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FORWARDING EVALUATION ENTITLED: "REPT OF ABNORMAL INDIACTIONS FROM METAL IMPACT MONITORING SYSTEM, UNIT NO 4.", PURSUANT TO ORDER FOR MODIFICATION OF LIC NO DPR-41 DTD 08/02/77.

PLANT NAME: TURKEY PT #3

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FLORIDA POWER & LIGHT COMPANY

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March 23, 1978
L-78-104

Office of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

RECEIVED MAR 27 1978 U.S. NUCLEAR REGULATORY COMMISSION Mail Section

Dear Mr. Schwencer:

Re: Turkey Point Unit 4
Docket No. 50-251
Metal Impact Monitoring System

The Order for Modification of License for Turkey Point Unit No. 4, dated August 2, 1977, amended paragraph 3.D of License DPR-41. Pursuant to the requirements of this Order, Florida Power & Light Company is forwarding the attached evaluation "Report of Abnormal Indications from Metal Impact Monitoring System, Turkey Point Unit No. 4." The indications were first noticed on March 9, 1978 while reviewing the MIMS tapes recorded during the Unit 4 startup.

Very truly yours,

Robert E. Uhrig
Vice President

REU:RJA:dt

Attachment

cc: Mr. James P. O'Reilly, Region II
Robert Lowenstein, Esquire

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PEOPLE . . . SERVING PEOPLE

REPORT OF ABNORMAL INDICATIONS FROM METAL IMPACT MONITORING SYSTEM

Turkey Point Unit 4
March 7-8, 1978

INTRODUCTION

At the Florida Power and Light Company Turkey Point Plant Unit #4, Metal Impact Monitoring alarms were observed on March 7, 1978. The Metal Impact Monitoring System incorporates three channels, with the transducers all mounted on the in-core moveable detector thimble conduits near the bottom of the reactor vessel.

During heatup of the Reactor Coolant System, magnetic tape recordings of the signals of the Metal Impact Monitoring System were made continuously. With the reactor coolant flow at steady state conditions, metal impacts were detected during two brief periods, one with two reactor coolant pumps running, and one with three pumps operating. Subsequently, a tape for the impacting period was transmitted to the NSSS vendor for analysis.

The tape recordings for two-pump operation, with pumps B and C running, were taken on March 7, 1978, with the reactor coolant temperature of 240°F and pressure of 350 psig. The recording with all three pumps operating was taken on March 8, 1978, with reactor coolant conditions of 540°F and 2235 psig.

ANALYSIS

During the analysis of this tape, the signals were played through a high pass filter to eliminate 60 Hz noise. The output signals were recorded on light sensitive paper of a recording oscillograph. The tape recorder reproduce speed and the paper speed of the oscillograph were set so as to obtain a frequency response of 20 KHz and clear indication of waveform shape of the impacts. The oscillograph charts were examined to determine the rate of impacts over a given time interval, and the amplitude of the impacts. Frequency spectra were also generated for selected impacts as a factor in determining the mass of the object. The results of this analysis are summarized in Table I.

In reviewing these data, consideration was given to the rise time of the signal waveform of the impacts. Techniques

based on the rise time of the signal waveform of the impacts can be used to determine if the impacts are against the vessel wall, or against other surfaces. If the rise times of the signal waveforms seen by all transducers are rapid, on the order of 100 microseconds, this is a fair indication that the impacts are nearby and against the reactor vessel wall. Signals with much longer rise times, up to the order of milliseconds, are an indication that the object is either impacting another surface or is impacting far away.

In performing this analysis, reference was made to Metal Impact Monitoring System data taken during July, 1977 at this plant.

CONCLUSIONS

The results of the analysis of the data, and a review of the July, 1977 data for two-pump operation indicates that:

1. The waveform of the impact signals were the same as for July, 1977.

2. The rate of impacts were approximately the same for both periods.

3. The amplitude of the impacts were moderately higher in March, 1978 than in July, 1977; however, the plant operating conditions under which the impacts occurred were not identical.

4. The data from both periods shows no sudden Δtime changes, i.e., successive impacts always occurred at the same location. No signal overlaps or impacts within 10 milliseconds of each other were found. Therefore, it can be concluded to a high degree of confidence that there is only one loose object impacting in the bottom of the reactor vessel.

5. Based on the relative amounts of the high and low frequency content in the impact signals, the mass of the loose object is estimated to be less than one (1) pound.

6. The impacts were found to be both against the reactor vessel wall and other structures in the bottom of the reactor vessel.

7. The continued safe operation of Turkey Point Unit 4 is not affected by the occurrence of the metal impacts as described in this report.

TABLE I

SUMMARY OF RESULTS

Temp. (°F)	Pressure (psig)	Pumps Running	Maximum Amplitude of Signal (Gp-p)	Rate Impacts/Sec.	Observation Period Sec.	Background Noise Gp-p
240 (3/7/78)	350	B. C. Steady State	1.8-8* (Avg. 2.8**)	2.4	11.0	1.25
540 (3/8/78)	2235	A. B. C. Steady State	0.8-4.7* (Avg. 1.43**)	3.1	9.5	0.67
The following data refer to recordings made during July, 1977.						
90	400	A. B. (2 Minute Runs)	0.7-4p-p*** (Avg. 1.5**)	2.6	12.0	0.7

*Maximum aplitude refers to greatest peak amplitude of any channel for the same impact.

**Average amplitude refers to average of peak amplitude of all three channels for the same impact.

***Response limited by Visicorder saturation.