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L-15-253

10CFR50.73(a)(2)(v)(D)

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

SUBJECT:
Perry Nuclear Power Plant
Docket No. 50-440, License No. NPF-58
Licensee Event Report Submittal

Enclosed is Licensee Event Report (LER) 2015-001, "Degraded Voltage Relay Found Outside the Allowable Value". There are no regulatory commitments contained in this submittal.

If there are any questions or if additional information is required, please contact Mr. Nicola Conicella, Manager – Regulatory Compliance, at (440) 280-5415.

Sincerely,

Ernest J. Harkness

Enclosure:
LER 2015-001

cc: NRC Project Manager
NRC Resident Inspector
NRC Region III

IE22
NRR

NRC FORM 366 (02-2014) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 1/31/2017

Estimated burden per response to comply with this mandatory collection request: 80 hrs. Reported lessons learned are incorporated into the licensing process and feed back to industry. Send comments regarding burden estimate to the FOIA, Privacy Information Collection Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet 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 reverse for required number of digits/characters for each block)

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4. TITLE

Degraded Voltage relay found outside the Allowable Value

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
06	16	2015	2015	- 001 -	00	08	11	2015		05000
									FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE

1

10. POWER LEVEL

100

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

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
Tony Kledzik – Regulatory Compliance	440-280-6188

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
D	EK	2	T351	Y					

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES (If yes, complete EXPECTED SUBMISSION DATE). ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

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

On June 16, 2015, at 0452 hours, during performance of surveillance testing, a degraded voltage time delay relay was found outside of the Technical Specification allowable value.

The cause of the Division 3 degraded voltage time delay relay being outside the allowable value was setpoint drift and the calibration setpoint not being centered within the allowable value range. The relay was satisfactorily recalibrated in accordance with procedures and successfully passed the as-left performance test during the remainder of the surveillance testing and was made operable on June 16, 2015, at 1117 hours. Planned corrective actions include centering the time delay relay setpoint within the allowable value and relay removal for analysis and evaluation.

The safety significance of this event is considered to be small. The degraded voltage time delay relay initiates load shedding, isolates the Division 3 bus and starts the Division 3 Emergency Diesel Generator (EDG). The Division 3 EDG is the on-site power source for the High Pressure Core Spray System which is a single train system. Therefore, this event is being reported in accordance with 10CFR50.73(a)(2)(v) as an event or condition that could have prevented the fulfillment of a safety function.

Additionally, as discussed in the Event Analysis section, this event is not considered a safety system functional failure because the as found setpoint was within the analytical design limit.

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NARRATIVE

Energy Industry Identification System (EIIS) codes are identified in the text as [XX]

INTRODUCTION

On June 16, 2015, at 0452 hours the control room was notified that during performance of surveillance test SVI-R22-T5074, "Division 3 4160 Volt Bus Undervoltage/Degraded Voltage Channel Calibration and Logic System Functional Test", the degraded voltage time delay relay [2] was found outside of the Technical Specification (TS) allowable value. The Division 3 Emergency Diesel Generator (EDG) [EK] had previously been declared inoperable for performance of this surveillance test on June 15, 2015, at 0735 hours. The Division 3 EDG supports the High Pressure Core Spray (HPCS) system [BG], which is a single train safety system. On June 16, 2015, at 1134 hours, a notification was made to the NRC Operations Center (Reference ENF No. 51159) in accordance with 10 CFR 50.72(b)(3)(V)(D) for an event or condition that could have prevented the fulfillment of a safety function. The relay was recalibrated and successfully tested. The surveillance was completed and the Division 3 EDG was returned to operable status on June 16, 2015, at 1117 hours.

This event is being reported in accordance with 10CFR50.73(a)(2)(v) as an event or condition that could have prevented the fulfillment of a safety function. The Division 3 EDG supports the HPCS Emergency Core Cooling System (ECCS) which performs a safety function to mitigate the consequences of an accident. The function of HPCS is credited for several operational transients or analyzed accidents described in Chapter 15 of the Updated Safety Analysis Report (USAR).

EVENT DESCRIPTION

On June 16, 2015, the plant was operating in Mode 1 at 100 percent Rated Thermal Power. The plant was in a normal electrical line-up with all EDGs and all ECCS operable, with the exception of the Division 3 EDG, which had been declared inoperable for performance of surveillance testing on June 15, 2015 at 0735 hours. The Division 3 EDG supports the HPCS System, which is a single train safety system.

On June 16, 2015, at 0452 hours, the control room was notified that during performance of surveillance test SVI-R22-T5074, "Division 3 4160 Volt Bus Undervoltage/Degraded Voltage Channel Calibration and Logic System Functional Test", the degraded voltage time delay relay was found outside of the TS allowable value at 272.66 seconds. The allowable value for this relay per TS 3.3.8.1 is between 180 and 270 seconds.

This relay is part of the degraded bus voltage logic to remove a faulty source of power from the Division 3 Safety Bus (EH13) [EB] and replace it with the Division 3 EDG. If voltage on EH13 drops to 3.8 kV (95 percent of nominal voltage) for 12 seconds, the EH13 VOLTAGE DEGRADATION alarm is received in the Control Room. If a Division 3 Loss of Coolant Accident (LOCA) signal is present then after 12 seconds the automatic loss of voltage actions occur, which include starting the EDG, primary offsite power breakers to EH13 opening, and the now running EDG connecting to the EH13 bus.

With no LOCA signal present, the degraded voltage condition is permitted to exist for 4 minutes before the actions for the loss of voltage would occur. The relay in question is the 4 minute timer for the non-LOCA logic. Loss of voltage actions will also occur through a different relay logic when bus voltage drops to 3010 Vac (75 percent of nominal) and three seconds have elapsed.

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The relay was recalibrated per plant procedures and successfully passed the as-left performance test. The surveillance test was completed and the Division 3 EDG was returned to operable status on June 16, 2015, at 1117 hours.

CAUSE OF EVENT

The cause of the Division 3 degraded voltage time delay relay setpoint being outside the TS allowable value was setpoint drift and the setpoint not being centered within the allowable value range. The calibration setpoint of 240 seconds is not centered within the allowable value of 180 to 270 seconds. It is biased to the upper limit of 270 seconds.

SVI-R22-T5074 is performed on a 24 month frequency. The relay was initially installed in 2008 with an as left value of 234.11 seconds. It was tested again in 2010 and 2013, with as left values of 240.3 and 250.16 seconds respectively. On both occasions, the relay was not recalibrated because it was in the leave-as-is-zone of 225 to 255 seconds. Other similar relays used in comparable applications were evaluated and no issues were identified.

EVENT ANALYSIS

The Division 3 degraded voltage time delay relay is designed to allow the operator sufficient time to manually correct a degraded voltage condition, prior to loss of voltage actions initiating, while protecting equipment that normally operates during a LOCA condition from sustained operation at degraded voltage levels. The setpoint is based on safety-related motor degraded voltage operating capabilities from the motor manufacture's specification. The design basis calculation shows that the maximum upper time limit for this relay is 300 seconds. The TS value of 270 seconds is based on a conservative assessment of motor degraded voltage operating capability. The Degraded Voltage time delay relay being 2 seconds beyond the TS allowable limit of 270 seconds would not have prevented the relay from functioning and initiating a Loss of Bus signal. The as-found value was within the analytical limit of 300 seconds; therefore, this is not considered a Functional Failure.

Probabilistic Risk Assessment (PRA) modeling indicates that with a loss of power event with no initial injection capabilities, time to core damage is greater than 15 minutes. Injection prior to this time is successful in the prevention of core damage. As such, a delay of 2.66 seconds would have no impact to the accident sequence. In the condition encountered for this analysis, the Division 3 EDG would have automatically initiated, albeit slightly outside of its TS allowable band. In the context of the PRA, no functional failure of the automatic start capability would be modeled as the EDG would have started and loaded the bus, within a time frame acceptable to PRA criteria.

The analysis of this event indicates no impact to the PRA model, and therefore no corresponding change in core damage frequency (CDF), and no corresponding change in the large early release frequency (LERF). The lack of change to CDF and LERF values are well below the acceptable thresholds of 1.0E-06/yr and 1.0E-07/yr, respectively, as discussed in Regulatory Guide 1.174. Therefore the risk of this event is considered small in accordance with the Regulatory Guidance.

LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET

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NARRATIVE

CORRECTIVE ACTIONS

Corrective actions are in place to center the time delay relay within the allowable value and also to adjust the leave-as-is-zone to allow more margin to the allowable value. In addition, the relay will be removed and replaced. The relay will then be sent to an offsite vendor for continued troubleshooting, if a different failure mode is identified, a Licensee Event Report revision will be issued.

PREVIOUS SIMILAR EVENTS

A review of LERs and the corrective action database for the past three years identified no similar events.

COMMITMENTS

There are no regulatory commitments contained in this report. Actions described in this document represent intended or planned actions, are described for the NRC's information, and are not regulatory commitments.