

Docket



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

September 1, 1988

Docket No. 50-458

Gulf States Utilities
ATTN: Mr. James C. Deddens
Senior Vice President (RBNG)
Post Office Box 220
St. Francisville, Louisiana 70775

Dear Mr. Deddens:

SUBJECT: THE IMPACT OF PROLONGED LOW POWER OPERATION
ON THE RELIABILITY OF CHECK VALVES

Reference: Letter from M. O. Medford to NRC, "Investigation
Report, San Onofre Unit 1 Water Hammer Event of
November 21, 1985," dated April, 1986.

Check valves are used in many systems important to plant safety and reliability. Failure of check valves can lead to overpressurization of low-pressure systems, water hammer, steam binding, and extensive damage to other components at nuclear power plants.

Recent industry experience showed that accelerated wear and failure of certain check valves could occur due to continued undesirable flow operations. The primary cause of this premature degradation is continuous fluctuation of the check valve disc when it is not firmly held against the backstop by the fluid forces pushing on it. The position of the check valve disc can be determined by a balance of fluid lifting force and the gravitational force acting on the disc and hinge arm weights. Low flow velocities are not sufficient to lift the disc through its full stroke and hold it firmly in a stable position against a stop. With each minor flow pulsation, the disc then fluctuates causing premature wear of moving parts. This instability if coupled with close proximity upstream flow disturbance such as elbows, tees, control valves and pumps could cause rapid wear and in some cases even failure of the valves.

An analysis (Reference 1) was performed to identify the root causes of check valve failures during the November 21, 1985, water hammer event at San Onofre Nuclear Generation Station, Unit 1. That analysis concluded that the failure of the five failed check valves was caused by repeated hammering of the disc stud and the stud nut against the backstop due to insufficient disc lifting force of the low flow rate during reduced power operation. The plant had been operating at reduced power and the reduced feedwater flow, coupled with a high level of turbulence due to increased throttling of the flow control valve, resulted in an amplified oscillation and accelerated degradation. Eventually it led to failures of the check valves.

Based on the above discussion, it is reasonable to conclude that certain check valves are very vulnerable to prolonged reduced flow operation during reduced power operation. Therefore, I am advising you of this concern and requesting

DF01
10

Mr. James C. Deddens

-2-

September 1, 1988

that you review your plant configuration for possible impact of prolonged low power operation on the reliability of check valves.

This letter requires no formal response.

Sincerely,

WAP

Walter A. Paulson, Project Manager
Project Directorate - IV
Division of Reactor Projects - III,
IV, V and Special Projects

cc: See next page

DISTRIBUTION

~~Socket File~~
L. Rubenstein
OGC-Rockville
PD4 Plant File

NRC PDR
J. Calvo
E. Jordan
T. Westerman, RIV

Local PDR
P. Noonan
B. Grimes

PD4 Reading
W. Paulson
ACRS (10)

PD4/LA *WAP*
PNoonan
09/1/88

PD4 *WAP*
WPaulson:sr
08/31/88

PD4 *WAP*
for JCalvo
09/01/88

Mr. James C. Deddens

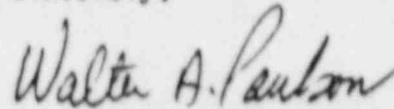
-2-

September 1, 1988

that you review your plant configuration for possible impact of prolonged low power operation on the reliability of check valves.

This letter requires no formal response.

Sincerely,

A handwritten signature in cursive script that reads "Walter A. Paulson".

Walter A. Paulson, Project Manager
Project Directorate - IV
Division of Reactor Projects - III,
IV, V and Special Projects

cc: See next page

Mr. James C. Deddens
Gulf States Utilities Company

River Bend Nuclear Plant

cc:

Troy B. Conner, Jr., Esq.
Conner and Wetterhahn
1747 Pennsylvania Avenue, NW
Washington, D.C. 20006

Mr. J. E. Booker
Manager-River Bend Oversight
P. O. Box 2951
Beaumont, TX 77704

Mr. Les England
Director - Nuclear Licensing
Gulf States Utilities Company
P. O. Box 220
St. Francisville, LA 70775

Mr. William H. Spell, Administrator
Nuclear Energy Division
Office of Environmental Affairs
P. O. Box 14690
Baton Rouge, Louisiana 70898

Richard M. Troy, Jr., Esq.
Assistant Attorney General in Charge
State of Louisiana Department of Justice
234 Loyola Avenue
New Orleans, Louisiana 70112

Mr. J. David McNeill, III
William G. Davis, Esq.
Department of Justice
Attorney General's Office
7434 Perkins Road
Baton Rouge, Louisiana 70808

Resident Inspector
P. O. Box 1051
St. Francisville, Louisiana 70775

H. Anne Plettinger
3456 Villa Rose Drive
Baton Rouge, Louisiana 70806

Gretchen R. Rothschild-Reinike
Louisianians for Safe Energy, Inc.
2108 Broadway Street
New Orleans, Louisiana 70118-5462

President of West Feliciana
Police Jury
P. O. Box 1921
St. Francisville, Louisiana 70775

Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
Office of Executive Director
for Operations
611 Ryan Plaza Drive, Suite 1000
Arlington, Texas 76011

Mr. Frank J. Uddo
Uddo & Porter
6305 Elysian Fields Avenue
Suite 400
New Orleans, Louisiana 70122

Philip G. Harris
Cajun Electric Power Coop. Inc.
10719 Airline Highway
P. O. Box 15540
Baton Rouge, LA 70895