

ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8909120396 DOC.DATE: 89/09/05 NOTARIZED: NO DOCKET #
 FACIL:50-250 Turkey Point Plant, Unit 3, Florida Power and Light C 05000250
 AUTH.NAME AUTHOR AFFILIATION
 HERRIN,D.W. Florida Power & Light Co.
 WOODY,C.O. Florida Power & Light Co.
 RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 88-021-01:on 880913,pressurizer power operated relief
 valve stroke time exceeds design basis specified in TS BSE.
 W/8 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 7
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR ENCL
	PD2-2 LA	1 1	PD2-2 PD	1 1
	EDISON,G	1 1		
INTERNAL:	ACRS MICHELSON	1 1	ACRS MOELLER	2 2
	ACRS WYLIE	1 1	AEOD/DOA	1 1
	AEOD/DSP/TPAB	1 1	AEOD/ROAB/DSP	2 2
	DEDRO	1 1	IRM/DCTS/DAB	1 1
	NRR/DEST/CEB 8H	1 1	NRR/DEST/ESB 8D	1 1
	NRR/DEST/ICSB 7	1 1	NRR/DEST/MEB 9H	1 1
	NRR/DEST/MTB 9H	1 1	NRR/DEST/PSB 8D	1 1
	NRR/DEST/RSB 8E	1 1	NRR/DEST/SGB 8D	1 1
	NRR/DLPQ/HFB 10	1 1	NRR/DLPQ/PEB 10	1 1
	NRR/DOEA/EAB 11	1 1	NRR/DREP/RPB 10	2 2
	NUDOCS-ABSTRACT	1 1	REG FILE 02	1 1
	RES/DSIR/EIB	1 1	RGN2 FILE 01	1 1
EXTERNAL:	EG&G WILLIAMS,S	4 4	L ST LOBBY WARD	1 1
	LPDR	1 1	NRC PDR	1 1
	NSIC MAYS,G	1 1	NSIC MURPHY,G.A	1 1
	NUDOCS FULL TXT	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!

FULL TEXT CONVERSION REQUIRED
 TOTAL NUMBER OF COPIES REQUIRED: LTTR 40 ENCL 40

A10-4
cut

R
I
D
S
/
A
D
D
S
/
A
D
D
S

SEPTEMBER 5 1988

L-89-297
10 CFR 50.73

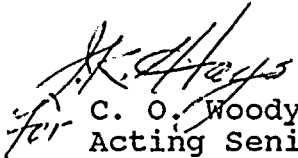
U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Gentlemen:

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Reportable Event: 88-21, Revision 1
Date of Event: September 13, 1988
Stroke Time Exceeds Design Basis as Specified In
Technical Specification Basis Safety Evaluation

The attached Licensee Event Report is being submitted pursuant to the requirements 10 CFR 50.73 to provide an update on the subject event.

Very truly yours,


C. O. Woody
Acting Senior Vice President - Nuclear

COW/JRH/cm

Attachment

cc: Stewart D. Ebnetter, Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, Turkey Point Plant

3909120396 890905
PDR ADOCK 05000250
S FDC

IE27
11

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Turkey Point Unit 3										DOCKET NUMBER (2) 0 5 0 0 0 2 5 0										PAGE (3) 1 OF 0 6	
TITLE (4) Pressurizer Power Operated Relief Valve Stroke Time Exceeds Design Basis As Specified in Technical Specification Basis Safety Evaluation																					
EVENT DATE (5)			LER NUMBER (6)				REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)											
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES Turkey Point Unit 4						DOCKET NUMBER(S) 0 5 0 0 0 2 5 1						
0	9	13	88	88	021	01	09	05	89							0 5 0 0 0					
OPERATING MODE (9) 1		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)																			
POWER LEVEL (10) 100		20.402(b)				20.405(c)				50.73(a)(2)(iv)				73.71(b)							
		20.405(a)(1)(i)				50.38(c)(1)				X 50.23(a)(2)(v)				73.71(c)							
		20.405(a)(1)(ii)				50.38(c)(2)				50.73(a)(2)(vi)				OTHER (Specify in Abstract below and in Text, NRC Form 368A)							
		20.405(a)(1)(iii)				50.73(a)(2)(i)				50.73(a)(2)(vii)(A)											
		20.405(a)(1)(iv)				X 50.73(a)(2)(u)				50.73(a)(2)(viii)(B)											
		20.405(a)(1)(v)				50.73(a)(2)(iii)				50.73(a)(2)(x)											
LICENSEE CONTACT FOR THIS LER (12)																					
NAME Dennis W. Herrin, Regulation and Compliance Engineer										TELEPHONE NUMBER AREA CODE 305 246-6749											
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																					
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC											
SUPPLEMENTAL REPORT EXPECTED (14)												EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR					
YES (If yes, complete EXPECTED SUBMISSION DATE)												X NO									

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On September 13, 1988, with both units at 100% power, it was determined that the Pressurizer Power Operated Relief Valves (PORV) time to open exceeded the design basis value for Technical Specification 3.15 of 2.0 seconds for the mass input case and 3.0 seconds for the heat input case. The Cold Overpressure Mitigating System was designed to provide protection for the inadvertent start of two Charging Pumps with a loss of letdown, or the start of a Safety Injection Pump (SI) and its injection into a water solid RCS, or the start of an idle Reactor Coolant Pump (RCP) with the secondary water temperature 50 degrees F above the RCS cold leg temperature. Test data since the initiation of IST of the PORVs in 1984 indicates opening times between 2 and approximately 6 seconds. The reason for these opening times is attributed to undersized air and nitrogen backup supply lines to the PORV actuators. The cause of this event was an inadequate design process which did not assure that the design basis opening time for the PORVs could be met. Until the situation is resolved, the SI pumps will be isolated at RCS temperatures less than 380 degrees F by means of two closed valves. Procedures were revised to prevent a third charging pump from operating with RCS temperatures less than 285 degrees F, and to maintain a pressurizer bubble with RCS temperatures greater than 200 degrees F.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Turkey Point Unit 3	DOCKET NUMBER (2) 0 5 0 0 0 2 5 0	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		8 8	0 2 1	0 1	0 2	OF	0 6

TEXT (If more space is required, use additional NRC Form 368A's) (17)

EVENT

On September 13, 1988, with both units operating at 100% power, it was determined that the Pressurizer Power Operated Relief Valve (PORV) (EIIS:AB) time to open exceeded the time stated in the Safety Evaluation Report (SER) for the basis of Technical Specification (TS) 3.15. The discrepancy between the SER time to open and the actual time to open was identified by the NRC in inspection report 250/251 88-14, issued on July 29, 1988. The above determination was made following an investigation into the discrepancy.

Technical Specification 3.15, its basis and its SER, were issued on March 8, 1982. The Inservice Testing (IST) program at Turkey Point began testing the PORVs with an acceptance criteria of 15 seconds, in May, 1984. The PORVs were not in the IST program prior to that time. When the PORVs were included in the IST program, the 15 second acceptance criteria for the opening time was estimated based on the 3" line size.

The Cold Overpressure Mitigation System (COMS) is designed to mitigate mass input and heat input induced pressure transients during cold shutdown conditions and during heatup and cooldown transients. The system was designed to provide overpressure protection for the following cases:

- 1) The inadvertent start of two Charging Pumps (EIIS:CB) with a loss of letdown, or
- 2) the start of a High Pressure Safety Injection Pump (SI) (EIIS:BQ) and its injection into a water solid RCS, or
- 3) the start of an idle Reactor Coolant Pump (RCP) with the secondary water temperature of the steam generators 50 degrees F above the RCS cold leg temperature.

Cases #2 and #3 are stated in the basis for the Technical Specifications of Turkey Point Units 3 and 4, Section 3.15. All cases are addressed in the original generic Westinghouse pressure transient analysis.

In the generic Westinghouse pressure transient analysis and in the Nuclear Regulatory Commission's (NRC) Safety Evaluation Report (SER) issued on March 14, 1980, the stroke times for the PORVs were specified as 2.0 seconds for the mass input case and 3.0 seconds for the heat input case. Actual PORV stroke time test results vary from less than 2.0 seconds to a maximum of 6.41 seconds. These values were obtained with no pressure under the valves' seats.

TS 3.15.3 requires both PORVs to be operable with RCS temperature less than or equal to 275 degrees F with the RCS pressure boundary established. Because of this requirement, the opening time of the PORVs is not an operability concern until a unit's RCS temperature decreases to 275 degrees F during cooldown. Discretionary enforcement to permit cooldown and enter the current Cycle XII refueling outage for Unit 4, continued operation until startup from the current Unit 4 refueling

FACILITY NAME (1) Turkey Point Unit 3	DOCKET NUMBER (2) 0 5 0 0 0 2 5 0	LER NUMBER (8)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		8 8	- 0 2 1	- 0 1	0 3	OF	0 6

TEXT (If more space is required, use additional NRC Form 368A's) (17)

outage and startup from the next refueling outage for Unit 3, was sought from and granted by the NRC on September 19, 1988. The granting of the discretionary enforcement was based on the implementation of corrective actions 1 through 4, as identified in this report, prior to Unit 4 cooldown below 275 degrees. Unit 4 cooled down below 275 degrees F and entered mode 5 on September 21, 1988.

CAUSE OF EVENT

The root cause of this event was an inadequate design process. The process did not verify that the design basis opening time of 2 seconds for the PORVs could be met by the PORVs installed at Turkey Point, nor did the process assure that the proper acceptance criteria was incorporated into the plant's affected documents. Undersized air and nitrogen backup supply lines to the PORV actuators is the most significant cause of the increased opening stroke times.

ANALYSIS OF EVENT

An evaluation of the safety impact of each potential overpressure event, on a case by case basis, is as follows:

1) **Inadvertent start of two charging pumps with a loss of letdown.**

The original generic Westinghouse overpressure transient analysis stated that the case of charging/letdown mismatch could be handled by the COMS without exceeding 10 CFR 50 Appendix G limits. Westinghouse reanalyzed this case with the PORV stroke times measured at Turkey Point. The results of this safety evaluation show that for the case of two charging pumps starting with a loss of letdown and a 6 second stroke time, the overshoot value is 18 psi. (Overshoot is the pressure by which the maximum RCS pressure exceeds the COMS setpoint of 415 psig.) This transient can be readily accommodated by the COMS without exceeding 10 CFR Appendix G limits. Westinghouse states that this case is the most probable mass input transient and that the PORV stroke times would have to increase to greater than ten seconds before the pressure excursions would approach the 10 CFR 50 Appendix G limits.

A calculation has been performed to analyze the mass input transient case of three charging pumps with a concurrent loss of letdown. This calculation was based on methods outlined in the Westinghouse Pressure Transient Analysis Report and is consistent with the procedure described in the original COMS report. The results of this calculation show that the PORV stroke time can degrade to at least 9.5 seconds and the COMS can safely mitigate this mass input transient.

FACILITY NAME (1) Turkey Point Unit 3	DOCKET NUMBER (2) 0 5 0 0 0 2 5 0	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		8 8	- 0 2 1	- 0 1	0 4	OF	0 6

TEXT (If more space is required, use additional NRC Form 346A's) (17)

This calculation is also conservative in that it is based on conservative generic Westinghouse data and assumes the start of three charging pumps instead of two. A more plant specific analysis of this case should yield longer PORV stroke times for this case.

2) Spurious start of one Safety Injection pump

The original generic Westinghouse overpressure transient analysis stated that the case of a spurious SI pump start is the limiting mass injection transient. It also states that although there are administrative controls in place at Turkey Point that ensure that the SI pumps cannot deliver water to the RCS below 380 degrees F, when the COMS is operable (at RCS temperatures less than or equal to 275 degrees F with a water solid, unvented RCS), it is designed to mitigate such an event. The possibility of this event is remote. Administrative controls are and have been in effect since the implementation of Technical Specification 3.15 at Turkey Point that prevent the possibility of a mass input transient caused by a spurious SI pump start. Procedure GOP-305, entitled "Hot Standby to Cold Shutdown," isolates the hot leg and cold leg safety injection valves prior to cooling the RCS below 380 degrees F. Attachment 1 to GOP-305 requires operator written verification that the SI valves are closed and that their associated power breakers are locked open.

A plant specific calculation of the mass injection pressure transient of a spurious start of a single safety injection pump has been performed by Westinghouse for Turkey Point Units 3 and 4. This case has been determined to be the most limiting pressure transient event. The calculation utilized actual valve characteristics. Additional credit was also taken for the test being performed with the block valves closed. The final results showed that the valve could be tested up to 3.45 seconds and still prevent the most limiting pressure transient from exceeding Appendix G limits.

3) Inadvertent starting of a RCP with a temperature differential between the secondary system and the RCS of 50 degrees F.

The original Westinghouse heat input case temperature differential is 50 degrees F, which was twice the maximum differential temperature allowed by procedure when starting a RCP. Current operating procedures specify a maximum differential temperature of 10 degrees F. Using a 20 degree F secondary to RCS differential temperature, Westinghouse has concluded that the valve stroke times would have to exceed 10 seconds before the limits of 10 CFR 50 Appendix G would be approached. Therefore, the COMS is capable of mitigating a heat input transient of the type that would currently be credible.

A review of previously permitted maximum differential temperatures has been performed to identify time frames during which operation may have been permissible with greater than the current maximum 20 degree differential temperature. That review concluded that during the time the Overpressure Mitigation System has been used (April-July 1977 to present), the maximum differential temperature allowed was less than the 20 degree F limit.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (8)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		05000250	88-021-01	05	OF	06	

TEXT (If more space is required, use additional NRC Form 366A (1) (17))

CORRECTIVE ACTIONS

- 1) The Safety Injection system is isolated from the RCS at temperatures less than 380 degrees F. This is a current requirement of Technical Specification 3.15. Until the current situation is resolved, each SI flowpath to the hotlegs will be isolated by means of two closed deactivated MOVs in series, and each SI flowpath to the cold legs will be isolated by means of one deactivated MOV and one locked closed manual valve in series. The manual valves will be controlled with locks and the motor operated valves will be tagged and have their breakers racked out. On-the-spot-changes (OTSC) of those procedures required for immediate unit shutdown to reflect the double isolation of the SI pumps were issued on September 19, 1988.

Administrative controls have been in effect since the implementation of Technical Specification 3.15 to isolate the SI pumps with at least one valve.

- 2) Procedures were revised to tag out one of the three charging pump breakers to prevent a third charging pump from operating with RCS temperatures less than 285 degrees F. The procedure revisions were completed on September 16, 1988.
- 3) Procedures were revised to maintain a pressurizer bubble with RCS temperatures greater than 200 degrees F. The procedure revisions were completed on September 16, 1988.
- 4) At RCS temperatures less than 275 degrees F, procedures currently do not permit starting a RCP unless steam generator secondary water temperature is less than 10 degrees F above the RCS temperature. OTSCs of those procedures required for immediate unit shutdown to reflect the racking out of a stopped RCP with an RCS temperature less than 285 degrees F were issued on September 19, 1988.

NOTE: Implementation of Corrective Actions 1 through 4 was the basis for the NRC granting Discretionary Enforcement for Units 3 and 4. These sanctions have been lifted for Unit 4 due to implementation of Corrective Actions 6, 10, and 11 below.

- 5) Other procedures which were not needed until after draindown or prior to unit startup were revised by September 23, 1988.
- 6) Plant Change/Modification (PC/M) 88-535 has been issued to increase the size of the Unit 4 PORV instrument air and nitrogen supply line tubing. This modification has been implemented and was demonstrated to be effective through performance of Preoperational Procedure 0800.216. This procedure requires an opening time of 1.65 to 3.45 seconds and a closing time of 1.0 to 2.0 seconds using both Instrument Air and Nitrogen Backup supplies.

PC/M 88-427 has been issued to increase the size of the Unit 3 PORV Instrument Air supply line tubing as a temporary measure to decrease the PORV opening stroke time. This modification has been implemented and was demonstrated to be

FACILITY NAME (1) Turkey Point Unit 3	DOCKET NUMBER (2) 0 5 0 0 0 2 5 0	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		8 8	— 0 2 1	— 0 1	0 6	OF	0 6

TEXT (If more space is required, use additional NRC Form 368A's) (17)

effective through performance of Startup Field Procedure SFP-13. Permanent modifications to the PORV Instrument Air and Nitrogen Backup supply line tubing will be implemented on the Unit 3 PORVs prior to restart from the next refueling outage.

- 7) Nuclear Engineering Quality Instruction (QI) 3.11, "JPN Review of Technical Specification Amendments," was issued in December 1988. This instruction addresses the review of technical specification amendments for impact on Engineering design documents. Initial training on this instruction was performed on December 30, 1988.
- 8) The current Technical Specifications for Turkey Point Units 3 and 4 are being upgraded to the Standard Technical Specification format. This task is outlined in the Technical Specification Revision Project (RTS) which includes a verification process to provide assurance of design basis conformance. That process satisfies the commitment to perform a review of previously issued amendments to the current Technical Specifications involving added equipment or performance requirement changes to assure that the affected design documents have been appropriately updated.
- 9) Administrative Procedure (AP) 0103.18, "Facility Operating License Amendments and/or Changes," was revised on November 28, 1988. This revision requires the Nuclear Engineering Department to document the review of proposed license amendments and provide a response to the Regulation and Compliance Group.
- 10) Operating Procedure OP 0209.1, "Valve Exercising Procedure," provides instructions for the periodic exercising of Safety Class 1, 2, and 3 valves for which exercising is required by the Valve Test Program portion of the Turkey Point Inservice and Testing Program. This procedure was revised on February 24, 1989 to ensure the Unit 4 PORVs meet an opening stroke time of 3.45 seconds. This procedure also ensures the Unit 3 PORVs meet an opening stroke time of less than or equal to 10 seconds. OP 0209.1 will be revised to specify an opening stroke time of 3.45 seconds for the Unit 3 PORVs upon completion of long term corrective modifications during the next refueling outage.
- 11) Unit 4 Operations Surveillance Procedure 4-OSP-041.4, "Overpressure Mitigating System Nitrogen Backup Leak and Functional Test," was revised on May 2, 1989 to ensure the Unit 4 PORVs meet an opening stroke time of 3.45 seconds using the Nitrogen Backup supply. 3-OSP-041.4 was revised on January 6, 1989 to ensure the Unit 3 PORVs meet an opening stroke time of less than or equal to 10 seconds using the Nitrogen Backup supply. 3-OSP-041.4 will be revised to specify an opening stroke time of 3.45 seconds for the Unit 3 PORVs upon completion of long term modifications during the next refueling outage.

ADDITIONAL INFORMATION

PORV Manufacturer: Copes-Vulcan

Actuator Manufacturer: Copes-Vulcan, model number D-100-160-2 1/2

Similar occurrences: none