

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 8812280179 DOC. DATE: 88/12/19 NOTARIZED: NO DOCKET #
 FACIL: 50-335 St. Lucie Plant, Unit 1, Florida Power & Light Co. 05000335
 50-389 St. Lucie Plant, Unit 2, Florida Power & Light Co. 05000389
 AUTH. NAME AUTHOR AFFILIATION
 CONWAY, W.F. Florida Power & Light Co.
 RECIP. NAME RECIPIENT AFFILIATION
 Document Control Branch (Document Control Desk)

SUBJECT: Responds to NRC Bulletin 88-004 re potential safety-related pump loss.

DISTRIBUTION CODE: IE11D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 9
 TITLE: Bulletin Response (50 DKT)

NOTES:

	RECIPIENT		COPIES			RECIPIENT		COPIES	
	ID CODE/NAME	LTR	ENCL	ID CODE/NAME		LTR	ENCL		
	PD2-2 LA	1	0	PD2-2 PD	1	1			
	NORRIS, J	1	1						
INTERNAL:	AEOD/DOA	1	1	AEOD/DSP/TPAB	1	1			
	NRR ALEXION, T	1	1	NRR/DEST/ADE 8H	1	1			
	NRR/DEST/ADS 7E	1	1	NRR/DEST/MEB 9H	1	1			
	NRR/DOEA/EAB 11	1	1	NRR/DOEA/GCB 11	1	1			
	NRR/DREP/EPB 10	1	1	NRR/PMAS/ILRB12	1	1			
	NUDOCS-ABSTRACT	1	1	REG FILE 02	1	1			
	RES/DSIR/EIB	1	1	RGN2 FILE 01	1	1			
EXTERNAL:	LPDR	1	1	NRC PDR	1	1			
	NSIC	1	1						

NOTE TO ALL "RIDS" RECIPIENTS:

PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL DESK, ROOM P1-37 (EXT. 20079) TO ELIMINATE YOUR NAME FROM DISTRIBUTION LISTS FOR DOCUMENTS YOU DON'T NEED!

TOTAL NUMBER OF COPIES REQUIRED: LTR 20 ENCL 19

AD
[Signature]

R
I
D
S
/
A
D
D
S



DECEMBER 19 1988

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

L-88-526

Gentlemen:

Re: St. Lucie Units 1 and 2
Docket Nos. 50-335 and 50-389
Response to NRC Bulletin 88-04
Potential Safety-Related Pump Loss

On May 5, 1988, the NRC issued NRC Bulletin 88-04 "Potential Safety-Related Pump Loss" which requested all licensees to investigate and address two miniflow design concerns. The first concern involved the potential for the dead-heading of one or more pumps in safety-related systems that have a miniflow line common to two or more pumps or other piping configurations that do not preclude pump-to-pump interaction during miniflow operation. A second concern was whether or not the installed miniflow capacity is adequate for even a single pump in operation.

By letter (L-88-293) dated July 11, 1988, Florida Power & Light Company (FPL) provided a response to the first concern. Based on discussions with the NRC Project Manager, FPL committed to provide a schedule to address the results of vendor evaluations of the second concern by December 19, 1988. Attached is a response to the second concern identified in the bulletin.

FPL does not currently expect any long term corrective actions to be necessary. Should any actions be necessary FPL will provide a schedule for those actions by May 26, 1989. Should there be any questions, please contact us.

Very truly yours,

W. F. Conway
Senior Vice President - Nuclear

WFC/GRM/cm

Enclosure

cc: Malcolm L. Ernst, Acting Regional Administrator, USNRC,
Region II
Senior Resident Inspector, USNRC, St. Lucie Plant

GRMPSRPL
8812280179 881219
PDR ADDCK 05000335
Q PNU

TELL
11

STATE OF FLORIDA)
)
COUNTY OF PALM BEACH) ss.

W. F. Conway being first duly sworn, deposes and says:

That he is Senior Vice President- Nuclear of Florida Power & Light Company, the Licensee herein;

That he has executed the foregoing document; that the statements made in this document are true and correct to the best of his knowledge, information, and belief, and that he is authorized to execute the document on behalf of said Licensee.



W.F. Conway

Subscribed and sworn to before me this

19 day of December, 1988.



NOTARY PUBLIC, in and for the County
of Palm Beach, State of Florida

My Commission expires:

Notary Public, State of Florida
My Commission Expires June 1, 1989
Bonded Thru Troy Fain - Insurance, Inc.

RESPONSE TO ITEM 4 OF NRC BULLETIN 88-04

I. GENERAL

Responses from safety related pump manufacturers were provided addressing minimum flow recommendations. All responses are considered final except for those from Ingersoll-Rand who has indicated that the minimum flows provided may not account for long term wear due to the hydraulic instability phenomenon.

II. RESPONSES TO BULLETIN 88-04 ITEM 4.

A. ACTION ITEM 4A:

Provide a written response that summarizes the problems and the systems affected

RESPONSE TO ITEM 4A:

Minimum flow rate recommendations are summarized in Table 1.

Interpretation of the results is provided as follows:

- 1) Auxiliary Feedwater (AFW) Pumps 1A, 1B, 1C, 2A, 2B and 2C
Containment Spray (CS) Pumps 2A and 2B
Low Pressure Safety Injection (LPSI) Pumps 2A and 2B

Based on existing operating and surveillance procedures utilized for these pumps, hydraulic instability is not a concern.

The design recirculation flow rates for these pumps meet the recommended minimum flow rates and time constraints. No further action is required for these pumps as a result of this bulletin.

- 2) CS Pumps 1A and 1B

The recommended minimum flow rates for these pumps exceed the design recirculation rates. The vendor's response indicates the pumps are acceptable with respect to hydraulic instability based on the existing recirculation

system design and present maintenance and operating procedures.

No further actions are required for these pumps as a result of this bulletin.

3) Boric Acid Makeup (BAM) Pumps 1A, 1B, 2A and 2B

The recommended minimum flow rates for continuous operation of these pumps exceeds the recirculation flow rate only during surveillance testing. During all other operating modes the pump flow rates exceed the recommended flow.

Test operation, however is for short time periods while vibration and other significant parameters are monitored. The maintenance and surveillance testing histories for these pumps have not identified observable trends relating to the hydraulic instability phenomenon. Operation of these pumps at present recirculation flow rates for surveillance testing is considered acceptable.

4) LPSI Pumps 1A and 1B

The LPSI pumps on Unit 1 operate solely on recirculation during surveillance testing.

For the Unit 1 LPSI pumps, testing is performed for time periods which may exceed the suggested nominal 20 minutes identified by Ingersoll-Rand. The actual test time however (approximately 30 minutes) is very close to this value and is considered acceptable. Surveillance testing history for these pumps has not indicated anomalies related to hydraulic instability.

For accident mitigation, the pumps on either unit are secured by procedure if primary pressure is greater than the pump shutoff head. Operation of the Unit 1 LPSI pumps solely on recirculation for extended times during accident mitigation is unlikely.

Maintenance history of these pumps and other industry pumps of the same make/model have not demonstrated common failures relating to

hydraulic instability.

5) High Pressure Safety Injection (HPSI) Pumps 1A, 1B, 1C, 2A and 2B.

The recommended minimum flow rate for these pumps exceeds the design recirculation flow rate. During surveillance testing, the pumps are operated for short time periods once per month accumulating only several hours of operating time a year. They are continuously monitored during testing allowing for determination of hydraulic instability problems.

Surveillance and maintenance histories of these pumps has not demonstrated any indications of the hydraulic instability phenomenon. Operation of the HPSI pumps on recirculation for a short time for surveillance testing is considered acceptable.

For Loss of Coolant Accident (LOCA) mitigation the HPSI pumps on both units can operate for extended periods solely on recirculation which does not meet the vendor's recommendations. However, the recommendations are considered guidelines and are not strictly interpreted to imply that pump damage or degradation is imminent and will occur if the limits are not rigidly followed. Hydraulic stability degradation as it may purportedly affect these pumps is considered cumulative and generally occurs over many hours of operation. Considering this and the maintenance and operating histories, the reliability of the HPSI pumps for accident mitigation is considered adequate. However, should an accident occur, appropriate post-accident inspections and repairs would be performed as necessary prior to pump restart to ensure adequate reliability.

B. ACTION ITEM 4B:

Provide a written response that identifies the short term and long term modifications to plant operating procedures or hardware that have been or are being implemented to ensure safe plant operation.

RESPONSE TO ACTION ITEM 4B:

1) Short Term Actions

As indicated above, the existing recirculation flow rates for safety related pumps at St Lucie Units 1 & 2 are presently considered acceptable with respect to hydraulic instability concerns. However, due to the perceived cumulative effects of the phenomenon, the long term reliability of the HPSI pumps on both units may be questionable. To acquire additional data to trend and evaluate potential long term effects on these pumps, one HPSI pump on Unit 2 will be inspected during the February 1989 refueling outage. The results of this inspection will be used to determine if further activities are necessary under this bulletin.

2) Long Term Actions

At the present time, long term modifications to plant operating procedures or hardware are not anticipated. Further actions will be predicated upon the HPSI pump inspection results.

C. ACTION ITEM 4C:

Provide a written response that identifies an appropriate schedule for long-term resolution of this and/or other significant problems that are identified as a result of this bulletin.

RESPONSE TO ITEM 4C:

As identified above, long term actions are not presently anticipated. Based on the Unit 2 HPSI pump inspection and evaluation, appropriate actions if required will be determined and a schedule for identified actions will be provided by May 26, 1989.

D. ACTION ITEM 4D:

Provide a written response that provides justification for continued operation particularly with regard to General Design Criterion 35 of Appendix A to Title 10 of the Code of Federal

Regulations (10 CFR 50), "Emergency Core Cooling" and 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Reactors".

RESPONSE TO ITEM 4D:

Justification for continued operation in regards to 10 CFR 50. Appendix A, Criterion 35 and to 10 CFR 50.46, is not required and is based on the following:

- Operation of most of the subject pumps is at or above the recommended flow rates for all operating conditions. For those pumps that do not meet recommended flow rates and/or time constraints, the maintenance and operating histories do not indicate problems directly attributable to hydraulic instability. The reliability of the pumps is considered adequate for accident mitigation.
- Operation at or below the recommended minimum flow rates during surveillance testing will occur only for short durations accumulating only several hours of operation each year. Monitoring techniques employed during testing provide for detection of hydraulic stability degradation as it may affect the pumps.
- There are no observable trends demonstrating potential degradation of the subject pumps that could be attributable to the hydraulic instability phenomenon.

TABLE 1

ST. LUCIE PLANT UNITS 1 & 2

NRC I&E BULLETIN 88-04
SAFETY RELATED PUMP LOSSMANUFACTURER'S MINIMUM FLOW RECOMMENDATIONS
FOR THERMAL AND/OR HYDRAULIC INSTABILITY CONCERNS

<u>PLANT UNIT</u>	<u>PUMP</u>	<u>SERIAL NO.</u>	<u>MANUFACTURER</u>	<u>DESIGN RECIRC. FLOW (gpm)</u>	<u>MINIMUM RECOMMENDED FLOW* (gpm)</u>
1	AFW-1A	711-N-0675	BYRON JACKSON	75	75-occasional use, less than 60 total hours annually 95-intermittent, accumulating 60 to 1500 hours annually 135-continuous, greater than 1500 hours annually
1	AFW-1B	711-N-0676			
1	AFW-1C	711-N-0677	BYRON JACKSON	100	
1	AFW-1C	711-N-0677	BYRON JACKSON	100	100-occasional use, less than 60 total hours annually 155-intermittent, accumulating 60 to 1500 hours annually 220-continuous, greater than 1500 hours annually
1	CS-1A	701-E-0188	BYRON JACKSON	50	150-occasional use, less than 60 hours annually 600-intermittent, 60 to 1500 hours annually 900-continuous, greater than 1500 hours annually
1	CS-1B	701-E-0189			
1	CS-1B	701-E-0189			
1	BAM-1A	N7008287-1	GOULDS	10**	40-continuous
1	BAM-1B	N7008287-2			
2	BAM-2A	N7508257-1			
2	BAM-2B	N7508257-2			
1	LPSI-1A	077064	INGERSOLL-RAND	40	40-continuous, less than 20 min.***
1	LPSI-1B	077065			
					800-continuous, less than 2 hours
					1800-continuous

<u>PLANT UNIT</u>	<u>PUMP</u>	<u>SERIAL NO.</u>	<u>MANUFACTURER</u>	<u>DESIGN RECIRC. FLOW (gpm)</u>	<u>MINIMUM RECOMMENDED FLOW* (gpm)</u>
2	LPSI-2A	1076-149	INGERSOLL-RAND	100	100-continuous, less than 1 hr.***
2	LPSI-2B	1076-150			1000-continuous
2	CS-2A	1076-142	INGERSOLL-RAND	150	150-continuous, less than 1 hr.***
2	CS-2B	1076-143			800-continuous
2	AFW-2A	0477-20	INGERSOLL-RAND	50	50-continuous
2	AFW-2B	0477-21			
2	AFW-2C	0477-22	INGERSOLL-RAND	70	70-continuous
1	HPSI-1A	200113	SULZER-BINGHAM	30	70-2 hours or less in 24 hours
1	HPSI-1B	200114			
1	HPSI-1C	200115			
2	HPSI-2A	14210014			114-continuous
2	HPSI-2B	14210015			

* Vendor latest recommended flows (see References 1, 2, 3, & 4).

** For the BAM pumps on both units, recirculation flow identified is experienced only during surveillance testing. During all other operating conditions, pump flow will exceed the recommended flow rate.

*** For certain Ingersoll-Rand pumps, the minimum flow is based on thermal considerations only. Further assessment of minimum flow for potential long term wear quantification due to hydraulic instability is being evaluated.