

SSINS No.: 6835
IN 84-92

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

December 17, 1984

IE INFORMATION NOTICE NO. 84-92: CRACKING OF FLYWHEELS ON CUMMINS FIRE
PUMP DIESEL ENGINES

Addressees:

All nuclear power reactor facilities holding an operating license (OL) or construction permit (CP), research and test reactors, and fuel facilities.

Purpose:

This information notice is to alert recipients of a potentially significant problem of cracking flywheels on certain models of Cummins fire pump diesel engines. This cracking apparently becomes noticeable only after it has propagated through the thickness of the flywheel and appears on its outer surface. It is expected that recipients will review the information for applicability to their facilities and consider actions, if appropriate, to preclude similar problems occurring at their facilities. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances

Since December 12, 1983, LaSalle County Station has experienced repeated fatigue cracking of flywheels on both of its Peerless Pump Co. fire pump diesel engines, Cummins Model No. NT-855-F2 equipped with flywheel Part No. 3453 (assembly no. 3023676). The cracks appear to initiate on the engine side (blind side) of the flywheel at a circumferential groove which intersects each crank shaft attachment bolt hole. Cracks have been found to initiate after as little as 34 hours of operation, but can only be detected with the use of a liquid penetrant. The initial development of these cracks is fast, but subsequent growth is slower and there have been no catastrophic failures to date. The cracking is believed to be related to the response of the flywheel to inherent engine and gearbox vibration and it appears to be generic to the flywheel design.

This problem was first discovered when a flywheel on an engine with 850 hours of operation had cracked through its thickness over 360° of the circumferential groove. A second unit with approximately 1500 hours of operation was found to have had its flywheel cracked through its thickness over approximately 270° of the circumferential groove. Both flywheels were replaced and a 6-month inspection program was established. At the end of the first 6-month period, a surface penetrant test was used and cracks were discovered on the engine side of the flywheels on both units (one unit with 34 hours of operation and the other with 50 hours). At this point it was decided to establish a program to inspect the flywheels after 50 hours of operation.

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Cummins has discontinued the use of this flywheel and is currently using their standard truck engine flywheel (Part No. 2965) on the NT 855 F4 fire pump diesel. They have been running comparison tests on these two flywheels (Parts No. 2965 and No. 3453) and are considering recommending use of the truck engine flywheel as a replacement for the flywheel that has the cracking problem. The retrofit of the new flywheel (Part No. 2965) would require some modification because of size differences in the stub shafts.

The following Cummins diesel fire pump engines that are equipped with flywheel Part No. 3453 are:

NH 220 IF
N 855 F
NT 855 F1
NT 855 F2

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact the Regional Administrator of the appropriate NRC regional office or this office.



Edward L. Jordan, Director
Division of Emergency Preparedness
and Engineering Response
Office of Inspection and Enforcement

Technical Contact: Chauncey Gould
(301) 492-8597

Attachment: List of Recently Issued IE Information Notices

Attachment
IN 84-92
December 17, 1984

LIST OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
84-91	Quality Control Problem of Meteorological Measurements Problems	12/10/84	All boiling water reactor facilities holding an OL or CP
84-90	Main Steam Line Break Effect on Environmental Qualification of Equipment	12/7/84	All boiling water reactor facilities holding an OL or CP
84-89	Stress Corrosion Cracking in Nonsensitized 316 Stainless Steel	12/7/84	All boiling water reactor facilities holding an OL or CP
84-88	Standby Gas Treatment System Problems	12/3/84	All boiling water reactor facilities holding an OL or CP
84-87	Piping Thermal Deflection Induced by Stratified Flow	12/3/84	All boiling water reactor facilities holding an OL or CP
84-86	Isolation Between Signals of the Protection System and Non-Safety-Related Equipment	11/30/84	All boiling water reactor facilities holding an OL or CP
84-85	Molybdenum Breakthrough from Technetium-99m Generators	11/30/84	All NRC licensed medical institutions and radiopharmaceutical suppliers
84-84	Deficiencies In Ferro-Resonant Transformers	11/27/84	All boiling water reactor facilities holding an OL or CP
84-83	Various Battery Problems	11/19/84	All boiling water reactor facilities holding an OL or CP
84-82	Guidance for Posting Radiation Areas	11/19/84	All boiling water reactor facilities holding an OL or CP

OL = Operating License
CP = Construction Permit