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SVPLTR # 12-0060

10 CFR 50.73

December 18, 2012

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

Dresden Nuclear Power Station, Unit 2
Renewed Facility Operating License No. DPR-19
NRC Docket No. 50-237

Subject: Supplemental Licensee Event Report 237/2011-005-01, Standby Liquid Control Explosive Valve Failure

Enclosed is Licensee Event Report 237/2011-005-01, "Standby Liquid Control Explosive Valve Failure." This is a final report. This condition is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B), "Any operation or condition which was prohibited by the plant's Technical Specifications."

There are no regulatory commitments contained in this submittal.

Should you have any questions concerning this letter, please contact Mr. Hal Dodd at (815) 416-2800.

Respectfully,

David M. Czufin
Site Vice President
Dresden Nuclear Power Station

Enclosure

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Dresden Nuclear Power Station

IE22
NRR

NRC FORM 366 (10-2010) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2013

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 FOIA/Privacy Section (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)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
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4. TITLE

Standby Liquid Control Explosive Valve 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
									N/A	05000
10	28	2011	2011	- 005 -	01	12	18	2012	FACILITY NAME: N/A	DOCKET NUMBER: 05000

9. OPERATING MODE

5

10. POWER LEVEL

000

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☒ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☐ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☐ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☐ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER *(Include Area Code)*
Shaina Matzke – Regulatory Specialist	815-416-2810

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
B	BR	V	C515	Y					

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES *(If yes, complete 15. 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 October 28, 2011, with Unit 2 in Mode 5, plant personnel performed a functional test of the Standby Liquid Control (SLC) system in accordance with plant procedures. When attempted, the "A" explosive valve failed to actuate during the functional test. The failed explosive valve was replaced and the "B" SLC system was tested to validate functionality was not lost.

Troubleshooting by plant personnel revealed that the failure of the "A" explosive valve was related to the trigger assembly. The failed components were sent to the vendor for a failure analysis. The vendor analysis concluded the cause of the "A" explosive valve failure is thermal degradation of the primer's explosive material.

Upon further investigation it was found that the heat trace modification done in 2009 was not installed in accordance with the modification's specifications. The incorrect installation placed the heat trace around the "A" squib valve trigger assembly which subjected the assembly to higher than expected temperatures. This resulted in the thermal degradation of the explosive material.

The safety significance of this condition is low. The "B" SLC system was functionally tested and demonstrated fully operable. The health and safety of the public were not compromised as a result of this condition.

This condition is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B), "Any operation or condition which was prohibited by the plant's Technical Specifications."

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NARRATIVE

PLANT AND SYSTEM IDENTIFICATION

Dresden Nuclear Power Station (DNPS) Unit 2 is a General Electric Company Boiling Water Reactor with a licensed maximum power level of 2957 megawatts thermal. The Energy Industry Identification System codes used in the text are identified as [XX].

A. Plant Conditions Prior to Event:

Unit: 02 Event Date: 10-28-2011 Event Time: 0405 hours CDT
Reactor Mode: 5 Mode Name: Refueling Power Level: 000 percent

B. Description of Event:

On October 28, 2011, with Unit 2 in Mode 5, plant personnel performed a functional test of the Standby Liquid Control (SLC) [BR] system in accordance with plant procedures. When attempted, the "A" explosive valve failed to actuate during the functional test. A functional test of the "B" loop was performed and acceptable results were obtained with the "B" explosive valve actuating acceptably.

Subsequent troubleshooting by plant personnel verified the "A" explosive firing circuitry functioned as designed. The failure mode of flow blockage due to foreign material was also eliminated by inspections and the successful functional test following explosive valve replacement. The inlet fitting did have an indentation indicating contact with the explosive valve actuation shaft (ram). The contact was insufficient to shear the inlet fitting.

C. Cause of Event:

Troubleshooting by plant personnel revealed that the failure of the "A" explosive valve was related to the trigger assembly. The failed components were sent to the vendor for a failure analysis. The vendor analysis concluded the cause of the "A" explosive valve failure is thermal degradation of the primer's explosive material.

The explosive material, Diazondinitrophenol (DDNP), contained in the installed SLC system explosive valve trigger assemblies is rated for five years with exposure of temperatures up to 120°F. A DDNP Primer explosive temperature vs. time curve is shown in Figure 1 below. This curve was used to estimate the primer life at various temperature environments. Temperature data was collected once a week for three consecutive weeks. According to the data collected the "A" trigger assembly was subjected to higher than expected temperatures. The average temperature of "A" trigger assembly was 124°F with the highest temperature being 132°F. The "B" trigger assembly average temperature was 102°F with the highest temperature being 103°F.

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NARRATIVE

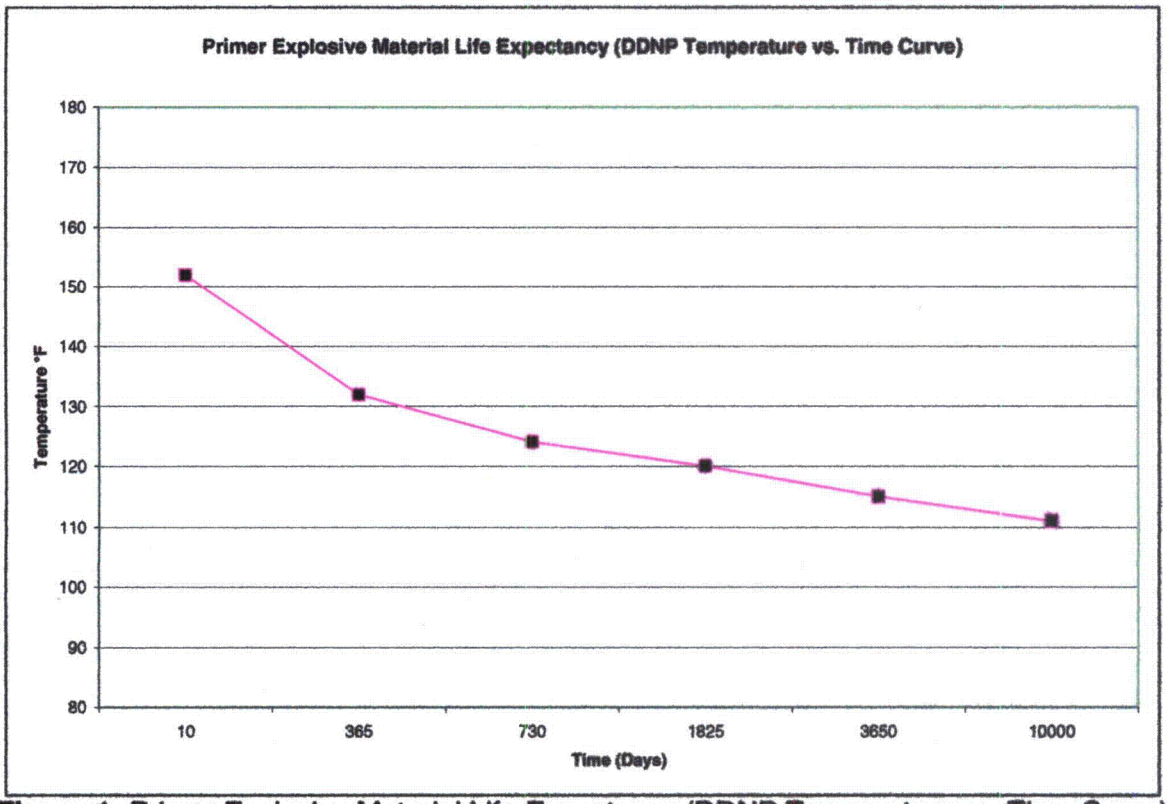

Figure 1: Primer Explosive Material Life Expectancy (DDNP Temperature vs. Time Curve)

The failed "A" squib valve was installed in November 2007. The "B" squib valve was replaced in 2009 and did not show any signs of degradation when tested in the plant.

In 2007, heat tracing on Unit 2 SLC system failed and as a compensatory action a temporary change was implemented during portions of the winter to install a temporary heater in front of the SLC pumps to provide the necessary heat to maintain the SLC suction piping above the Technical Specification temperature limit. This temporary change was in place for approximately one year (i.e., October 2008 to September 2009). In August 2009, a heat trace modification was installed to correct the failed heat trace system. The repairs removed the need for the temporary heater. Even though temperatures in the area of the explosive valve during this time could not be determined while the temporary heater was in use, it is believed that the temporary heater may have contributed to higher than normal temperatures near the explosive valve trigger assembly.

Upon further investigation, it was revealed that the heat trace modification done in 2009 was not installed in accordance with the modification's specifications. The incorrect installation placed the heat trace around the "A" explosive valve trigger assembly which resulted in higher than normal temperatures and resulted in thermal degradation of the explosive material. Subsequently, the heat trace on Unit 3 was checked and was found to be installed correctly.

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D. **Safety Analysis:**

The safety significance of this condition is low. Disabling the "A" explosive valve would not prevent the SLC system from performing its designated function. The "B" SLC loop functional test was completed with satisfactory results subsequent to the actuation failure of the "A" explosive valve. It should be noted that system design provides for delivery of the sodium pentaborate solution from either SLC pump through either explosive valve. Hence, had system actuation been required, the "A" pump could have been used in the event of failure of the "B" Pump. Therefore, the health and safety of the public were not compromised as a result of this condition.

E. **Corrective Actions:**

The failed assembly was replaced and the functional testing was subsequently completed satisfactorily. Following successful testing of the 2A system, a new explosive valve was installed.

A work order was completed to rearrange the heat trace for the Unit 2 SLC system so that it is installed in accordance with the modification instruction.

F. **Previous Occurrences:**

A review of DNPS history of similar events did not reveal any conditions associated with failures of SLC explosive valves.

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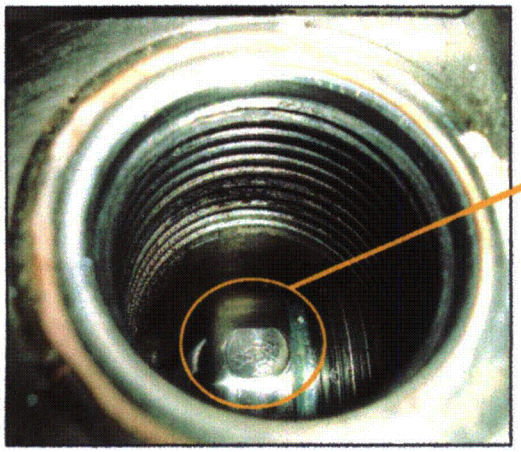
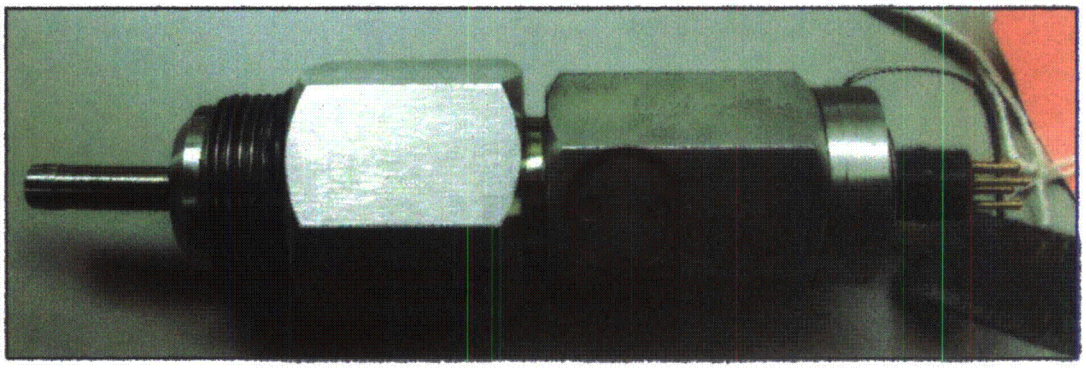
G. **Component Failure Data:**

Manufacturer	Component	Model-(Serial Number)
IST - CONAX NUCLEAR, INC.	V	CON-O-CAP TYPE –(131/142)



"As found" condition of the inlet fitting after removing failed explosive

New unfired explosive (left) and the failed explosive (right)



Successfully fired explosive