

March 7, 2006

MEMORANDUM TO: Mary Jane Ross-Lee, Chief  
Operating Experience Branch  
Division of Inspection and Regional Support  
Office of Nuclear Reactor Regulation

FROM: Eric J. Benner, Team Leader */RA/*  
Clearinghouse Team  
Operating Experience Branch  
Division of Inspection and Regional Support  
Office of Nuclear Reactor Regulation

SUBJECT: CLOSURE MEMORANDUM: ISSUE FOR RESOLUTION 2005-083:  
"EVALUATION: PART 21 - ENGINE SYSTEMS - GOVERNOR DRIVE  
COUPLING ELEMENT"

The staff from Operating Experience Branch (IOEB) and Component Performance Branch (CPTB) of Office of Nuclear Reactor Regulation (NRR) have completed their evaluation of the Issue for Resolution (IFR) 2005-083: "Evaluation: Part 21 - Engine Systems - Governor Drive Coupling Element." Based on staff's review of the information provided by the licensee (ADAMS Accession Number ML052650354) and the information received from potentially affected licensees – Grand Gulf, River Bend, Perry, Vogtle, Shearon Harris, and Comanche Peak, the staff concludes that the issue of governor drive coupling element has adequately been investigated by the supplier and corrected by the affected licensees, and is not of safety-significance. Staff concludes that all the affected plants have taken timely and appropriate actions to replace potentially affected coupling elements.

Additionally, this operating experience has been captured in the Reactor Operating Experience database for future tracking and trending purposes.

Based on the staff's evaluation, the Operating Experience Branch has closed IFR 2005-083, and associated TAC MC8519, in accordance with NRR Office Instruction LIC-401.

Enclosure:  
Staff Evaluation of Issue for Resolution 2005-083: "Evaluation: Part 21 - Engine Systems - Governor Drive Coupling Element."

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**Staff Evaluation of the Issue for Resolution (IFR) 2005-083,  
“Part21- Engine Systems - Governor Drive Coupling Element”**

Purpose of Evaluation

The purpose of this evaluation is to document the evaluation of potential defect with Engine Systems Inc. (ESI) governor drive coupling element and its significance, as well as to make recommendations for applying the lessons learned.

Description of the Issue

In June 2005 the Shearon Harris plant removed a coupling element from their diesel engine and observed the material to be swollen and deformed. A subsequent technical report provided by the site's Materials Services Section found the material composition of the element to be isoprene (natural rubber). The design of the coupling specifies the material to be polychloroprene (neoprene). The isoprene material is not suitable for the high temperature, oil rich environment of the engine gear case and is susceptible to failure after prolonged exposure.

In its September 9, 2005 letter (ADAMS Accession Number ML052650354), ESI informed NRC that it had supplied the governor drive coupling element, P/N AK-007-001, to several utilities that were fabricated from an incorrect material. The coupling assembly is used on a vertical drive shaft to transmit power from the engine gear train to the governor in order to allow engine speed sensing and regulating capability. Failure of the element would cause the coupling assembly to fail which would result in inoperability of the governor. In its letter, ESI indicated that it had supplied potentially incorrect coupling elements to Grand Gulf, River Bend, Perry, Vogtle, Shearon Harris, and Comanche Peak nuclear plants.

Significance Evaluation

NRC staff contacted the licensees of the Grand Gulf, River Bend, Perry, Vogtle, Shearon Harris, and Comanche Peak nuclear plants to determine whether the ESI's governor drive coupling element P/N AK-007-001 had been installed in any diesel generators and to inquire about licensees actions for the replacement of the defective governor drive coupling elements.

The Shearon Harris licensee confirmed that it had received ESI coupling elements made from isoprene rather than neoprene and that it had replaced with neoprene couplings on both emergency diesel generators (EDGs) in Fall 2005.

The Vogtle licensee confirmed that they had received ESI coupling elements made from isoprene but they were never installed. The licensee also confirmed that the elements were removed from the warehouse and returned to the manufacturer for replacement.

The Grand Gulf licensee confirmed that they had received two coupling elements subject to this Part 21. One of these elements was removed from stock and returned to vendor. The second element is installed on the Division I Diesel Generator. This coupling element installed on the Division I EDG is planned for replacement during a system outage in May 2006.

Enclosure

The River Bend licensee confirmed that the incorrect material (isoprene vs. the correct neoprene) has been used in River Bend Station's since December 2003 for Division 2, and January 2004 for Division 1. River Bend also confirmed that condition report (CR) RBS-2005-03279 tracks the replacement of the coupling and that the replacement of the couplings for both Division 1 and 2 EDGs is currently scheduled for May 2006.

The Perry licensee confirmed that they have not installed any of ESI's EDG governor susceptible material into the EDGs. Three elements were procured on 11/18/02. Two of these were installed and one was placed into spares. The laboratory test results confirmed the spare from this order is a neoprene material. Six additional elements were purchased in September 1994 and March 2005. The laboratory test results indicated an isoprene blend. These are in still inventory and have not been installed.

The Comanche Peak licensee confirmed that they had installed ESI coupling elements made from isoprene on both Units' EDGs. They also confirmed that the elements on both Unit 1 EDGs were replaced during 1RF11 refueling outage in Fall 2005 and the elements on the Unit 2 EDGs are currently scheduled to be replaced during 2RF09 refueling outage in Fall 2006.

#### Operating Experience History

Transamerica Delaval issued a 10 CFR Part 21 report on 6/23/82 which indicated that a potential defect existed for isoprene couplings, and that they should be replaced with neoprene couplings. An operating experience (OE) search was conducted by NRC Region II on the INPO Web Site for governor drive coupling failures or events. The following events were specifically reviewed, and none of the events were caused by improper coupling material: LER 96-010-00 (EDG Governor Failure), OE6098 (EDG Booster Pump Coupling Failure), OE 10395 (EDG Fan Shaft Coupling Failure).

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#### Staff Conclusion and Recommendation

ESI has informed all of its customers of this condition and recommended that they inspect and remove from their inventory any coupling element made from isoprene, or replace them if any isoprene elements had been installed on their EDGs. Additionally, ESI has informed its customers that it would provide replacement elements free of charge until December 31, 2005.

NRC staff issued a morning report ([H-2005-0023](#)) when first became aware of this condition on August 12, 2005. Subsequently, staff issued a second morning report ([H-2005-0024](#)) on September 26, 2005, after ESI concluded its investigation and issued a 10 CFR Part 21 report.

Staff concludes that the ESI has correctly identified the root cause of this condition and has made appropriate recommendations to its customers to investigate and replace suspected elements. Additionally, staff has confirmed with affected licensees that they are aware of this condition and have and/or planned for replacing unsuitable coupling elements. The staff does not recommend any generic communication or further action.

Additionally, this operating experience has been captured in the Reactor Operating Experience database for future tracking and trending purposes.

Based on the staff's evaluation, the Operating Experience Branch has closed IFR 2005-083, and associated TAC MC8519, in accordance with NRR Office Instruction LIC-401.