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

Date: September 30, 2015

**Attn: Edward H. Roach, Chief
Mechanical Vendor Inspection Branch
Division of Construction Inspection
and Operational Programs
Office of New Reactors**

Subject: 10CFR21 Investigation Summary and Deliverables
Integral Yoke Pressure Retaining Rings Used in Pressure Seal Valves

Dear Sir:

Crane Nuclear, Inc. has completed all actions associated with the 10CFR part 21 Interim Report dated July 8th, 2015 investigation into ASME Boiler and Pressure Vessel Section III Code design Pressure Seal Valve orders for yokes with integral hubs acting as retaining rings. The information required for this notification is provided below:

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

Jason Klein
Engineering Manager

Rosalie Nava
Director Safety and Quality

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

Pressure Seal Valve orders may potentially have misclassified material and non-destructive examination requirements for Yokes with integral hub retaining ring designs.

(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.



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Crane Nuclear uses a parts classification procedure (03-107) to ensure that appropriate requirements are specified when processing valve and valve part orders. The procedure is based on the ASME Code Case N-62 which is currently part of the 2015 Edition of the ASME Boiler and Pressure Vessel Section III Code, non-Mandatory Appendix HH.

A yoke incorporating a threaded hub should be treated in the same manner as a threaded retaining ring requiring the material to be purchased Safety Related, ASME B&PV Section II, Part D materials, and required NDE (reference Category 3 valve items per N-62). However, yokes with integral hubs acting as retaining rings may have been processed to material requirements for a yoke per Procedure 03-107 and not a threaded retaining ring resulting in the incorrect material specification and non-destructive examination specified.

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

Crane Nuclear Engineering initiated investigation correspondence to Crane Nuclear Director of Safety and Quality via email correspondence dated Feb 20th, 2015.

(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.

Data in the CNI engineering database search was conducted for orders from 1992 to present and was filtered by pressure seal valve types with a description field filtered for valves and ASME Section III design. The assembly drawings in the population were reviewed to determine if the retaining ring had the correct pressure retaining material designation.

CNI identified a total of 112 orders that required review during this search. Of these orders, three orders were supplied with non-compliant integral yoke retaining ring material for the valve assemblies. The orders are as follows:

1. CNI SO# 24237-01, TVA, Browns Ferry, P.O. 00031943 – Quantity shipped = 1, Chapman, 8", Figure L953, Class 900, ASME Class 2, 95 Ed., 96 Add., no N stamp
2. CNI SO# 39501-01, Georgia Power, Hatch, P.O. SNG10016537 – Quantity shipped = 3, Crane, 3", Figure 776U, Class 600, ASME Class 3, 71 Ed., W71 Add.
3. CNI SO# 39745-01, Southern California Edison, San Onofre, P.O. 4500456451) – Quantity shipped = 1, Aloyco, 4", Figure N5247PSB, Class 900, ASME Class 3, 71 Ed., S73 Add.

The search was extended to investigate all orders from Crane, Walworth, Chapman, and Aloyco designs not within the 1992 databases. The search consisted of manually retrieving 2511 order files and reviewing the order content for pressure seal valves or components. Each order was reviewed against original OEM requirements and order requirements. Possible categorization by one of the following:

- Processed consistent with retaining ring requirements
- Processed not meeting retaining requirements

The following chart in Figure 1 shows the decision tree for the investigation.



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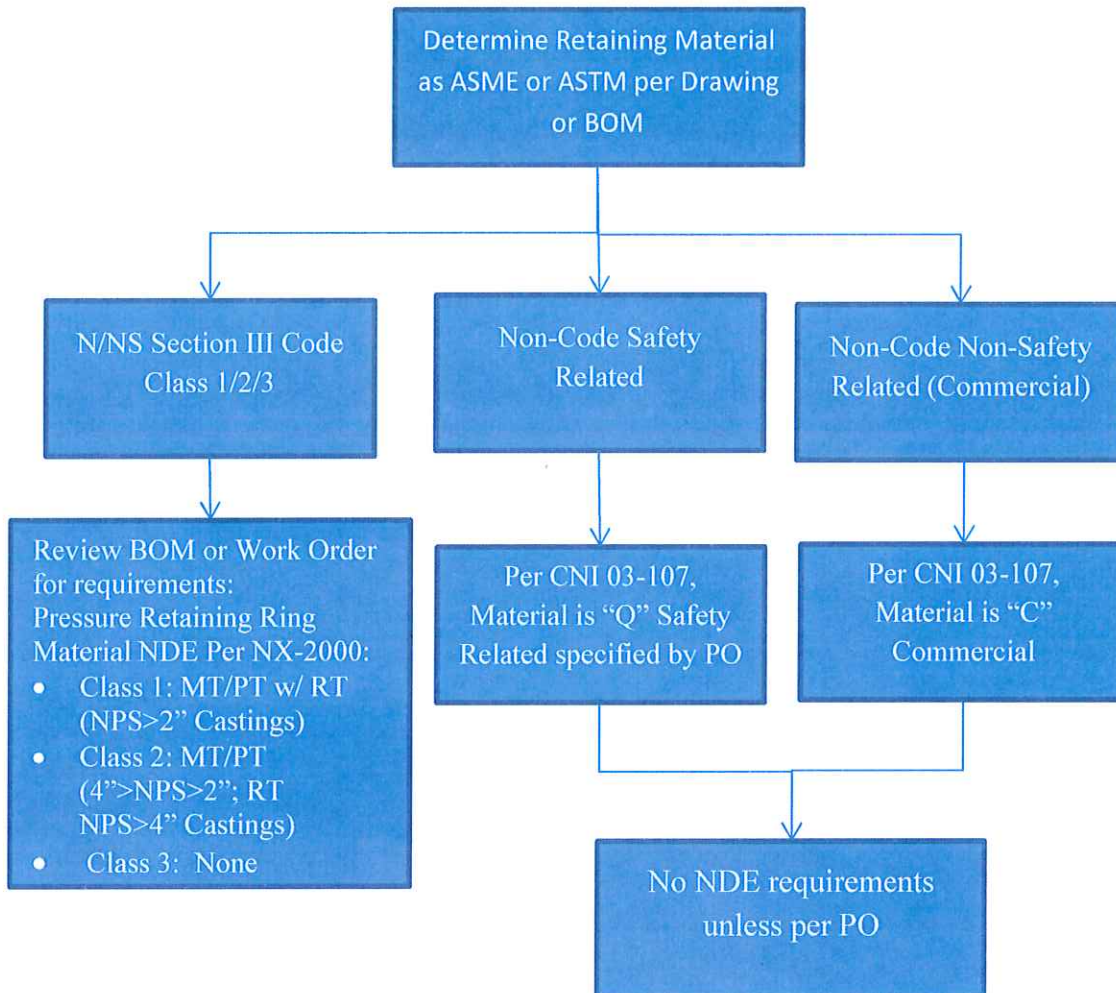


Figure 1: Decision Tree Chart for Integral Yoke Retaining Ring Investigation

The search found 55 total orders as pressure seal designs. The results did not uncover any additional misclassified integral yoke retaining ring components.

(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.

Issue #1: CNI Sales Order #: 24237-01

Customer: TVA, Browns Ferry

Customer P.O.: 00031943 – Quantity Shipped = 1

Valve Description: Chapman, 8", Figure L953, Class 900, ASME Class 2, 1995 Ed., '96 Add., no N stamp



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Investigation Results:

Both the yoke and yoke lock ring components were not provided as ASME Table 1a materials per NC-2000; materials were specified as ASTM. The cast Yoke was provided without the required volumetric examination.

Cause of Condition:

The valve order was for a "Like for Like" replacement of a Walworth's Supplied Order #PP37653, Walworth drawing A-12275-M-11D. The materials were misclassified by Crane as not specifying ASME material for the components based on the original Walworth material construction from the BOM referencing ASTM materials; this was in contrast to the original Walworth valve design. The investigation found the Walworth material specification "duo certifies" the ASTM material as ASME, which is allowed by the Code. The incorrect material selection occurrence for CNI SO# 32634-01 was due to recreating the original BOM for the Walworth valve without the duo certification from ASTM to ASME material. The reason for the issue was lack of training to the pressure retaining design feature.

Containment and Corrective Actions:

- Training held for engineers involved in classification of yokes with integral retaining ring hubs completed 5/7/15.
- Look-across and where-used at all pressure seal valve and part orders completed 8/23/15.
- Revise CNI Procedure 03-107 to add figures reflecting configurations and clarify classifications completed 8/24/15.
- Revise assembly drawing CD03703 (attached) to correct item identification as pressure retaining material; CNI material reconciliation from ASTM to ASME classification for yoke and yoke lock ring components, revise Design Reports SR-270 (attached) to show correct material designation for assembly drawing revision; create Reconciliation for Yoke material w/out RT (attached) for deviation acceptance completed 8/28/15.

Issue #2: CNI SO# 39501-01

Customer: Georgia Power, Hatch

Customer P.O.: SNG10016537 – Quantity shipped = 3

Valve Description: Crane, 3", Figure 776U, Class 600, ASME Class 3, 71 Ed., W71 Add.

Investigation Results:

The yoke was not provided as ASME Table 1a material per ND-2000; materials were specified as ASTM.

Cause of Condition:

CNI SO# 39501: The original valve was constructed to Draft ASME Code for Pumps and Valves. Materials for the Draft Code were ASTM. The repeat order was to 1971 Edition, S'73Add where material was required to be ASME. The yoke was misclassified as ASTM material as the original Draft Code construction and was not detected. The occurrence was due to reclassifying the valve from ASTM construction to ASME. The reason for the issue was lack of training to the integral yoke pressure retaining design feature.



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Containment and Corrective Actions:

- Training held for engineers involved in classification of yokes with integral retaining ring hubs completed 5/7/15.
- Look-across and where-used at all pressure seal valve and part orders completed 8/23/15.
- Revise CNI Procedure 03-107 to add figures reflecting configurations and clarify classifications completed 8/24/15.
- Revise assembly drawing CC05546 (attached) to correct item identification as pressure retaining material; CNI material reconciliation (attached) for the yoke component from ASTM to ASME classification; revise Design Reports SR-331 (attached) to show correct material designation for assembly drawing revision completed 8/28/15.

Issue #3: CNI SO# 39745-01

Customer: Southern California Edison, San Onofre

Customer P.O.: 4500456451) – Quantity shipped = 1

Valve Description: Aloyco, 4", Figure N5247PSB, Class 900, ASME Class 3, 71 Ed., S73 Add.

Investigation Results:

The yoke was not provided as ASME Table 1a material per ND-2000; materials were specified as ASTM.

Cause of Condition:

The original valve was provided with Yoke as ASME material shown on the Aloyco BOM and drawing D-56014. The Crane BOM and drawing of the valve, CC05590, showed the Yoke as ASTM and was not detected. The occurrence was due to reclassifying the component as ASTM construction versus ASME. The reason for the issue was lack of training to the integral yoke pressure retaining design feature.

Containment and Corrective Actions:

- Training held for engineers involved in classification of yokes with integral retaining ring hubs completed 5/7/15.
- Look-across and where-used at all pressure seal valve and part orders completed 8/23/15.
- Revise CNI Procedure 03-107 to add figures reflecting configurations and clarify classifications completed 8/24/15.
- Revise assembly drawing CC05590 (attached) to correct item identification as pressure retaining material and CNI material reconciliation (attached) for the yoke component from ASTM to ASME classification completed 8/28/15.

(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.

Pressure seal valves provide a mechanically rigid bearing surface that captures the pressure seal ring between it and the bonnet. This prevents the upward movement of the pressure seal ring. Upward force of the bonnet (due to system pressure) is converted into a radial force on the seal ring creating a seal on the body neck inside diameter. The bearing surface is created by a retaining ring set or threaded into the body.



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When a retaining ring is used, it is held in-place by directly threading it into the body inside diameter (Code Case N-62-7 Figure 1) or capturing it with a locking ring threaded to the outside diameter of the body neck. Per the Code Case, it is grouped with the stem and the gate (wedge), i.e. flow/pressure blocking elements.

Pressure under the bonnet creates a rejection load that is resisted in shear and bending by the threaded connection. If the shear or bending stresses exceed the allowable yield strength of the material the threads could plastically deform allowing the pressure seal ring to deform and violate the pressure boundary.

There are no known instances of pressure retaining threads failing in any application – nuclear or non-nuclear.

Crane Nuclear has notified and reconciled the material and documentation for the respective customers of the three orders that have been identified.

(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 Jason Klein, Engineering Manager at (630) 226-4953 or Rosalie Nava, Director of Safety and Quality at (630) 226-4940.

Regards,

A handwritten signature in black ink, appearing to be "JK", written over a light blue horizontal line.

Jason Klein
Engineering Manager
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jklein@cranevs.com