PECO NUCLEAR

A UNIT OF PECO ENERGY

PECO Energy Company
PO Box 2300
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10CFR50.73

July 7, 2000
Docket No. 50-352
License No. NPF-39

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

SUBJECT: Licensee Event Report
Limerick Generating Station (LGS) - Unit 1

This LER concerns pressure setpoint drift of twelve (12) Main Steam System Safety Relief Valves (SRV) primarily caused by corrosion induced bonding within the SRVs. This resulted in a condition where a common cause resulted in more than two (2) independent trains becoming inoperable in a single safety system.

Reference:	Docket No. 50-352
Report Number:	1-00-003
Revision Number:	00
Event Date:	June 12, 2000
Report Date:	July 7, 2000
Facility:	Limerick Generating Station P.O. Box 2300, Sanatoga, PA. 19464-2300

This LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(vii) and 10CFR50.73(a)(2)(i)(B).

Very truly yours,

Robert C. Braun, Plant Manager, LGS

STG

cc: H. J. Miller, Administrator Region I, USNRC
A. L. Burritt, USNRC Senior Resident Inspector, LGS

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NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION
(6-1998)

LICENSEE EVENT REPORT (LER)

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

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001
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.

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Limerick Generating Station, Unit 1	05000352	1 OF 4

TITLE (4)
Twelve Main Steam System Safety Relief Valves (SRV) Failed to Meet 1% Setpoint Tolerance due to Septoint Drift

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 NAME	DOCKET NUMBER
06	12	2000	2000	-- 003 --	00	07	07	2000		05000
									FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9)	1
POWER LEVEL (10)	100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	20.2201(b)		20.2203(a)(2)(v)	x	50.73(a)(2)(i)		50.73(a)(2)(viii)
	20.2203(a)(1)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)
	20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
	20.2203(a)(2)(ii)		20.2203(a)(4)		50.73(a)(2)(iv)		OTHER
	20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
	20.2203(a)(2)(iv)		50.36(c)(2)	x	50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
K. P. Bersticker, Manager - Experience Assessment	(610) 718-3400

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
B	SB	RV	T020	Y						

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
☐ YES (If yes, complete EXPECTED SUBMISSION DATE).	☒ NO				

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

On 06/12/00, Engineering was informed that as-found test results for 12 of 14 Main Steam Safety Relief Valves (SRVs) did not meet the 1% setpoint tolerance of Tech Spec 3.4.2. The 14 SRVs were replaced during the 8th Unit 1 refueling outage (1R08) in April 2000. The condition of the 12 SRVs resulted in more than 2 independent trains in a single safety system becoming inoperable from a common cause. The consequences were minimal since no challenges to the overpressure protection system occurred. The 1R08 SRV setpoint drifts have been evaluated and found to be acceptable. This conclusion is based on an analysis performed to support installation of the three stage SRVs on Unit 1. The analysis assumed two (2) failed SRVs and incorporated data from a GE parametric study. The plant overpressure analysis was met. The SRVs are Target Rock Corp. Model 7567F pilot operated two-stage valves. The setpoint drift primarily resulted from corrosion induced bonding between the pilot disc and seat. All fourteen (14) Unit 1 SRVs were replaced with three-stage Target Rock SRVs prior to restart.

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Limerick Generating Station Unit 1	05000 -352	2000	-- 003 --	00	4

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

Unit Conditions Prior to the Event

Unit 1 was in Operational Condition (OPCON) 5 (Refueling) at 0% power level. There were no structures, systems, or components out of service that contributed to this event.

Background

Unit 1 entered Operational Condition (OPCON) 5 (Refueling) on April 2, 2000 for 1R08, at which time 14 Main Steam Safety Relief Valves (SRVs) (EIIS: RV) were replaced. Technical Specifications (TS) 4.4.2.2 requires seven (7) SRVs to be recalibrated or replaced each 24 month surveillance interval and previous commitments require 14 SRVs to be recalibrated or replaced each 24 month surveillance interval based on industry generic setpoint drift issues.

The SRVs are Target Rock Corporation, Model 7567F, pilot operated two-stage SRVs which have generically experienced upward setpoint drift in the BWR industry. The BWR operating environment causes a corrosion induced bond to form between the pilot disc and seat. This bond often influences the first lift point of the two-stage Target Rock SRV.

Description of the Event

On June 12, 2000, Station Engineering was notified that the as-found setpoint tests for twelve (12) SRVs removed during 1R08 exceeded the 1% tolerance previously specified in Unit 1 Technical Specification (TS) 3.4.2. Unit 1 TS 3.4.2 had required specific setpoints with a +/- 1% tolerance. Ten (10) SRVs also did not meet the ASME 3% criteria. All 14 Unit 1 SRVs were replaced with three-stage Target Rock SRVs.

The as-found setpoints for the fourteen (14) SRVs for Unit 1 Cycle 8 are listed below:

SRV	Required Setpoint	First Pilot #	Lift Point	% Over SP
1A	1190	525	1247 psig	4.79%
1B	1190	517CP	1199	0.76
1C	1190	1213CP	1242	4.37
1D	1180	508P	1290	9.32
1E	1180	530CP	1294	9.66
1F	1190	507CP	1188	-0.17
1G	1190	529	1301	9.33
1H	1170	532P	1219	4.19
1J	1170	512CP	Did not lift	NA
1K	1180	1209CP	1222	3.56
1L	1170	526P	1196	2.22
1M	1180	515P	1322	12.03
1N	1170	1214	1151	-1.62
1S	1180	521P	1225	3.81

Unit 1 Technical Specification 3.4.2 had required at least 11 of 14 SRVs to be operable within 1% of the required setpoint with four (4) SRVs set at 1170 psig, five (5) SRVs set at 1180 psig, and five (5) SRVs set at 1190 psig. The Overpressure Protection System is designed to prevent the primary coolant pressure boundary from exceeding the ASME Section III level B service (i.e., upset) limit. This limit is 110% of the 1250 psig design pressure, or 1375 psig.

The twelve (12) tested SRVs were inoperable because the as-found setpoints were out of tolerance. The cause was determined to be corrosion induced bonding for all but one of the twelve. The 1J valve did not lift which was probably due to corrosion induced bonding, although no specific troubleshooting was performed. One (1N) of the twelve (12) valves was found to be 1.62% lower than nominal set pressure. PECO Energy considers this performance normal and within industry and ASME expectations.
This condition resulted in more than two (2) independent trains of a single safety system being inoperable due to a common cause, and resulted in a condition prohibited by the plant's Technical Specifications. This report is being submitted in accordance with the requirement of 10CFR50.73(a)(2)(vii) and (a)(2)(i)(B).

Analysis of the Event

There were no actual adverse consequences associated with the SRV setpoint drifting since no event challenged the Overpressure Protection System during Unit 1 Cycle 8 operation. The potential consequences of the situation were minimal. With the reported setpoint performance, sufficient SRV actuations would have limited the peak pressure below the TS safety limit and would have permitted high pressure systems to operate as analyzed. Setpoint drift would have had no effect on the Automatic Depressurization System or the remote manual operation of the Main Steam system SRVs. These functions were previously analyzed by GE for the BWR Owners Group (BWROG). These functions utilize a pneumatic actuator to remove set spring pressure from the pilot disc, allowing the SRV to open. In the event of an overpressure transient on the reactor vessel, Operation's Emergency Procedures and training direct the use of SRVs to maintain control of reactor pressure if normal pressure relief functionality is unavailable.

The overpressure protection function of the reactor vessel was not impacted by the as-found condition of the twelve (12) SRVs. An analysis for the Unit 1 Cycle 8 core reload evaluated the consequences if two SRVs failed to lift on overpressure. This analysis has been determined to satisfactorily bound the 1R08 SRV setpoint drift results.

Cause of the Event

For eleven (11) of the twelve (12) valves out of tolerance, the cause of the setpoint drift is corrosion induced bonding. This cause is evident when subsequent test actuations of the SRV are within the expected range of actuation. One (1) of the twelve (12) valves was found to be 1.62% lower than nominal set pressure. PECO Energy considers this performance normal and within industry and ASME expectations.

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

Corrective Actions

All 14 SRVs were replaced with three-stage Target Rock SRVs prior to restarting the unit. In addition, Unit 1 received a TS amendment (#137, April 6, 2000) changing the required in-service setpoint to +/- 3% tolerance. Unit 2 SRVs were previously replaced with three stage SRVs during 2R05. This is a significant change since the performance of the three stage valves have demonstrated a capability to maintain a 1% tolerance at PECO Energy's Peach Bottom Plant. PECO Energy believes that this corrective action will ensure compliance with the Unit 1 and Unit 2 TS setpoint requirement. The effectiveness of this corrective action will be verified by as-found testing scheduled to be performed on the three-stage valves following the Unit 2 refueling outage scheduled for April 2001 and Unit 1 refueling outage scheduled for April 2002.

Previous Similar Occurrences

Limerick Generating Station LERs 1-87-034, 1-89-036, 1-91-015, 1-92-017, 2-92-010, 1-95-009, 2-95-009, 1-96-009, 2-97-003, 1-98-008 and 2-99-004 report Main Steam System SRV setpoint drift. The cause of each of these events is primarily the same as stated in this LER.

Failed Component Data:
Safety relief valves
Target Rock Corp.
Model 7567F