



Entergy Nuclear Northeast
Entergy Nuclear Operations, Inc.

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Pete Dietrich
Site Vice President

June 22, 2009
JAFP-09-0075

United States Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

SUBJECT: LER: 2009-005-00, "Safety Relief Valve Setpoints Outside of Allowable Tolerances"
James A. FitzPatrick Nuclear Power Plant
Docket No. 50-333
License No. DPR-59

Dear Sir or Madam:

This report is submitted in accordance with 10 CFR 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. Joseph Pechacek, Licensing Manager, at (315) 349-6766.

Sincerely,



Pete Dietrich
Site Vice President

PD/JP/mh

Enclosure(s): 1. JAF LER 2009-005-00, "Safety Relief Valve Setpoints Outside of Allowable Tolerances"

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

JEF
NPP

LICENSEE EVENT REPORT (LER)

Estimated burden per response to comply with this mandatory collection request: 80 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.

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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	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
04	20	2009	2009	005	00	06	22	2009	N/A	05000
									FACILITY NAME	DOCKET NUMBER
									N/A	05000

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)										
	<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)								
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<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

FACILITY NAME Mr. Joseph Pechacek, Licensing Manager	TELEPHONE NUMBER (Include Area Code) (315) 349-6766
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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	T020	Y					

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

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

Review of the as-found test results for 11 Safety / Relief Valve (S/RV) [SB] pilot assemblies removed and replaced in September 2008, determined that 5 S/RVs were outside the allowable as-found tolerance of 1145 psig +/- 3% (+/- 34.3 psig) required by Technical Specification (TS) Surveillance Requirement SR 3.4.3.1.

The effect of these S/RVs 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. The most probable cause for the failure of four of the S/RVs was determined to be corrosion bonding between the S/RV pilot disc and seat, a recognized industry generic problem with two-stage Target Rock relief valves. The fifth failure was determined to be due to significant pilot valve seat leakage which would have required additional steam pressure to overcome the leakage and lift this S/RV.

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NARRATIVE

BACKGROUND

The James A. FitzPatrick Nuclear Power Plant uses eleven (11) two-stage Target Rock Safety / Relief Valves (S/RV) for emergency pressure relief. These valves are located inside the primary containment, and relieve pressure from the main steam lines to the torus. The valves are manually actuated once during plant start-up to demonstrate their ability to open. They are not subsequently tested during the plant operating cycle since actuation would result in an unnecessary transient and operator challenges.

During each refueling outage approximately one-third of the S/RV main body assemblies and all eleven of the pilot assemblies are removed and replaced with vendor tested and certified components. The main bodies and pilots that are replaced are sent to a vendor facility for testing, refurbishment, and certification. The test results for pilot assemblies removed in September 2008, during Refueling Outage 18, identified 5 S/RVs that would not have opened within the Technical Specification (TS) setpoint tolerance of 1145 psig +/- 3% (1110.7 - 1179.3 psig).

EVENT DESCRIPTION

As-found testing was performed on the eleven Main Safety / Relief Valves (S/RV) pilot assemblies removed in September 2008, during Refueling Outage 18. The testing was conducted between April 9, 2009 and April 17, 2009 by Wyle Laboratories. The TS setpoint for each SRV is 1145 psig +/- 3%. During the initial lift test, five of the eleven pilot assemblies failed to open within the allowed setpoint tolerance of +/-3% (1110.7 to 1179.3 psig). The following table summarizes the test results for the 5 pilot assemblies that failed the initial lift test.

In-service Location	Pilot Serial Number	First Test (psig)	Second Test (psig)	Acceptance Range 1111-1179	Over Pressure Analysis Limit 1195 psig
02RV-071B	1237	1192	1163	Unsat	Under
02RV-071C	1047	1184	1156	Unsat	Under
02RV-071E	1080	1187	1170	Unsat	Under
02RV-071F	1238	1227	----	Unsat	Over
02RV-071L	1193	1245	1148	Unsat	Over

As shown in the above table, subsequent tests passed the acceptance criteria of +/-3% for four of the five pilot assemblies. The most probable cause for the high lift setpoint on the four pilot assemblies that were retested was determined to be corrosion bonding between the pilot valve disc and seat. The most probable cause for the failure on the fifth pilot assembly was determined to be significant pilot valve seat leakage. Due to the seat leakage additional steam pressure would have been required to overcome the leakage and lift the S/RV. As shown in this table, pilot 1238 was not retested. This was due to the stated failure mechanism being significant seat leakage. The seat leakage was draining the pressure header of the test equipment such that repeat testing was not feasible.

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EVENT DESCRIPTION (continued)

TS LCO 3.4.3 requires nine operable S/RVs when in Modes 1, 2 or 3. Specifically, the LCO states: "The safety function of 9 S/RVs shall be OPERABLE." Since five of eleven pilot valves exceeded the allowable setpoint tolerance, 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..."

As described above, all eleven S/RVs in the plant had recently rebuilt and certified pilots installed during the refueling outage and were opened during the plant start-up to verify their Operability. Therefore, the currently installed S/RVs are OPERABLE.

EVENT ANALYSIS

The S/RVs provide overpressure protection for the Reactor Coolant Pressure Boundary (RCPB) as required by the ASME Boiler and Pressure Vessel Code. S/RV 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 S/RVs opening at an analyzed upper limit pressure of 1195 psig, and two S/RVs out of service.

Three of the five failed S/RV pilots opened within the analyzed upper limit of the overpressure analysis. Therefore, nine of the eleven S/RVs would have opened within the upper limit of the overpressure analysis and the overpressure analysis remains a bounding analysis.

Although the electric lift system installed in 2000 is not credited in the RCPB Overpressure Analysis, it was OPERABLE throughout the operating cycle. This system uses a pressure switch to energize solenoid valves which supply pneumatic pressure to assist in overcoming corrosion bonding. Based on industry experience, this electric lift system compensates for corrosion bonding, and was available to mitigate the effects of corrosion bonding on the four S/RV pilot assemblies that exhibited this failure mode.

The high as-found test for S/RV pilot 1238 was not attributed to corrosion bonding. This S/RV Pilot was determined to have failed due to significant seat leakage that would have required additional steam pressure to overcome the seat leakage and lift the valve. Due to the effect of the seat leakage on the test equipment this pilot assembly was tested only once.

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

CAUSE OF EVENT

The most probable cause for four of the five high out of tolerance pilot setpoints was determined to be corrosion bonding between the S/RV 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 its 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 S/RV, the pilot disc to seat bond results in a higher pilot lift setpoint.

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CAUSE OF EVENT (continued)

Corrosion bonding is a known phenomenon caused by an oxygen rich environment in the pilot assembly, due to the radiolytic breakdown of water into hydrogen and oxygen. 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 temperature gradients across the pilot assembly, related to the SRV insulation and ventilation airflow. The installation of insulation on the Target Rock S/RVs and redirecting ventilation flow away from the S/RVs has proven to be beneficial in the industry.

The fifth SRV was determined to have failed due to seat leakage. Additional steam pressure would have been required to overcome the leakage and lift the S/RV. The seat leakage identified in pilot 1238 is most likely a result of performing the lift test during plant start-up. There is extensive industry experience with pilot valve leakage after the lift test.

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 Nuclear Regulatory Commission (NRC) and Boiling Water Reactor Owner's Group (BWROG) generic assessments. Based on the known industry wide issues with the two-stage Target Rock S/RVs FitzPatrick has implemented the following industry recommendations:

1. Installed Stellite 21 discs in all of the eleven S/RVs pilot assemblies during refurbishment at the vendor facility;
2. Installed the electric lift system recommended by the BWROG;
3. Installed enhanced insulation on the S/RVs; and
4. Redirected ventilation air flow away from the S/RVs

FAILED COMPONENT IDENTIFICATION

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

CORRECTIVE ACTIONS

Corrective Actions Completed Prior to this Report:

1. Installed enhanced insulation on pilot assemblies.
2. Redirected ventilation to limit cooling effect.
3. Replaced pilot assemblies with recently refurbished, tested and certified assemblies.

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ASSESSMENT OF SAFETY CONSEQUENCES

The effect of the lift setpoints for these S/RVs 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.

This event did not result in a safety system functional failure as defined by NUREG 1022 and NEI 99-02, Revision 5.

SIMILAR EVENTS

1. JAF LER-07-001 "Safety Relief Valve Setpoint Drift," August 6, 2007.
2. JAF LER-05-002 "Safety Relief Valve Setpoint Drift," June 6, 2005.
3. JAF LER-03-002 "Safety Relief Valve Setpoint Drift," October 16, 2003.
4. JAF LER-01-005 "Safety Relief Valve Setpoint Drift," August 17, 2001.
5. JAF LER-99-003 "Safety Relief Valve Setpoint Drift," March 16, 1999.
6. JAF LER-98-002 "Safety Relief Valve Setpoint Drift," April 9, 1998.

REFERENCES

1. JAF Condition Report CR-JAF-2009-01439, Root Cause Analysis Report, Five of the eleven pilots failed as-found testing (testing high out of tolerance).
2. 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).