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August 6, 2007  
JAFP-07-0094

United States Nuclear Regulatory Commission  
Attn: Document Control Desk  
Mail Station P1-137  
Washington, D.C. 20555

Subject: **Docket No. 50-333**  
**LICENSEE EVENT REPORT: LER-07-001 (CR-JAF-2007-02108)**

**Safety Relief Valve Setpoints Outside of Allowable Tolerances**

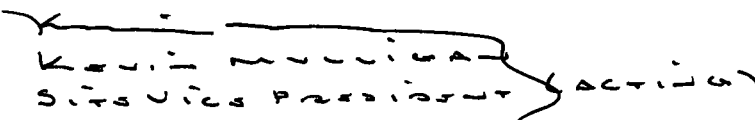
Dear Sir or Madam:

This report is submitted in accordance with 10 CFR 50.73(a)(2)(i)(B), "Any operation or condition which was prohibited by the plant's Technical Specifications..."

There are no commitments contained in this report.

Questions concerning this report may be addressed to Mr. Jim Costedio at (315) 349-6358.

Very truly yours,

  
Kevin Mulligan  
Site Vice President (acting)

Pete Dietrich

PD:rp  
Enclosure

cc: USNRC, Region 1  
USNRC, Project Directorate  
USNRC Resident Inspector  
INPO Records Center

IE22

MRR

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](mailto: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.

**LICENSEE EVENT REPORT (LER)**

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

1. FACILITY NAME James A. FitzPatrick Nuclear Power Plant	2. DOCKET NUMBER 05000333	3. PAGE 1 OF 5
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4. TITLE  
Safety Relief Valve Setpoints Outside of Allowable Tolerances

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
06	06	07	07	01	00	08	06	07	N/A	05000
11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)										
9. OPERATING MODE 1			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)	
10. POWER LEVEL 100			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 Specify in Abstract below or in NRC Form 366A	
			20.2203(a)(2)(iii)		50.46(a)(3)(ii)		50.73(a)(2)(v)(C)			
			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 Mr. Rick Plasse, Project Manager NRR	TELEPHONE NUMBER (Include Area Code) (315) 349-6793
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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
B	SB	RV	T020	Y					

**14. SUPPLEMENTAL REPORT EXPECTED**

YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO
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**15. EXPECTED SUBMISSION DATE**

MONTH	DAY	YEAR

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

Review of the as-found setpoints for 10 Safety Relief Valve (SRV) [SB] pilot assemblies, removed at the end of Cycle 17, determined that 7 SRVs were outside the allowable as-found tolerance of 1145 psig +/- 34.3 psig (+/- 3%) required by Technical Specifications (TS) Surveillance Requirement (SR) 3.4.3.1. Additionally, one pilot removed at the end of Cycle 17 could not be tested as required by TS SR 3.4.3.1. This report documents the failure to meet this SR for 8 of the 11 SRVs.

The effect of these SRVs being out of tolerance was analyzed and the results of this analysis show that Reactor Pressure Vessel (RPV) overpressure protection and nuclear plant safety were not adversely affected. Consequently, the safety significance of this event was minimal. Each of the seven out of tolerance SRV setpoints was determined to have a most probable cause of corrosion bonding between the SRV pilot disc and seat, a recognized industry generic problem.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2	OF 5
James A. FitzPatrick Nuclear Power Plant	05000333	07	001	00		

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

EIS Codes in [ ]

**Event Description:**

On June 6, 2007, while the plant was operating at 100 percent power, FitzPatrick was notified that seven Safety Relief Valve (SRV) [SB] pilot assemblies removed at the end of Cycle 17 (October 2006 Refueling Outage) had as-found setpoints outside the allowable tolerance of 1145 psig +/- 34.3 psig (+/- 3%).

This allowable tolerance (1110.7 to 1179.3 psig) is required per Technical Specifications (TS) Surveillance Requirement (SR) 3.4.3.1. The seven SRVs exceeded the high limit of 1179.3 psig.

The removed SRV pilots were tested at Wyle Laboratories during the period May 29, 2007 through June 4, 2007. The results from these tests were reported to FitzPatrick by Wyle Laboratories on June 6, 2007. One pilot in location 02RV-71A was damaged during removal and could not be tested. To prevent recurrence, JAF plans to enhance the SRV pilot valve removal maintenance procedure. Three pilot valves have been sent for forensic analysis to confirm cause. This LER will be updated, if required based on the forensic results.

**Test Results:**

<u>Pilot Serial Number</u>	<u>Plant Valve Number</u>	<u>Initial Lift As-Found Setpoint</u>	<u>Initial Lift &gt; 3% Above Setpoint</u>
1013	02RV-71B	1184	Yes
1236	02RV-71C	1180	Yes
1110	02RV-71D	1155	No
1218	02RV-71E	1176	No
1191	02RV-71F	1187	Yes
1217	02RV-71G	1177	No
1235	02RV-71H	1195	Yes
1045	02RV-71J	1206	Yes
1051	02RV-71K	1233	Yes
1195	02RV-71L	1190	Yes

TS LCO 3.4.3 requires nine operable SRVs when in Modes 1, 2 or 3. Specifically, the TS states:

*The safety function of 9 S/RVs shall be OPERABLE.*

Since seven pilot valves exceeded the allowable setpoint range, this report is being made under 10 CFR 50.73(a)(2)(i)(B), "Any operation or condition which was prohibited by the plant's Technical Specifications..."

**Cause of Event:**

The most probable cause of each of the seven high out of tolerance pilot setpoints was determined to be corrosion bonding between the SRV pilot disc and seat [Cause Code B]. With a bond forming between the pilot disc and seat, more pressure is needed to raise the pilot disc off the seat. Since the normal balance of pilot assembly spring force and steam pressure force necessary to lift the pilot disc corresponds to the nominal setpoint of the SRV, the pilot disc to seat bond results in a higher pilot lift setpoint.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
James A. FitzPatrick Nuclear Power Plant	05000333	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3 OF 5
		07	001	00	

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

**Cause of Event:** (continued)

An oxygen rich environment in the pilot assembly, due to the radiolytic breakdown of water to hydrogen and oxygen, causes corrosion bonding. Oxygen accumulates in the area of the pilot disc because the pilot assembly is a high point on the main steam [SB] line.

A contributing cause for corrosion bonding of the pilot disc to seat may be related to SRV insulation. The installation of insulation on the Target Rock 7567F SRVs has proven to be critical in the industry. Currently JAF is investigating the configuration of installed SRV insulation to determine recommended improvements. Based on the results of the investigation of insulation configuration this LER will be updated if required.

**Event Analysis:**

The SRVs provide overpressure protection for the Reactor Coolant Pressure Boundary (RCPB) as required by the ASME Boiler and Pressure Vessel Code. SRV pilots actuating at pressures higher than the required setpoint may be significant if adequate overpressure protection is not available. The RCPB Overpressure Analysis is performed each fuel cycle based on the worst case anticipated transient with nine SRVs opening at an analyzed Upper Limit pressure of 1195 psig, and two SRVs out of service.

The current Anticipated Transient Without Scram (ATWS) analysis was performed using the worst case ATWS with two SRVs out of service and the other nine opening at the upper end of the uncertainty range for the Electric Lift trip setpoints. This analysis is not affected by as-found setpoint testing unless Electric Lift is inoperable during the cycle. During Cycle 17, SRV D experienced an electrical actuation failure due to a loose electrical connector (CRs-JAF-2006-02384 and 04108), which rendered Electric Lift inoperable for that one valve. Since the analysis assumes two SRVs out of service, the actual performance is enveloped by the analysis. Also, SRV D as-found lift setpoint (1155 psig) was less than the associated lift setpoint from the analysis (1157 psig). Accordingly, operation during Cycle 17 complied fully with the current ATWS analysis.

In comparing as-found SRV lift setpoints to the RCPB Overpressure Analysis, SRV A must be considered as not opening based on the inability to perform as-found testing (see CR-JAF-2007-01944). Two other pilots lifted at greater than 1195 psig; taking the higher as the second out of service valve, one of the nine lifted at 1206. However, eight of the pilots lifted at or below the 1195 analytical value, some by significant margins; also, the "out of service" valve lifted at 1233 psig, well below the peak transient pressure. The effect of the early lifts of several SRVs more than overcomes the effect of the slightly late lift of one SRV. Therefore, the peak pressure resulting from a limiting overpressure transient with the as-found SRV setpoints would be less than the peak pressure of 1307.4 psig from the cycle reload analysis, which met the safety limit of 1325 psig.

Additionally, the Electric Lift system installed in 2000 was operable throughout the cycle, except for SRV D as noted above. Electric Lift is not credited in the RCPB Overpressure Analysis. This system actuates the SRVs at the specified setpoints regardless of corrosion bonding, further limiting the peak pressure in the event of a pressurization transient.

Therefore, the safety significance of this event is considered low and does not decrease the effectiveness of plant barriers providing safety to the public.

Consequently, the safety significance of this event was minimal.

**LICENSEE EVENT REPORT (LER)**  
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4 OF 5
James A. FitzPatrick Nuclear Power Plant	05000333	07	001	00	

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

**Extent of Condition:**

All of the SRVs are susceptible to setpoint drift due to pilot disc to seat corrosion bonding. This is a recurring industry issue that has been the subject of both NRC and BWROG generic assessments.

As part of FitzPatrick's efforts to improve the performance of the SRV pilots, Stellite 21 discs were installed in all of the eleven SRVs at the beginning of Cycle 17.

In addition, the BWROG recommended modification to provide pressure switch actuation of the SRVs has been installed and was operational during Cycle 17. This modification provides an electric actuation of SRV pilot valves based upon a pressure switch actuating at a predetermined setpoint. This provides a diverse, redundant method of SRV actuation, which overcomes the pilot disc-seat corrosion bonding effect.

**Corrective Actions:***Corrective Actions Completed Prior to this Report:*

1. All SRV Pilots were removed from the plant during Refuel Outage 17 (October 2006) and replaced with newly refurbished and test certified pilots (using Stellite 21 discs) for Cycle 18.
2. The BWROG recommended modification to provide pressure switch actuation of the SRVs was operational during Cycle 17 when these valves were in service.
3. All SRV pilot assemblies are tested and replaced each operating cycle, however as stated above, 02RV-71A was not tested due to a maintenance error.
4. "D" SRV loose electrical connector was repaired during Refuel Outage 17.

*Corrective Actions for this Event:*

1. Revise the maintenance procedure for SRV pilot valve removal (MP-002-04) to prevent damage of the pilot valve during removal.

**(Due 08/01/08)****Safety System Functional Failure Review:**

This event did not result in a safety system functional failure as defined by NEI 99-02, Revision 5.

**Similar Events:**

1. JAF LER-05-002 "Safety Relief Valve Setpoint Drift," June 6, 2005.
2. JAF LER-03-002 "Safety Relief Valve Setpoint Drift," October 16, 2003.
3. JAF LER-01-005 "Safety Relief Valve Setpoint Drift," August 17, 2001.
4. JAF LER-99-003 "Safety Relief Valve Setpoint Drift," March 16, 1999.
5. JAF LER-98-002 "Safety Relief Valve Setpoint Drift," April 9, 1998.

**LICENSEE EVENT REPORT (LER)**  
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
James A. FitzPatrick Nuclear Power Plant	05000333	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	5 OF 5
		07	001	00	

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

**Failed Component Identification:**

Manufacturer: Target Rock Corporation  
 Model Number: 7567F-10  
 NPRDS Manufacturer Code: T020  
 NPRDS Component Code: Valve  
 FitzPatrick Component ID: 02RV-071A, B, C, F, H, J, K, & L

**References:**

1. JAF Condition Report CR-JAF-2007-02108, Root Cause Analysis Report, Seven of ten SRV pilots failed as-found testing (testing high out of tolerance).
2. JAF Condition Report CR-JAF-2007-01944, Method of removal of A SRV (02RV-71A) pilot assembly (serial number 1087) invalidates as-found testing.
3. JAF Condition Reports CR-JAF-2006-02384 and 04108, D SRV electric lift inoperable due to loose electrical connector.
4. JAF-RPT-04-00441, Supplemental Reload Licensing Report for James A. FitzPatrick Reload 16 Cycle 17.
5. NEDC-33087P, Rev. 1, J. A. FitzPatrick Nuclear Power Plant APRM/RBM/Technical Specifications / Maximum Extended Operating Domain (ARTS/MEOD).