From:	Hover, Margie
To:	Hoc, HOO X
Cc:	Hover, Margie
Subject:	[External_Sender] Curtiss-Wright Transmittal DT193199 (PO# N/A): Response required [#DDDTIHUIHYQE#]
Date:	Friday, May 31, 2019 11:06:22 AM
Attachments:	Notification Report for Potential Part 21 Update Event ML18289A457 Log No. 2018-24-00.pdf

Document Control Workflow Notification

Dear Customer,

Please confirm receipt of attached documentation by replying Yes to this email.

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	DOCUMENT TRANSMITTAL	Contract N/A

Nuclear Division 4600 East Tech Drive, Cincinnati, OH 45245 T: 513.528.7900 | F: 513.528.4537	Number DT193199	Customer/Vendor Purchase Order Number N/A
Originated By Hover, Margie	Originated Date 5/30/2019	Project 10CFR PART 21 REPORT UPDATE

Name	Company	Email
Headquarters Operation Officer	U.S. Nuclear Regulatory Commission	hoo.hoc@nrc.gov

Document Number	Rev	Document Type	Qty	For...
10CFR Part 21 Report	N/A	Report	1	Final Record

Remarks	
Contact Information for Originator of Part-21 Notification: TIM FRANCHUK Curtiss-Wright Nuclear Division Director of Quality (513) 201-2176, tfranchuk@curtisswright.com Notification Report for Potential Part 21 Update: Namco Limit Switch PIN: EA 700-90964 U.S. Nuclear Regulatory Commission ATTN: NRC Document Control Desk Washington, DC 20555-0001 Phone: (301) 816-5100 Fax: (301) 816-5151	ACKNOWLEDGMENT: Please confirm receipt of the referenced documentation by replying "YES" to the email you received. The referenced documentation will default to a status of UNCONTROLLED if your "YES" reply is not received within 30 days.
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Transmitted By Hover, Margie	Transmitted Date 5/31/2019

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Removed per telephone conversation with T. Franchuk on 6/3/2019 ep

CURTISS-WRIGHT

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May 31, 2019

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

Subject: Notification Report for Potential Part 21 update.

Dear Sir or Madam:

In reference to the Curtiss-Wright Interim Notification Report dated 10/8/2018 (Event No. ML18289A457/Log No. 2018-24-00) for an EA700-90964 limit switch failure, the following updates are provided.

Curtiss-Wright was notified on August 7th, 2018 by Exelon's Quad Cities Plant that a Curtiss-Wright Supplied Namco Limit Switch, PIN: EA 700-90964 had failed during a planned maintenance test.

The switch was found to be sluggish in returning to the normal shelf state after actuation, or would not return at all. The switch was identified as Curtiss-Wright Tag# 5T34603 and was provided as a safety related component to Exelon in September 2005. According to Exelon, the item was stored for 8 years then failure occurred roughly four and a half years into service. The part has a manufacturer date coded as August 2005.

The switch was subsequently sent to Exelon PowerLabs where a detailed failure evaluation was performed (See QDC-07067). Exelon PowerLabs confirmed the failure mode and determined that there was insufficient lubrication in place to support normal switch function. The switch was then sent to Namco for further evaluation and Namco confirmed the lack of lubrication.

Note that in subsequent discussions after release of the QDC-07067 report, Namco indicated that their statement on the lack of lubrication was an observation of the switch's current condition, and not the cause of the failure.

References (attached):
Exelon PowerLabs Initial Report QDC-07067 08/08/2018 on failed Switch
Exelon PowerLabs 2nd Report QDC-62770 R1 05/09/2019 on used Switches
Namco Report Mechanical Cycle Testing, EA700-90964 Commercial Limit Switch (Final Report – 28May2019)

Initial Report QDC-07067 Conclusions:

Initial Failure occurred roughly four and a half years in service where switch "binding was due to insufficient (i.e. dried out) lubrication on the moving parts". The shaft O-ring was severely hardened from aging, "which could have contributed to binding".

Second Report QDC-62770:

Per Table 1, pg. 3: SN 05, 09, & 02 were installed for 6 years without a failure.

Pages 16 & 17 photos show these 3 switches are without lubrication and had wear patterns between the slide & the outer housing, similar to the failed switch.

Per pg. 1: CQ1400801 S/N 03 was installed for approximately 9 months.

Page 17 photo shows significant lubrication and the same wear pattern.

The foreign material found in the switches were identified as paint residue (due to wear).

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Shaft O-Rings on the 6 years in service switches were severely hardened and embrittled due to aging, while the 9 month switch's O-Ring was still in good condition, but beginning to show signs of aging as noted by an increase in hardness.

NAMCO Cycle Aging Report:

Report showed the results of Mechanical Cycle Testing on two new switches, which was performed in the same orientation as the Exelon application. The purpose of this test was to prove that with/without lubrication, at the known rate of cycles, these units would not have experienced the amount of wear indications noted in Exelon PowerLabs' reports regardless of the amount of lubrication present. One switch was completely lubricated and one was without any lubrication. These were cycled for 4800 cycles and were both functional at the end of testing.

Curtiss-Wright noted that Namco's testing was done at laboratory ambient conditions, and did not account for other external factors such as typical system vibrations and operating temperature present in Quad Cities application.

CW Conclusion:

Based upon similar wear patterns, the presence of "significant grease" does not resolve wear pattern issue caused in a shorter period of time, thus the lack of grease can be considered to "not be a significant credible failure mechanism" (same or no grease between shuttle and housing). Based upon the NAMCO report, the presence or lack of grease has no impact on wear or operability and thus does not affect the safety function.

In addition, the CQ1400801 S/N 03 installed for 9 months, the O-Ring measured an 81 durometer hardness (showing aging) but not brittle. The other 3 installed for 6 years were brittle but did not affect operability. Thus the hardness of the O-Rings can be considered to "not be a significant credible failure mechanism".

All four switches in Report QDC-62770 had paint scrapings caused by wear which was present and operated properly after being in service for an extended period of time. Thus the presence of paint residue due to wear can be considered to "not be a significant credible failure mechanism".

There have been no other reported failures of this type. The root cause failure mechanism has not been identified, thus this switch failure does not appear to represent a common mode failure.

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