



Dresden Nuclear Power Station  
6500 North Dresden Road  
Morris, IL 60450

June 14, 2022

10 CFR 50.73

SVPLTR # 22-0021

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

Dresden Nuclear Power Station, Unit 3  
Renewed Facility Operating License No. DPR-25  
NRC Docket No. 50-249

Subject: Licensee Event Report 249/2021-001-01, Reactor Scram due to Main Power Transformer Failure

Enclosed is Licensee Event Report 249/2021-001-01, Reactor Scram due to Main Power Transformer Failure.

There are no regulatory commitments contained in this submittal.

Should you have any questions concerning this letter, please contact Mr. Ken Mack, Regulatory Assurance Manager, at (815) 416-2800.


Respectfully,

A handwritten signature in black ink, appearing to read "Patrick J. Boyle".

Patrick J. Boyle  
Site Vice President  
Dresden Nuclear Power Station

Enclosure: Licensee Event Report 249/2021-001-01

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

<b>NRC FORM 366</b> (08-2020)		<b>U.S. NUCLEAR REGULATORY COMMISSION</b>		<b>APPROVED BY OMB: NO. 3150-0104</b>		<b>EXPIRES: 08/31/2023</b>			
		<b>LICENSEE EVENT REPORT (LER)</b> (See Page 3 for required number of digits/characters for each block) (See NUREG-1022, R.3 for instruction and guidance for completing this form <a href="http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/">http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/</a> )							
<b>1. Facility Name</b> Dresden Nuclear Power Station, Unit 3				<b>2. Docket Number</b> 05000249		<b>3. Page</b> 1 OF 3			
<b>4. Title</b> Unit 3 Reactor Scram due to Main Power Transformer Failure									
<b>5. Event Date</b>			<b>6. LER Number</b>			<b>7. Report Date</b>			
Month	Day	Year	Year	Sequential Number	Revision No.	Month	Day	Year	
10	16	2021	2021	001 -	01	06	14	2022	
<b>8. Other Facilities Involved</b>						<b>Facility Name</b> N/A			
						<b>Docket Number</b> N/A			
<b>9. Operating Mode</b> 1						<b>10. Power Level</b> 100			
<b>11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)</b>									
<input checked="" type="checkbox"/> <b>10 CFR Part 20</b>		<input type="checkbox"/> 20.2203(a)(2)(vi)		<input type="checkbox"/> 50.36(c)(2)		<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)			
<input type="checkbox"/> 20.2201(b)		<input type="checkbox"/> 20.2203(a)(3)(i)		<input type="checkbox"/> 50.46(a)(3)(ii)		<input type="checkbox"/> 50.73(a)(2)(v)(A)			
<input type="checkbox"/> 20.2201(d)		<input type="checkbox"/> 20.2203(a)(3)(ii)		<input type="checkbox"/> 50.69(g)		<input type="checkbox"/> 50.73(a)(2)(v)(B)			
<input type="checkbox"/> 20.2203(a)(1)		<input type="checkbox"/> 20.2203(a)(4)		<input type="checkbox"/> 50.73(a)(2)(i)(A)		<input type="checkbox"/> 50.73(a)(2)(v)(C)			
<input type="checkbox"/> 20.2203(a)(2)(i)		<input type="checkbox"/> 20.2203(a)(2)(ii)		<input type="checkbox"/> 50.73(a)(2)(i)(B)		<input type="checkbox"/> 50.73(a)(2)(v)(D)			
<input type="checkbox"/> 20.2203(a)(2)(ii)		<input type="checkbox"/> 21.2(c)		<input type="checkbox"/> 50.73(a)(2)(i)(C)		<input type="checkbox"/> 50.73(a)(2)(vii)			
<input type="checkbox"/> 20.2203(a)(2)(iii)		<input type="checkbox"/> 50.36(c)(1)(i)(A)		<input type="checkbox"/> 50.73(a)(2)(ii)(A)		<input type="checkbox"/> 50.73(a)(2)(viii)(A)			
<input type="checkbox"/> 20.2203(a)(2)(iv)		<input type="checkbox"/> 50.36(c)(1)(ii)(A)		<input type="checkbox"/> 50.73(a)(2)(ii)(B)		<input type="checkbox"/> 50.73(a)(2)(viii)(B)			
<input type="checkbox"/> 20.2203(a)(2)(v)		<input type="checkbox"/> 50.73(a)(2)(iii)		<input type="checkbox"/> 50.73(a)(2)(ix)(A)					
<input type="checkbox"/> OTHER (Specify here, in abstract, or NRC 366A).									
<b>12. Licensee Contact for this LER</b>									
<b>Licensee Contact</b> Ken Mack – Regulatory Assurance Manager						<b>Phone Number (Include area code)</b> 815-416-2800			
<b>13. Complete One Line for each Component Failure Described in this Report</b>									
Cause	System	Component	Manufacturer	Reportable to IRIS	Cause	System	Component	Manufacturer	Reportable to IRIS
X	EL	XFMR	S125	Y					
<b>14. Supplemental Report Expected</b>					<b>15. Expected Submission Date</b>				
<input checked="" type="checkbox"/> No					<input type="checkbox"/> Yes (If yes, complete 15. Expected Submission Date)				
					Month	Day	Year		
<b>16. Abstract (Limit to 1560 spaces, i.e., approximately 15 single-spaced typewritten lines)</b> On October 16, 2021, at 0428 CDT, an automatic reactor protection system actuation occurred due to failure of the main power transformer. The safety significance of this event was minimal. All control rods inserted to their full-in position. Following the reactor scram, all systems operated as expected. The cause of this event was due to a sudden, unanticipated, catastrophic failure of the main power transformer high voltage oil impregnated paper bushing. Corrective actions included replacement of the failed main power transformer and restricting use and/or procurement of the specific type of bushing that failed. This event is being reported in accordance with 10 CFR 50.73(a)(2)(iv)(A), an event that resulted in automatic actuation of a system listed in paragraph 10 CFR 50.73(a)(2)(iv)(B), specifically the reactor protection system including reactor scram.									



**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/>)

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, Library, and Information Collections Branch (T-6 A10M), U. S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to [Infocollects.Resource@nrc.gov](mailto:Infocollects.Resource@nrc.gov), and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street NW, Washington, DC 20503; e-mail: [oir\\_submission@omb.eop.gov](mailto:oir_submission@omb.eop.gov). The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Dresden Nuclear Power Station, Unit 3	05000- 249	2021	- 001	- 01

**NARRATIVE****PLANT AND SYSTEM IDENTIFICATION**

General Electric – Boiling Water Reactor, 2957 megawatts thermal rated core power

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

**A. CONDITIONS PRIOR TO EVENT**

Unit: 3                      Event Date: October 16, 2021                      Event Time: 0428 CDT

Reactor Mode: 1                      Mode Name: Power Operation                      Power Level: 100%

**B. DESCRIPTION OF EVENT**

On October 16, 2021, at 0428 CDT, an automatic reactor protection system [JC] actuation occurred due to failure of the main power transformer (MPT) [EL]. All control rods [AA] inserted to their full-in position. Following the reactor scram, all systems operated as expected.

The MPT experienced a phase-to-ground fault. There is no evidence of a plant event or grid event as the initiator. There were no alarms indicative of a transformer failure as a precursor to the failure. Additionally, a dissolved gas analysis of the transformer oil sample performed two hours prior to the event revealed no alert nor degrading trend.

The MPT "A" phase high voltage bushing, lightning arrester, and control cabinet suffered catastrophic damage. Ancillary components and equipment of the transformer suffered various degrees of damage.

As a result of a fire associated with the MPT failure, an Unusual Event was declared due to a fire in the protected area not extinguished in less than 60 minutes. The Unusual Event was terminated at 0709 CDT.

The transformer was replaced with a transformer of a different design and a different manufacturer.

This event is being reported in accordance with 10 CFR 50.73(a)(2)(iv)(A), an event that resulted in automatic actuation of a system listed in paragraph 10 CFR 50.73(a)(2)(iv)(B), specifically the reactor protection system including reactor scram.

**C. CAUSE OF EVENT**

The cause of the event was due to a sudden, unanticipated, catastrophic failure of the MPT high voltage oil impregnated paper bushing. This conclusion is based on the failure history associated with Trench Condenser Oil Transformer ANSI High Voltage Oil-Impregnated Paper (COTA HV OIP) bushings, the physical characteristics of the catastrophic failure, and the various analyses performed.

**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/>)

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, Library, and Information Collections Branch (T-6 A10M), U. S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to [Infocollections.Resource@nrc.gov](mailto:Infocollections.Resource@nrc.gov), and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street NW, Washington, DC 20503; e-mail: [oira\\_submission@omb.eop.gov](mailto:oira_submission@omb.eop.gov). The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Dresden Nuclear Power Station, Unit 3	05000- 249	2021	- 001	- 01

**NARRATIVE****D. SAFETY ANALYSIS**

The safety significance of this event was determined to be minimal based upon the availability of the required systems to

- 1) Shutdown the reactor and maintain it in a safe shutdown condition,
- 2) Remove residual heat,
- 3) Control the release of radioactive material, or
- 4) Mitigate the consequences of an accident.

There were no safety consequences impacting plant or public safety as a result of this event. There was no loss of safety function for this event.

**E. CORRECTIVE ACTIONS**

Corrective actions included replacement of the failed MPT with a transformer of a different design and from a different manufacturer. Additionally, Trench COTA HV OIP bushings, the type of bushing that failed, are identified as do not use and/or do not procure.

Other corrective actions were developed to provide a method of rapid cut-out of control cabinet power supplies for the Main Power Transformers, Unit Auxiliary Transformers, and Reserve Auxiliary Transformers. These corrective actions address fire re-flashing within the transformer control cabinets due to energized circuits faulting.

**F. PREVIOUS OCCURRENCES**

The most recent transformer failure at Dresden was in April 2014 (LER 05000237/2014-002-02). During that event the Unit 2 MPT failed due to an internal fault with the most probable cause determined to be a combination of insulation issues. The event resulted in the main turbine tripping and a reactor scram. The transformer was replaced with a transformer of a different design and a different manufacturer.

**G. COMPONENT FAILURE DATA**

Device	Manufacturer	Model	S/N	Type
Main Power Transformer	Siemens	ELIN	1731659	TDQ-A27D9K-99