee started EDG #3 and observed a starting time of 9.07 seconds. Typical starting times were expected to be 8.5 to 8.8 seconds based on historical data. The licensee generated NCR 91903 due to the observed 3-4 degree slippage of the EDG #3 right bank air distributor. The investigation performed as part of NCR 91903 documented that it was possible that the EDG #3 drive shaft was slightly out of round, causing the drive arm clamp to rotate slightly, but was not verified due to the amount of disassembly and resulting EDG unavailability that would be required.

July 22, 2003

The licensee replaced the EDG #3 right bank air distributor valve drive arm with a new style drive arm with a set screw installed in accordance with WO 00413823. The inspectors noted that the post-maintenance testing (PMT) only included barring EDG and did not involve running to observe slippage. The drive arm that was removed was observed out of round and the slot was off center as compared to the new arm that was installed.

October 8, 2006

EDG #3 start time measured at 9.71 seconds by multi-amp timer during monthly surveillance testing. The TS requirement is less than or equal to 10 seconds. The licensee generated NCR 208626. The licensee conducted troubleshooting and discovered that the EDG #3 air start distributor valve had "offset slightly" in the drive arm. The exact number of degrees was not documented. The licensee generated Engineering Change (EC) 72244 to evaluate modification of the setscrew installation to provide a more robust attachment of the drive arm to the air distributor valve shaft.

Enclosure

December 4, 2006

The licensee checked the EDG #3 right bank air start distributor valve for proper timing in accordance with WO 967477. The EDG #3 right bank air distributor valve was found to be approximately one half-inch from the correct position and corrected. The exact number of degrees was not documented.

October 4, 2007

EDG #3 starting time was measured as 9.34 seconds by multi-amp timer during monthly surveillance testing. The licensee conducted troubleshooting and found the EDG #3 right bank air start distributor valve approximately 30 degrees retarded. The licensee generated NCR 249355.

December 29, 2008

EDG #3 starting time measured at 9.83 seconds by multi-amp timer during monthly surveillance testing. The licensee generated NCR 312500 and formed a troubleshooting team.

December 31, 2008

The licensee discovered the EDG #3 right bank air starting distributor valve was 81.5 degrees retarded during the troubleshooting of the slow starting time. The starting air distributor was re-aligned in accordance with WO 1472140. EDG #3 starting time was measured to be 8.78 seconds by a multi-amp timer during post-maintenance testing.

.03 Assess effects of problems with fuel rack limiting cylinders on ability of EDGs to perform the intended safety function (Charter Item 3)

a. Inspection Scope

The team reviewed EDG loading information contained in the updated final safety analysis report (UFSAR); BNP-E-7.010, Rev. 6, EDG Static and Dynamic Load Studies; selected pump control circuits; and other information to assess the kilowatt (kW) load carried by the EDGs at specified times after design-basis accidents. The team also reviewed the EDG #3 and #4 past-operability evaluations performed by the licensee as a result of the fuel rack limiter problems discovered on December 28, 2008, to verify that the conclusions were appropriate. The team reviewed completed EDG #3 and #4 testing data to verify that the licensee assumptions regarding EDG kW load carrying capabilities with the fuel rack in the limited position were appropriate. The team reviewed the transient analyses contained within the past-operability evaluations to verify that the methods used were appropriate and that the conclusions showed that the EDGs would have been able to maintain the licensing and design basis voltage and frequency while the fuel rack was in the limited position. The inspectors also observed the plant training simulator run a LOOP with EDG #3 failing at approximately 10 seconds after EDG #3 output breaker closure in order to observe modeled plant response and applicable operating procedures.

Enclosure

b. Findings

No findings of significance were identified.

Based on a review of the calculations, past-operability evaluations, and testing data discussed above, the team concluded that the issues with the fuel rack limiters on the EDGs from December 29, 2008 to January 1, 2009, would not have prevented them from performing their intended safety function.

.04 Review the licensee's corrective actions, root cause analysis, and extent of condition associated with problems with the EDG starting air distributors and EDG fuel rack limiting cylinders (Charter Item 4)

EDG Starting Air Distributors

a. Inspection Scope

The inspectors reviewed the apparent cause evaluations performed as part of NCRs 312500 and 312973 which addressed the issues involving slower than expected starting times, the slippage of the EDG #3 right side air start distributor valve in the drive arm, and organizational aspects of the issues. The inspectors also reviewed selected corrective action documents, condition reports, action items, and work orders to independently assess the conclusions and recommended actions of the licensee investigation. The inspectors verified that the licensee investigation evaluated start times and evidence of equivalent problems on the other three EDGs. The licensee had determined, based on the history of EDG starting times and air start distributor inspections on all four EDGs, that the slippage of the air start distributor valve in the drive arm was isolated to the EDG #3 right side air start distributor. The inspectors reviewed three years of starting time data on all four EDGs to independently assess whether start time problems were isolated only to EDG #3. The inspectors also reviewed vibration data from all four EDGs to verify that there was not evidence of a vibration causing the problems with the EDG #3 right side air start distributor.

b. Findings

No findings of significance were identified. However, one licensee-identified violation is discussed in Section 4OA7 of this inspection report.

The adverse condition investigations performed as part of NCRs 312500 and 312973 were finalized by the licensee during the week of 9-13 February, 2009. The team did not provide feedback or comments to the licensee regarding their conclusions until after the investigations were finalized. The adverse condition investigation performed as part of NCR 312500 did not conclude what the cause has been for the EDG #3 right side air distributor valve slipping relative to the drive arm, but, did put corrective actions in place to continue monitoring the starting times for EDG #3 and noted that the EDG #3 starting times have not exceeded the TS required starting time. The licensee's operability evaluation concluded that continued operation of EDG #3 until corrective actions could be completed was acceptable based on the fact that EDG #3 had never failed a TS

Enclosure

surveillance and that documented EDG #3 right side air distributor valve slippage relative to the drive arm was not exhibiting degradation in a manner indicative of an imminent failure. The adverse condition investigation performed as part of NCR 312500 also prescribed a corrective action to completely disassemble the EDG #3 right side air distributor to inspect and measure all components to verify proper tolerances. During the week of February 2-6, 2009, the licensee made a decision to scope the disassembly and inspection of the EDG #3 right side air distributor into a scheduled refueling outage in March 2009. The adverse condition investigation performed as part of NCR 312973 identified ineffective corrective actions as one of the causes of the problems with the EDG #3 right side air distributor. The adverse condition investigation performed as part of NCR 312973 associated with this issue also included actions to generate specific guidance for generating NCRs when safety-related equipment performance enters an identified "alert" range.

EDG Fuel Rack Limiting Cylinders

a. Inspection Scope

The inspectors reviewed the root cause evaluation performed as part of NCR 312500 which addressed the issues involving the problems the EDG fuel rack limiter cylinders experienced from December 28, 2008 through January 2, 2009. The inspectors reviewed selected corrective action documents, condition reports, action items, and work orders to independently assess the conclusions and recommended actions of the licensee investigation. The inspectors also reviewed the past availability and past operability evaluations for EDG #3 and EDG #4 to verify that there was reasonable assurance that the EDGs would have been capable of performing the intended safety function during a LOOP on both units with a concurrent DBLOCA on a single unit. The inspectors also reviewed the extent of condition assessments conducted to verify that they were appropriate.

b. Findings

No findings of significance were identified.

The inspectors noted that the root cause investigation had assigned an action to address the appropriate type of PMT to be performed after maintenance or replacement of the EDG fuel rack limiters. However, the root cause investigation did not address what type or frequency of test of the function of the EDG fuel rack limiters would be included in future surveillance testing to ensure proper operation. The inspectors also noted that the root cause evaluation identified that station procedures governing PMT were not well understood by Operations and Engineering Personnel and included actions to generate formal guidance for safety-related PMT. As a result, the licensee instituted a formal requirement for all safety-related PMT packages to be reviewed by Engineering.

.05 Assess the adequacy of the licensee's post-maintenance testing after replacement of fuel rack limiter components on EDG #4 in June 2007, and EDG #3 in November 2008 (Charter Item 5)

a. Inspection Scope

The inspectors reviewed WOs 01033642 and 01033628 which were implemented to replace the fuel rack limiter cylinders on EDG #3 and #4. The inspectors also reviewed EDG design basis documentation, calculations, and maintenance procedures. The inspectors reviewed the root cause investigation performed by the licensee as part of NCR 312876 to assess the adequacy of the investigation and the conclusions.

b. Findings

No findings of significance were identified. However, one licensee-identified violation is discussed in Section 4OA7 of this inspection report.

The fuel rack limiter cylinder for EDG #4 (2-DG4-STRT-FO-RK-LIM-CYL) was replaced on June 26, 2007, in accordance with WO 01033642. The fuel rack limiter cylinder for EDG #3 (2-DG3-STRT-FO-RK-LIM-CYL) was replaced on November 3, 2008 in accordance with WO 01033628. The replacement of these two fuel rack limiter cylinders was scheduled and conducted as a preventative measure due to component aging. The PMT specified in the WOs was to "verify proper operation" of the fuel rack limiter cylinders and did not specify testing which would verify the fuel rack limiters would have moved out of the limited position and allowed allow the EDGs to carry the expected loading at the required times following a LOOP on both units with a concurrent DBLOCA on a single unit. There was no requirement specified for timing or span of motion identified in the PMT and none was recorded. As a result, the PMT did not ensure that the fuel rack limiter cylinders would have allowed the EDGs to perform the intended safety function.

On December 29, 2008, the licensee conducted troubleshooting efforts on EDG #3 in response to a slower than expected starting time. During the engine start to verify that the starting time issues had been adequately resolved, the licensee conducted detailed monitoring of EDG #3 and a new problem was observed in that the fuel rack limiter for EDG #3 did not disengage as expected when the engine speed increased to normal running speed. The resulting significant adverse condition investigation performed as part of NCRs 312876 was finalized by the licensee during the week of 9-13 February, 2009. The team did not provide feedback or comments to the licensee regarding their conclusions until after the investigation was finalized. The significant adverse condition investigation performed as part of NCR 312876 identified inadequate PMT as one of the causes of the problems with the fuel rack limiters on EDG #3 and #4.

.06 Review any vendor documents or support provided regarding the EDG air starting distributor or fuel rack limiting cylinders (Charter Item 6)

a. Inspection Scope

The team reviewed the vendor manuals provided by the Nordberg Manufacturing Co. for the EDGs installed at the Brunswick plant. This was a four volume set which covered the EDGs themselves and all associated equipment. The team reviewed the licensee files of all correspondence from the EDG vendor. The team reviewed the Service Bulletins, Memorandums, and Design Policies from the Nordberg Manufacturing Co. which were in the possession of the licensee at the Brunswick plant. At the request of the team, the OE coordinator conducted searches of their documents for the key words "fuel rack" or "DG starting air," the results of which the team reviewed. The team also searched the NRC's Operating Experience Community database on EDGs which contained information dating from October 26, 2004, to the time of this inspection. The team searched the NRC's database for reports generated pursuant to 10 CFR 21 (Part 21 reports). The team interviewed the licensee's vendor interface program coordinator and reviewed his files on the EDGs.

c. Findings

No findings of significance were identified.

The OE review did not identify any references to the specific problems which are the subject of this Special Inspection.

The EDG vendor manuals contained pages covering the fuel rack limit cylinder which provided dimensions. However, the instruction book did not provide any definitive information on the reset time for the cylinder. The EDG vendor manuals also included engineering application data on the fuel rack limiting cylinder flow control valves (needle valves) which were manufactured by Westinghouse Air Brake Company. This included a description of how to adjust the rate of controlled flow and recommended maintenance. The manuals stated that actual settings must be determined by the user based on system requirements, but the manuals provided no detailed guidance on this topic. There appeared to be no detailed guidance on setting up or testing the EDG fuel rack limiters. A general description of EDG operation stated, "The fuel rack limit cylinder restricts the movement of the fuel rack to a position which will not over fuel in proportion to air available at start."

The current vendor for the Nordberg EDGs is Engine Systems Inc. (ESI). Extensive technical expertise is available through ESI for the EDGs. As the owner of the nuclear Nordberg EDG design, ESI has the complete documentation and dedication files from the previous two Nordberg nuclear design owners. ESI has an approved quality program, is on Progress Energy's approved supplier listing, and was audited by the NRC (reference Docket Number 9901362, Inspection Report Number 99901362/2006-201). Technical expertise has been available from multiple industry consultants with a wide range of diesel expertise. The licensee has had contracts in place with numerous

Enclosure

companies and individual expert consultants to provide technical guidance or fabrication activities.

Brunswick and McGuire are the only two operators in the United States that utilize Nordberg EDGs in nuclear safety-related applications. Progress Energy and Duke Power Corporation are partnered with ESI as owners of the Nordberg nuclear EDG design and share information regarding the Nordberg EDGs. This provides Progress Energy with the availability of shared resources and access to a spare Nordberg diesel at the McGuire nuclear plant for training and troubleshooting. Also, operating experience gained from McGuire provides immediate feedback and alert on key diesel issues or previous maintenance activities.

.07 Review of licensee actions with respect to compliance with TS requirements for two inoperable EDGs on December 31, 2008, through January 1, 2009 (Charter Item 7)

a. Inspection Scope

The inspectors reviewed the TS, TS bases, NCRs, and operating logs to verify that the licensee complied with the TS requirements for two inoperable EDG on December 31, 2008, through January 1, 2009.

b. Findings

No findings of significance were identified.

.08 Collect data necessary to develop and assess the safety significance of any findings in accordance with IMC 0609, "Significance Determination Process (Charter Item 8)

a. Inspection Scope

The inspectors reviewed licensee surveillance test procedures, CRs, WOs, root cause evaluations, operability assessments, engineering evaluations, maintenance procedures, and operating experience information to gather data necessary to develop and assess the safety significance of any findings.

b. Findings

Two licensee-identified violations are listed in Section 4A07 of this inspection report.

.09 Identify any potential generic safety issues and make recommendations for appropriate follow-up actions (e.g., Information Notices, Generic Letters, Bulletins) (Charter Item 9)

a. Inspection Scope

The inspectors reviewed the licensee's internal operating experience database, root cause evaluation, CRs, WOs, and the NRC Operating Experience (OpE) database to determine the potential for generic safety issues related to the problems with the EDG fuel rack limiting cylinders or starting air distributors.

Enclosure

b. Findings

No findings of significance were identified. Based on the information reviewed, the inspectors did not identify any generic safety issues.

40A6 Meetings, Including Exit

On February 13, 2009, the special inspection team leader presented the preliminary inspection results to Mr. Benjamin C. Waldrep, Brunswick Steam Electric Plant Vice President, and members of his staff. Subsequently, additional in-office reviews were conducted and the final inspection results and preliminary significance determination were discussed by telephone with Mr. Michael Annacone, Brunswick Steam Electric Plant Director of Site Operations, and members of his staff on March 6, 2009. The licensee acknowledged the inspection findings. No proprietary information is included in this inspection report.

40A7 Licensee-Identified Violations

The following violations of very low safety significance (Green) were identified by the licensee and are a violation of NRC requirements which meet the criteria of Section VI.A.1 of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as NCV's.

- .01 Technical Specification 5.4.1, Administrative Control (Procedures), requires that written procedures shall be established, implemented, and maintained covering applicable procedures recommended in Regulatory Guide 1.33, Appendix A, November 1972 (Safety Guide 33, November 1972). Section I (1) of Regulatory Guide 1.33 (Safety Guide 33, November 1972), states, in part, that maintenance which can affect the performance of safety-related equipment should be properly preplanned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. Contrary to the above, PMT procedures generated for WO 01033642 and 01033628 were not appropriate to the circumstances in that they did not contain clear direction for the PMT which resulted in testing which did not verify that the fuel rack limiters were operating in accordance with the design basis of the EDGs. The fuel rack limiter cylinder for EDG #4 (2-DG4-STRT-FO-RK-LIM-CYL) was replaced on June 26, 2007, in accordance with WO 01033642. The fuel rack limiter cylinder for EDG #3 (2-DG3-STRT-FO-RK-LIM-CYL) was replaced on November 3, 2008, in accordance with WO 01033628. The replacement of the fuel rack limiter cylinders was scheduled and conducted as a preventative measure due to component aging. The PMT specified in the WOs was to "verify proper operation" of the fuel rack limiter cylinders. There was no requirement specified for timing or span of motion identified in the PMT and none was recorded. This issue is more than minor because it affects the Mitigating Systems Cornerstone objective of ensuring the availability, reliability, and operability of the EDGs to perform the intended safety function during a design basis event and the cornerstone attribute of Procedure Quality, i.e. maintenance and testing (Pre-event). The inspectors assessed the finding using the SDP and determined that the finding was of very low safety significance because the deficiency did not result in EDG #3 or EDG #4 being inoperable based upon additional analysis which showed that the EDGs could have performed the intended safety function with the observed slow disengagement of the fuel

Enclosure

rack limiter. This issue has been entered into the licensee corrective action program as NCR 312876.

- .02 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, states, in part, that measures shall be established to assure that conditions adverse to quality, such as deficiencies and deviations are promptly identified and corrected. Contrary to the above, the licensee did not take actions to correct the slippage of the EDG #3 right bank air distributor valve which was discovered on at least eight occasions from April 28, 1994, to December 28, 2008. This issue is more than minor because it affects the Mitigating Systems Cornerstone objective of ensuring the availability, reliability, and operability of the EDGs to perform the intended safety function during a design basis event and the cornerstone attribute of Equipment Performance, i.e. availability and reliability. The inspectors assessed the finding using the SDP and determined that the finding was of very low safety significance because the deficiency did not result in EDG #3 being inoperable based upon a review of documented EDG #3 starting times. This issue has been entered into the licensee corrective action program as NCR 312973.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

J. Anderson, Lead Diesel Generator System Engineer
M. Annacone, Director Site Operations
E. Armakovitch, Maintenance Mechanic
G. Atkinson, Supervisor - Licensing/Regulatory Programs
J. Burke, Operations Shift Supervisor
P. Flados, Lead Design Engineer
S. Gordy, Supervisor – Operations Shift Manager
J. Harrell, Diesel Generator Project Manager
J. Pierce, Operations Control Room Supervisor
J. Rau, Operations Training Instructor
W. Richardson, Diesel Generator System Engineer
T. Sherrill, Licensing Senior Technical Specialist
N. Smith, Supervisor – Electrical/I&C Systems
B. Waldrep, Site Vice President
K. Welch, Systems Engineering Superintendent

NRC Personnel

Randall A. Musser, Chief, Reactor Projects Branch 4, Division of Reactor Projects Region II

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

None.

Closed

None.

Opened

None.

LIST OF DOCUMENTS REVIEWED

Design Basis Documents and System Descriptions

SD-39, Emergency Diesel Generators, Rev. 7

Procedures

0AI-144, Risk Management

0ENP-2704, Administrative Control of NRC Generic Letter 89-13 Requirements, Rev 16

0MST-DG11R, DG-1 Loading Test, Rev. 5

0MST-DG12R, DG-2 Loading Test, Rev. 6

0MST-DG13R, DG-3 Loading Test, Rev. 7

0MST-DG14R, DG-4 Loading Test, Rev. 7

0MST-DG500R, Emergency Diesel Generators 24 Month Inspection, Rev. 26

0OP-50.1, Diesel Generator Emergency Power System Operating Procedure, Rev. 72

0PLP-20, Post Maintenance Testing Program, Rev. 34

0PT-09.8, HPCI System Coupled Overspeed Trip Test, Rev. 1

0PT-12.2C, No. 3 Diesel Generator Monthly Load Test, Rev. 91

0PT-12.2D, No. 4 Diesel Generator Monthly Load Test, Rev. 97

ADM-NGGC-0006, Online EOOS Model, Rev. 6

ADM-NGGC-0101, Maintenance Rule Program, Rev. 20

ADM-NGCC-0104, Work Management Process, Rev 32

EGR-NGGC-0005, Engineering Change, Rev. 28

EGR-NGGC-0011, Engineering Product Quality, Rev. 12

OPS-NGGC-1305, Operability Determinations, Rev. 1

OPS-NGGC-1307, Operational Decision Making, Rev. 2

Completed Test Procedures

0MST-DG11R, DG-1 Loading Test, performed April 15, 2008

0MST-DG12R, DG-2 Loading Test, performed April 20, 2008

0MST-DG13R, DG-3 Loading Test, performed April 10, 2007

0MST-DG14R, DG-4 Loading Test, performed April 9, 2007

0PT-10.1.8, RCID System Valve Operability Test, performed April 18, 2007 and July 26, 2007

0PT-10.1.1, RCIC System Operability Test, performed April 18, 2007

0PT-12.2C, No. 3 Diesel Generator Monthly Load Test, performed December 1, 2008

0PT-12.2D, No. 4 Diesel Generator Monthly Load Test, performed November 13, 2008

Drawings

0-FP-20014, Engine Pneumatic Control Schematic, Rev. C

D-02265, sheets 1A and 1B, drawing D-02266, sheets 2A and 2B, Piping Diagram for Diesel Generators Starting Air System Units 1 and 2, Rev. 19

D-02268, sheets 1A and 1B, drawing D-02269, sheets 2A and 2B, Piping Diagram for Diesel Generators Fuel Oil System Units 1 and 2, Rev. 28

F-03003, 4160V Emergency System Switchgear E3 & E4 Auxiliary One Line Diagram, Rev. 15

F-03004, 4160V Emergency System Switchgear E1 & E2 Auxiliary One Line Diagram, Rev. 15

F-09118, DG-3/E-3 Division I Engineered Safeguard System Logic Cabinet H60 Control Wiring Diagram Sheet 1, Rev. 25

LL-09111, Nuclear Service Water Pump 1A Control Wiring Diagram Sheet 41, Rev. 12

LL-09111, Nuclear Service Water Pump 1A Cable Diagram Sheet 43, Rev. 14

LL-09113, Residual Heat Removal Pump 2A Control Wiring Diagram Sheets 29 and 30, Rev. 7

LL-09114, Emergency Diesel Generator No. 4 Breaker Control Wiring Diagram Sheet 12, Rev. 10
 LL-09114, Emergency Diesel Generator No. 4 Breaker Control Wiring Diagram Sheet 12A, Rev. 12
 LL-09114, Emergency Diesel Generator No. 4 Breaker Control Wiring Diagram Sheet 13B, Rev. 6
 Nordberg Part Drawing 28620722, Rev. A
 Nordberg Part Drawing 83576531, Air Distributor Body, Rev. I
 Nordberg Part Drawing FS40450-1, Air Distributor Valve, Rev. C

Calculations

2270-0006-01, Brunswick No. 3 EDG Operability Evaluation, Rev. 2
 2270-0006-02, Brunswick No. 4 EDG Operability Evaluation, Rev. 1
 BNP-E-7.010, Emergency Diesel Generator Static and Dynamic Load Study (Attachment B, Cases 3,4,and 7; and Attachment C, Cases 3 and 4), Rev. 6
 EDG 4 Past Operability Evaluation Due to Fuel Rack Limit Cylinder Impairment (Ref. AR 312916), January 16, 2009
 Calculation of Maximum Starting Load (kW) on EDG 3 Upon Bus E3 Initial Energization during LOCA/LOOP and SBO, dated January 27, 2009

Corrective Action Documents

NCR 67121, 2-DSA-V88 IST Failure to Close, July 23, 2002
 NCR 91903, DG 3 Right Bank Air Distributor Drift, April 28, 2003
 NCR 107271, Maintenance Rule Tracking for 2-DSA-V88, October 12, 2003
 NCR 138067, 2-DSA-V70 Rework, September 22, 2004
 NCR 208626, EDG #3 Start Time Approached 10 Seconds, October 8, 2006
 NCR 234482, Unplanned LCO Entry – EDG #4 Inoperable, May 29, 2007
 NCR 243739, Evaluate DG 4 Start Times, August 21, 2007
 NCR 249355, EDG #3 Slow Start Time, October 4, 2007
 NCR 253523, Oil Found in EDG #3 Left Bank Air Distributor Filter, November 6, 2007
 NCR 271611, Adverse Trend in BNP Service Water Performance, March 22, 2008
 NCR 312500, DG 3 Start Times per OPT-12.2.C Close to Acceptance Criteria, December 29, 2008
 NCR 312819, Common cause evaluation for DG 1, 2 AND 4, December 31, 2008
 NCR 312854, DG #3 fuel rack limiter cylinder, January 1, 2009
 NCR 312868, OCR from Engineering to Evaluate Fuel Rack on EDG #4, January 1, 2009
 NCR 312876, Short Duration LCO Entry on EDG #3 and #4, January 1, 2009
 NCR 312916, Diesel Generator Fuel Rack Limiter Cylinder Springs, January 2, 2009
 NCR 312969, 2-DG1-CS-2SS intermittent operation, January 2, 2009
 NCR 312971, DG Fuel Rack Limit Cylinder/Needle Valve Setup, January 2, 2009
 NCR 312973, NCR Not Written When DG 3 Start Time Entered the Alert Range, January 2, 2009

Work Orders

192495-15, Obtain Fuel Rack Position Versus EDG #4 Load, April 1, 2007
 967477, 2-DG3-ENG, Check Air Distributor Timing, December 4, 2006
 00413823, Replace Right Bank Air Distributor Drive Arm with New Style, July 18, 2003

00967621, 2-DSA-V179: Replace DG3 Starting Fuel Rack Limit Cylinder Flow Control Valve, December 4, 2006
 01033587, 2-DSA-V177: Replace DG1 Starting Fuel Rack Limit Cylinder Flow Control Valve, October 23, 2007
 01033602, 2-DSA-V178: Replace DG2 Starting Fuel Rack Limit Cylinder Flow Control Valve, June 12, 2007
 01033603, DG2 Fuel Oil Rack Limiter Cylinder Replacement, March 21, 2008
 01033628, DG3 Fuel Oil Rack Limiter Cylinder Replacement, September 10, 2008
 01033641, 2-DSA-V180: Replace DG3 Starting Fuel Rack Limit Cylinder Flow Control Valve, June 26, 2007
 01033642, DG4 Fuel Oil Rack Limiter Cylinder Replacement, June 18, 2007
 01053018, DG4 Fuel Rack Reading 4-5 MM in Standby Condition, June 5, 2007
 01122816, 2-DSA-V180 Adjust Orifice Setting, May 27, 2008
 01472140, Inspect EDG #3 Air Distributor Arms, December 31, 2008
 01472328, Replace EDG #3 Fuel Oil Rack Limiting Cylinder, December 31, 2008
 01472763, 2-DSA-V179: Replace DG3 Starting Fuel Rack Limit Cylinder Flow Control Valve, December 31, 2008
 01472965, 2-DSA-V179: Adjust Needle Valve Per Engineer Direction (DG3), January 1, 2009
 01473214, 2-DSA-V178: Adjust Needle Valve Per Engineer Direction (DG2), January 2, 2009
 01472963, 2-DSA-V180 Adjust Needle Valve Per Engineer Direction, January 1, 2009
 01472978, 2-DG2-STRT-FO-RK-LIM-CYL, Bench Test 69931061; Disassemble/Reassemble Cylinder, January 2, 2009
 01473147, 2-DG4-STRT-FO-RK-LIM-CYL, Bench Test Old Cylinder, January 2, 2009

Engineering Changes

EC52886, Addition of Setscrew to EDG Drive Arm, Rev. 0

Miscellaneous

Brunswick SIT Document Request, ADAMS accession number ML090150537, dated January 13, 2009
 CO 185085, DG#3 air distributor troubleshooting
 CO 185083, DG#3 fuel rack limiter troubleshooting
 DG3 Fuel Rack Limit Cylinder Delayed Operation Fault Tree
 Facsimile Transmission from NAK Engineering Subj: Air Distributor Shaft and Drive Arm, June 3, 1994
 FP-20322, Diesel Engine Instruction Manual, Rev. L
 FP-20323, Diesel Engine Parts Manual, Rev. R
 FP-20326, Diesel Engine Auxiliary Bulletins, Rev. V
 FP-20327, Diesel Engine Auxiliary Bulletins, Rev. AC
 NRC Request for Documents (ML 090150537), dated January 13, 2009
 Memo from Diesel Root Cause Team to David Wells Subj: Rack Limit Air Cylinder Review, January 13, 2009
 Woodward Governor Company Product Specification 37738A, EGB-10C, 13C & 35C Governor/Actuator, Rev. 87/09/F

Corrective Action documents initiated due to SIT activity

NCR 316327, WO 1479676 Work Instructions/Completion Documentation Inadequate