SSINS No.: 6835
IN 87-04

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

January 16, 1987

IE INFORMATION NOTICE NO. 87-04: DIESEL GENERATOR FAILS TEST BECAUSE OF DEGRADED FUEL

Addressees:

All nuclear power reactor facilities holding an operating license or a construction permit.

Purpose:

This notice is to alert recipients to a potentially significant problem pertaining to long-term storage of fuel for diesel engines for emergency service. This problem highlights the importance of a carefully structured inspection, sampling, and test program to verify continuing acceptability of the fuel for emergency use. The NRC expects that recipients will review this notice for applicability to their facilities and consider actions, if appropriate, to preclude a similar problem occurring at their facilities. However, suggestions contained in this notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Reference Documents:

1. Licensee Event Report No. 50-368/86-14, "Emergency Diesel Generator Failure Due to Fuel Supply System Fouling as a Result of Fuel Oil Degradation," November 18, 1986

2. IE Circular No. 77-15, "Degradation of Fuel Oil Flow to the Emergency Diesel Generator," November 23, 1977

Description of Circumstances:

On June 27, 1986, at Arkansas Nuclear One Unit 2 (ANO 2), one of the two emergency diesel generators (EDGs) failed to complete a prescribed 24-hour endurance test because of fuel starvation (Reference 1). The licensee found the screen element in the Y-strainer between the day tank and the engine severely fouled (component B in Figure 1), restricting flow of fuel to the engine. Cleaning the element required using a hand-held torch to remove a hard carbonaceous coating. The licensee cleaned the tank and piping and successfully completed the endurance test.

The corresponding strainer for the redundant EDG was found to not be as severely fouled. The redundant EDG successfully performed a 24-hour endurance test begun after the faulted EDG was made operable.

Discussion:

The licensee virually inspected and cleaned the fuel supply system for each EDG as short-term corrective action. In addition, the licensee installed temporary piping, pumps, and filters to recirculate and clean the fuel inventory. The interior surfaces of the day tanks and underground vault tanks had coatings of sludge that were easily removed. The fuel suction line foot valves and strainers (component A in Figure 1) did not appear to be fouled.

During the evaluation of the event, the licensee determined that the day tank strainers (components A and B in Figure 1) had not been routinely inspected and cleaned because the station procedures did not address this action. Although these components are identified on the fuel supply system piping drawings, they had not been considered in station procedures. The licensee also determined that the function of the component B strainers was adequately served by the engine mounted strainers (Cuno-type; component C in Figure 1), which are capable of removing particulates smaller than the rated removal size of the component B strainers and are readily cleaned in service. In addition, the Cuno-type strainers are equipped with differential pressure indication. Subsequently, in accordance with 10 CFR 50.59, the licensee removed the screen element from the component B strainers for both EDGs.

The licensee engaged a contract laboratory to analyze the fuel. The contractor reported that a high concentration of particulates existed in the fuel as a result of oxidation and biological contamination. The licensee instituted a program to enhance fuel quality by periodic inspection and cleaning of the storage tanks and frequent sampling of the fuel. The laboratory strongly recommended use of a proprietary additive to prevent oxidation and to inhibit biological growth; however, a decision has not been made on the use of any additive. Further, the licensee is considering design modifications to include dual filters and strainers and a permanent storage tank recirculation system to facilitate filtering of the complete inventory each refueling outage.

It should be noted that the fuel supply systems differed between Unit 1 and Unit 2 in the absence on Unit 1 of the day tank strainers (components A and B in Figure 1).

On July 14, 1977, at Cooper, a clogged strainer had caused an EDG to similarly starve of fuel oil. This event was described and discussed in Reference 2.

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 Contacts: Vern Hodge, IE
(301) 492-7275

Jim Henderson, IE
(301) 492-9654

Attachments:
1. Figure 1 - Schematic Fuel Supply System for Emergency Diesel Generator at Arkansas 2
2. List of Recently Issued IE Information Notices

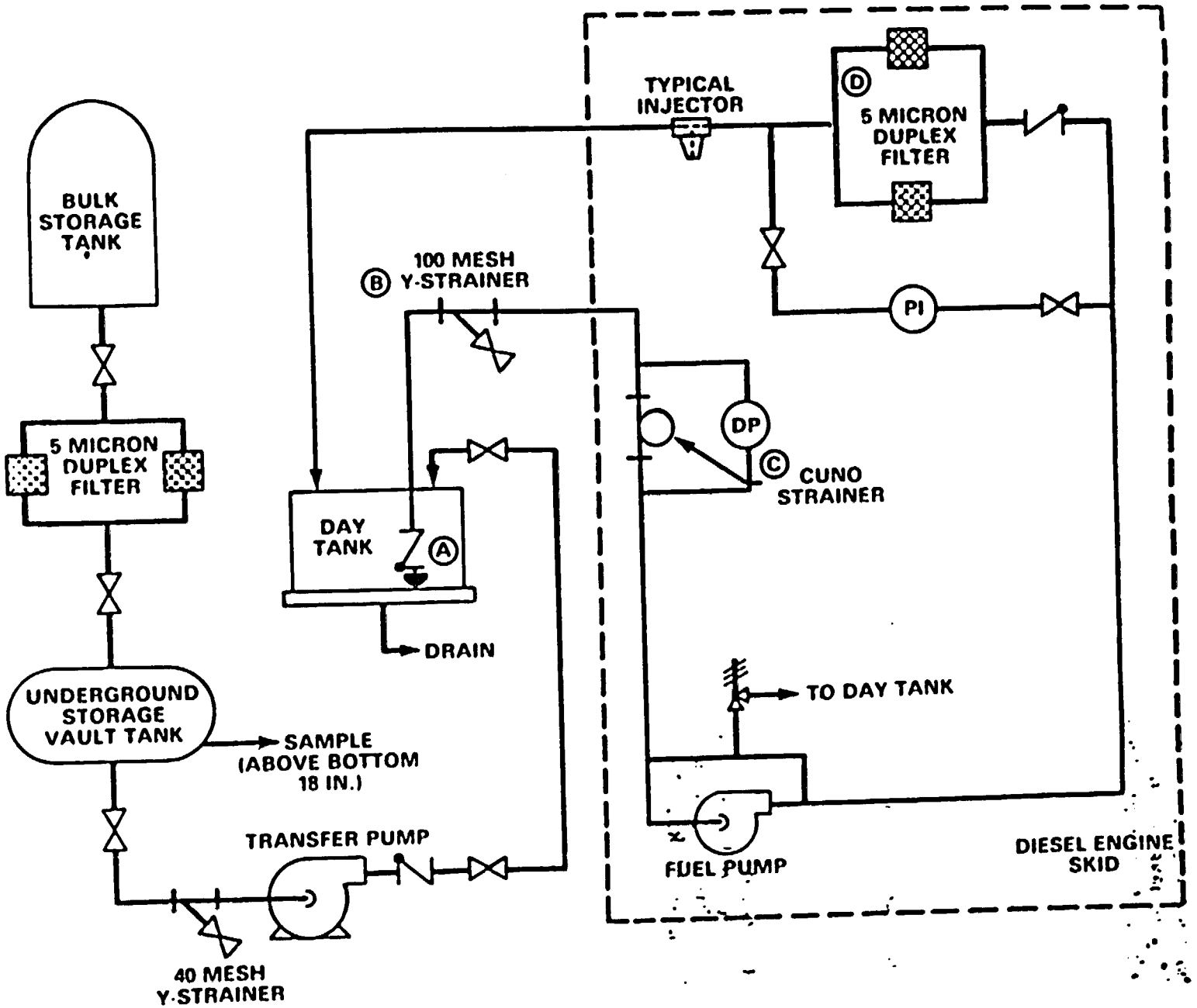

Figure 1. Schematic Fuel Supply System for Emergency Diesel Generator at Arkansas 2

Attachment 1
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LIST OF RECENTLY ISSUED IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
87-03	Segregation of Hazardous	1/15/87	All NRC licensees
87-02	Inadequate Seismic Qualification of Diaphragm Valves by Mathematical Modeling and Analysis	1/15/87	All power reactor facilities holding an OL or CP
87-01	RHR Valve Misalignment Causes Degradation of ECCS in PWRs	1/6/87	All PWR facilities holding an OL or CP
86-110	Anomalous Behavior of Recirculation Loop Flow in Jet Pump BWR Plants	12/31/86	All BWR facilities holding an OL or CP
86-109	Diaphragm Failure In Scram Outlet Valve Causing Rod Insertion	12/29/86	All BWR facilities holding an OL or CP
86-108	Degradation Of Reactor Coolant System Pressure Boundary Resulting From Boric Acid Corrosion	12/29/86	All PWR facilities holding an OL or CP
86-107	Entry Into PWR Cavity With Retractable Incore Detector Thimbles Withdrawn	12/29/86	All power reactor facilities holding an OL or CP
86-106	Feedwater Line Break	12/16/86	All power reactor facilities holding an OL or CP
86-105	Potential For Loss Of Reactor Trip Capability At Intermediate Power Levels	12/19/86	All holders of OL or CP for PWR or BWR
86-104	Unqualified Butt Splice Connectors Identified In Qualified Penetrations	12/16/86	All pressurized and boiling-water reactor facilities holding an OL or CP

OL = Operating License
CP = Construction Permit