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 FACIL:50-261 H.B. Robinson Plant, Unit 2, Carolina Power & Light C 05000261
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 RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 90-012-00:on 900928,potential of inadequate NPSH for
 safety injection pumps.W/901026 ltr.

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OCT. 26 1990

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(10CFR50.73)

United States Nuclear Regulatory Commission
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H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261
LICENSE NO. DPR-23
LICENSEE EVENT REPORT 90-012-00

Gentlemen:

The enclosed Licensee Event Report (LER) is submitted in accordance with 10CFR50.73 and NUREG 1022, Supplements No. 1 and 2.

Very truly yours,

J. J. Sheppard
General Manager
Robinson Nuclear Project Department

RDC:sgk

Enclosure

cc: Mr. S. D. Ebnetter
Mr. L. W. Garner
INPO

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LICENSEE EVENT REPORT (LER)

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|--|--------|--|----------------|---------------------|-----------------|------------------|-----------------|-----------|----------------|--------------------------------------|--|-------------------------------|------------------|--|--------------------|------|
| FACILITY NAME (1) H. B. Robinson Steam Electric Plant, Unit No. 2 | | | | | | | | | | DOCKET NUMBER (2) 0 5 0 0 0 2 6 1 | | | | | PAGE (3) 1 OF 5 | |
| TITLE (4) Potential of Inadequate NPSH for Safety Injection Pumps | | | | | | | | | | | | | | | | |
| EVENT DATE (5) | | | LER NUMBER (6) | | | | REPORT DATE (7) | | | OTHER FACILITIES INVOLVED (8) | | | | | | |
| MONTH | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | MONTH | DAY | YEAR | FACILITY NAMES | | | | DOCKET NUMBER(S) | | | |
| 0 9 | 2 8 | 9 0 | 9 0 | 0 1 2 | 0 0 | 1 0 | 2 5 | 9 0 | | | | | 0 5 0 0 0 | | | |
| OPERATING MODE (9) | | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11) | | | | | | | | | | | | | | |
| N | | 20.402(b) | | | | 20.405(c) | | | | 50.73(a)(2)(iv) | | | | 73.71(b) | | |
| POWER LEVEL (10) | | 20.405(a)(1)(i) | | | | 50.38(c)(1) | | | | 50.73(a)(2)(v) | | | | 73.71(c) | | |
| 0 0 0 | | 20.405(a)(1)(ii) | | | | 50.38(c)(2) | | | | 50.73(a)(2)(vii) | | | | OTHER (Specify in Abstract below and in Text, NRC Form 366A) | | |
| | | 20.405(a)(1)(iii) | | | | X 50.73(a)(2)(i) | | | | 50.73(a)(2)(viii)(A) | | | | | | |
| | | 20.405(a)(1)(iv) | | | | 50.73(a)(2)(ii) | | | | 50.73(a)(2)(viii)(B) | | | | | | |
| | | 20.405(a)(1)(v) | | | | 50.73(a)(2)(iii) | | | | 50.73(a)(2)(x) | | | | | | |
| LICENSEE CONTACT FOR THIS LER (12) | | | | | | | | | | | | | | | | |
| NAME R. D. Crook, Senior Specialist, Regulatory Compliance | | | | | | | | | | TELEPHONE NUMBER | | | | | | |
| | | | | | | | | | | AREA CODE 8 0 3 3 8 3 - 1 1 7 9 | | | | | | |
| COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13) | | | | | | | | | | | | | | | | |
| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NPDOS | | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NPDOS | | | | | | |
| | | | | | | | | | | | | | | | | |
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| SUPPLEMENTAL REPORT EXPECTED (14) | | | | | | | | | | | | EXPECTED SUBMISSION DATE (15) | | MONTH | DAY | YEAR |
| X YES (If yes, complete EXPECTED SUBMISSION DATE) | | | | | | | | | | | | NO | | 0 1 | 3 0 | 9 1 |

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On September 25, 1990, with H, B. Robinson Unit No. 2 in cold shutdown for a scheduled refueling outage, a special test was performed to determine the capability of the one Safety Injection pump injecting into three cold legs of the Reactor Coolant System, which could be an expected alignment during certain design basis Loss of Coolant Accidents. The results of the test indicated the potential for inadequate Net Positive Suction Head (NPSH) available for either Safety Injection Pump. Based on this test, both Safety Injection Pumps were conservatively declared inoperable. It should be noted that the plant was in a mode where the pumps were not required to be operable, and there were no safety implications to the public.

The cause for the potential for pump runout has not been determined due to the unavailability of information necessary to adequately assess the significance of the concern. Resolution of this issue is being actively pursued, and results will be reported in a supplement to this Licensee Event Report.

NRC Form 364A
(9-83)

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED CMB NO. 3150-2104

EXPIRES: 8/31/95

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|-------------------|-------------------|----------------|-------------------|-----------------|----------|----------|
| FACILITY NAME (1) | DOCKET NUMBER (2) | LER NUMBER (8) | | | PAGE (3) | |
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | | |
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H. B. Robinson, Unit No. 2

0 | 5 | 0 | 0 | 0 | 2 | 6 | 1

TEXT (If more space is required, use additional NRC Form 364A's) (17)

I. DESCRIPTION OF EVENT

On September 25, 1990, with Unit No. 2¹ in cold shutdown for a scheduled refueling outage, a special test was performed in response to an NRC inspection report² to determine the capability of one Safety Injection (SI) pump injecting into three cold legs of the Reactor Coolant System (RCS). This configuration would be the expected alignment during certain design basis Loss of Coolant Accidents (LOCA). The procedure was to test the runout operation of SI pumps "A" and "B" individually, and was modeled after the previous tests of the SI pumping system performed during 1973-74. As such, the same maximum runout limitations were adopted in the testing procedure as were used in the 1973-74 tests. This runout limitation was used in the 1973-74 tests as a conservative value that would adequately protect the SI pumps and motors. However, the 1973-74 work did not test one SI pump lined up to flow through all three cold legs simultaneously.

The results of the test were that approximately 640 gpm flow was achieved with a discharge pressure of 360 psig for each SI pump tested. This is a concern because with one SI pump and one Residual Heat Removal (RHR) pump discharging into the cold legs with the RCS depressurized and the reactor vessel head removed, the SI pump has a higher flow rate and a lower discharge pressure than previous documentation indicated. Previous responses to Net Positive Suction Head (NPSH) issues assumed an SI pump flow of less than 600 gpm. Thus, at the higher flow rates and with minimum level in the Refueling Water Storage Tank (RWST), there may not be sufficient NPSH available for either SI pump.

At 1730 hours on September 25, a 72-hour operability determination was initiated in accordance with Plant procedures to administratively evaluate the status of the SI pumps. On September 28, 1990, the Licensees' Technical Support staff notified Operations management that a lack of sufficient information existed to make a conclusive determination regarding pump operability. Therefore, as a conservative measure, both SI pumps were declared inoperable. This condition was reported to the NRC via the ENS at 1643 hours on September 28, 1990, in accordance with 10CFR50.72(b)(2)(i), as a degraded condition found while shutdown.

¹H. B. Robinson Unit No. 2 is a Westinghouse Pressurized Water Reactor nuclear power plant in commercial operation since March, 1971.

²NRC Inspection Report No. 89-09, URI 89-09-02, dated June 26, 1989.

NRC Form 364A
(9-83)

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED CMB NO. 315G-0104

EXPIRES: 8/31/95

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|----------------------------|-------------------|----------------|-------------------|-----------------|------------|
| FACILITY NAME (1) | DOCKET NUMBER (2) | LER NUMBER (3) | | | PAGE (3) |
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | |
| H. B. Robinson, Unit No. 2 | 0 5 0 0 0 2 6 1 | 9 0 | 0 1 2 | 0 0 | 0 3 OF 0 5 |

TEXT (If more space is required, use additional NRC Form 364A's) (17)

II. CAUSE OF EVENT

The Safety Injection pumps were rebuilt and tested in 1974. The test was performed with all three pumps running aligned with one pump discharging through one RCS injection line and two pumps discharging through three injection lines. The test results indicated a maximum runout of more than 500 psig discharge pressure with below 600 gpm on any single pump. These parameters have been considered the "maximum runout limit" up to this point.

During 1988, a modification was performed to the Automatic Bus Transfer (ABT) system which made SI pump "B" a maintenance pump only.³ This left the possibility of only one SI pump flowing into all three RCS cold legs should one safety train fail. This flow arrangement had not been previously tested for maximum runout. Calculations were performed by the NSSS supplier which determined a runout flow of 596 gpm. However, the NRC initiated an Unresolved Item in 1989 which prompted testing of the new configuration, one pump flowing through three cold legs.

The cause of the potential for increased pump runout cannot readily be determined at this time. An investigation has been initiated and is in progress, and a supplemental report will be submitted that provides the results of the investigation and the corrective actions taken.

³Licensee Event Report 88-003-01, October 24, 1988, Serial No. RNP/88-3511.

NRC Form 364A
(9-83)

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED CMB NO. 3150-0104

EXPIRES: 8/31/96

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| FACILITY NAME (1) H. B. Robinson, Unit No. 2 | DOCKET NUMBER (2) 0 5 0 0 0 2 6 1 | LER NUMBER (8) | | | PAGE (3) | |
| | | YEAR 9 0 | SEQUENTIAL NUMBER 0 1 2 | REVISION NUMBER 0 0 | 0 4 OF 0 5 | |

TEXT (If more space is required, use additional NRC Form 364A's) (17)

III. ANALYSIS OF EVENT

This event is considered reportable because the potential exists for the Plant to be in an unanalyzed condition that significantly compromises plant safety, and is thus reportable pursuant to 10CFR50.73(a)(2)(ii)(A).

The primary area of concern for this issue remains with the determination of adequate NPSH for the SI pumps with the increased flowrate. The increase in flow would mean an increase in NPSH required. The level setpoints on the RWST are established to provide required NPSH levels. Inadequate NPSH at the increased pump runout could result in damage to the pump and a loss of the safety injection function.

With respect to the core cooling function of the SI pumps, the measure of effectiveness of the SI system is the ability of the pumps and accumulators to keep the core flooded or to reflood the core rapidly where the core has been uncovered under a postulated LOCA. The Safety Injection function is to limit any increase in clad temperature below a value where emergency core cooling objectives are met.

Without further investigation and testing, there is no information readily available to fully and adequately assess SI Pump operability and to make a conclusive determination on the significance of this concern. At the present time the Plant is in cold shutdown condition and in refueling, and there is no requirement for the SI pumps to be operable.

IV. CORRECTIVE ACTION

Resolution of this issue is being actively pursued. A supplemental LER will be submitted when the ongoing investigation has been completed and validated and appropriate corrective actions taken. In any case, the operability issue will be resolved prior to restart from the current refueling outage.

NRC Form 364A
(9-83)

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED CMB NO. 3150-3104

EXPIRES: 8/31/96

FACILITY NAME (1)

DOCKET NUMBER (2)

LER NUMBER (3)

PAGE (3)

H. B. Robinson, Unit No. 2

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TEXT (If more space is required, use additional NRC Form 364A's) (17)

V. ADDITIONAL INFORMATIONA. Failed Component Information

None.

B. Previous Similar Events

None.