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To: NRC's Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-001

From: Allen Fisher

Date: April 4, 2019

Subject: Part 21 Written Notification – Event Number: 53973

The following documents are included:

NRC Notification Letter – Total 3 pages

10CFR Part 21 Evaluation – 10CFR21 2-8-19 – Total 3 pages – 1 of 4, 2 of 4, and 3 of 4

JE19
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Dear Sir or Madam,

This notification is being submitted pursuant to the guidelines of 10 CFR Part 21 to report that a 24" Class 150 Globe valve for RHRSW-HX Isolation MOV, E1150F068B at Detroit Edison - Fermi 2, experienced two stem failures.

The site notified WVC USA on November 6th of this issue involving two stems. WVC USA had supplied these stems on orders 20000262-10 and 20012001-10, Detroit Edison PO's 4700505700 and 4701149217. A new stem failed in service after approximately 1 month in service in valve F068B. A replacement stem was installed and failed soon after being placed in service. This second stem failure had previously been in service for approximately three years while installed in sister valve F068A. Both stem breakages occurred at the transition area of the stem backseat and were visually identical. See pictures of failure in Attachment A. In the as found condition, the disc to stem connection appears to have lacked design clearances. The cause of this clearance issue was cleaning of the disc surface where the disc nut is tack welded. The material supplied is A276 410 heat treated and tempered to obtain (269-311 BHN). This material was approved by Powell as an acceptable alternate to the original material A182 F6(269-311 BHN). During original Part 21 evaluation, testing of the stem material revealed low impact values and reflected effects of temper embrittlement. Other possible contributors to the failure were transition region at stem backseat and the valve service conditions where vibration due to throttling has been experienced. It was determined that although temper embrittlement and other factors may have contributed to the failures, that the lack of design clearance led to the failure of the stems and was not reportable by WVC USA. However, after discussions with Detroit Edison, WVC USA was requested to evaluate the failure considering the effects of temper embrittlement that might lead to future failures.

WVC USA engineering is unable to determine the effects of temper embrittlement for the A276 410 material. Powell engineering was also consulted and there are no known methods to evaluate the potential for failure on the stem in this condition. As noted in NRC Information Notice No. 85-59, tempering in the 700F to 1050F range is not recommended because it results in low and erratic impact properties and poor resistance to corrosion and stress corrosion for 410 stainless steel.

The stem failures in this case reflected these low and erratic impact properties based on material testing that was performed by DTE Fermi and WVC USA. The A276 410 materials supplied in this event were tempered at 1025F and 1050F.

The best solution is to eliminate the potential for temper embrittlement by using a higher required tempering temperature. The recommendation is to use A276 410 tempered at a minimum of 1100F. This is also in alignment with Code Case N-62-7. We are in the process of updating our item records to reflect this minimum tempering requirement and expect this action to be completed within one month.

WVC USA is notifying the following sites of this potential issue so that they can evaluate the impact on the safe operation of the plant.

74347-10 Entergy PO 10118969 Site Grand Gulf
Item Number P_26126666ASSEMAO_QLA Stem & Disc Assy 14" Qty (1) Shipped 7/28/06

0020005433-10 Georgia Power Company PO SNG10081312 REV. 2 Site Hatch
Item Number P0000419C Stem/Disc Assy 24-300 Globe Valve Qty (1) Shipped 10/29/15

0020006979-10 Detroit Edison Company PO 4700846295 Site Fermi 2
Item Number P0000455C Stem 8in Gate Valve Qty (1) Shipped 6/29/15

0020011676-10 Detroit Edison Company PO 4701123403 Site Fermi 2
Item Number P0000455C Stem 8in Gate Valve Qty (1) Shipped 2/14/18

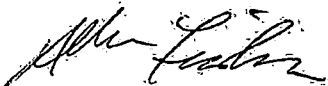
0020013251-10 Detroit Edison Company PO 4701230062 Site Fermi 2
Item Number P0000283 Stem Globe 24in 150# Qty (1) Shipped 9/19/18

0020013586-10 Detroit Edison Company PO 4701259926 CO#6 Site Fermi 2
Item Number P0000283 Stem Globe 24in 150# Qty (1) Shipped 11/13/18

Stem supplied under order 0020013251-10 is currently installed in F068A and order 0020013586-10 was delivered but not installed. F068B valve has been restored by Detroit Edison with a stem which has acceptable properties for the service.

Please feel free to contact me with any questions or comments.

Regards,



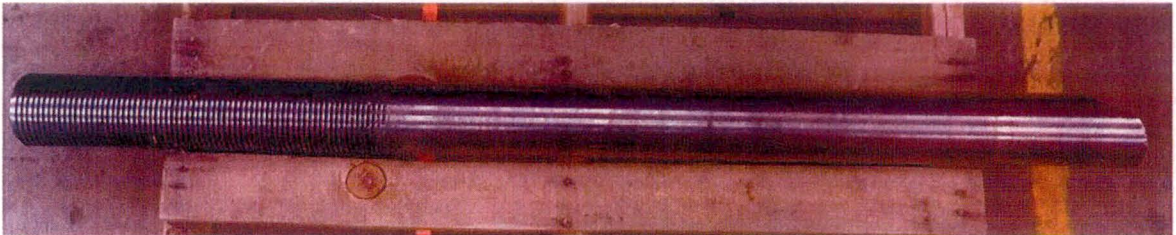
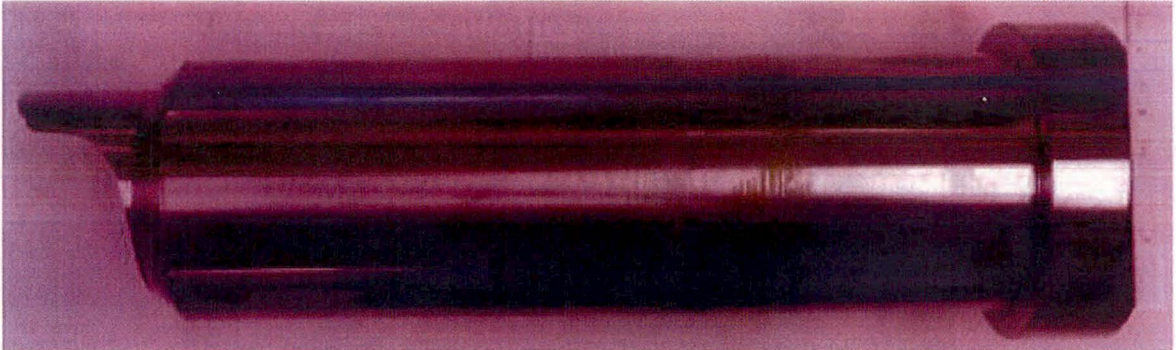
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Attachment A





10 CFR PART 21 EVALUATION
 Evaluation of Deviation or Potential Failure to Comply

DOCUMENT
 10CFR21 2-8-19

PAGE
 1 of 4

Part 1: Identification of Concern and Preliminary Evaluation

1A Identify the source of the information on the **deviation** or potential **failure to comply**:
 DTE Fermi has requested WVC USA to determine the effects of temper embrittlement in failed stems originally evaluated for Part 21 reportability under evaluation 10CFR21 11-19-18.

1B Describe the **deviation** or potential **failure to comply** that has been discovered:
 Customer has reported 2 stem failures on a motor operated Powell Globe Valve 24"150#

1C Does the potential failure to comply represent a violation of the Atomic Energy Act of 1954, as amended, or any applicable rule, regulation, order, or license of the NRC, including technical specification limits?
 If **Yes** or **Uncertain**, a potential **failure to comply** exists check and complete Section 1F.
 If **No**, check and complete Section 1D.

1D(1) Does the **deviation** affect the functionality of items or services provided by Weir Valves & Controls USA?
 If **Yes** or **Uncertain**, check and complete Section 1D(2). If **No**, check and complete Section 1E.

1D(2) Does the **deviation** involve a **basic component**?
 If **Yes** or **Uncertain**, check and complete Section 1D(3). If **No**, check and complete Section 1E.

1D(3) Has the **basic component** been delivered to a customer?
 If **Yes** or **Uncertain**, check and complete Section 1D(4). If **No**, check and complete Section 1E.

1D(4) Does the **basic component** deviate from the requirements of the customer's procurement document?
 If **Yes** or **Uncertain**, check and complete Section 1G. If **No**, check and complete Section 1E.

1E No reportable **deviation** or potential **failure to comply** in accordance to 10CFR21 exists based on:

_____ Originator (signature)	_____ Originator (print)	_____ Date
_____ Designated Responsible Officer (signature)	_____ Designated Responsible Officer (print)	_____ Date

Have local Director, Quality Assurance retain this form on file for 5 years

Discovery

1F The **deviation** or potential **failure to comply** warrants further **evaluation** in accordance with 10CFR21.

_____ Originator (signature)	_____ Originator (print)	_____ Date
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Forward this form with relevant information to the Designated Responsible Officer.

1G I have reviewed Part 1 and determined that the **deviation** or potential **failure to comply** should be evaluated based on the basis below for reportability in accordance with 10CFR21. (Start of 60-day clock)

_____ Designated Responsible Officer (signature)	_____ Date	Initial Due Date: 4/1/19
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Within the 60-day clock started above, I will evaluate the **deviation** or potential **failure to comply** discovered in Part 1 to determine reportability in accordance with 10CFR21.

_____ Cognizant Technical Engineer (signature)	_____ Date
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Part 2: Technical Evaluation

2A Identification of the company supplying the **basic component** or activity which contains a **deviation** or potential **failure to comply**:

WVC USA & Powell (design control for spare parts)

2B Confirm the information in Part 1. Note any discrepancies that need to be addressed:

DTE Fermi had a new stem failed in service after approximately 1 month in service in valve F068B. A replacement stem was installed and failed soon after being placed in service. This second stem failure had previously been in service for approximately three years while installed in sister valve F068A. Both stem breakages occurred at the transition area of the stem backseat and were visually identical. In the as found condition, the disc to stem connection appears to have lacked design clearances. The cause of this clearance issue was cleaning of the disc surface where the disc nut is tack welded. The material supplied is A276 410 heat treated and tempered to obtain (269-311 BHN). This material was approved by Powell as an acceptable alternate to the original material A182 F6(269-311 BHN). During the previous evaluation testing of the stem material revealed low impact values and reflected effects of temper embrittlement.

2C Provide A) Technical Justification of Unit Acceptability; or B) Proposed Technical Solution

WVC USA engineering is unable to determine the effects of temper embrittlement for the A276 410 material. Powell engineering was also consulted. There are no known methods to evaluate the potential for failure on the stem in this condition. As noted in NRC Information Notice No. 85-59, tempering in the 700F to 1050F range is not recommended because it results in low and erratic impact properties and poor resistance to corrosion and stress corrosion for 410 stainless steel.

The stem failures in this case reflected these low and erratic impact properties based on material testing that was performed by DTE Fermi and WVC USA. The A276 410 material supplied was tempered at 1025F and 1050F.

The best solution is to eliminate the potential for temper embrittlement by using a higher required tempering temperature. The recommendation is to use A276 410 tempered at a minimum of 1100F. This is also in alignment with Code Case N-62-7.

- This issue is reportable pursuant to 10CFR21.
- This issue is not reportable pursuant to 10CFR21.
- A decision on reportability cannot be made based on the available information.


Cognizant Technical Engineer (signature)

4/1/19
Date

Review with the DRO within 5 days of completion


Designated Responsible Officer (signature)

4/1/19
Date

The DRO will finalize the reporting requirements and submit the reports to the NRC and any affected facilities within 30 days.



Part 3: Conclusion of Reportability Evaluation

3A Basis for decision:

*Based upon the technical evaluation defined in paragraph 2C I
concur that this is a reportable condition.*

3B Number and location of all affected components:

74347-10 Entergy PO 10118969

Item Number P_26126666ASSEMAO_QLA Stem & Disc Assy 14" Qty (1) Shipped 7/28/06

0020005433-10 Georgia Power Company PO SNG10081312 REV. 2

Item Number P0000419C Stem/Disc Assy 24-300 Globe Valve Qty (1) Shipped 10/29/15

0020006979-10 Detroit Edison Company PO 4700846295

Item Number P0000455C Stem 8in Gate Valve Qty (1) Shipped 6/29/15

0020011676-10 Detroit Edison Company PO 4701123403

Item Number P0000455C Stem 8in Gate Valve Qty (1) Shipped 2/14/18

0020013251-10 Detroit Edison Company PO 4701230062

Item Number P0000283 Stem Globe 24in 150# Qty (1) Shipped 9/19/18

0020013586-10 Detroit Edison Company PO 4701259926 CO#6

Item Number P0000283 Stem Globe 24in 150# Qty (1) Shipped 11/13/18

3C I have evaluated the information and technical assessment developed and

- This issue is reportable pursuant to 10CFR21.
 This issue is not reportable pursuant to 10CFR21.
 A decision on reportability cannot be made based on the available information.

Based on this determination, I will proceed with all proper notifications within the allowable timeframes.

Designated Responsible Officer (signature)

4/6/19
Date