



**FPL**

10 CFR § 50.73  
L-2007-11  
January 29, 2007

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, D. C. 20555-0001

Re: Turkey Point Unit 4  
Docket No. 50-251  
Reportable Event: 2006-001-00  
Date of Event: November 28, 2006  
Containment Purge Penetration Fails Leak Rate Test Due to Inadequate Preventive  
Maintenance on Isolation Valve

The attached Licensee Event Report 05000251/2006-001-00 is being submitted pursuant to the requirements of 10 CFR 50.73(a)(2)(i)(B) to provide notification of the subject event.

If there are any questions, please call Mr. James Connolly at (305) 246-6632.

Very truly yours,

Terry O. Jones  
Vice President  
Turkey Point Nuclear Plant

Attachment

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

*IE22*

**LICENSEE EVENT REPORT (LER)**

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

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose 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.

<b>1. FACILITY NAME</b> Turkey Point Unit 4	<b>2. DOCKET NUMBER</b> 05000251	<b>3. PAGE</b> 1 OF 6
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**4. TITLE**  
Containment Purge Penetration Fails Leak Rate Test Due to Inadequate Preventive Maintenance on Isolation Valve

6. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
11	28	2006	2006	- 001 -	00	1	29	2007		05000
									FACILITY NAME	DOCKET NUMBER
										05000

<b>9. OPERATING MODE</b> 5	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§:</b> (Check all that apply)			
<b>10. POWER LEVEL</b> 0	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

**12. LICENSEE CONTACT FOR THIS LER**

NAME Paul F. Czaya – Licensing Engineer	TELEPHONE NUMBER (Include Area Code) 305-246-7150
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**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
E	NH	ISV	Henry Pratt Co.	N					

<b>14. SUPPLEMENTAL REPORT EXPECTED</b> <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO	<b>16. EXPECTED SUBMISSION DATE</b>	MONTH	DAY	YEAR

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

On November 28, 2006, while attempting to perform the local leak rate test (LLRT) of the Unit 4 containment purge exhaust penetration (36), the penetration was observed to be leaking excessively as it could not be pressurized. Subsequent investigation determined that power-operated containment isolation valve POV-4-2602 was not fully closed. The cause of the event is inadequate preventative maintenance. Penetration 36 failed its LLRT because the valve disc for POV-4-2602 was not fully closed. Corrosion in the actuator bearing surfaces created friction that exceeded actuator closing capability. It was conservatively determined that POV-4-2602 was inoperable from the last time it was stroked for a position indication surveillance on October 14, 2006. From October 27, 2006 to October 30, 2006, a containment purge was in progress in preparation for a refueling outage shutdown. As a result, a Technical Specification action requirement for an inoperable purge valve was not met. Immediate corrective actions included the lubrication of the actuator bearing surfaces, an increase in spring preload providing added closing force, and the installation of a valve disc travel stop. To prevent recurrence, a refueling outage preventive maintenance activity will be added to lubricate the bearing surfaces, and overhauls have been scheduled for POV-4-2602 and its counterpart on Unit 3 (POV-3-2602) during the next refueling outage for each unit. Since the redundant containment purge exhaust isolation valve (POV-4-2603) was operable, the safety function of containment penetration isolation was maintained.

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

**DESCRIPTION OF THE EVENT**

On November 28, 2006, while attempting to perform the local leak rate test (LLRT) of the Unit 4 containment [EIS: NH] purge exhaust penetration [EIS: PEN], the penetration was observed to be leaking excessively as it could not be pressurized.

Subsequent investigation determined that power-operated containment isolation valve [EIS: NH, ISV] POV-4-2602 was not fully closed. Condition Report 2006-34852 was initiated to evaluate the event and identify corrective actions.

Unit 4 was in Mode 5 at the time of discovery in preparation for a return to service from a refueling outage. The condition is presumed to have existed while purging was in progress during power operation prior to shutdown for the refueling outage, as allowed by Technical Specification (TS) Limiting Condition for Operation (LCO) 3.6.1.7. At the time, Unit 3 was in Mode 1 at approximately 100% rated power.

This condition is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B).

**BACKGROUND**

Isolation provisions limit radioactive effluent releases from the containment building in the event of a reactor [EIS: AC] accident. Isolation valves either close automatically or remain closed to perform this function. Containment isolation valves and penetrations are tested to ensure leakage is within allowed limits.

Containment purge is accomplished by opening the intake and exhaust isolation valves and initiating ventilation flow. The containment purge exhaust valves are POV-4-2602 (outside containment) and POV-4-2603 (inside containment) in Penetration 36. The line size is 54 inches. They are butterfly valves with a 30 degree opening restriction that close automatically on a containment ventilation isolation signal, loss of power or loss of instrument air.

The purge valves are required by TS LCO 3.6.1.7 to be operable and to be "...sealed closed to the maximum extent practicable" during Modes 1-4, but can be opened "...for pressure control, for environmental conditions control, for ALARA and respirable air quality considerations for personnel entry and for surveillance tests that require the valve to be open."

**CAUSE OF THE EVENT**

The cause of the event is inadequate preventative maintenance. Penetration 36 failed its LLRT because the valve disc for POV-4-2602 was not fully closed. Corrosion in the actuator bearing surfaces created friction that exceeded actuator closing capability.

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**ANALYSIS OF THE EVENT**

A successful as-found LLRT was performed on penetration 36 on October 12, 2006. The penetration valves (POVs-4-2602 and 2603) are not operated before, during or after an LLRT as part of the test. POV-4-2602 was later opened for a position indication channel check on October 14, 2006. The next time the valve was opened was on October 27, 2006 while the unit was in Mode 1 at approximately 100% power to initiate containment purge in preparation for a refueling outage. Unit 4 entered Mode 5 on October 30, 2006 at approximately 1534.

After stroking POV-4-2602 during the refueling outage at the time of the failed LLRT on November 28, 2006, the valve was discovered in a partially open position.

POV-4-2602 is a 54 inch Pratt symmetrical butterfly valve with a Pratt A3M actuator. After the failed LLRT, POV-4-2602 was found about 3/8 to 1/2 inch open. The valve shaft was corroded in the upper actuator bearing area and presumably in the lower actuator bearing; however, the lower bearing area was not visible. The actuator lever dropped and was not centered between the actuator plates. The contact area between the lever and the actuator lower plate was corroded. Other areas of minor corrosion on the actuator, such as cylinder pivots, were noted. Minor corrosion was also identified at the bottom of the valve disc and the lower segment plates. None of the corrosion affected the structural integrity of the actuator or the ability of the valve to seal once it is closed.

Due to the nature of the degradation it was conservatively concluded that containment purge exhaust isolation valve POV-4-2602 in penetration 36 was inoperable from the time it was operated on October 14, 2006 until repaired during the refueling outage. The valve was operated at various times during the outage prior to the failed LLRT. While conclusive evidence is not available as to exactly when the ability of POV-4-2602 to fully close was lost, it was prior to the LLRT on November 28, 2006.

Penetrating oil was applied to the corroded bearing areas. The actuator lever was match marked, the actuator stem was cleaned of old grease and debris and lubricated, and the upper and lower bearing surfaces between the lever and the actuator were lubricated. The spring preload was increased by extending the distance of the clevis from the actuator. Since the added preload could increase closure travel of the disc past the seat, a travel stop was installed. Successful LLRTs were documented for penetration 36 on November 29, 2006 and December 5, 2006.

The identical actuators and valves are used in the other purge exhaust valves for both units at Turkey Point, POV-4-2603, POV-3-2602 and POV-3-2603. The time since the last overhaul is longer for POV-4-2602 than the other valves. The time since the last overhaul of POV-3-2602 (also an outside containment isolation valve) is almost as long as POV-4-2602; however, its spring preload had been increased providing additional closing force. All the other purge exhaust valves (besides POV-4-2602) have passed their stroke time tests and LLRTs. Corrective actions will be applied to POV-3-2602 based on inspection and being exposed to the same environment as POV-4-2602.

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**Reportability**

A review of the reporting requirements of 10 CFR 50.72 and 10 CFR 50.73 and NRC guidance provided in "Event Reporting Guidelines," 10 CFR 50.72 and 10 CFR 50.73 (NUREG-1022, Rev. 2) was performed for the subject event. As a result of this review, the event is reportable as described below.

Purge exhaust isolation valve POV-4-2602 in penetration 36 is presumed inoperable from the time it was operated on October 14, 2006 until repaired. Successful LLRTs were documented for penetration 36 on November 29, 2006 and December 5, 2006, indicating that POV-4-2602 was repaired and operable with respect to leakage as early as November 29, 2006. The other valve in penetration 36 (POV-4-2603) was not affected by the inoperability of POV-4-2602. This was demonstrated by the various LLRTs performed prior to and subsequent to the identification of the problem on November 28, 2006, which rendered POV-4-2602 inoperable.

TSs for operability of containment purge valves are as follows:

"3.6.1.7 Each containment purge supply and exhaust isolation valve shall be OPERABLE and:

- a. The containment purge supply and exhaust isolation valves shall be sealed closed to the maximum extent practicable but may be open for purge system operation for pressure control, for environmental conditions control, for ALARA and respirable air quality considerations for personnel entry and for surveillance tests that require the valve to be open.
- b. The purge supply and exhaust isolation valves shall not be opened wider than 33 or 30 degrees, respectively (90 degrees is fully open).

APPLICABILITY: MODES 1, 2, 3, AND 4.

**ACTION:**

- a. With a containment purge supply and/or exhaust isolation valve(s) open for reasons other than given in 3.6.1.7.a above, close the open valve(s) or isolate the penetration(s) within 4 hours, otherwise be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- b. With a containment purge supply and/or exhaust isolation valve(s) having a measured leakage rate exceeding the limits of Specification 4.6.1.7.2, restore the inoperable valve(s) to OPERABLE status or isolate the penetrations such that the measured leakage rate does not exceed the limits of Specification 4.6.1.7.2 within 24 hours, otherwise be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours."

The containment purge valves are required to be operable in Modes 1-4. TS 3.6.1.7, Action b, requires a valve determined inoperable due to excessive leakage to be restored to operable status or the penetration is to be isolated such that leakage is within allowed limits within 24 hours.

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On October 27, 2006, with Unit 4 in Mode 1, a containment purge was initiated at approximately 0945 hours in preparation for unit shutdown for a refueling outage. On October 30, 2006 at approximately 1430 hours, the containment purge system was shutdown in accordance with Section 6.1 of procedure 0-OP-053 due to a problem with the exhaust fan. Section 6.1 requires closing the purge supply and exhaust valves.

Unit 4 entered Mode 5 on October 30, 2006 at approximately 1534 hours. At this time, operability of the containment purge valves was no longer required by the TSs.

The containment purge system was in operation for approximately 77 hours between October 27, 2006 and October 30, 2006 with POV-4-2602 and POV-4-2603 open while in Modes 1-4. Since POV-4-2602 is presumed inoperable due to excessive leakage from October 14, 2006, at least until repaired and tested on November 29, 2006, TS 3.6.1.7, Action b, was not met. POV-4-2602 was inoperable due to excessive leakage and the penetration was not isolated within 24 hours.

As TS 3.6.1.7, Action b, was not met, this is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B) as a "...condition which was prohibited by the plant's Technical Specifications..."

**ANALYSIS OF SAFETY SIGNIFICANCE**

Based on the analysis described below, it is concluded that the health and safety of the public were not affected by this event.

POV-4-2603, the inside containment purge exhaust isolation valve, remained operable while POV-4-2602 was inoperable from October 14, 2006 until repaired on November 29, 2006. While the reliability of the isolation provisions for penetration 36 was reduced, the capability to isolate the penetration via POV-4-2603 was not lost. Therefore, the increase in risk during the period of inoperability of POV-4-2602 is judged to be very small.

**CORRECTIVE ACTIONS**

Immediate

Built up corrosion products on the bearing surfaces was reduced and grease was applied to form a barrier between the metal surfaces and the corrosive environment. The spring preload was increased and a disc travel stop was installed. Diagnostic testing verified sufficient closing margin after the immediate corrective actions were completed. Successful stroke time testing and LLRT were also demonstrated.

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Corrective action to prevent recurrence

1. A new preventative maintenance activity to grease bearing surfaces on purge exhaust isolation valves every 18 months will be developed. The lubrication will form a barrier between the bearing surfaces and the corrosive environment.
2. Overhauls of outside containment purge exhaust isolation valves (POV-3-2602 for Unit 3 and POV-4-2602 for Unit 4) will be revised to the next refueling outage for each unit with subsequent overhauls adjusted based on the frequency interval.

ADDITIONAL INFORMATION

EIIS Codes are shown in the format [EIIS SYSTEM: IEEE system identifier, component function identifier, second component function identifier (if appropriate)].

FAILED COMPONENTS IDENTIFIED: Henry Pratt Co. 54 inch Butterfly Valve and A3M Actuator

SIMILAR EVENTS: None