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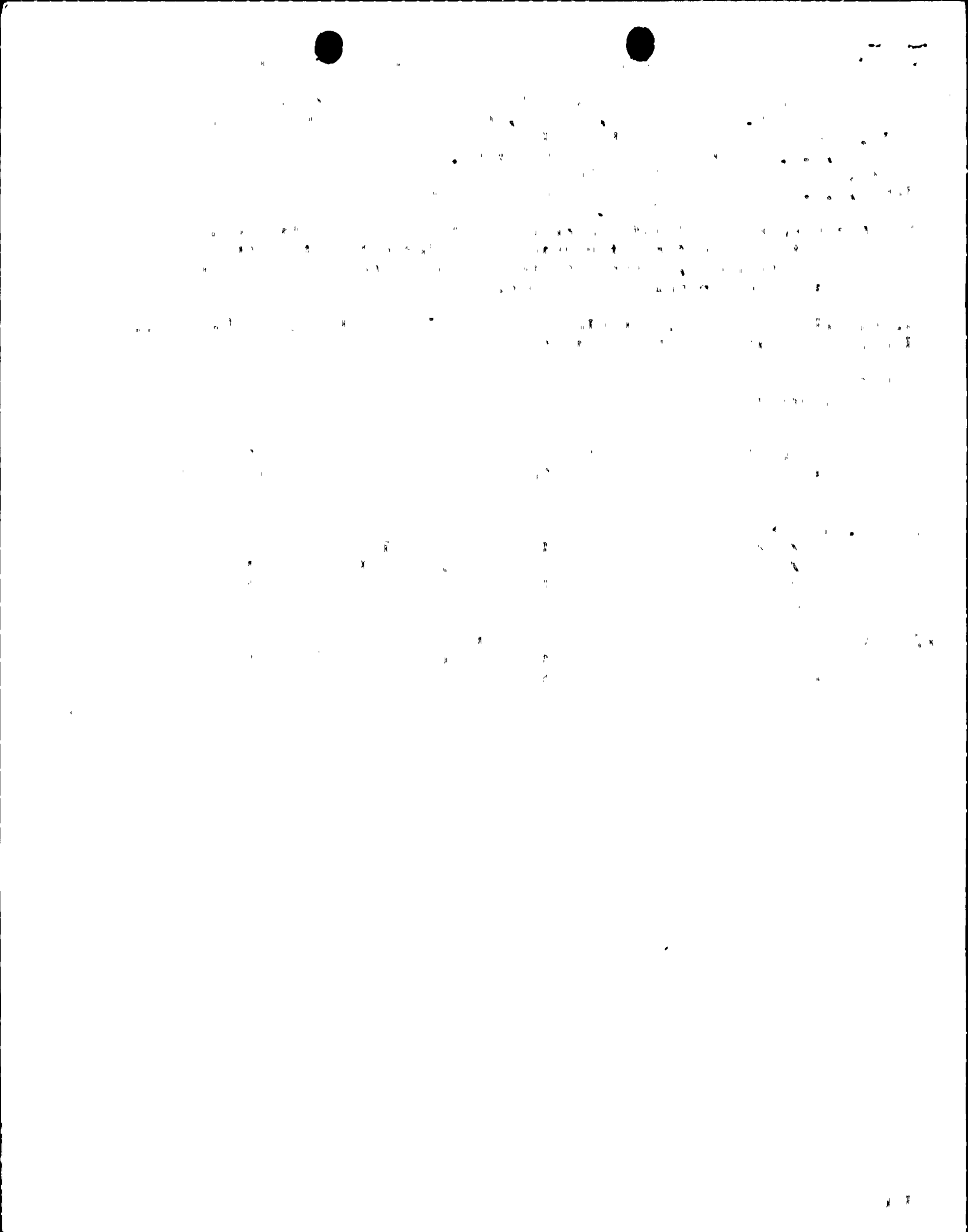
ACCESSION NBR: 8408090096 DOC. DATE: 84/08/06 NOTARIZED: NO DOCKET #
 FACIL: 50-389 St. Lucie Plant, Unit 2, Florida Power & Light Co. 05000389
 AUTH. NAME AUTHOR AFFILIATION
 WILLIAMS, J.W. Florida Power & Light Co.
 RECIP. NAME RECIPIENT AFFILIATION
 MILLER, J.R. Operating Reactors Branch 3

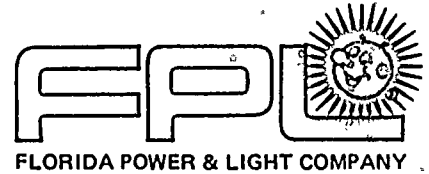
SUBJECT: Forwards addl info re crack growth rates & westinghouse methodology for determining temps for calculating crack growth rates, in response to NRC 840409 request. Info will be included in next FSAR update.

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L-84-198
August 6, 1984

Office of Nuclear Reactor Regulation
Attention: Mr. James R. Miller, Chief
Operating Reactors Branch #3
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Miller:

Re: St. Lucie Unit No. 2
Docket No. 50-389
Turbine Disc Inspection

During NRC review of Florida Power & Light Company letter L-84-97, dated April 9, 1984, additional information was requested.

Attachment 1 provides the information requested concerning crack growth rates and reinspection intervals. This information will be included in the next update to the St. Lucie Unit 2 FSAR.

Attachment 2 provides the information requested concerning Westinghouse's methodology for determining temperatures for the purpose of calculating crack growth rate.

Should you require any further information, please call.

Very truly yours,

for J. W. Williams, Jr.
J. W. Williams, Jr.
Group Vice President
Nuclear Energy

JWW/RJS/cab

Attachments

8408090096 840806
PDR ADDCK 05000389
P PDR

Root
1/1

FLORIDA POWER & LIGHT COMPANY

ST. LUCIE UNIT 2

ATTACHMENT 1

		TEMP				A _{CR}		CRACK GROWTH RATE IN/MONTH			REINSPECTION TIME MONTH		
	σ_o	INLET	OUTLET	σ_y	K _{1c}	BORE	KEYWAY*	BORE INLET	BORE EXIT	KEYWAY	BORE INLET	BORE EXIT	KEYWAY
Rotor TN 8194													
Disc 1 GOV	84.3	438	324	116	246.6	7.458	4.002	.1618	.0496	.02527	DRY	75.2	79.2
Disc 2 GOV	88.0	280	263	126.2	185.8	3.883	1.904	.0370	.02935	.01496	52.4	66.2	63.6
Disc 1 GEN	84.3	438	324	111.0	173.8	3.705	1.800	.1377	.0422	.02151	DRY	43.9	41.8
Disc 2 GEN	88.0	280	263	127.3	168.5	3.196	1.501	.0382	.0303	.01542	41.9	52.8	48.7
ROTOR TN 8195													
Disc 1 GOV	84.3	438	324	112.9	178.4	3.900	1.914	.1451	.04449	.02268	DRY	43.8	42.2
Disc 2 GOV	88.0	280	263	129.1	159.8	2.872	1.311	.04012	.03181	.01621	35.8	45.1	40.4
Disc 1 GEN	84.3	438	324	115.2	176.8	3.830	1.873	.1547	.04743	.02417	DRY	40.4	38.8
Disc 2 GEN	88.0	280	263	131.5	169.0	3.212	1.511	.04289	.03401	.01733	37.4	47.2	43.59

$$A_{CR} = \frac{Q}{\pi \times 1.21} \left\{ \frac{1.2K_{1c}}{\sigma_o} \right\}^2$$

$$Q = \begin{matrix} 2.3 \text{ BORE} \\ 1.35 \text{ KEYWAY} \end{matrix}$$

$$\text{TIME (MONTHS)} = \frac{1/2 (A_{CR} - \rho)}{da/dt \times 730}$$

$$\ln da/dt = \frac{-7302}{460 + \text{Temp}} + .0278 \sigma_y - \begin{matrix} 3.531 \text{ (BORE)} \\ 4.205 \text{ (KEYWAY)} \end{matrix}$$

(IN/YEAR)

$$\rho = \text{KEYWAY RADIUS} = 0.375$$

* A_{CR} for the Keyway has the radius subtracted from the calculated value.

ATTACHMENT 2



Westinghouse
Electric Corporation

Power Generation

Steam Turbine Generator Division

The Quadrangle
University Boulevard at Alafaya Trail
Orlando Florida 32817

RECEIVED

JUL 31 1984

Nuclear Licensing

July 18, 1984

Mr. Stan Shepherd
Florida Power & Light Company
P.O. Box 529100
Miami, Florida 33152

Subject: St. Lucie Unit #2

Dear Mr. Shepherd:

This letter will document a Telecon in which S. Shepherd (FP&L), R. Stevens (FP&L), W. Hazelton (NRC), R. Sells (NRC) and M. Schlatter (Westinghouse) participated. The purpose of the call was to address concerns which were raised by J. Schiffens review of FP&L's recent FSAR which contained disc inspection interval calculations for the St. Lucie Unit #2.

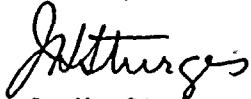
At issue was the method for determining the appropriate temperatures at a shrunk on disc bore and keyway for the purpose of calculating crack growth rate. Westinghouse confirmed that we use the disc metal temperature at a point two inches from the disc outlet face to calculate keyway crack growth rate. Likewise, the temperature at a point two inches from the inlet face is used in the bore crack growth rate expression. These temperatures are determined on an individual unit basis using the relationships between local steam temperature and disc metal temperature as determined by two dimensional steady state heat transfer analysis.

This procedure is consistent with the convention used to establish the growth rate expressions; i.e., all actual keyway data points used in the regression analysis were assigned temperatures corresponding to that two inches from the exit face. The bore points were treated similarly.

The significance of selecting the locations two inches from the disc faces is that these represent the average temperatures of the local areas where cracking had been observed.

There has been no change in the method of establishing these temperatures since the acceptance of the methodology described in MSTG-1-P "Criteria for Low Pressure Nuclear Turbine Disc Inspection" by the NRC in 1981.

Regards,



J. H. Sturges
Customer Project Management
Southeast Area

cc: W. Caperton
M. Schlatter

Miami 00610-PGS
Orlando 00707-205

JHS/ep