

ACCESSION #: 9607110286

LICENSEE EVENT REPORT (LER)

FACILITY NAME: Maine Yankee Atomic Power Company PAGE: 1 OF 3

DOCKET NUMBER: 05000309

TITLE: Service Water Pump Cutless Bearing Cooling Water System

Design

EVENT DATE: 06/07/96 LER #: 96-011-00 REPORT DATE: 07/03/96

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 7 POWER LEVEL: 090

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:

OTHER

LICENSEE CONTACT FOR THIS LER:

NAME: Ethan Brand, NSEG Supervisor TELEPHONE: (207) 882-5661

COMPONENT FAILURE DESCRIPTION:

CAUSE: SYSTEM: COMPONENT: MANUFACTURER:

REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

THIS IS AN INFORMATIONAL LER. At the time the condition described below was discovered on June 7, 1996, Maine Yankee was operating steady state at 90% power.

On June 7, 1996, the Plant Engineering Department notified the Control Room that P-29 B and C Service water pumps may not be able to perform their design basis function based upon a concern involving the supply of cooling water flow to the pump's cutless bearings.

There are four Service Water Pumps at Maine Yankee, P-29, A, B, C, D, which provide

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cooling water flow for the Engineered Safeguards Systems. Two are required to be in service during power operations. The pumps are equipped with cutless shaft bearings which require forced water flow for cooling and lubrication. This cooling water flow is supplied either by the Raw Water System (a fresh water supply) or by scawater from the pumps own discharge. All four pumps are configured such that the preferred supply is raw water. P-29A and D utilize a passive system involving check valves to supply saltwater cooling if raw water is lost or degraded. P-29 B and C utilize an active system utilizing pressure switches, solenoids and Air Operated Valves (AOVs) to switch supplies when raw water is lost.

On June 7, 1996, the bearing supply water for P-29 B/C was positiond to saltwater supply pending further engineering evaluation.

On June 26, 1996, subsequent engineering evaluation determined that sufficient water would be supplied to the pump's cutless bearings by raw water, and therefore the P-29 B/C design basis function was not impacted by this issue.

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THIS IS AN INFORMATIONAL LER.

INITIAL PLANT CONDITIONS:

At the time the condition described below was evaluated, on June 7, 1996,

Maine Yankee was operating steady state at 90% power.

EVENT DESCRIPTION:

On June 7, 1996, the Plant Engineering Department notified the Control Room that P-29 B and C Service (BS) water pumps (P) may not be able to perform their design basis function based upon a concern involving the supply of water to the pump's cutless bearings.

There are four Service Water Pumps at Maine Yankee, P-29, A, B, C, D, which provide cooling water flow for the Engineered Safeguards Systems.

Two are required to be in service during power operations. The pumps are vertical shaft and are equipped with cutless shaft bearings which require

forced water flow for cooling, lubrication, and flushing. This water flow is supplied either by the Raw Water System (KI) (a filtered fresh water supply) or by seawater from the pumps own discharge. All four pumps are configured such that the preferred supply is raw water. P-29A and D utilize a passive system involving check valves to supply saltwater cooling if raw water is lost or degraded. P-29 B and C utilize an active system utilizing pressure switches (PS), solenoids and Air Operated Valves (AOVs) to switch supplies.

The pressure switches for P-29 B/C pumps are set to swap to seawater if the raw water pressure drops to less than 2 psiG. This set point appears to have been based on an assumption that raw water would be lost entirely. The minimum required flow rate estimated to be required to supply the cutless bearings, 3 gpm, requires approximately 6.4 psiG raw water pressure at the pressure switches. An preliminary engineering analysis concluded that if the raw water system were to degrade slowly, then adequate water flow to the cutless bearings may not have been demonstrated.

This concern was brought to the Control Room on June 7, 1996 and was reported to the NRC via ENS as an condition outside the design basis of the plant.

At the time of the discovery of this issue, raw water pressure was at approximately 25 psiG (measured adjacent to the pressure switches). In order to assure future operability of the P-29B/C pumps, pending further

engineering evaluation, the bearing water supply was positioned to seawater.

On June 26, 1996, engineering concluded that the 2 psiG setpoint WOULD provide sufficient raw water supply to the P-29 B/C pump cutless bearings to support their safety function. This conclusion was based upon input from the pump and bearing manufactures. The original 3 gpm requirement is based upon general guidance from the bearing manufacturer which recommends 1 gpm for each inch of bearing diameter (the P-29B/C shaft diameter is approximately 3 inches); this value is for nominal service life consideration. Engineering determined that at 2 psiG, approximately .75 gpm would be supplied. Given the closed column design housing the bearings, all that is required is sufficient head to keep the column full to provide lubrication and cooling, and some minimal flow to flush particles from the bearing surfaces. It was concluded that approximately 2 psiG and .75 gpm would be sufficient to meet these requirements.

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SAFETY SIGNIFICANCE:

There is no safety significance to this issue. Sufficient water supply would have been provided to the P-29B/C pump bearings during accident conditions.

CORRECTIVE ACTIONS:

Immediate:

Cutless bearing cooling water supply for P-29B/C was positioned to

seawater.

Long Term:

1) The set point of the pressure switches may be changed to support additional cooling flow rate or

2) The cutless bearing supply water system for P-29B/C may be changed to a passive system.

CAUSAL FACTORS:

The active cooling water system for P-29B/C was installed in 1974. The apparent cause of this event was an oversight in not considering a gradual loss of raw water as a design consideration.

PREVIOUS SIMILAR EVENTS:

The following LERs discuss events where an oversight in design occurred:

96-008, Turbine Hall Flood Protection Design Deficiency

96-007, Emergency Feedwater Pump Room Ventilation

95-007, "A" Train Spray System Valve Actuation Power Supply from "B" Train Source

95-012, RHR Spring Relief Valves Inadequate for LTOP Protection Due to Back Pressure

94-002, Inadequate Configuration Control in Design and Operation of Steam Generator Blowdown System.

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Maine Yankee

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329 BATH ROAD - BRUNSWICK, MAINE 04011 - (207) 798-4100

July 3, 1996

MN-96-89 JRH-96-137

UNITED STATES NUCLEAR REGULATORY COMMISSION

Attention: Document Control Desk

Washington, D. C. 20555

Reference: (a) License No. DPR-3 6 (Docket No. 50-309)

Subject: Maine Yankee Licensee Event Report 96-011, Service Water
Pump Cutless Bearing Cooling Water System Design

Gentlemen:

Please find enclosed Maine Yankee Licensee Event Report 96-011. This
report is submitted as an informational LER.

Please contact us should you have any questions regarding this matter.

Very truly yours,

James R. Hebert, Manager

Licensing & Engineering Support Department

JVW

Enclosure

c: Mr. Thomas T. Martin

Mr. J. T. Yerokun

Mr. E. H. Trottier

Mr. Patrick J. Dostie

Mr. Uldis Vanags

*** END OF DOCUMENT ***
