

Part 21 (PAR)

Event # 52867

<b>Rep Org:</b> SUSQUEHANNA NUCLEAR LLC	<b>Notification Date / Time:</b> 07/21/2017 10:40 (EDT)
<b>Supplier:</b> EATON/CUTLER HAMMER	<b>Event Date / Time:</b> 07/14/2017 16:46 (EDT)
	<b>Last Modification:</b> 07/21/2017
<b>Region:</b> 1	<b>Docket #:</b>
<b>City:</b> BERWICK	<b>Agreement State:</b> Yes
<b>County:</b>	<b>License #:</b>
<b>State:</b> PA	
<b>NRC Notified by:</b> JASON JENNINGS	<b>Notifications:</b> ANNE DeFRANCISCO R1DO
<b>HQ Ops Officer:</b> VINCE KLCO	PART 21/50.55 REACTORS EMAIL
<b>Emergency Class:</b> NON EMERGENCY	
<b>10 CFR Section:</b>	
21.21(d)(3)(i) DEFECTS AND NONCOMPLIANCE	

## PART 21 NOTIFICATION - EATON/CUTLER HAMMER A200 SERIES STARTER

The following information was received by the licensee via email:

"Pursuant to 10 CFR 21, this is a non-emergency notification by Susquehanna Nuclear, LLC concerning a defect in an Eaton/Cutler Hammer A200 series starter that failed while in service at Susquehanna Steam Electric Station. The failed starter was manufactured by Eaton Corporation in 2014 and purchased by Susquehanna from AZZ/NLI as part of an MCC bucket assembly. The starter failed with its contacts stuck in the energized state when it was de-energized. A failure analysis identified the contactor sticking to be due to the pole faces of the coil laminations and those of the armature laminations adhering to one another at normal operating temperatures. There was residue/material on the pole faces which closely matched Polydimethylsiloxane (PDMS) and silicone grease. One of the characteristics of PDMS is that at cooler temperatures it is more of a solid consistency, and at higher temperatures it becomes more viscous and tacky.

"A previous Part 21 report submitted by Curtiss-Wright QualTech NP (Event Notification Number 51611) in December 2015 provided notification of Eaton/Cutler Hammer A200 series starters failures due to silicon based mold release that remained on the molded parts and would come between the moving (magnet) and fixed armatures. The Part 21 stated that when heated for extended period of time, the material would become sticky causing anywhere from a minor delay in opening to a frozen closed condition. Eaton/Cutler Hammer determined that the silicone mold release was first introduced into the manufacturing facility in May 2008 and used periodically until October 2012. According to Eaton/Cutler Hammer, any starters manufactured after January 1, 2013 should be silicon mold release free.

"Following the failure of the 2014 starter at Susquehanna, Eaton Corporation performed an investigation and reconfirmed that silicon mold release was banned from molding production in October 2012 and has not been used

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since that time. Eaton concluded that the contamination does not appear to be systemic, but rather random and intermittent and that the contamination was most likely introduced either by operators and assemblers on the manufacturing lines, or by others who disassemble and inspect the product after shipment from their plant. Susquehanna does not take the components apart during receipt for testing or visual inspection. Eaton concluded that there is no evidence that the issue is systemic and considers it a random event. Susquehanna has evaluated the condition and has concluded that the condition could create a substantial safety hazard."

The licensee notified the NRC Resident Inspector.

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**From:** [Jennings, Jason](#)  
**To:** [Hoc, HOO X](#)  
**Cc:** [Hood, Tanya](#); [Micewski, Laura](#)  
**Subject:** [External\_Sender] Susquehanna Part 21 Notification  
**Date:** Friday, July 21, 2017 10:35:50 AM  
**Attachments:** [Susquehanna Part 21.pdf](#)

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Please see attached for Part 21 Initial Notification from Susquehanna. I will follow up with a phone call shortly. Thank you –

Jason Jennings  
Nuclear Regulatory Affairs Manager  
Susquehanna Nuclear, LLC  
(570)542-3155

~~The information contained in this message is intended only for the personal and confidential use of the recipient(s) named above. If the reader of this message is not the intended recipient or an agent responsible for delivering it to the intended recipient, you are hereby notified that you have received this document in error and that any review, dissemination, distribution, or copying of this message is strictly prohibited. If you have received this communication in error, please notify us immediately, and delete the original message.~~

NRC FORM 361  
(12-2000)

U.S. NUCLEAR REGULATORY COMMISSION  
OPERATIONS CENTER

**REACTOR PLANT  
EVENT NOTIFICATION WORKSHEET**

EN #

NRC OPERATION TELEPHONE NUMBER: PRIMARY - 301-816-5100 or 800-532-3469\*, BACKUPS -[1st] 301-951-0550 or 800-449-3694\*, [2nd] 301-415-0550 and [3rd] 301-415-0553  
\*Licensees who maintain their own ETS are provided these telephone numbers.

NOTIFICATION TIME	FACILITY OR ORGANIZATION	UNIT	NAME OF CALLER	CALL BACK #:
	<b>SUSQUEHANNA NUCLEAR LLC</b>	<b>2</b>	<b>Jason Jennings</b>	<b>570-542-3155</b>

EVENT TIME & ZONE	EVENT DATE	POWERMODE BEFORE	POWERMODE AFTER
<b>1646 EDT</b>	<b>7/14/2017</b>	<b>U1: 100% / Mode 1 / U2: 100% / Mode 1</b>	<b>U1: 100% / Mode 1 / U2: 100% / Mode 1</b>

EVENT CLASSIFICATIONS		1-Hr. Non-Emergency 10 CFR 50.72(b)(1)	(v)(A) Safe S/D Capability	AINA
GENERAL EMERGENCY	GEN/AAEC	TS Deviation	ADEV	(v)(B) RHR Capability AINB
SITE AREA EMERGENCY	SIT/AAEC	4-Hr. Non-Emergency 10 CFR 50.72(b)(2)		(v)(C) Control of Rad Release AINC
ALERT	ALE/AAEC	(i) TS Required S/D	ASHU	(v)(D) Accident Mitigation AIND
UNUSUAL EVENT	UNU/AAEC	(iv)(A) ECCS Discharge to RCS	ACCS	(xii) Offsite Medical AMED
50.72 NON-EMERGENCY	(see next columns)	(iv)(B) RPS Actuation (scram)	ARPS	(xii) Loss Comm/Asmt/Resp ACOM
PHYSICAL SECURITY (73.71)	DDDD	(xi) Offsite Notification	APRE	<b>60-Day Optional 10 CFR 50.73(a)(1)</b>
MATERIAL/EXPOSURE	B???	8-Hr. Non-Emergency 10 CFR 50.72(b)(3)		Invalid Specified System Actuation AINV
FITNESS FOR DUTY	HFIT	(ii)(A) Degraded Condition	ADEG	<b>Other Unspecified Requirement (Identify)</b>
OTHER UNSPECIFIED REQMT	(see last column)	(ii)(B) Unanalyzed Condition	AUNA	x 10 CFR 21.21(d)(3)(i) NONR
INFORMATION ONLY	NNF	(iv)(A) Specified System Actuation	AESF	NONR

**DESCRIPTION**

Include: Systems affected, actuations & their initiating signals, causes, effect of event on plant, actions taken or planned, etc. (Continue on back)

**Part 21 Notification – Eaton/Cutler Hammer A200 Series Starter**

Pursuant to 10 CFR 21, this is a non-emergency notification by Susquehanna Nuclear, LLC concerning a defect in an Eaton/Cutler Hammer A200 series starter that failed while in service at Susquehanna Steam Electric Station. The failed starter was manufactured by Eaton Corporation in 2014 and purchased by Susquehanna from AZZ/NLI as part of an MCC bucket assembly. The starter failed with its contacts stuck in the energized state when it was de-energized. A failure analysis identified the contactor sticking to be due to the pole faces of the coil laminations and those of the armature laminations adhering to one another at normal operating temperatures. There was residue/material on the pole faces which closely matched Polydimethylsiloxane (PDMS) and silicone grease. One of the characteristics of PDMS is that at cooler temperatures it is more of a solid consistency, and at higher temperatures it becomes more viscous and tacky.

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Following the failure of the 2014 starter at Susquehanna, Eaton Corporation performed an investigation and reconfirmed that silicon mold release was banned from molding production in October 2012 and has not been used since that time. Eaton concluded that the contamination does not appear to be systemic, but rather random and intermittent and that the contamination was most likely introduced either by operators and assemblers on the manufacturing lines, or by others who disassemble and inspect the product after shipment from their plant. Susquehanna does not take the components apart during receipt for testing or visual inspection. Eaton concluded that there is no evidence that the issue is systemic and considers it a random event. Susquehanna has evaluated the condition and has concluded that the condition could create a substantial safety hazard.

NOTIFICATIONS	YES	NO	WILL BE	ANYTHING UNUSUAL OR NOT UNDERSTOOD?	<input type="checkbox"/> YES (Explain above)	<input checked="" type="checkbox"/> NO
NRC RESIDENT	<b>X</b>					
STATE(s)		<b>X</b>		DID ALL SYSTEMS FUNCTION AS REQUIRED?	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO (Explain above)
LOCAL		<b>X</b>				
OTHER GOV AGENCIES		<b>X</b>		MODE OF OPERATION:		ADDITIONAL INFO ON BACK?
MEDIA/PRESS RELEASE		<b>X</b>		UNTIL CORRECTED	<b>N/A</b>	ESTIMATED RESTART DATE:
					<b>N/A</b>	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO

RADIOLOGICAL RELEASES: CHECK OR FILL IN APPLICABLE ITEMS (specific details/explanations should be covered in description)													
LIQUID RELEASE		GASEOUS RELEASE		UNPLANNED RELEASE		PLANNED RELEASE		ONGOING		TERMINATED			
MONITORED		UNMONITORED		OFFSITE RELEASE		T.S. EXCEEDED		RM ALARMS		AREAS EVACUATED			
PERSONNEL EXPOSED OR CONTAMINATED				OFFSITE PROTECTIVE ACTIONS RECOMMENDED		*State release path in description							
		Release Rate (Ci/sec)		% T.S. LIMIT		HOO GUIDE		Total Activity (Ci)		% T.S. LIMIT		HOO GUIDE	
Noble Gas						0.1 Ci/sec						1000 Ci	
Iodine						10 uCi/sec						0.01 Ci	
Particulate						1 uCi/sec						1 mCi	
Liquid (excluding tritium & dissolved noble gases)						10 uCi/min						0.1 Ci	
Liquid (tritium)						0.2 Ci/min						5 Ci	
Total Activity													
		PLANT STACK		CONDENSER/AIR EJECTOR		MAIN STEAM LINE		SG BLOWDOWN		OTHER			
RAD MONITOR READINGS:													
ALARM SETPOINTS:													
% T.S. LIMIT (if applicable)													
RCS OR SG TUBE LEAKS: CHECK OR FILL IN APPLICABLE ITEMS: (specific details/explanations should be covered in event description)													
LOCATION OF THE LEAK (e.g., SG #, valve, pipe, etc.):													
LEAK RATE		UNITS: gpm/gpd		T.S. LIMITS		SUDDEN OR LONG TERM DEVELOPMENT							
LEAK START DATE:		TIME:		COOLANT ACTIVITY & UNITS:		PRIMARY		SECONDARY					
LIST OF SAFETY RELATED EQUIPMENT NOT OPERATIONAL:													
EVENT DESCRIPTION (Continued from front)													