ENGINE SYSTEMS, INC.
1220 S. Washington St., Rocky Mount, NC 27801
P.O. Box 1928, Rocky Mount, NC 27802-1928
Telephone: 252/977-2720
Fax: 252/446-1134

June 11, 2003

U.S. Nuclear Regulator Commission
Document Control Desk
Mail Stop 0P1-17
Washington, DC 20555

Subject: 10CFR21 Reporting of Defects and Non-Compliance -
Engine Systems, Inc. Report No. 10CFR21-0087, Rev. 0

EMD Electric Start Motors at Oyster Creek

Dear Sir:

The enclosed report addresses a reportable notification about EMD electric start motors at Oyster Creek (manufactured in 1999) – P/N 10478830.

A copy of the report has also been sent to the NRC.

Please sign below, acknowledging receipt of this report, and return a copy to the attention of Document Control at the address above (or, fax to number 252/446-1134) within 10 working days after receipt.

Yours very truly,

ENGINE SYSTEMS, INC.

Susan Woolard

Susan Woolard
Document Control

Please let us know if ANY of your mailing information changes - name of recipient, name of company/facility, address, etc. Mark the changes on this acknowledgment form and send to us by mail or FAX to the number above.

RECEIVED: _____

(93)

DATE: _____

IE19

ENGINE SYSTEMS, INC.
1220 S. Washington St., Rocky Mount, NC 27801
P.O. Box 1928, Rocky Mount, NC 27802-1928
Telephone: 252/977-2720
Fax: 252/446-1134

Report No. 10CFR21-0087
Rev. 0: 06/11/03

10CFR21 REPORTING OF DEFECTS AND NON-COMPLIANCE

COMPONENT: EMD Electric Start Motors at Oyster Creek (manufactured in 1999). P/N 10478830

SYSTEM: EMD diesel generators at Oyster Creek

CONCLUSION: Reportable in accordance with 10CFR21.

Prepared By: _____ Engineering Manager Date: 6/11/03

Reviewed By: Michael Nudig Quality Assurance Manager Date: June 11, 2003

REV	DATE	PAGE	DESCRIPTION

COMPONENT:

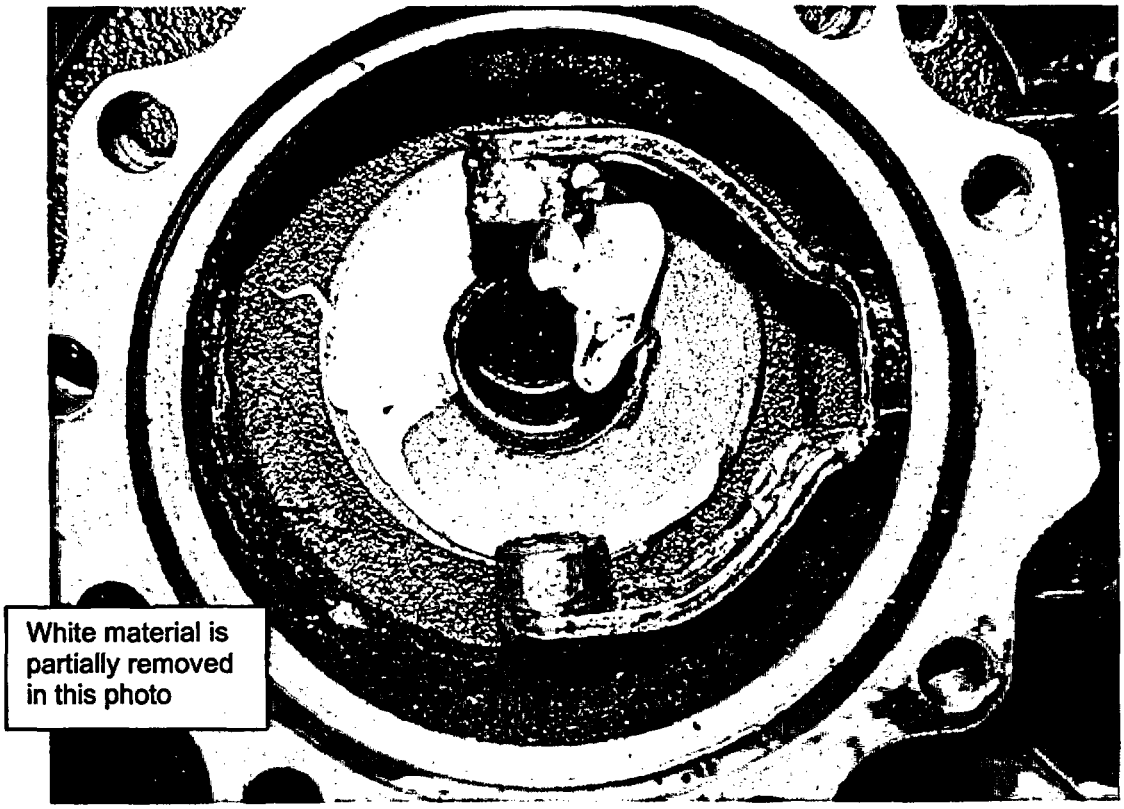
EMD electric start motors, P/N 10478830 manufactured in 1999.

SUMMARY:

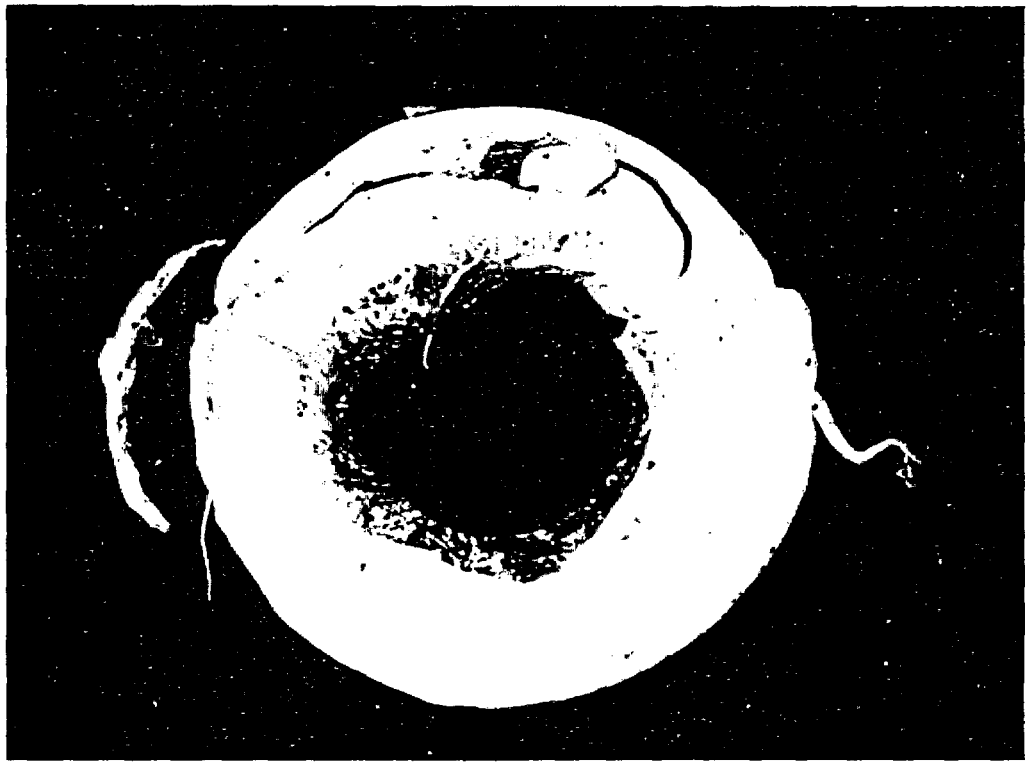
Engine Systems Inc. (ESI) has concluded an investigation of a condition reported with an EMD electric start motor. Oyster Creek Generating Station purchased 4 electric start motors from ESI on their PO 0744183 in 1999. One of these starters, p/n 10478830, s/n 05D99 was returned to ESI for failure analysis. Reportedly the starter, having been in the site's inventory since receipt, was bench tested and the starter drive or "Bendix" did not extend properly from rest upon application of voltage to the solenoid. ESI performed functional testing and inspection of the starter. Inspection revealed that the starter drive brake washer had adhesive applied to both sides (normally, only one side has adhesive). This caused the brake washer and starter drive to "stick" to the lever housing; thus preventing the starter drive from operating properly.

DISCUSSION:

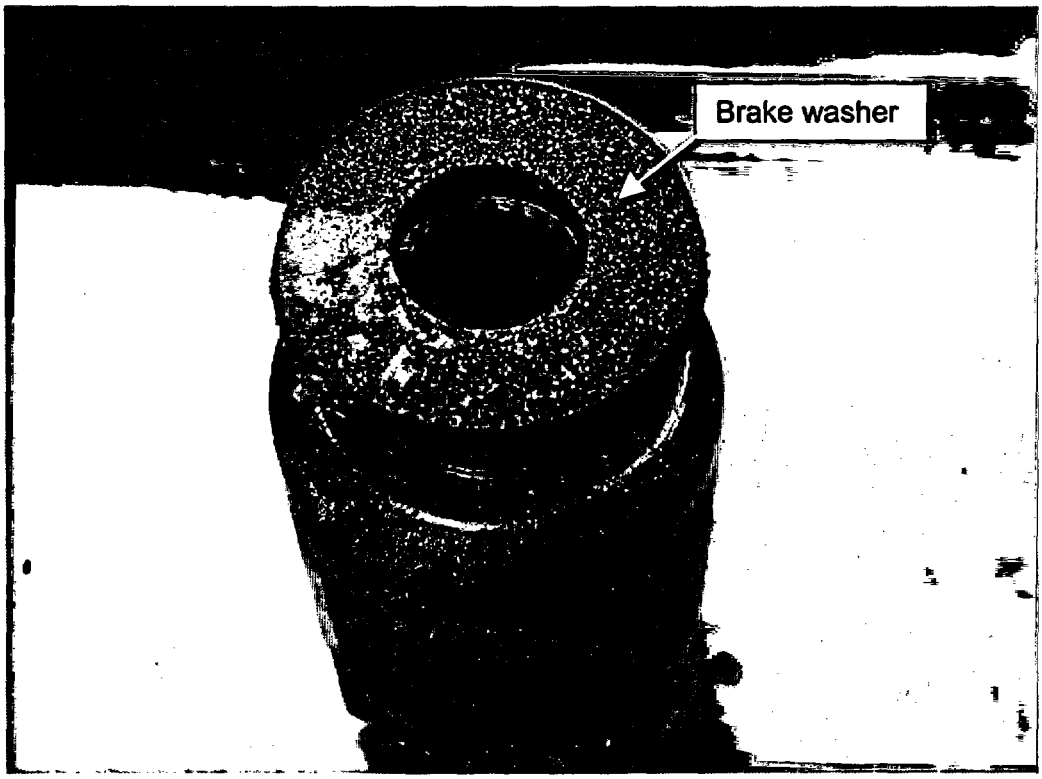
Upon removal of the Bendix assembly from the starter, a white opaque ring of material was found adhered to the lever housing. This material was in a position such that the Bendix assembly would rest against it in the de-energized state.



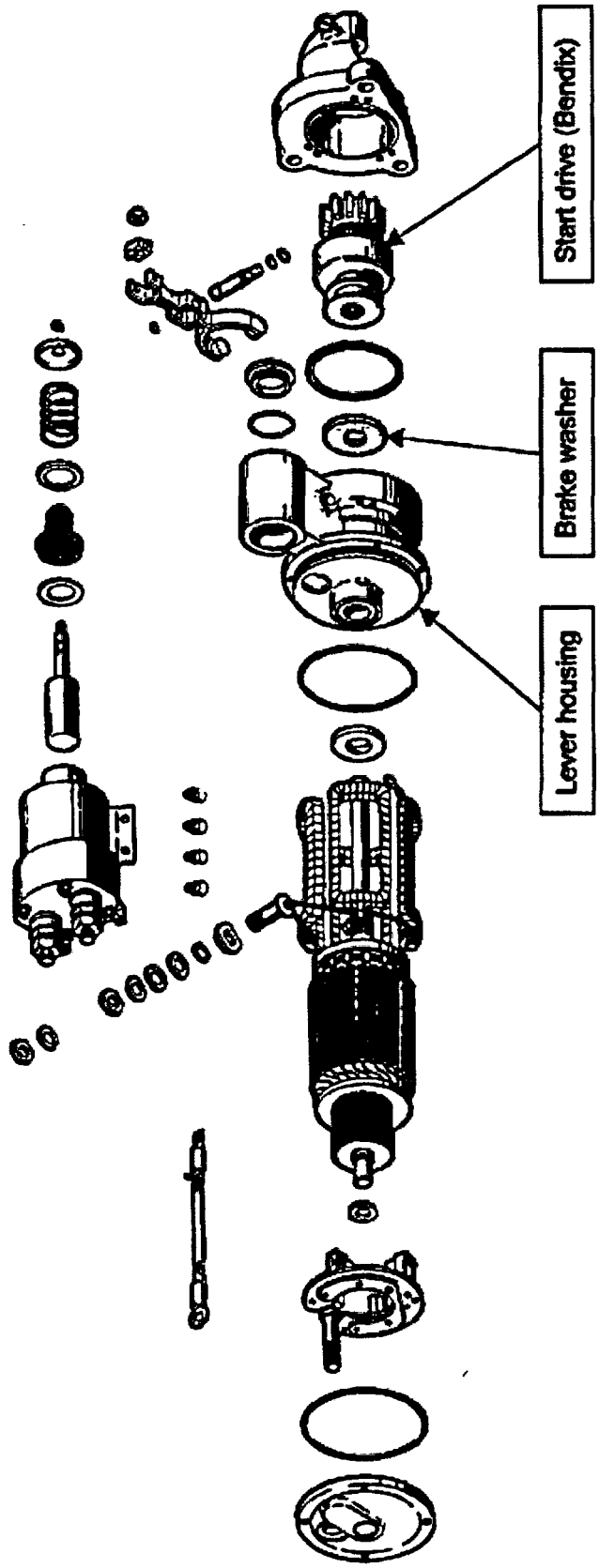
Internal view of lever housing, Bendix removed



White material removed from lever housing



Non-drive end of Bendix assembly, brake washer surface


Start drive (Bendix)
Brake washer
Lever housing

The function of the brake washer is to slow down the starter's armature after the engine starts and the pinion disengages. This reduces the starter's coast down time and conserves brush life.

ESI contacted the manufacturer, Delco Remy, to discuss the findings. The representative reviewed photos of the material found and determined it was an RTV adhesive formerly used to adhere the brake washer. Delco Remy's practice is to either adhere the brake washer to the lever housing or to the Bendix assembly. In the early 1980's, RTV was used exclusively to adhere the brake washer. In 1986, their sub-supplier applied a mastic type adhesive on the brake washer. Sometimes the pre-applied adhesive did not provide sufficient bond strength, so RTV was used occasionally as a supplemental adhesive. At some point in 1999, the manufacturer stated that they had a process problem in which the brake washer was installed in the standard manner, but RTV was applied to the opposite side also. Delco Remy could not confirm the exact dates of this problem, but they estimate that it occurred only over a 2 week period. In April, 2001 a stronger adhesive was applied by the brake washer sub-supplier and the use of RTV was eliminated.

Because the process problem date could not be obtained from the manufacturer, all starters with 1999 serial numbers are considered suspect.

CONCLUSION:

Improper operation of the starter's drive assembly was caused by the presence of silicone RTV adhesive on the face of the lever housing. In this starter assembly, the brake washer was apparently adhered to the Bendix assembly using the pre-applied adhesive while RTV was applied to the lever housing and/or to the opposite face of the brake washer. The RTV surface maintained a sticky finish relative to the face of the brake washer, and this led to higher than normal required forces to separate the two. Therefore, with normal test voltage applied to the starter's solenoid, the Bendix would not engage.

After removal of the improperly applied RTV, the Bendix assembly operated properly.

CUSTOMERS AFFECTED:

ESI has searched its historical data and has determined that only one (1) customer is affected. All other EMD users have air start motors.

CUSTOMER	SITE	P/N	S/N or Date Code	ESI ORDER
GPU	Oyster Creek Nuclear Station	10478830	99D30, 99D30, 05D99, 05D99	61790

Note: One of "05D99" starters has already been corrected by ESI as part of the failure analysis.

CORRECTIVE ACTION:

1. Inspect starters with serial numbers containing "99" for a "sticking" starter drive. Two (2) starting motors are required for the engine. The solenoids of each motor are connected in series; therefore, the starter drive must engage at ½ of the minimum system voltage.

2. Starters with sticking drives should be disassembled and the RTV removed; or, returned to ESI for evaluation and repair.