SSINS No.: 6835
IN 86-07

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

February 3, 1986

IE INFORMATION NOTICE NO. 86-07: LACK OF DETAILED INSTRUCTION AND INADEQUATE OBSERVANCE OF PRECAUTIONS DURING MAINTENANCE AND TESTING OF DIESEL GENERATOR WOODWARD GOVERNORS

Addressees:

All nuclear power reactor facilities holding an operating license (OL) or a construction permit (CP).

Purpose:

This notice is provided to alert recipients of a potentially significant problem with the maintenance of Woodward Governors used on standby diesel generators. Loss of engine speed control has resulted from inadequate oil inventory following maintenance on the governor. This notice is also provided to make recipients aware of the importance of starting the engines in a highly controlled manner, especially following maintenance activities, to preclude excessive engine speed while confirming proper operation.

It is expected that recipients will review this information for applicability to their facilities and consider actions, if appropriate, to preclude a similar problem from occurring. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

During startup of a standby diesel generator at Grand Gulf Unit 1, the diesel engine oversped for about 15 seconds. This startup was the first following preventive maintenance on the governor. The overspeed damaged numerous engine components, including connecting rods, rod bearings, main bearings, link pin bushings, wrist pin bushings, and the engine base. It is not known whether the manual trip, the overspeed trip, or excessive vibration terminated the overspeed.

Because the governor was suspected as the cause of the overspeed, it was removed without modification and returned to the manufacturer, Woodward Governor, for testing. Those tests demonstrated that the governor was ineffective in controlling speed because of an inadequate inventory of oil. It is postulated that inadequate filling and venting by licensee personnel following the maintenance work resulted in the low oil level.

Based on information available, the inadequate venting after refilling with oil has been attributed to use of an outdated technical manual, oil capacity figures for the governor and associated components not being available, no detailed procedure for filling and venting, and inexperienced or insufficiently trained personnel.

During normal operation, the governor is actuated by an electrical signal from the generator and a mechanical signal from the engine. However, both signals depend on the same hydraulic actuator and a common oil supply to control engine speed. In this case, the electrical signal was deactivated because the generator field had no excitation, as was required by the licensee's procedure. Because the remaining mechanical governor is relatively slow-acting (in comparison to the electric governor), a reduction in the governor control setting is usually made during initial startup after maintenance to limit engine speed overshoot. At Grand Gulf the governor control reduction had been omitted from the procedure. With the governor oil level low, the licensee concluded that a lower governor control setting would not have prevented the overspeed.

In addition to the above, the engine has an overspeed trip device that uses engine lube oil as its actuating fluid, thus making it independent of the hydraulic governor. This trip was ineffective in preventing engine overspeed because it was found by the licensee to be relatively slow acting in relation to the engine acceleration experienced during the overspeed. A design change to reduce the overspeed trip response time is being considered by Transamerica Delaval.

Discussion:

The corrective action taken at Grand Gulf in response to the overspeed event included development of: (1) detailed procedures for venting trapped air from hydraulic governors and associated components during oil refilling operations and (2) detailed procedures that establish highly controlled conditions for initial startup following such maintenance activities. Highly controlled conditions included "air rolling" the engine, exercising direct manual control of the engine, reducing the governor control and overspeed trip settings, and limiting fuel rack travel.

Licensees are reminded that every reasonable effort, as detailed in Generic Letter 83-28, "Required Actions Based on Generic Implications of Salem ATWS Events," dated July 8, 1983, should be made to ensure the most recent technical information is available at plant sites for proper guidance of all equipment maintenance and testing activities. Utilities that use Woodward Governors on their diesel engines are encouraged to contact Woodward Governor to ensure they have the latest technical information applicable to their equipment.

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 regional office or this office.

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

Technical Contact: W. P. Haass, IE
(301) 492-9041

Attachment: List of Recently Issued IE Information Notices

Attachment 1
IN 86-07
February 3, 1986

LIST OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
86-06	Failure Of Lifting Rig Attachment While Lifting The Upper Guide Structure At St. Lucie Unit 1	2/3/86	All power reactor facilities holding an OL or CP
86-05	Main Steam Safety Valve Test Failures And Ring Setting Adjustments	1/31/86	All PWR facilities holding an OL or CP
86-04	Transient Due To Loss Of Power To Integrated Control System At A Pressurized Water Reactor Designed By Babcock & Wilcox	1/31/86	All power reactor facilities holding an OL or CP
86-03	Potential Deficiencies In Environmental Qualification Of Limitorque Motor Valve Operator Wiring	1/14/86	All power reactor facilities holding an OL or CP
86-02	Failure Of Valve Operator Motor During Environmental Qualification Testing	1/6/86	All power reactor facilities holding an OL or CP
86-01	Failure Of Main Feedwater Check Valve Causes Loss Of Feedwater System Integrity And Water-Hammer Damage	1/6/86	All power reactor facilities holding an OL or CP
85-101	Applicability of 10 CFR 21 To Consulting Firms Providing Training	12/31/85	All power reactor facilities holding an OL or CP
85-100	Rosemount Differential Pressure Transmitter Zero Point Shift	12/31/85	All power reactor facilities holding an OL or CP
85-99	Cracking In Boiling-Water-Reactor Mark I And Mark II Containments Caused By Failure Of The Inerting System	12/31/85	All BWR facilities having a Mark I or Mark II containment

OL = Operating License
CP = Construction Permit