Robert W. Boyce
Plant Manager
Limerick Generating Station

PECO NUCLEAR
A Unit of PECO Energy

PECO Energy Company
Limerick Generating Station
PO Box 2300
Sanatoga, PA 19464-0920
610 718 2000

April 12, 1996
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 - Unit 1

This LER concerns pressure setpoint drift of five 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 independent trains becoming inoperable in a single safety system.

Reference:	Docket No. 50-352
Report Number:	1-96-009
Revision Number:	00
Event Date:	March 14, 1996
Report Date:	April 12, 1996
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).

Very truly yours,

Robert W. Boyce

DMS:cah

cc: T. T. Martin, Administrator Region I, USNRC
N. S. Perry, USNRC Senior Resident Inspector, LGS

9604220297 960412
PDR ADOCK 05000352
S PDR

IE22
1/1

NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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.

LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Limerick Generating Station, Unit 1	05000 352	1 OF 6

TITLE (4) **Corrosion Induced Bonding Results in Main Steam System Safety Relief Valve Setpoint 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
										05000
03	14	96	96	-- 009 --	00	04	12	96	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)

	20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)
	20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)		73.71(c)
	20.405(a)(1)(ii)		50.36(c)(2)	X	50.73(a)(2)(vii)		OTHER
	20.405(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		(Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(iv)		50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)		
	20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
J. L. Kantner, Manager - Experience Assessment	**(610) 718-3400**

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
B	SB	RV	T020	Yes					

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

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

On 3/14/96, station Engineering was notified that 5 of 6 Main Steam System safety relief valves (SRV) removed during the sixth Unit 1 refueling outage (1R06) were tested and did not lift within the Technical Specifications (TS) required limit of ± 1% of the nameplate setpoint as specified in TS Section 3.4.2. This resulted in a condition where a common cause resulted in more than 2 independent trains of a single safety system becoming inoperable. The consequences were minimal since there were no challenges to the reactor overpressure protection system, and previous analysis bounds these conditions. Fourteen SRVs were replaced with calibrated spares during the refueling outage which occurred during February 1996. The SRVs are Target Rock Corporation, Model 7567F, pilot operated 2 stage valves. The cause of the setpoint drift was corrosion induced bonding between the pilot disc and seat. The BWR Owners Group recommends using SRVs containing modified platinum catalyst pilot discs. To date, test results have not confirmed the success of this recommendation. One of the 5 reported Unit 1 SRVs has the modified disc while the remaining 4 SRVs do not. Units 1 and 2 have partial sets of SRVs with the modified pilot discs installed.

Unit Conditions Prior to the Event:

Unit 1 was in Operational Condition 1 (Power Operation) at 100% power level. There were no structures, systems, or components out of service which contributed to this event.

Background:

During the sixth Unit 1 refueling outage (1R06) which commenced on February 5, 1996, fourteen (14) Main Steam System safety relief valve pilot valve assemblies (SRV, EIIS:RV) were replaced with refurbished spares. Per Technical Specifications Section 4.4.2.2, only seven (7) of the fourteen (14) SRVs are required to be setpoint tested or replaced each refueling outage.

The SRVs are Target Rock Corporation, Model 7567F, pilot operated two stage SRVs, which have a generic issue regarding setpoint drifting within the Boiling Water Reactor (BWR) industry. Corrosion induced bonding of the pilot disc has been found to cause the first lift of the SRV to be above specification.

As-found testing is normally done to recertify the pilot valves for reuse. During 1R06, six (6) SRV pilot valve assemblies were sent to an offsite testing facility to provide needed spares at the Limerick Generating Station (LGS).

Description of the Event:

On March 14, 1996, station Engineering was notified that five (5) of six (6) as-found setpoint tests on the Main Steam System SRVs were found outside of their required pressure ranges. As-found testing of one (1) SRV was found within specification (#529). Technical Specifications (TS) Section 3.4.2 requires specific setpoints with a $\pm$ 1% tolerance. The as-found pressure setpoint results for the six (6) SRVs are as follows:

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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.

Valve Location	Pilot Valve #	Setpoint Required	As-found Setpoint	% Drift
1D	528	1140 psig	1182 psig	+3.6%
1E	529	1140	1150	+0.9%
1F	518	1150	1189	+3.4%
1H	504	1130	Did Not Lift	-----
1M	508	1140	1163	+2.0%
1S	519	1140	1126	-1.2%

Reactor overpressure protection for LGS Nuclear Steam Supply System (NSSS) is provided by the safety valve mode of the fourteen (14) Target Rock Corporation pilot operated two stage SRVs. General Electric (GE) supplied these SRVs with the NSSS design. Prior to the Unit 1 re-rate modifications, TS Section 3.4.2 required at least eleven (11) of fourteen (14) SRVs to be operable, with four (4) valves set at 1130 psig, five (5) valves at 1140 psig, and five (5) valves at 1150 psig. The SRVs during the previous operating cycle were required to be within ± 1% tolerance of these nominal setpoints. The overpressure protection system is designed to prevent the primary coolant system 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.

On March 19, 1996, the reportability evaluation for these conditions was completed. There is no recommended method of verifying functional operability of an installed SRV during plant operation. Therefore, end-of-cycle testing is performed to determine whether the SRVs are in compliance with TS Section 3.4.2. This testing does not provide identification as to whether the SRVs may have drifted outside the TS ± 1% tolerance during the operating cycle when the TS limit applied. It is therefore concluded that the SRVs were out of the setpoint tolerance just prior to removal and the TS actions of TS Section 3.4.2 were met. Four (4) of the five (5) SRVs were found to have setpoints out of tolerance due to corrosion induced bonding. This condition did result in more than two (2) independent trains of a single safety system inoperable due to a common cause. This report is being submitted in accordance with the requirements of 10CFR50.73(a)(2)(vii).

Analysis:

There were no actual adverse consequences associated with the SRV setpoint drifting since no overpressure transients occurred during the fifth Unit 1 operating cycle. Also, the Reactor Protection System and the main turbine bypass systems were fully operable during the fifth Unit 1 operating cycle and would have aided in the mitigation of a reactor over pressurization transient.

Setpoint drift would have had no affect on the Automatic Depressurization System or 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 force 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 flow paths are unavailable.

The generic concern of SRV setpoint drift is currently being addressed by the BWROG Setpoint Drift Fix Committee. A sensitivity study of BWR plants using the Target Rock Corporation, Model 7567F, pilot operated two stage SRVs was performed by GE as documented in Report No. NEDO-22210. This study enveloped LGS and determined that sufficient overpressure protection margin existed at all plants to tolerate an upward total average setpoint drift of 10% for 14 SRVs during the limiting pressurization transient. The most severe pressurization transient event was conservatively assumed to be the simultaneous closure of all Main Steam Isolation Valves (MSIVs) with a coincident failure of the MSIV position scram signal. In this case, a reactor scram subsequently occurs on a high neutron flux signal. Since the SRV pressure setpoint data is bounded by this sensitivity study, peak reactor vessel pressure would have remained well below the 1375 psig design pressure rating, even considering the fact that SRV #504 did not lift. This analysis assumes that the SRVs would have performed as tested. Therefore, there were no safety consequences regarding over pressurization protection as a result of the five (5) SRVs being out-of-tolerance.

Cause of the Event:

The cause of setpoint drift on four (4) (i.e., #504, #508, #518, #528) of the five (5) SRVs was corrosion induced bonding of the pilot disc to its seat. The corrosion arises from oxidation build-up in the presence of moisture and the heated environment. The fifth SRV (i.e., #519) first lifted slightly below the acceptable limit; however, the next three lifts were within tolerance. This setpoint drift is not due to corrosion induced bonding.

Three (3) SRV pilots which lifted at high setpoints (i.e., #508, #518, #528), lifted much closer to the required setpoints in subsequent lifts. SRV pilot #504 which did not lift due to severe corrosion induced bonding, was inspected with no additional damage indicated. SRV #504 was then reconditioned and subsequently tested satisfactorily. SRV pilot #508, which has the modified platinum catalyst pilot disc, was found to have a lower degree of corrosion induced bonding.

Corrective Actions:

To resolve the occurrence of SRV setpoint drift, PECO Energy Company is currently implementing the solution recommended by the BWROG Setpoint Drift Fix Committee. PECO Energy Company has recently installed a special 'modified' pilot disc in several SRVs. The modified disc contains a platinum catalyst which inhibits the corrosion formation between the pilot disc seating surfaces. If this special pilot disc option does not resolve the occurrence of SRV setpoint drift, then the secondary BWROG Setpoint Drift Fix Committee option will be pursued. The second option is to investigate having the SRVs actuate using an automatic pressure switch. Below is a listing of the completed and future actions to address the SRV setpoint drift concern.

Completed Actions:

1. During 1R06, fourteen (14) Unit 1 SRVs were replaced with certified spare pilot valves meeting the required setpoint. Six (6) of these fourteen (14) SRVs contained the modified platinum catalyst pilot valves.

On March 24, 1996, Unit 1 entered a planned outage (i.e., 1E07) and two (2) of the six (6) modified SRVs were removed and replaced with non-modified pilot valves. Currently, four (4) out of the fourteen (14) SRVs have the modified platinum catalyst pilot valves installed.

2. Seven (7) Unit 2 SRVs currently have modified platinum catalyst pilot valves installed.

Future Actions:

1. The remaining eight (8) Unit 1 SRVs are expected to be tested by August 31, 1996.

2. Seven (7) spare SRVs will be modified with platinum catalyst pilot valves for use on Unit 2.

3. Three (3) spare SRVs which have the modified platinum catalyst pilot valves will be repaired for installation in either unit.

4. Test results from the industry will be analyzed to determine the success of the BWROG Setpoint Drift Fix Committee's recommendation to utilize modified SRVs containing platinum catalyst pilot valves.

Previous Similar Occurrence:

LGS LERs 1-87-034, 1-91-015, 1-92-017, 2-92-010, 2-95-009, and 1-95-009 report Main Steam System SRV setpoint drift.

The cause of each of these events is primarily the same and the issue of resolving the SRV setpoint drift problem is being addressed by the BWROG SRV Setpoint Drift Fix Committee.