



DEC 03 2003

L-2003-295  
10 CFR § 50.73

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

Re: Turkey Point Unit 4  
Docket No. 50-251  
Reportable Event: 2003-002-00  
Date of Event: October 2, 2003  
As-Found Cycle 20 Main Steam Safety Valve  
Setpoint Outside Technical Specification Limits

The attached Licensee Event Report 251/2003-002-00 is being submitted pursuant to the requirements of 10 CFR § 50.73(a)(2)(i)(B) to provide notification of the subject event.

Very truly yours,

Terry O. Jones  
Vice President  
Turkey Point Nuclear Plant

WJP

Attachment

cc: Regional Administrator, USNRC, Region II  
Senior Resident Inspector, USNRC, Turkey Point Nuclear Plant

JE22

## LICENSEE EVENT REPORT (LER)

(See reverse for required number of  
digits/characters for each block)

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

## 1. FACILITY NAME

Turkey Point Unit 4

## 2. DOCKET NUMBER

05000251

## 3. PAGE

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## 4. TITLE

As-Found Cycle 20 Main Steam Safety Valve Setpoint Outside Technical Specification Limits

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
10	02	2003	2003	- 002	- 00	12	03	2003	FACILITY NAME	DOCKET NUMBER
9. OPERATING MODE		1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more)							
10. POWER LEVEL		49	20.2201(b)		20.2203(a)(3)(II)		50.73(a)(2)(II)(B)		50.73(a)(2)(ix)(A)	
			20.2201(d)		20.2203(a)(4)		50.73(a)(2)(III)		50.73(a)(2)(x)	
			20.2203(a)(1)		50.36(c)(1)(I)(A)		50.73(a)(2)(iv)(A)		73.71(a)(4)	
			20.2203(a)(2)(I)		50.36(c)(1)(II)(A)		50.73(a)(2)(v)(A)		73.71(a)(5)	
			20.2203(a)(2)(II)		50.36(c)(2)		50.73(a)(2)(v)(B)		OTHER	
			20.2203(a)(2)(III)		50.46(a)(3)(II)		50.73(a)(2)(v)(C)		Specify in Abstract below or in NRC Form 366A	
			20.2203(a)(2)(IV)		50.73(a)(2)(I)(A)		50.73(a)(2)(v)(D)			
			20.2203(a)(2)(V)		X	50.73(a)(2)(I)(B)	50.73(a)(2)(vii)			
			20.2203(a)(2)(VI)			50.73(a)(2)(I)(C)	50.73(a)(2)(viii)(A)			
			20.2203(a)(3)(I)			50.73(a)(2)(II)(A)	50.73(a)(2)(viii)(B)			

## 12. LICENSEE CONTACT FOR THIS LER

NAME

Walter J. Parker, Licensing Manager

TELEPHONE NUMBER (Include Area Code)

(305) 246 - 6632

## 13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
B	SB	RV	C710	YES	-	-	-	-	-

## 14. SUPPLEMENTAL REPORT EXPECTED

15. EXPECTED  
SUBMISSION  
DATE

MONTH DAY YEAR

YES  
(If yes, complete EXPECTED SUBMISSION DATE).

X

NO

## 16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On October 2, 2003, Turkey Point Unit 4 was in Mode 1 and holding at approximately 49 percent (%) reactor power, while performing Technical Specification (TS) surveillance testing of the Main Steam Safety Valves (MSSV) setpoints, just prior to the Unit 4 Cycle 21 Refueling Outage. The Unit 4 "A" Steam Generator (SG) MSSV, RV-4-1400, as-found lift pressure was 1128.5 psig, which was greater than the TS allowable setpoint pressure of  $\pm 3\%$  of 1085 psig (1052.5 psig - 1117.5 psig). RV-4-1400 was declared inoperable and the plant entered TS action statement 3.7.1.1.b. Reactor power was at 49%, which is below the 53% reactor power required per TS 3.7.1.1.b.

RV-4-1400 was subsequently tested at 1097.9 psig, or 1.19% above the setpoint. Per ASME Operation and Maintenance (OM), Part 1, Section 1.3.4.1(e)(2), RV-4-1400 remained out of service, pending cause and corrective action determination. The cause of the high lift pressure for RV-4-1400 was determined to be micro-bonding of the nozzle and disc. An adjustment was made of 1 flat of the adjusting nut to restore the valve to within 1% of the setpoint pressure and the plant exited TS action statement 3.7.1.1.b. The valve was subsequently overhauled and tested twice more, with the results within 1% of the required setpoint pressure the valve was placed back in service.

Operation of the facility with the as-found setting was within analytical bounds; therefore, this event had no impact on the health and safety of the public.

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Turkey Point Unit 4	05000251	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	Page 2 of 5
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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

**Description of the Event**

On October 2, 2003, Turkey Point Unit 4 was in Mode 1 and holding at approximately 49 percent (%) reactor power during the downpower for the PTN 4 Cycle 21 refueling outage. Technical Specification (TS) surveillance testing of the Main Steam Safety Valves (MSSVs) [EIIS:SB:RV] was performed at this power level. The TS surveillance testing was performed in accordance with procedure 4-OSP-072.5, "Main Steam Safety Valve Setpoint Verification Test".

The Unit 4 "A" Steam Generator (SG) MSSV, RV-4-1400, as-found lift pressure tested at 1128.5 psig, or 4.01% above the setpoint pressure. This is greater than the TS allowable setpoint pressure range of  $\pm 3\%$  of 1085 psig (1052.5 psig to 1117.5 psig). RV-4-1400 was declared inoperable and the plant entered TS Action Statement 3.7.1.1.b. Since reactor power was at 49%, no reactivity changes were required in order to comply with TS 3.7.1.1.b.

RV-4-1400 was subsequently tested at 1097.9 psig, or 1.19% above the setpoint. An adjustment was made of 1 flat of the adjusting nut to restore the valve to within 1% of the setpoint pressure and the plant exited TS action statement 3.7.1.1.b. The valve was tested twice more, with results within 1% of the required setpoint pressure. Although the valve had been adjusted and tested within 1% of the required setpoint pressure, based on the requirements of ASME OM, Part 1, Section 1.3.3.1(e)(2), the valve was not returned to service until the cause was determined and corrected. RV-4-1400 was subsequently overhauled, tested and returned to service.

As a result of the RV-4-1400 failed test, the Inservice Testing (IST) program required test expansion for an additional 2 relief valves over the planned testing requirement of 4 relief valves for this Unit 4 outage. All other MSSVs tested were within the  $\pm 3\%$  range of the required setpoint pressure.

**Cause of the Event**

Based on inspection of valve internals, the cause of the high as-found lift setpoint for RV-4-1400 was determined to be micro-bonding of the nozzle and disc. Lift pressure test results that exhibit a moderate to large reduction following the as-found test (typically 30 psig) are symptomatic of this phenomenon. Micro-bonding of the nozzle and disc can occur when the harder disc (410 stainless steel) causes microscopic galling of the softer nozzle (316 stainless steel) during plant heatup, due to the differential thermal expansion between the contact surfaces. These small gall beads cause the disc and nozzle to fuse to a limited degree.

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Under these conditions, the first as-found lift pressure is often significantly higher than subsequent lifts. Investigations performed by Altran Corporation for PG&E support this theory as a potential reason why the first as-found lift pressure is often significantly higher than subsequent lifts. The high initial lift pressure, followed by the subsequent test acceptable lift pressure, is consistent with the phenomenon of micro-bonding.

The traditional corrective action for micro-bonding has been to resurface the nozzle and disc (disc is usually replaced) during the safety valve overhaul. However, it was noted that there had been an apparent increasing trend in occurrences of micro-bonding, which is apparently related to seating surface finish.

The overhaul procedure had been recently revised to minimize the contribution to micro-bonding of seat finish. RV-4-1400 was overhauled to lap the seating surfaces to eliminate the micro-galling associated with this phenomena; however, a rougher surface finish was specified to an L4-L8 profile (i.e., Lapped to a 4-8  $\mu$ -in finish) in order to reduce the likelihood of future micro-bonding occurrences. Additionally, different disc materials will be evaluated to further improve minimizing the occurrence of micro-bonding in the MSSVs.

**Analysis of the Event**

The existence of micro-bonding in RV-4-1400 is an indication that the condition may well have developed during the operating cycle and that the condition existed prior to the surveillance testing. Based on this past operability assessment, the condition could have existed during Unit 4 Cycle 20 operation; this event is reportable under 10 CFR 50.73(a)(2)(i)(B).

**Analysis of Safety Significance**

The MSSVs were designed and constructed in accordance with the requirements of the ASME Code, Section III (ref. UFSAR Table 10.1-1). The function of the MSSVs is to provide overpressure protection for the shell side of the SGs (also ASME III components; ref. UFSAR table 4.1-9). The MSSVs are classified as safety related, Quality Group B components. Unit 4 was in Mode 1 at approximately 49 percent reactor power, when RV-4-1400 on the "A" steam generator failed its lift pressure surveillance test. The unit entered TS 3.7.1.1.b action statement and complied with the action statement by remaining at approximately 49 percent reactor power (less than 53 percent as required TS Table 3.7-1).

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This is the maximum allowable power level with one MSSV inoperable on any steam generator. All other MSSVs tested were within  $\pm 3\%$  of the required setpoint pressure.

A review of the Turkey Point safety analyses was performed to assess the impact of RV-4-1400 "as found" condition on Unit 4 Cycle 20 operation. The analyses where the MSSVs are modeled include:

- Uncontrolled Rod Withdrawal At Power
- Feedwater System Malfunction
- Increase in Steam Flow
- Loss of Flow
- Locked Rotor
- Loss of External Electrical Load/Turbine Trip
- Loss of Normal Feedwater With/Without Loss of Non-Emergency AC Power
- Small Break LOCA

The review indicated that only the events that are susceptible to overpressure conditions might be impacted by the "as found" condition of the subject MSSVs. These include:

- Loss of External Electrical Load (LOL)/Turbine Trip (Limiting Event)
- Rod Withdrawal From Power (RWFP)
- Loss of Normal Feedwater (LONF) With/Without Loss of Non-Emergency AC Power

Safety significance was evaluated on a system-wide basis for the MSSVs. The limiting overpressurization event is the Loss of External Electrical Load (LOL)/Turbine Trip. Based on the dynamics of the LOL safety analysis it is concluded that the "as found" MSSV condition does not result in the LOL design basis analysis being adversely impacted. This is because the "as found" opening setpoints of the second and third MSSV banks are lower than  $+3\%$  above the setpoint assumed in the LOL safety analysis. This lower "as found" opening setpoints compensate the higher "as found" opening setpoint for the first bank.

Based on the above discussion it is concluded that the overpressure design basis criteria for the LOL event were not exceeded during Cycle 20 as a result of the "as found" MSSV opening setpoints.

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Operation of the facility with the as-found setting was within analytical bounds; therefore, this event is evaluated as low safety significance and had no impact on the health and safety of the public.

**Corrective Actions**

- (1) RV-4-1400 was disassembled and overhauled, with the seating surfaces lapped to an L4 - L8  $\mu$ -in finish acceptance criteria.

**Additional Information**Failed Components Identified

Manufacturer: Crosby

Model Number: Style HA-55-FN, size 6R10, direct acting, spring loaded, open bonnet valves

Component: Main Steam Safety Relief Valve

**Similar Events**

Turkey Point Unit 3, Docket No. 50-250, Reportable Event: 2003-004-00, dated February 27, 2003, "As-Found Cycle 19 Main Steam Safety Valve Setpoints Outside Technical Specification Limits", Letter L-2003-087, dated April 25, 2003.