REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8209210085 DOC.DATE: 82/09/01 NOTARIZED: NO DOCKET #
FACIL:50-250 Turkey Point Plant, Unit 3, Florida Power and Light C 05000250
50-251 Turkey Point Plant, Unit 4, Florida Power and Light C 05000251
AUTH.NAME AUTHOR AFFILIATION
UHRIG,R.E. Florida Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
EISENHUT,D.G. Division of Licensing

SUBJECT: Forwards final response to NUREG-0737,Item II.D.1 re PWR relief & safety valve testing,Evaluations of pressurizer safety valves & pressurizer safety & relief piping encl.

DISTRIBUTION CODE: A046S COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 6
TITLE: Response to NUREG-0737/NUREG-0660 TMI Action Plan Rgmts (OL's)

NOTES:

	RECIPIENT ID CODE/NAME		COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME		COPIES LTTR	COPIES ENCL
	NRR ORB1 BC	01	7	7				
INTERNAL:	ELD/HDS4		1	0	IE/DEP DIR	33	1	1
	IE/DEP EPDS		1	1	IE/DEP/EPLB		3	3
	NRR/DE DIR	21	1	1	NRR/DE/ADCSE	22	1	1
	NRR/DE/ADMQE	23	1	1	NRR/DHFS DIR	28	1	1
	NRR/DHFS/DEPY	29	1	1	NRR/DL DIR	14	1	1
	NRR/DL/ADL	16	1	1	NRR/DL/ADOR	15	1	1
	NRR/DL/ADSA	17	1	1	NRR/DL/ORAB	18	3	3
	NRR/DSI DIR	24	1	1	NRR/DSI/ADCPS	25	1	1
	NRR/DSI/ADRP	26	1	1	NRR/DSI/ADRS	27	1	1
	NRR/DSI/AEB		1	1	NRR/DSI/ETSB		1	1
	NRR/DSI/RAB		1	1	NRR/DST DIR	30	1	1
	NRR/DST/ADGP	31	1	1	NRR/DST/ADT	32	1	1
	REG FILE	04	1	1	RGN2		1	1
EXTERNAL:	ACRS	34	10	10	FEMA-REP DIV		1	1
	INPO,J.STARNES		1	1	LPDR	03	1	1
	NRC PDR	02	1	1	NSIC	05	1	1
	NTIS		1	1				

TOTAL NUMBER OF COPIES REQUIRED: LTTR 53 ENCL 52

DOCKET: 50-250 Turkey Point Plant, Unit 3, Florida Power and Light [illegible]
50-251 Turkey Point Plant, Unit 4, Florida Power and Light [illegible]

AUTH. NAME — AUTHOR AFFILIATION
UHRIG, R.E. — Florida Power & Light Co.
RECIP. NAME — RECIPIENT AFFILIATION
EISENHUT, D.G. — Division of Licensing

SUBJECT: Forwards final response to NUREG-0737, Item II.D.1 re [illegible] safety valve testing. Evaluations of pressurizer safety valves & pressurizer safety & relief piping encl.

DISTRIBUTION CODE: A046S COPIES RECEIVED: LTR __ ENCL __ SIZE: __________
TITLE: [illegible] NUREG-0737/NUREG-0660 [illegible]

NOTES:

RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
[illegible]	1	[illegible]	[illegible]	1	1
[illegible]	1	1	[illegible]	[illegible]	2
[illegible]	1	1	[illegible]	1	1
[illegible]	1	1	[illegible]	1	1
[illegible]	1	1	[illegible]	1	1
[illegible]	1	1	[illegible]	1	1
[illegible]	1	1	[illegible]	3	2
[illegible]	1	1	[illegible]	1	1
[illegible]	1	1	[illegible]	1	1
[illegible]	1	1	[illegible]	1	1
[illegible]	1	1	[illegible]	1	1
[illegible]	1	1	[illegible]	1	1
[illegible]	1	1	[illegible]	1	1
[illegible]	10	10	[illegible]	1	1
[illegible]	1	1	[illegible]	1	1
[illegible]	1	1	[illegible]	1	1
[illegible]	1	1			

P. O. BOX 14000, JUNO BEACH, FL 33408

FLORIDA POWER & LIGHT COMPANY

September 1, 1982
L-82-388

Office of Nuclear Reactor Regulation
Attention: Mr. Darrell G. Eisenhut, Director
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Eisenhut:

Re: Turkey Point Units 3 & 4
Docket Nos. 50-250 and 50-251
Post-TMI Requirements
PWR Relief and Safety Valve Testing

The purpose of this letter is to provide you with Florida Power & Light Company's final response to the requirements of Item II.D.1 of NUREG-0737 concerning the PWR Safety and Relief Valve Test Program. Attachment 1 contains the results of our evaluation of the operability of the Turkey Point Unit 3 and 4 pressurizer safety valves. Attachment 2 contains the results of the evaluation of the pressurizer safety and relief valve piping for Turkey Point 3 and 4. The conclusions reached in the attachments of this letter and in our previous submittals of April 1, 1982, July 9, 1982 and August 13, 1982 support the continued safe operation of Turkey Point Units 3 and 4 and satisfies Florida Power and Light Company's responsibility to address the NRC concerns contained in Item II.D.1 of NUREG-0737.

Very truly yours,

Robert E. Uhrig
Vice President
Advanced Systems & Technology

REU/PKG/mbd

Attachments

cc: Mr. James P. O'Reilly, Region II
Harold F. Reis, Esquire

A046

Re: Turkey Point Units 3 & 4
Docket Nos. 50-250 and 50-251
Post-TMI Requirements
PWR Relief and Safety Valve Testing

ATTACHMENT 1

PWR Safety and Relief Valve Test Program

Item II.D.1.A of NUREG-0737 required that utilities operating and/or constructing Pressurized Water Reactor (PWR) power plants provide evidence, supported by test, of safety and relief valve operability. In response to these requirements, the Electric Power Research Institute (EPRI) implemented a generic test program on behalf of the PWR utilities. Florida Power & Light has been a participant in the EPRI program. The NRC Generic Letter 81-36 dated September 29, 1981, contains a schedule for the submittal of test results and the submittal of plant-specific reports. In accordance with this schedule, results of the EPRI program, summarized in various EPRI reports, were forwarded to the NRC on April 1, 1982, in parallel with distribution to the participating utilities. In our July 9, 1982 submittal addressing the operability of the Turkey Point Units 3 & 4 Power Operated Relief Valves, we confirmed our earlier commitment to submit a final Safety Valve operability evaluation on September 1, 1982. The following is Florida Power & Light's evaluation of the operability of the pressurizer safety valves.

Safety Relief Valves

The Safety Relief Valves (SRVs) at Turkey Point Units 3 & 4 are Crosby HB-BP-86, Type 4 K 26, Assembly No. 51249. The seating material is Stellite 6B and the disc holder is stainless steel with stellite lands and stellite disc bushing. Three Crosby SRVs were selected for the EPRI test program: HB-BP-86 Types 3K6, 6M6, and 6N8. The type 3K6 is chosen as the representative test valve for Turkey Point due to its orifice size and corresponding flowrate as shown in Reference (1). The test conditions were selected based on the fluid conditions presented in Reference (2).

The "As Tested" matrices and the valve performance data for the Turkey Point Units 3 and 4 SRVs are shown in Reference (3) Section 3.4. Four loop seal-steam tests were performed on a piping configuration of length close to that at Turkey Point. In three of the four tests, valve flutter at partial lift positions was observed during passage of the loop seal water. Upon steam entering the inlet, the valve "popped" open and achieved full lift and stability when the pressure was 6% above the valve design set pressure. Pressure spikes were observed in the upstream piping during the loop seal passage and corresponding flutter, these pressure spikes were shown not to affect valve operability in the Westinghouse WCAP 10105 (Ref. 4). Inspection of the valve after each test indicated that the typical wear pattern observed was scratches or marks on the seat surfaces, all deemed non-detrimental to valve operation. During each of the loop-seal tests, the valve opened on demand and fully closed on demand.

Conclusion

EPRI Testing has shown that the representative test valve when tested in a loop seal configuration and piping run similar to the Turkey Point Safety Relief system does operate in a manner compliant with the system design. Based on the EPRI test results, both the valve manufacturer and NSSS supplier concur to endorse continued safe operation of Turkey Point SRVs. This satisfies Florida Power and Light Company's responsibility to demonstrate Safety Relief Valve Operability in response to NUREG-0737.

References

1. "PWR Safety and Relief Valve Test Program Valve Selection/Justification Report", NP-2292-LD, Research Project V102, prepared by MPR Associates, Inc., Participating PWR Safety and Relief Valve manufacturers; EPRI PWR Safety and Relief Valve Test Program Staff, March 1982.

2. Valve Inlet Fluid Conditions for Pressurizer Safety and Relief Valves in Westinghouse - Designed Plants, NP-2296-LD-Project V102-20 prepared by Westinghouse Electric Company, March 1982.

3. "EPRI PWR Safety and Relief Valve Test Program - Safety and Relief Valve Test Report", prepared by EPRI Valve Test Program Staff, April 1982.

4. Westinghouse WCAP-1015, Review of Pressurizer Safety Valve Performance as observed in the EPRI Safety and Relief Valve Test Program, June, 1982.

Re: Turkey Point Units 3 & 4
Docket No. 50-250 and 50-251
Post-TMI Requirments
PWR Relief and Safety Valve Testing

ATTACHMENT 2

PWR Safety and Relief Valve Piping Evaluation

Item II.D.1.A of NUREG-0737 required that utilities operating and/or constructing Pressurized Water Reactor (PWR) power plants provide evidence, supported by test, of the adequacy of pressurizer SRV and PORV piping and supports. In response to these requirements, Florida Power & Light contracted Ebasco Services, Inc. to analyze the Turkey Point Units 3 & 4 relief configuration using any applicable test data resulting from the Electric Power Research Institute (EPRI) test program. (Ref. 1).

The NRC Generic letter 81-36 dated September 29, 1981, contains a schedule for the submittal of test results and the submittal of plant-specific reports. In accordance with this schedule, results of the EPRI program, summarized in various EPRI reports, were forwarded to the NRC on April 1, 1982, in parallel with distribution to the participating utilities. In our July 9, 1982 submittal addressing the operability of the Turkey Point Units 3 & 4 Power Operated Relief Valves, Florida Power and Light confirmed our earlier commitment to provide a final submittal for evaluating the SRV and PORV piping and support adequacy by September 1, 1982. In accordance with that commitment, Florida Power & Light provides the following evaluation.

SAFETY RELIEF VALVE PIPING

Analyses have been performed on the SRV piping and supports at Turkey Point Plant Units 3 & 4 to evaluate their adequacy. A model was generated from the I&E Bulletin 79-14 "As-Built" Isometrics which was used as input to the EPRI developed RELAP5/MOD1 computer code (Ref. 2). Thermalhydraulic properties were then calculated by RELAP5/MOD1 to be input into the postprocessor code CALPLOTFIII, (Ref. 3), developed by Ebasco for the calculation of the appropriate forcing functions and time histories.

These forcing functions were generated from analysis of the following scenarios of valve actuation:

a. Two PORVs open simultaneously, SRVs closed
b. PORVs do not open, all three SRVs open simultaneously
c. PORVs open, Pressurizer pressure continues to increase and SRVs open simultaneously.

Valve opening times were selected from the data tabulated in the EPRI interim test report (Ref. 4) from those valve tests representative of the Turkey Point valves and piping configuration. The forcing functions were then used as input to the computer code PIPESTRESS 2010 (Ref. 5) for analyses. Preliminary runs indicated some overstressing in certain portions of the discharge piping. The forcing functions were then used as input to the computer code PLAST (Ref. 6), which extends the analysis into the plastic region of the stress-strain curves. The intent was to show adequacy of the discharge piping

when stress levels exceed the yield point of the material. The PLAST analysis demonstrated that:

a) No deformation was significant enough to reduce the flow area or detrimentally impact the flow path,
b) Piping and restraint movements were such to preclude interaction with other components,
c) No pipe rupture was found, thereby precluding possibility of pipe whip or jet impingement;

thereby establishing the adequacy of the SRV piping and supports.

POWER OPERATED RELIEF VALVE PIPING

Analysis has been performed on the PORV piping and supports in conjunction with the SRV piping analysis. The methodology of analysis was as used in the SRV piping because of the shared portions of the discharge piping. The piping and supports unique to the PORVs were found to have acceptable stress levels per ANSI B 31.1 from the use of the PIPESTRESS 2010 code, thereby negating the need for further analyses by PLAST.

CONCLUSION

The SRV and PORV piping and supports for Turkey Point have been analyzed to demonstrate adequacy. The results from these analyses are contained in Reference (7). All portions of the SRV and PORV piping and supports in the Primary Coolant Boundary were shown to have acceptable stress levels per ANSI B31.1 during all of the postulated valve actuation scenarios discussed above. Portions of the discharge piping were found to have stress levels departing from the realm of elasticity with no detrimental affects on the adequacy of the piping and supports. This satisfies Florida Power & Light's responsibility to demonstrate the adequacy of the Turkey Point Units 3 & 4 SRV and PORV piping and supports.

REFERENCES

1. EPRI NP-2479-LD - Application of RELAP5/MOD1 for Calculations of Safety and Relief Valve Discharge Piping Hydrodynamic Loads, July, 1982.

2. Ransom V.H., Wagner R.J. et al. "RELAP 5 Mod 1 Code Manual" Vol. 1 & 2, EGG Idaho Inc., NUREG/CR 1826, EGG 2070 Draft, Rev. 2, September, 1981.

3. CALPLOTFIII - A computer code to calculate and plot forces, "W.J. Krotiuk, Ebasco Services, Inc., Applied Physics Procedure No. 4, March, 1982.

4. EPRI PWR Safety and Relief Valve Test Program - Safety and Relief Valve Test Report, Research Project V102, Interim Report, April 1982.

5. "User's Manual for Pipe Stress Analysis, "PIPESTRESS Program 2010, G. Cohen, J. Chasler, Ebasco Services Incorporated, June, 1979.

6. "User's Manual for Dynamic Pipe Whip Analysis," PLAST Program 2267, L. Listvinsky, Ebasco Services Incorporated, Revision 0, November 1980.

7. Analysis of Pressurizer Power Operated Relief Valve and Safety Valve Discharge Piping - Turkey Point Nuclear Power Plant Units Nos. 3 & 4 - . Prepared by: Ebasco Services, Inc.