Distribution
Docket
NRC PDR
Local PDR
ORB Rdg
NSIC
DCrutchfield
HSmith
RDudley
KEccleston
OELD
OI&E
ACRS (10)
SEPB

August 17, 1982

Docket No. 50-409

Mr. Frank Linder
General Manager
Dairyland Power Cooperative
2615 East Avenue South
LaCrosse, Wisconsin 54601

Dear Mr. Linder:

SUBJECT: NUREG 0737 ITEM II.K.3.19;
INTERLOCK RECIRCULATION PUMP MODIFICATION
LA CROSSE BOILING WATER REACTOR

Re: Letter dated May 11, 1982, L. Goodman (DPC) to D. Dudley (NRC)

According to information provided in the above transmittal, we have revised our April 27, 1982 Safety Evaluation to make some minor corrections. These corrections do not alter our original conclusions. A copy of the revised Safety Evaluation and of the May 11, 1982 transmittal are attached.

Sincerely,

Original Signed By

Dennis M. Crutchfield, Chief
Operating Reactors Branch #5
Division of Licensing

Enclosures:
As stated

SE01
DSU USE (38)

OFFICE	DL:ORB#5	DL:ORB#2	DL:ORB#5	DSI:RSB			
SURNAME	DD DDudley	KEccleston	DCrutchfield	ELantz			
DATE	8/17/82	8/13/82	8/17/82	8/16/82			

cc
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D. Dudley

MAY 11, 1982

TO: JOHN D. PARKYN, LACBWR ASST. SUPERINTENDENT
DICK DUDLEY, LACBWR-NRC PROJECT MANAGER

FROM: LYNNE GOODMAN, LACBWR OPERATIONS ENGINEER

SUBJECT: NRC SAFETY EVALUATION ON NUREG-0737, ITEM II.K.3.17, "INTERLOCK RECIRCULATION PUMP MODIFICATION", DATED APRIL 27, 1982

I have found the following minor inaccuracies in the subject report:

1) (Page 1) During startup of reactor to criticality and low power, recirculation flow is used. The startup procedure requires it to be in operation prior to pulling rods. T.S. limits power to 10^{-5} % without recirculation flow. The report says recirculation flow not used during startup or low power.

2) (Page 3) The Shutdown Condenser is not normally in operation after shutdown as is implied on page 3.

3) (Page 2) Shutdown Condenser will not cause opening of both pump's suction and discharge valves if a) 1 pump running, other below minimum speed or b) rod control switch in withdraw.

4) (Page 3) There are unusual circumstances in which both discharge valves can be closed during shutdown, e.g., if one pump below minimum speed and other pump above minimum speed, but its loop is cold enough to have high ΔT close its discharge valve.

   If the discharge valve closes, the discharge bypass valve opens, so the loop is not isolated.

5) The analysis misses the important point that both loops come off of a common suction header and feed into a common discharge header.

Lynne Goodman

Lynne Goodman

LSG:af

cc: R. Shimshak
LSG
Files T5n, A-11, M4a
TMI-NB-T.L.
Reading File

NUREG-0737 REQUIREMENT II.K.3.19

SAFETY EVALUATION

INTRODUCTION

Item II.K.3.19 of NUREG-0737 requires nonjet BWRs to have an interlock which ensures that at least two recirculation loops are always open for flow so that water level measurements in the downcomer region are representative of the water level in the core region.

BACKGROUND

The La Crosse BWR (LACBWR) has only two recirculation loops. The major components in each of these loops are: a pump suction valve, a pump, a pump discharge valve, and a control system which automatically controls the positions of the valves. The pump suction valves are normally open and require the operation of a key locked switch to close them.

During the startup of the reactor the control system is designed to automatically open both discharge valves (Reference 1). This opening takes place before the rod control switch is placed in the withdrawal position, because the opening of these valves could produce a sudden increase in positive reactivity.

Both discharge valves remain open when going up to power. The Technical Specifications require a minimum recirculation flow of 3.23×10^6 #/hr for 63 percent steady state power (Reference 2). This is about 60 percent of the rated flow in one recirculation loop (Reference 3). Thus LACBWR can operate with one recirculation loop in operation and the other one isolated. At full power, however, the operation of both recirculation loops is required

During shutdown the control system for these loops is designed to automatically open both of these discharge valves when both recirculation pumps are operating at less than a set speed, which is in the range of 30 to 38 percent of full rated speed (Reference 1), and it is designed to prevent the closure of a pump suction valve as long as the associated recirculation pump is running (Reference 4). Thus both recirculation loops are normally open while LACBWR is being shut down.

The recirculation loop controls are interlocked with the shutdown condenser controls so that operation of the shutdown condenser causes the automatic opening of the recirculation suction and discharge valves and prevents their closure unless 1 pump is runing and the other is below minimum speed or the rod control switch is in "withdraw." (Reference 5)

EVALUATION

For LACBWR, which has only two recirculation loops, one non-isolated loop is sufficient for determining the actual water level in the reactor vessel. During startup to criticality and power both loops are normally open. At low power LACBWR can operate with one recirculation loop in operation and the other one isolated, but at full power the operation of both loops is required. During the shutdown from power, the control system is interlocked so that at least one recirculation loop will be open.* We conclude that the LACBWR controls are designed to meet the objective of NUREG-0737 Item II.K.3.19 and are, therefore, acceptable.

*Except in the unusual case in which one pump is below minimum speed and the other pump is above minimum speed and loop temperature is cold enough to have high ΔT close the discharge valve; in which case the bypass valve will be open.

ACKNOWLEDGMENT

The following people were contributors to this package:

E. Lantz (RSB)
R. Dudley

REFERENCES

1. Appendix A to Provisional Operating Authorization No. DPRA-6, Technical Specifications for the La Crosse Boiling Water Reactor (LACBWR); Item 2.3.3.4-(5), page 5; 10/31/69 as amended to 3/11/82.

2. ibid; Figure 4.0.2.2.1-1, page 27ff 10/31/69, as amended to 3/11/82.

3. Angle, C.W. and Thie, J.A.; La Crosse Boiling Water Reactor Power-Flow, Anomaly Test and Analysis; Dairyland Power Cooperative Report, LAC-TR-005, Appendix B, page 31; 8/21/73.

4. Appendix A to Provisional Operating Authorization No. DPRA-6, Technical Specifications for the La Crosse Boiling Water Reactor (LACBWR); Item 2.3.3.4-(10), page 4.

5. ibid; Item 2.3.3.4-(6), page 5.