

From:

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#023 P.001/004

To: NRC Operations Center  
301.816.5151

From: Joyce Hamman  
Director, Safety & Quality  
Crane Nuclear, Inc.

3 pages to follow



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CRANE NUCLEAR, INC. 860 REMINGTON BOULEVARD BOLINGBROOK, IL. 60440

Date: December 19, 2017

Attn: Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-001

Subject: 10 CFR Part 21 Notification of Defect on  
Weak Link Analysis for Chapman Gate Valve Figure L900, Item #18,  
Drawing CC05307, Revision B

This letter provides notification of a defect in a Weak Link Analysis provided to the Tennessee Valley Authority (TVA) by Crane-Aloyco, Inc. (CAI), a Crane Nuclear, Inc. (CNI) predecessor business unit, for a Chapman Gate Valve, Figure L900, Item #18, Drawing CC05307, Revision B for the Browns Ferry Nuclear (BFN) plant.

*(i) Name and address of the individual or individuals informing the Commission.*

Joyce Hamman  
Director Safety and Quality

Burt Anderson  
Site Leader

Samson Kay  
Engineering Manager

Crane Nuclear  
860 Remington Blvd  
Bolingbrook, IL 60440

*(ii) Identification of the basic component supplied for such facility or such activity within the United States which may fail to comply or contains a potential defect*

Weak Link Analysis for the 14-in Class 900 Chapman Gate Valve: Figure L900, CNI Drawing CC05307, Revision B, which utilizes a Limitorque SMB-4T actuator. The Weak Link Analysis was supplied by CAI to TVA in 1988.

*(iii) Identification of the firm supplying the basic component which fails to comply or contains a defect.*

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*(iv) Nature of the defect or failure to comply and the safety hazard which is created or could be created by such defect or failure to comply*

The subject valve was originally procured from Crane Chapman in 1968. In 1988, TVA requested Crane to supply a Weak Link Analysis for the original valve. A Weak Link Analysis (OTC-258 Rev.0) was developed by CAI, which identified a maximum thrust capacity of approximately 112,000lbf.

In November 2017, Crane Nuclear, Inc. developed a new Weak Link Analysis for the valve. Crane Nuclear, Inc. provided the new Weak Link Analysis (WL-103 Rev. 0) to TVA on November 17<sup>th</sup>, 2017. Crane Nuclear, Inc. identified in the new Weak Link Analysis a maximum thrust capacity of approximately 96,000lbf.

The thrust bearings, which are unique to the Limitorque SMB-4T and SMB-5T actuator design, were not identified / analyzed in the original weak link report, but should have been considered, as they are components that are in the load path and could affect the operability of the valve. The manufacturer's rating for the bearings was approximately 96,000lbf and was the weakest component in the load path. The rating for all other components in the load path was above the maximum thrust capacity of approximately 112,000lbf provided in 1988.

As a result, CNI has identified a potential safety issue for Chapman gate valves utilizing the SMB-4T or SMB-5T actuator with the thrust bearing design and operating at a thrust load above the 96,000lbs rating of the thrust bearings. Operation at a condition above 96,000lbf could lead to a potential failure of the bearings, which could impact operability of the affected valve.

*(v) The date on which the information of such defect or failure to comply was obtained.*

CNI was notified of operability issues with the subject valve on September 29, 2017. The focus at that time was the yoke nut. CNI determined at that time, although the weak link of the yoke nut was above the guidance provided for the valve in 1988, the Weak Link Analysis provided to TVA by Crane Nuclear, Inc. in 2015 was incomplete (included the center section but not the flange ends). CNI provided a revised Weak Link Analysis, WL-082 Revision 1, to TVA for the yoke nut on October 12, 2017. CNI initiated Corrective Action Report 17-33 to address the root cause of why the Weak Link Analysis for the Yoke Nut was not provided correctly in 2015.

In addition, CNI reviewed the Weak Link Analysis for the valve assembly. During this review, Crane Nuclear, Inc. determined that the thrust bearings should be included in the Weak Link Analysis for the valve assembly. CNI revised the Weak Link Analysis for the valve assembly, WL-103 Revision 0, and issued it to TVA on November 17, 2017. Crane Nuclear, Inc. has initiated CAR 17-34 to review the Weak Link Analysis for all safety-related gate valves supplied by Crane with Limitorque SMB-4T or SMB-5T actuators.



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*(vi) In the case of a basic component which contains a defect or fails to comply, the number and location of these components in use at, supplied for, being supplied for, or may be supplied for, manufactured, or being manufactured for one or more facilities or activities subject to the regulations in this part.*

CNI is reviewing our records to determine if the maximum thrust rating in any other Weak Link Analyses provided by CNI for gate valve designs with an SMB-4T or SMB-5T actuator exceeds the rating for the thrust bearings.

*(vii) The corrective action which has been, is being, or will be taken; the name of the individual or organization responsible for the action; and the length of time that has been or will be taken to complete the action.*

A revised Weak Link Analysis has been provided to TVA for the 14-in Class 900 Chapman Gate Valve: Figure L900, CNI Drawing CC05307, Revision B, which utilizes a Limitorque SMB-4T actuator.

In the event that the review of our records indicates the maximum thrust rating in any other Weak Link Analyses provided by CNI for gate valve designs with SMB-4T and SMB-5T actuator exceed the rating for the thrust bearings, Crane Nuclear will notify the customer and the Nuclear Regulatory Commission, and will supply the affected customer with a revised Weak Link Analysis.

*(viii) Any advice related to the defect or failure to comply about the facility, activity, or basic component that has been, is being, or will be given to purchasers or licensees.*

Crane Nuclear will recommend to the affected customers and the Nuclear Regulatory Commission that customers review their weak link analyses for gate valves with 4T or 5T actuators to confirm that the thrust bearings have been considered in the Weak Link Analysis.

*(ix) In the case of an early site permit, the entities to whom an early site permit was transferred.*

Not applicable.

Should you have any questions regarding this matter, please contact me, Joyce Hamman, Director, Safety & Quality at (678) 451-2280, Burt Anderson, Site Leader, at (630) 226-4990, or Samson Kay, Engineering Manager at (630) 226-4983.

Regards,

A handwritten signature in cursive script, appearing to read "J Hamman".

Joyce Hamman  
Director, Safety & Quality  
Crane Nuclear, Inc.