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ACCESSION NBR: 8810260034 DOC. DATE: 88/10/20 NOTARIZED: NO DOCKET #
 FACIL: 50-250 Turkey Point Plant, Unit 3, Florida Power and Light C 05000250
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SUBJECT: LER 88-021-00: on 880913, pressurizer PORV stroke time exceeds design basis per Tech Spec basis safety evaluation.
 W/8 ltr.

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 TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

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NUDOCS-ABSTRACT	1 1	REG FILE 02	1 1
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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					DOCKET NUMBER(S)									
0 9	1 3	8 8	8 8	0 2 1	0 0	1 0	2 0	8 8	Turkey Point Unit 4					0 5 0 0 0 2 5 1									
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) 1 0 0			20.402(b)						20.406(c)						50.73(a)(2)(iv)						73.71(b)		
			20.406(a)(1)(i)						50.38(c)(1)						50.73(a)(2)(v)						73.71(c)		
			20.406(a)(1)(ii)						50.38(c)(2)						50.73(a)(2)(vi)						OTHER (Specify in Abstract below and in Text, NRC Form 366A)		
			20.406(a)(1)(iii)						50.73(a)(2)(i)						50.73(a)(2)(vii)(A)								
			20.406(a)(1)(iv)						50.73(a)(2)(ii)						50.73(a)(2)(vii)(B)								
			20.406(a)(1)(v)						50.73(a)(2)(iii)						50.73(a)(2)(x)								
LICENSEE CONTACT FOR THIS LER (12)																							
NAME Gabe Salamon, Compliance Engineer										TELEPHONE NUMBER AREA CODE 3 0 5 2 4 6 - 6 5 6 0													
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																							
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDs		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDs													
SUPPLEMENTAL REPORT EXPECTED (14)												EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR							
<input checked="" type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)												NO		0 2	2 4	8 9							

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 has not been established, however the valves will be investigated during the current Unit 4 and the following Unit 3 refueling outages. 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.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

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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

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

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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.

The latest test data for the PORVs indicates opening times ranging from 2.5 to 3.5 seconds. These values were obtained with no pressure under the valves' seats. Currently, the reason for the opening times has not been established, however the Unit 4 valves will be investigated during the current Unit 4 refueling outage, and the Unit 3 valves will be investigated during the next Unit 3 refueling outage.

ANALYSIS OF EVENT

A preliminary 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 worst 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.

An evaluation of the possible consequences of operation with three charging pumps, with loss of letdown, will be performed.

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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. Although the spurious SI pump start case with the excessive stroke times has not been evaluated to date, 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.

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 will be performed to identify time frames during which operation may have been permissible with greater than the current maximum 20 degree differential temperature.

This report is being submitted in excess of 30 days from the date of event due to additional efforts required to identify root causes and appropriate corrective actions.

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.

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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.
- 5) Other procedures which were not needed until after draindown or prior to unit startup were revised by September 23, 1988.
- 6) A reanalysis of the spurious start of one unisolated SI pump will be performed by the Nuclear Engineering Department by December 31, 1988.
- 7) The Unit 4 PORVs will be investigated during the current Unit 4 refueling outage, and the Unit 3 PORVs will be investigated during the next Unit 3 refueling outage. This investigation will focus on discrepancies which may account for the increased stroke time.
- 8) The Nuclear Engineering Department is investigating a permanent resolution for this issue. A resolution for the Unit 4 PORVs will be implemented prior to startup from the current Unit 4 refueling outage, and for the Unit 3 PORVs, prior to startup from the next Unit 3 refueling outage.
- 9) The design change process has been modified. The current process incorporates a check list requiring the responsible engineer to determine whether or not various design documents have been addressed adequately. This process is in place for plant changes and will be replicated for future Technical Specification amendments. The required procedure changes and training will be completed by December 31, 1988.
- 10) Previously issued Technical Specification amendments involving added equipment or performance requirement changes will be reviewed by the Nuclear Engineering Department to assure that the affected design documents have been appropriately updated. The scope and schedule for this task will be determined by November 30, 1988.
- 11) A review of previously permitted maximum differential temperatures will be performed to identify time frames during which operation may have been permissible with greater than the current maximum 20 degree differential temperature. This will be completed by December 31, 1988.

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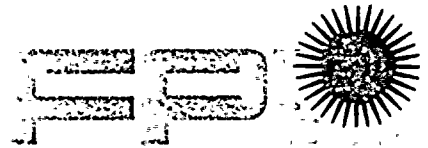
- 12) A final evaluation of the as-found condition, including operation with three charging pumps with loss of letdown will be performed by FPL. This will be completed by December 31, 1988.
- 13) Plant procedures will be revised to assure that the engineering department reviews future Technical Specification amendments. This procedure revision and appropriate training will be completed by November 30, 1988.

ADDITIONAL INFORMATION

PORV Manufacturer: Copes-Vulcan

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

Similar occurrences: none



OCTOBER 20 1988

L-88-450
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: 250-88-21
Date of Event: September 13, 1988
Pressurizer Power Operated Relief Valve
Stroke Time Exceeds Design Basis as Specified in
Technical Specification Basis Safety Evaluation

The attached License Event Report (LER) is being submitted pursuant to the requirements of 10 CFR 50.73 to provide notification of the event.

An extension, from October 13, 1988 until October 20, 1988, for submittal of this report was requested by FPL. This request was approved by a member of the NRC Region II staff.

Very truly yours,

W. F. Conway
Senior Vice President - Nuclear

WFC/RHF/gp

Attachment

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

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an FPL Group company