UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 1000
ARLINGTON, TEXAS 76012

SEP 2 1980

MEMORANDUM FOR: Those Listed Below

FROM: G. L. Madsen, Chief, Reactor Operations and Nuclear Support Branch, RIV

SUBJECT: IE BULLETIN NO. 80-18

Subject IE Bulletin has been sent to the following licensees. A copy is attached for your information.

Arkansas Power & Light Company
ANO-1 & 2 (50-313, 50-368)

Omaha Public Power District
Ft. Calhoun Nuclear Station (50-285)

G L Madsen

G. L. Madsen, Chief,
Reactor Operations and
Nuclear Support Branch

Attachment:
As stated

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Accession No.:
8005050062

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

Dupe

IE Bulletin No. 80-18
Date: July 24, 1980

MAINTENANCE OF ADEQUATE MINIMUM FLOW THRU CENTRIFUGAL CHARGING PUMPS FOLLOWING SECONDARY SIDE HIGH ENERGY LINE RUPTURE

Description of Circumstances:

Letters similar to the May 8, 1980 notification made pursuant to Title 10 CFR Part 21 (enclosure) were sent from Westinghouse to a number of operating plants and plants under construction (list, within enclosure) in early May, 1980.

The letters and the enclosed "Part 21" letter contain a complete description of the potential problem summarized below. The letters indicated that under certain conditions the centrifugal charging pumps (CCPs) could be damaged due to lack of minimum flow before presently applicable safety injection (SI) termination criteria are met. The particular circumstances that could result in damage vary somewhat from plant to plant, but involve unavailability of the pressurizer power operated relief valves (PORVs), with operation of one or more CCPs repressurizing the reactor during SI following a secondary system high energy line break. Since the SI signal automatically isolates the CCP mini-flow return line, the flow through the CCPs is determined by the individual pump characteristic head vs. flow curve, the pressurizer safety valve setpoint, and the flow resistances and pressure losses in the piping and in the reactor core. That minimum flow may not be adequate to insure pump cooling, and resulting pump damage could violate design criteria before current SI termination criteria are met.

Westinghouse recommends that plant specific calculations outlined in the letter (enclosure) be performed to determine if adequate minimum flow is assured under all conditions. If adequate minimum flow is not assured, Westinghouse recommends specific equipment and procedure modifications which will result in adequate minimum flow. The recommended modifications assure availability of the necessary minimum flow by assuring that the mini-flow bypass line will be open when needed, but will be closed at lower pressures when the extra flow resulting from bypass line closure might be necessary for core cooling.

Actions to be taken by PWR licensees listed in the enclosure as "operating plants," and those listed as "non-operating plants" which are nearing licensing* are listed below:

1. Perform the calculations, outlined in the enclosure, for your plant.

2. If availability of minimum cooling flow for the CCPs is not assured for all conditions by the calculations in 1:

   a. Make modifications to equipment and/or procedures, such as those suggested in the enclosure, to insure availability of adequate minimum flow under all conditions. If modifications are made as described in the attachment for interim modification II, verify that the Volume Control Tank Relief Valve is operable and will actuate at its design setpoint.

   b. Justify that any manual actions necessary to assure adequate minimum flow for any transient or accident requiring SI can and will be accomplished in the time necessary.

   c. Verify that any manipulations required (valve opening or closing, along with the instrumentation necessary to indicate need for the action or accomplishment of the action, etc.) can be accomplished without offsite power available.

   d. Justify that flow available from the CCPs with the modifications in place will be sufficient to justify continued applicability of any safety related analyses which take credit for flow from the CCPs (LOCA, HELB, etc.).

   e. Justify that all Technical Specifications based on the Item 2.d analyses remain valid.

3. Provide the results of calculations performed under Item 1, and describe any modifications made as a result of Item 2 (include the justifications requested).

Actions to be taken by PWR licensees not listed in the enclosure are listed below:

1. In a quantitative manner similar to 1 above, determine whether or not minimum cooling is provided to centrifugal pumps used for high pressure injection, for all conditions requiring SI, prior to satisfying SI

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*Those listed in the enclosure considered to be "nearing licensing" are: North Anna 2, Diablo Canyon 1, McGuire 1, Salem 2, and Sequoyah. These plants must respond in writing within the specified time. Other non-licensed plants whether or not listed in the enclosure, are not required to submit a written response at this time.

termination criteria. If a "minimum flow bypass" line is present which remains open during high pressure injection, and if that line guarantees that minimum cooling flow will be provided to the pumps under such conditions, then no further calculations are required if all safety related analyses (Item 2.d above) assumed presence of the open line.

2. Same as 2 above.

3. Same as 3 above.

Licensees of all operating PWR power reactor facilities and those nearing licensing* shall submit the information requested within 60 days of the date of this letter. Include in your response to this Bulletin, (a) your schedule for any changes proposed, (b) if reactor operation is to continue prior to completion of the proposed changes, include your justification for continued operation.

Reports shall be submitted to the Director of the appropirate NRC Regional Office and a copy forwarded to the Director, NRC Office of Inspection and Enforcement, Division of Reactor Operations Inspection, Washington, D. C. 20555.

Approved by GAO, B280225 (R0072); clearance expires 7-31-80. Approval was given under a blanket clearance specifically for identified generic problems.

Enclosure:
Ltr from T. M. Anderson, W
to V. Stello, IE (w/attachments) dtd 5/8/80

*Those considered to be "nearing licensing" are: North Anna 2, Diablo Canyon 1, McGuire, Salem 2, and Sequoyah.

Westinghouse Electric Corporation

Water Reactor Divisions

Nuclear Technology Division

Box 355
Pittsburgh Pennsylvania 15230

May 8, 1980

NS-TMA-2245

80-219-006

Mr. V. Stello, Director
Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission
1717 H Street
Washington, D. C. 20555

Subject: Centrifugal Charging Pump Operation Following Secondary Side High Energy Line Rupture

Dear Mr. Stello:

This letter is to confirm the telephone conversation of May 8, 1980 between Westinghouse and Mr. Ed Blackwood of Division of Reactor Operations Inspection, Office of Inspection and Enforcement, regarding notification made pursuant to Title 10 CFR Part 21.

A review of the Westinghouse Safety Injection (SI) Termination Criteria following a secondary side high energy line rupture (feedline or steamline rupture at high initial power levels) has revealed a potential for consequential damage of one or more centrifugal charging pumps (CCPs) before the SI termination criteria are satisfied and CCP operation terminated. Such consequential damage may adversely impact long-term recovery operations for the initiating event and is not permitted by design criteria. This concern exists for plants which utilize the CCPs as Emergency Core Cooling System (ECCS) pumps, where the CCPs are automatically started, and where the CCP miniflow isolation valves are automatically isolated upon safety injection initiation. Attachment A identifies plants potentially subject to this concern. A summary of the concern and recommendations follow.

Following a secondary side high energy line rupture and associated reactor trip, Reactor Coolant System (RCS) pressure and temperature initially decrease. Safety injection is actuated and the CCPs start to increase RCS inventory. Reactor Coolant System pressure and temperature subsequently increase due to the loss of secondary inventory, steamline and feedline isolation, RCS inventory addition and reactor core decay heat generation. The accident scenario may vary with rupture size and specific plant design, but it will
...companying increase in RCS pressure.
...ower-operated relief valves
...o 2350 psia. Although these
...designed as safety-related equip-
...her loss of offsite power,

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