PSEG Nuclear LLC
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PSEG
Nuclear LLC

10 CFR 50.73

LR-N18-0102

OCT 03 2018

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Hope Creek Generating Station
Renewed Facility Operating License No. NPF-57
NRC Docket No. 50-354

Subject: Supplemental Licensee Event Report 2018-002-01, Safety Relief Valve (SRV) As-Found Setpoint Failure

Reference: PSEG Letter LR-N18-0065, dated June 18, 2018
Licensee Event Report 2018-002-00

In accordance with 10 CFR 50.73(a)(2)(i)(B), PSEG Nuclear LLC (PSEG) is submitting Supplemental Licensee Event Report (LER) Number 2018-002-01, "Safety Relief Valve (SRV) As-Found Setpoint Failure." Subsequent to the initial LER, PSEG determined that an additional failure cause existed. This supplemental LER contains information related to the additional cause of failure.

There are no regulatory commitments contained in this submittal. If you have any questions or require additional information, please contact Mr. Thomas MacEwen at 856-339-1097.

Sincerely,

Edward T. Casulli
Plant Manager
Hope Creek Generating Station

ttm

Attachment 1 - Licensee Event Report 2018-002-01

cc: Administrator, Region I, NRC
Project Manager, NRC
NRC Senior Resident Inspector, Hope Creek
Mr. P. Mulligan, Chief, NJBNE
Corporate Commitment Tracking Coordinator
Hope Creek Commitment Tracking Coordinator

LR-N18-0102

Attachment 1

Licensee Event Report 2018-002-01
Safety Relief Valve (SRV) As-Found Setpoint Failure

NRC FORM 366 (02-2018) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 03/31/2020

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 Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@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 Page 2 for required number of digits/characters for each block)

(See NUREG-1022, R.3 for instruction and guidance for completing this form http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)

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4. Title

Safety Relief Valve (SRV) As-Found Setpoint Failure

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
										05000
04	20	2018	2018	- 002	- 01	10	03	2018	Facility Name	Docket Number
										05000

9. Operating Mode

5 - Refuel

10. Power Level

0%

11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: *(Check all that apply)*

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(C)	☐ 73.77(a)(1)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(D)	☐ 73.77(a)(2)(ii)
☐ 20.2203(a)(2)(vi)	☒ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(iii)
	☐ 50.73(a)(2)(i)(C)	☐ Other (Specify in Abstract below or in NRC Form 366A	

12. Licensee Contact for this LER

Licensee Contact	Telephone Number (Include Area Code)
Tanya Timberman, Senior Nuclear Engineer	856-339-1426

13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable To ICES	Cause	System	Component	Manufacturer	Reportable To ICES
B	SB	RV	T020	Y					

14. Supplemental Report Expected	15. Expected Submission Date	Month	Day	Year
☐ Yes (If yes, complete 15. Expected Submission Date) ☒ No				

Abstract (Limit to 1400 spaces, i.e., approximately 14 single-spaced typewritten lines)

On April 20, 2018, Hope Creek Generating Station (HCGS) received results that the 'as-found' set-point tests for safety relief valve (SRV) pilot stage assemblies had exceeded the lift setting tolerance prescribed in Technical Specification (TS) 3.4.2.1. The TS requires the SRV lift settings to be within +/- 3% of the nominal set-point value.

During the twenty-first refueling outage (H1R21), all fourteen SRV pilot stage assemblies were removed for testing at an offsite facility. Between April 20 and May 11, 2018, HCGS received the test results for all fourteen of the SRV pilot valve assemblies. A total of eight of the fourteen SRV pilot stage assemblies experienced set-point drift outside of the TS 3.4.2.1 specified values. All of the valves failing to meet the limits were Target Rock Model 7567F two-stage SRVs.

This is a condition reportable under 10 CFR 50.73(a)(2)(i)(B) as an Operation or Condition Prohibited by Technical Specifications.

The cause of the set-point drift for the eight SRV pilot stage assemblies is attributed to corrosion bonding between the pilot disc and seating surfaces, which is consistent with industry experience. This conclusion is based on previous cause evaluations and the repetitive nature of this condition at HCGS and within the BWR industry.

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Hope Creek Generating Station	05000-354	2018	- 002	- 01

NARRATIVE

PLANT AND SYSTEM IDENTIFICATION

General Electric – Boiling Water Reactor (BWR/4)
Main Steam – EIIS Identifier {SB}*
Safety Relief Valves – EIIS Identifier {SB/RV}*

*Energy Industry Identification System {EIIS} codes and component function identifier codes appear as {SS/CCC}

IDENTIFICATION OF OCCURRENCE

Event Date: April 20, 2018
Discovery Date: April 20, 2018

CONDITIONS PRIOR TO OCCURRENCE

When the reports of the 'as-found' results were received, Hope Creek was in Operational Condition (OPCON) 5, Refuel, at 0 percent rated thermal power. No other structures, systems or components that could have contributed to the event were inoperable at the time of the event.

DESCRIPTION OF OCCURRENCE

During the twenty-first refueling outage (H1R21) at Hope Creek Generating Station (HCGS), all fourteen Main Steam safety relief valves (SRV) pilot stage assemblies {SB/RV} were removed and tested at NWS Technologies. The SRVs are Target Rock Model 7567F two-stage SRVs. During the period from April 20 through May 11, 2018, HCGS received the results of the 'as-found' set pressure testing required by Technical Specification (TS) Surveillance Requirement (SR) 4.4.2.2. A total of eight of the fourteen SRV pilot stage assemblies had set-point drift outside of the required TS 3.4.2.1 tolerance values of +/-3% of nominal value.

The 'as-found' test results for the eight SRVs not meeting the TS requirements are as follows:

Valve ID	As Found (psig)	TS Lift Setting (psig)	Acceptable Band (psig)	% Difference Actual
F013B	1210	1130	1096.1 – 1163.9	7.10%
F013D	1191	1130	1096.1 – 1163.9	5.40%
F013F	1146	1108	1074.8 – 1141.2	3.40%
F013G	1197	1120	1086.4 – 1153.6	6.90%
F013H	1200	1108	1074.8 – 1141.2	8.30%
F013L	1155	1120	1086.4 – 1153.6	3.10%
F013M	1161	1108	1074.8 – 1141.2	4.80%
F013P	1199	1120	1086.4 – 1153.6	7.10%

Technical Specification (TS) 3.4.2.1 requires that the safety function of at least 13 of 14 SRVs be operable with a specified code safety valve function lift setting, within a tolerance of +/- 3%. Action (a) of TS 3.4.2.1 specifies "With the safety valve function of two or more of the above listed fourteen safety/relief valves inoperable, be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the next 24 hours." Therefore, this is a condition reportable under 10 CFR 50.73(a)(2)(i)(B) as an Operation or Condition Prohibited by TS.

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NARRATIVE

DESCRIPTION OF OCCURRENCE (Continued)

The extent of condition for this event is to expand the scope of the SRV Group 1 valve testing, per ASME OM Code Section I-1320 for Class 1 Pressure Relief Valves. However, since all fourteen SRV pilot stage assemblies were removed and replaced with tested spares during the refueling outage (H1R21), the extent of condition scope was satisfied.

CAUSE OF EVENT

The cause of the set-point drift for the eight SRV pilot stage assemblies is attributed to corrosion bonding between the pilot disc and seating surfaces, which is consistent with industry experience. This conclusion is based on previous cause evaluations and the repetitive nature of this condition at HCGS and within the BWR industry.

One of the eight SRVs that experienced set point drift, F013H, was determined to have a second failure mechanism present. The H SRV was the only valve that failed its second (informational) lift test. Disassembly of the SRV pilot revealed steam-cutting of the pilot disc and valve seat, as well as a build-up of corrosion products on the seating surface of the pilot valve. Leak-by on the pilot disc resulted in damage to the pilot seat which affected the lift setpoint. This is the cause of the second test lift to remain outside of the acceptable tolerance. This steam leak also caused the corrosion products to be seen on the seat base material.

SAFETY CONSEQUENCES AND IMPLICATIONS

There were no instances during cycle 21 that resulted in any of the fourteen SRVs being declared inoperable and there were no events during that cycle that required operation of the SRVs. All SRVs lifted well below the Safety Limit, providing reasonable assurance that accident analysis conclusions would remain valid. The industry has recognized that corrosion bonding occurs during the operating cycle. Once an SRV lifts, the corrosion bond breaks and subsequent openings occur very close to the set point as demonstrated during testing, with the exception of the H SRV as described above.

Since the eight as-found setpoint SRVs are within their Maximum Allowable Percent Increase (MAPI) above SRV nominal setpoint criteria established in GE document NEDC-32511P, "Safety Review for Hope Creek Generating Station Safety/Relief Valve Tolerance Analysis", the SRVs are bounded by their MAPI value and no formal Technical Evaluation is required.

SAFETY SYSTEM FUNCTIONAL FAILURE

A review of this condition and a previous technical evaluation documents this is not a functional failure, therefore it was determined that a Safety System Functional Failure (SSFF) as defined in Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Performance Indicator Guideline," did not occur.

PREVIOUS EVENTS

Similar events occurred during the 2015 (H1R19) and 2016 (H1R20) Hope Creek refueling outages when multiple SRVs were found out of the TS required limits of +/- 3%. These events were reported as LER 354/2015-004-00 (ten inoperable SRVs) and LER 354/2016-003-00 (ten inoperable SRVs).

CORRECTIVE ACTIONS

1. All 14 SRV pilot stage assemblies were removed and replaced with pre-tested, certified spare pilot valves (H1R21).
2. Evaluate options for the replacement of the currently installed Target Rock two-stage SRVs with a design that eliminates setpoint drift events exceeding +/-3% and improve SRV reliability. The replacement schedule will be developed after a suitable valve is identified.

LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET

(See NUREG-1022, R.3 for instruction and guidance for completing this form http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)

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COMMITMENTS

There are no regulatory commitments contained in this LER.