TELEPHONE (630) 226-4900
FAX (630) 226-4646
www.cranenuclear.com

CRANE NUCLEAR

CRANE NUCLEAR • 860 REMINGTON BOULEVARD • BOLINGBROOK, ILLINOIS 60440

October 20, 2015

United States Nuclear Regulatory Commission
Washington, D.C. 20555-0001

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

Subject: Nuclear Regulatory Commission Inspection Report of Crane Nuclear, Inc. No. 99901450/2015-202, Notice of Violation and Notice of Nonconformance

Dear Mr. Roach:

The following provides the milestones and status with regards to the Notice of Violation and the Notice of Nonconformance identified in the report by the Nuclear Regulatory Commission noted above.

Notice of Violation 99901450/2015-202-01
Contrary to Part 21.21, 21.21a, and Crane Nuclear, Inc. Procedure 15-100 "10CFR21 Reporting of defects and Non-Compliance" the violation noted that Crane Nuclear failed to evaluate a deviation potentially associated with a substantial safety hazard. Specifically Crane Nuclear did not conduct an evaluation for reportability or provide notification of a deviation associated with a potential substantial safety hazard related to valve yokes fabricated from improperly classified material and known to be shipped to Browns Ferry Nuclear Plant, Edwin I. Hatch Nuclear Plant, and San Onofre Nuclear Generating Station. The violation requested a reply to address the following items:

1. Reason for Violation:
   Failure to implement the Crane Nuclear Inc. procedures, 15-100 "10CFR21 Reporting of Defects and Noncompliance" and 16-100 "Corrective Action Reports" relative to the identification and timely reporting of a misclassified integral yoke. The procedures lack of clarity or inadequate requirements relative to significant conditions adverse quality and personnel not fully understanding the requirements contained therein.

   The Part 21 Reporting procedure (15-100) while not restrictive did not clearly empower all personnel with the ability to report potential Part 21 issues while the Corrective Action Report procedure (16-100) did not emphasize significant conditions adverse to quality and therefore the level of importance for SCAQs was not clear procedurally. Though the integral yoke issue was identified as a concern by one employee the practice was to review and evaluate the issue prior to fixing the discovery date by documenting the potential 21 issues, essentially starting the clock relative to the report times defined in 21.21(a)(2).

IE09 11/5/15 Original
NRO Sunsi Complete
KO

2. Corrective Steps Taken and Results Achieved:
The initial measure to preclude recurrence of a misclassified yoke with an integral retaining ring was conducted through training performed on May 5, 2015 (see Attachment 1).

Crane Nuclear, Inc. procedure 03-107 "Classification of Valve Components" was revised (08/28/15 Rev. 5) (see Attachment 2) and training was conducted (see Attachment 3).

The three customers affected by this issue (TVA Browns Ferry PO 00031943, Georgia Power Hatch PO SNG1001657 and Southern California Edison San Onofre PO 450045641 – see Attachments 4) were notified by Crane. However Crane did not notify NRC therefore; Corrective Action Report 15-25 was issued on July 3, 2015 (see Attachment 5) to track issues associated with completing an interim report to NRC (see Attachment 6) and the subsequent research of 2511 sales order files for potential reporting applicability were reviewed and no other customers were found to be affected (see Attachment 5 page 2).

Crane Nuclear Procedure 16-100 "Corrective Action Reports" was revised (Rev. 6 dated 6/22/15) to expand on significant conditions affecting quality (SCAQ) and to improve the Crane Nuclear safety culture amending the language from QA initiating Corrective Action Reports to "The initiator of the Corrective Action Report" (see Attachment 7). Training Records were completed for this revision see Attachment 8.

Crane Nuclear Procedure 15-100 "10CFR21 Reporting of Defects and Non-Compliance" was revised (Rev. 9 dated 08/31/15) to empower every employee to identify concerns, perceived issues or significate conditions affecting quality which will allow for a documented review (see Attachment 9). Training Records were completed for this revision, see Attachment 10.

Part 21 Investigation summary letters were sent to the three affected customers (TVA Browns Ferry PO 00031943, Georgia Power Hatch PO SNG1001657 and Southern California Edison San Onofre PO 450045641 – see Attachments 11). These letters identify the results of the Crane Nuclear evaluation and provide corrected documentation.

The last of the actions were completed on September 30, 2015 with the issuance of the follow-up letters to the customers and the Commission. These final activities and the training associated with the revised procedures (15-100 and 16-100) allowed closure of CAR 15-25 (see Attachment 5).

3. Corrective steps that will be taken:
No additional steps are required as all actions have been completed.

4. Date full compliance will be achieved:
With this letter dated October 20, 2015.

Notice of Nonconformance 99901450/2015-202-02
Contrary to Criterion XVI "Corrective Action" of Appendix B and Crane Nuclear Procedure 16-100 "Corrective Action Reports" Crane failed to document conditions adverse to quality. The violation requested a reply to address the following items:

1. Reason for Noncompliance:
   Failure to implement the Crane Nuclear procedure 16-100 "Corrective Action Reports" relative to the identification and timely reporting of a misclassified integral yoke. The procedures lack of clarity or inadequate requirements relative to significant conditions adverse quality and personnel not fully understanding the requirements contained therein.

2. Corrective Steps Taken and Results Achieved
   Crane Nuclear has made efforts to change the safety culture by empowering all employees to identify defects and noncompliances through the revisions of Procedures 16-100 "Corrective Action Reports" and 15-100 "10CFR21 Reporting of Defects and Non-Compliance" (see Attachments)

   Corrective Action Report 15-25 was generated to evaluate all the issue and this Corrective Action Report is now closed (see Attachment 5).

   Corrective Action Report 15-15 was generated to evaluate all actions relative to the ASME Class 1 bolted bonnet gate valve with non-pressure retaining parts (wedge guides) welded to the body. See Attachment 12 that confirms that the classification is compliance with ASME Code requirements.

3. Corrective steps that will be taken:
   No additional steps are required as all actions have been completed.

4. Date full compliance will be achieved:
   With this letter dated October 20, 2015.

If there are any questions please feel free to contact Mr. Jason Klein Engineering Manager 630-226-4953 or Rosalie Nava at 630-226-4940.

Sincerely,

Crane Nuclear, Inc.

Rosalie Nava

Rosalie Nava
Director Safety and Quality

Enclosures: Attachments 1 - 12

ATTACHMENT NO. 1

CRANE NUCLEAR, INC.

TRAINING RECORD

DATE: 5/7/2015 INSTRUCTOR: D.B. Dwyer DURATION: 45 min

___ INDOCTRINATION x TRAINING ___ REVIEW

TOPICS: Interpreting classification of parts not overtly identified in the procedure 03-107 figures – yokes with integral threaded retaining ring bases. Addressed purpose of code vs. 03-107 and relationship between them. Discussed potential Part 21 based on misclassification of a yoke with an integral threaded hub.

CIRCULATE THRU ENGINEERS RETURN TO ME. THANKS

NAME AND TITLE (print or type)	SIGNATURE AND DATE
BEN WILLIAMS. NPD DESIGN ENGINEER	5/7/15
Ben Ciotti Senior Design Eng.	5/7/15
JASON LAMBIN LEAD ENGINEER	5/7/15
JERRY FOLKENS Sr. Design Engineer	5/7/15
SWAPNA CHILUKURI DESIGN ENGINEER	05/07/15
Mary Redmond Project Engineer	5/7/15
JAMES GOLZ PROJECT ENGINEER	5/7/15
Paul Sund Project Engineer	5/7/15
Lotfi Rast Sr. Project Eng	5/7/15
SAMSON KAY LEAD ENGINEER	5/7/15

INSTRUCTOR NAME AND TITLE (print or type below)	INSTRUCTOR SIGNATURE AND DATE (below)
D.B. DWYER, MGR OF ENG	5/7/15

Exhibit 2.3 Rev. 6

ATTACHMENT NO. 2

PAGE 1 OF 2

CRANE NUCLEAR, INC.	CNI PROCEDURE NO.: 03-107	
	REVISION 5	PAGE 1 OF 25
TITLE: Classification of Valve Components		

REVISION SUMMARY

PREPARED BY	QA REVIEW	APPROVED	EFFECTIVE DATE	REV.
Jerome A. Kurowski 03/20/01	R. Hillis 03/22/01	Lyle J. Parnell 03/22/01	03/30/01	0
Jerome A. Kurowski 04/06/01	R. Hillis 04/06/01	Lyle J. Parnell 04/09/01	04/09/01	1
R. Nava 03/18/03	R. Nava 03/18/03	Lyle J. Parnell 03/19/03	03/19/03	2
E. Bunke 04/29/09	J. Hii 04/29/09	D. Dwyer 04/30/09	04/30/09	3
C. Presz 8/14/14	R. Nava 08/14/14	D. Dwyer 08/14/14	08/15/14	4
C. Presz 8-27-15	R Nava 8/27/15	8/27/15	8/28/15	5
				6
		CONTROLLED		7
				8
				9
				10
				11
				12
				13
				14
				15

[redacted]

1.0 PURPOSE AND SCOPE

1.1 To define and classify individual component parts of valves. This procedure is to be used as the primary basis for determining the design, material, and quality assurance requirements to be used in processing orders for valve parts at Crane Nuclear, Inc. (CNI).

1.1.1 The classifications used in this procedure define the requirements for all valve parts fabricated at CNI and addresses the following safety levels:

1.1.1.1 Code, Nuclear Safety-Related, ASME Section III, Division 1, Class 1, 2 and 3
1.1.1.2 Non Code, Nuclear Safety-Related
1.1.1.3 Non Code, Non Safety-Related

1.2 Classifications shall be per this procedure unless Customer's Purchase Order(s) impose more stringent requirements. In such cases, Customer's Purchase Order requirements shall take precedence over the classification requirements contained in this procedure.

2.0 RESPONSIBILITY

2.1 The Manager of Engineering shall be responsible for the implementation of this procedure including categorizing parts not specifically identified in Code Case N-62.

2.2 The Project Engineer shall be responsible for determining the classification of valve parts in accordance with this procedure and customer contract requirements.

2.3 The Quality Assurance Engineer shall verify the classification of valve parts as determined by the Project Engineer.

3.0 REFERENCES

3.1 Crane Nuclear, Inc. (CNI) Nuclear Quality Assurance Manual (NQAM)
3.2 ASME Boiler & Pressure Vessel Code (B&PVC), Section III, Division 1 (latest edition)
3.3 ASME Boiler & Pressure Vessel Code, Code Case N-62

4.0 BACKGROUND

4.1 The ASME B&PVC, Section III, Division 1 does not directly address all aspects of valve/valve component design. The intent of this code is to assure that the pressure boundary components; i.e., body, bonnet, disc, bonnet **bolting, pressure retaining rings,** etc., are designed and fabricated with suitable safety margins. NCA-1130 specifically exempts components not associated with the pressure retaining function such as shafts, stems, trim, spray nozzles, bearings, bushings, operators, springs, wear plates, seals, packing, gaskets and seat rings from the material requirements of NX2000.

4.2 Code Case N-62 provides design guidelines for many valve components not addressed by the Code. This Code Case provides a method of classification of valve components with examples of gate, globe, check and other types of valves

5.0 DESIGN PRACTICE

5.1 Crane Nuclear, Inc. (CNI) uses Code Case N-62 as a guideline for classifying components of "Code, Nuclear Safety-Related" and "Non-Code, Nuclear Safety-Related" valves. Code Case N-62 shall also be used with other codes/standards for specifying materials, design, fabrication and NDE requirements for valves and valve components.

5.2 The Project Engineer may use higher classification of parts than required by this procedure, when, in his judgment, it is appropriate (i.e., active valve yoke and actuator mounting parts may be safety-related rather than commercial.)

CRANE NUCLEAR, INC.

TRAINING RECORD

DATE: 08/28/15 INSTRUCTOR: Self-Read DURATION: Due by: 09/25/15

___ INDOCTRINATION X TRAINING ___ REVIEW

TOPICS: 03-107 Rev. 5 Classification of Valve Components

NAME AND TITLE (print or type)	SIGNATURE AND DATE
Chilukuri, Swapna - Design Engineer	8/28/15
Ciotti, Ben - Lead Engineer	9/1/15
Dwyer, David - Engineering Manager	9/1/15
Folkens, Jerry - Lead Engineer	8/28/15
Golz, James - Project Engineer	9/1/15
Gonsoulin, LuAnn - CAD Drafter	8/31/15
Kay, Samson - Project Engineer	8-31-15
Kornijenko, John - Sr. Mech. Designer/CAD Lead	9/1/15
Lambin, Jason - Lead Engineer	8/31/15
Rasti, Lotfi - Sr. Project Engineer	08/31/15
Riegle, Joshua - CAD Drafter	09/01/15
Sund, Paul - Project Engineer	9/1/15
Williams, Ben - NPD Design Engineer	9/1/15
Durawa, Debbie - Administrative Assistant	9/3/15

INSTRUCTOR NAME AND TITLE (print or type below): Self-Read

INSTRUCTOR SIGNATURE AND DATE (below): Self-Read

Exhibit 2.3 Rev. 6

CRANE NUCLEAR, INC.

TRAINING RECORD

DATE: 08/28/15 INSTRUCTOR: Self-Read DURATION: Due by: 09/25/15

___ INDOCTRINATION X TRAINING ___ REVIEW

TOPICS: 03-107 Rev. 5 Classification of Valve Components

NAME AND TITLE (print or type)	SIGNATURE AND DATE
Brown, Antoine - Material Handler	AB 9-10-15
Dabulskis, Jim - Manufacturing Specialist	9/9/15
Hobbick, Greg - Operations Scheduler	9/2/15
Price, Chris - Operations Planner	8/28/15

INSTRUCTOR NAME AND TITLE (print or type below): Self-Read

INSTRUCTOR SIGNATURE AND DATE (below): Self-Read

Exhibit 2.3 Rev. 6

ATTACHMENT NO 3
PAGE 1 OF 3

CRANE NUCLEAR, INC.

TRAINING RECORD

DATE: 08/28/15 INSTRUCTOR: Self-Read DURATION: Due by: 09/25/15

___ INDOCTRINATION X TRAINING ___ REVIEW

TOPICS: 03-107 Rev. 5 Classification of Valve Components

NAME AND TITLE (print or type)	SIGNATURE AND DATE
Motley, Everette - QA Engineer	

INSTRUCTOR NAME AND TITLE (print or type below): Self-Read

EVERETTE MOTLEY

INSTRUCTOR SIGNATURE AND DATE (below): Self-Read

Everette Motley 8/31/15

Exhibit 2.3 Rev. 6

CRANE NUCLEAR, INC.

TRAINING RECORD

DATE: 08/28/15 INSTRUCTOR: Self-Read DURATION: Due by: 09/25/15

___ INDOCTRINATION X TRAINING ___ REVIEW

TOPICS: 03-107 Rev. 5 Classification of Valve Components

NAME AND TITLE (print or type)	SIGNATURE AND DATE
Bregovy, Jennifer - QA Engineer	Jennifer Bregovy 8/28/15

INSTRUCTOR NAME AND TITLE (print or type below): Self-Read

INSTRUCTOR SIGNATURE AND DATE (below): Self-Read

Exhibit 2.3 Rev. 6

ATTACHMENT NO. 3
PAGE 2 OF 3

CRANE NUCLEAR, INC.

TRAINING RECORD

DATE: 08/28/15 INSTRUCTOR: Self-Read DURATION: Due by: 09/25/15

___ INDOCTRINATION X TRAINING ___ REVIEW

TOPICS: 03-107 Rev. 5 Classification of Valve Components

NAME AND TITLE (print or type)	SIGNATURE AND DATE
Stear, Eric - QA Engineer	8/28/15

INSTRUCTOR NAME AND TITLE (print or type below): Self-Read

INSTRUCTOR SIGNATURE AND DATE (below): Self-Read

Exhibit 2.3 Rev. 6

CRANE NUCLEAR, INC.

TRAINING RECORD

DATE: 08/28/15 INSTRUCTOR: Self-Read DURATION: Due by: 09/25/15

___ INDOCTRINATION X TRAINING ___ REVIEW

TOPICS: 03-107 Rev. 5 Classification of Valve Components

NAME AND TITLE (print or type)	SIGNATURE AND DATE
Osbourne, Robert - QA Engineer	9/4/15

INSTRUCTOR NAME AND TITLE (print or type below): Self-Read

INSTRUCTOR SIGNATURE AND DATE (below): Self-Read

Exhibit 2.3 Rev. 6

ATTACHMENT No. 3
PAGE 3 OF 3

TELEPHONE (630) 226-4932
FAX (630) 226-4648

CRANE NUCLEAR

ATTACHMENT NO. 4

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

June 12, 2015

Edison Material Supply
14300 Mesa Road
San Clemente, CA 92672

Attention: Oversight Manager

Reference: P.O. 4500456451
CNI Sales Order 39745

Subject: 10CFR21 Notification
Yokes with Integral Pressure Retaining Hubs Used in Pressure Seal Valves

This is a letter of notification of a potential 10CFR Part 21 related to how yokes were classified during processing of valve orders.

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. The procedure classifies threaded retaining rings and retaining ring segments as N/NS for ASME Class 1, 2 and 3 valves. A yoke incorporating a threaded hub should be treated in the same manner as a threaded retaining ring and not as a yoke. Yokes with integral hubs acting as retaining rings may have been processed to the requirements of yokes which would be contrary to the intent of the classification methodology.

Based on a review of the orders identified as potentially having misclassified yokes, it was found that the above referenced order had a yoke with an integral threaded hub that was processed in a manner that conflicts with the intent of the classification methodology. The attached sheet is a more detailed summary of the issue along with the corrective action.

If you have any questions or comments, please feel free to contact me.

Regards,

Burt Anderson
Site Leader
630 226-4990
banderson@cranevs.com

ATTACHMENT NO. 4

Yokes with Integral Pressure Retaining Hubs Used in Pressure Seal Valves

Issue

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. The procedure classifies threaded retaining rings and retaining ring segments as N/NS for ASME Class 1, 2 and 3 valves. A yoke incorporating a threaded hub should be treated in the same manner as a threaded retaining ring and not as a yoke. Yokes with integral hubs acting as retaining rings may have been processed to the requirements of yokes which would be contrary to the intent of the classification methodology.

Background

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.

When a retaining ring can 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. Some designs incorporate this feature into the yoke.

Because stand-alone yokes are not pressure boundary parts, they typically have fewer requirements, e.g., NDE, ASTM vs. ASME material for Code applications, etc. than retaining rings. No figure in the procedure or Code Case explicitly addresses a yoke integral with a threaded hub.

Failure Mechanism

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 these threads failing in any application – nuclear or non-nuclear.

Identification of Potential Scope

Data in the engineering database was reviewed by model number against OEM catalog data to determine pressure seal vs. bolted bonnet designs. This information was added to the "Valve Type" field to better identify the valve type.

Only orders entered after 3/30/01 were considered. This is consistent with Procedure 03-107, Rev. 0 issue date. The database was further filtered by pressure seal valve types and the description field was filtered for valves, and yokes. This yielded the orders that involved possible yokes with integral threaded hubs. The assembly drawings for each order in the population were reviewed to determine if a yoke with an integral hub was produced.

Identification of Potentially Affected Components
Each order was reviewed against original OEM requirements and order requirements. Possible categorized by one of the following:

Met OEM requirements for a Like-for-Like order
Processed consistent with retaining ring requirements
Processed not meeting retaining requirements

Secondarily, assembly drawings were reviewed to determine how yokes with integral hubs were identified on parts lists. There will be an assembly drawing revision processed to reflect identification if required.

In addition to the above, the classification of separate retaining rings was also reviewed. No occurrence of inadequate processing was found.

Investigation Summary
Based on a review of the orders identified as potentially having misclassified yokes, it was found that the following order had a yoke with an integral threaded hub that was processed in a manner that conflicts with the intent of the classification methodology.

39745-01, (Southern California Edison, San Onofre, P.O. 4500456451) – Aloyco, 4", Figure N5247PSB, Class 900, ASME Class 3, 71 Ed., S73 Add. The yoke was supplied as A216 Gr. WCB. The yoke was processed as a safety-related, non-pressure retaining part. The procedure requires "SA" material. The code required NDE per the material spec.

Containment and Corrective Actions
Review documentation of supplied material to determine if it can be recertified as SA material.

Revise Procedure 03-107 to add figures reflecting configurations and clarify classifications.

Training held for engineers involved in classification of components. Completed 5/7/15.

Revise assembly drawings to correct item identification to be consistent with Procedure 03-107 classification.

TELEPHONE (630) 226-4932
FAX (630) 226-4648

CRANE NUCLEAR

ATTACHMENT NO 4

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

June 12, 2015

TVA Nuclear
Nuclear Assurance and Licensing
1101 Market Street
Chattanooga, TN 37402-2801

Attention: Manager, Operating Experience

Reference: P.O. 00031943
CNI Sales Order 24237

Subject: 10CFR21 Notification
Yokes with Integral Pressure Retaining Hubs Used in Pressure Seal Valves

This is a letter of notification of a potential 10CFR Part 21 related to how yokes were classified during processing of valve orders.

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. The procedure classifies threaded retaining rings and retaining ring segments as N/NS for ASME Class 1, 2 and 3 valves. A yoke incorporating a threaded hub should be treated in the same manner as a threaded retaining ring and not as a yoke. Yokes with integral hubs acting as retaining rings may have been processed to the requirements of yokes which would be contrary to the intent of the classification methodology.

Based on a review of the orders identified as potentially having misclassified yokes, it was found that the above referenced order had a yoke with an integral threaded hub that was processed in a manner that conflicts with the intent of the classification methodology. The attached sheet is a more detailed summary of the issue along with the corrective action.

If you have any questions or comments, please feel free to contact me.

Regards,

Burt Anderson
Site Leader
630 226-4990
banderson@cranevs.com

Page 1 of 3

ATTACHMENT NO. 4

Yokes with Integral Pressure Retaining Hubs Used in Pressure Seal Valves

Issue

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. The procedure classifies threaded retaining rings and retaining ring segments as N/NS for ASME Class 1, 2 and 3 valves. A yoke incorporating a threaded hub should be treated in the same manner as a threaded retaining ring and not as a yoke. Yokes with integral hubs acting as retaining rings may have been processed to the requirements of yokes which would be contrary to the intent of the classification methodology.

Background

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.

When a retaining ring can 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. Some designs incorporate this feature into the yoke.

Because stand-alone yokes are not pressure boundary parts, they typically have fewer requirements, e.g., NDE, ASTM vs. ASME material for Code applications, etc. than retaining rings. No figure in the procedure or Code Case explicitly addresses a yoke integral with a threaded hub.

Failure Mechanism

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 these threads failing in any application – nuclear or non-nuclear.

Identification of Potential Scope

Data in the engineering database was reviewed by model number against OEM catalog data to determine pressure seal vs. bolted bonnet designs. This information was added to the "Valve Type" field to better identify the valve type.

Only orders entered after 3/30/01 were considered. This is consistent with Procedure 03-107, Rev. 0 issue date. The database was further filtered by pressure seal valve types and the description field was filtered for valves, and yokes. This yielded the orders that involved possible yokes with integral threaded hubs. The assembly drawings for each order in the population were reviewed to determine if a yoke with an integral hub was produced.

ATTACHMENT NO. 4

Identification of Potentially Affected Components
Each order was reviewed against original OEM requirements and order requirements. Possible categorized by one of the following:

Met OEM requirements for a Like-for-Like order
Processed consistent with retaining ring requirements
Processed not meeting retaining requirements

Secondarily, assembly drawings were reviewed to determine how yokes with integral hubs were identified on parts lists. There will be an assembly drawing revision processed to reflect identification if required.

In addition to the above, the classification of separate retaining rings was also reviewed. No occurrence of inadequate processing was found.

Investigation Summary
Based on a review of the orders identified as potentially having misclassified yokes, it was found that the following order had a yoke with an integral threaded hub that was processed in a manner that conflicts with the intent of the classification methodology.

24237-01, (TVA, Browns Ferry, P.O. 00031943) – Chapman, 8", Figure L953, Class 900, ASME Class 2, 95 Ed., 96 Add., no N stamp. The original valve was supplied safety-related. The replacement valve supplied by this order was specified as ASME, no N stamp. Both the yoke and the locking ring are pressure retaining components but were processed as safety-related, non-pressure retaining parts. The yoke was supplied as A216 Gr. WCB. The procedure requires "SA" material. The code required the material to have RT or UT. The locking ring was supplied as A516 Gr. 70. For this material the code requires RT of weld repairs only.

Containment and Corrective Actions
Review documentation of supplied material to determine if it can be recertified as SA material.

Revise Procedure 03-107 to add figures reflecting configurations and clarify classifications.

Training held for engineers involved in classification of components. Completed 5/7/15.

Revise assembly drawings to correct item identification to be consistent with Procedure 03-107 classification.

TELEPHONE (630) 226-4932
FAX (630) 226-4648

ATTACHMENT NO 4

CRANE NUCLEAR

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

June 12, 2015

Southern Nuclear Operating Company
40 Inverness Center Place
Birmingham, AL 35242

Attention: Licensing Manager

Reference: P.O. SNG10016537
CNI Sales Order 39501

Subject: 10CFR21 Notification
Yokes with Integral Pressure Retaining Hubs Used in Pressure Seal Valves

This is a letter of notification of a potential 10CFR Part 21 related to how yokes were classified during processing of valve orders.

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. The procedure classifies threaded retaining rings and retaining ring segments as N/NS for ASME Class 1, 2 and 3 valves. A yoke incorporating a threaded hub should be treated in the same manner as a threaded retaining ring and not as a yoke. Yokes with integral hubs acting as retaining rings may have been processed to the requirements of yokes which would be contrary to the intent of the classification methodology.

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If you have any questions or comments, please feel free to contact me.

Regards,

Burt Anderson
Site Leader
630 226-4990
banderson@cranevs.com

ATTACHMENT NO.4

Yokes with Integral Pressure Retaining Hubs Used in Pressure Seal Valves

Issue

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. The procedure classifies threaded retaining rings and retaining ring segments as N/NS for ASME Class 1, 2 and 3 valves. A yoke incorporating a threaded hub should be treated in the same manner as a threaded retaining ring and not as a yoke. Yokes with integral hubs acting as retaining rings may have been processed to the requirements of yokes which would be contrary to the intent of the classification methodology.

Background

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.

When a retaining ring can 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. Some designs incorporate this feature into the yoke.

Because stand-alone yokes are not pressure boundary parts, they typically have fewer requirements, e.g., NDE, ASTM vs. ASME material for Code applications, etc. than retaining rings. No figure in the procedure or Code Case explicitly addresses a yoke integral with a threaded hub.

Failure Mechanism

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 these threads failing in any application – nuclear or non-nuclear.

Identification of Potential Scope

Data in the engineering database was reviewed by model number against OEM catalog data to determine pressure seal vs. bolted bonnet designs. This information was added to the "Valve Type" field to better identify the valve type.

Only orders entered after 3/30/01 were considered. This is consistent with Procedure 03-107, Rev. 0 issue date. The database was further filtered by pressure seal valve types and the description field was filtered for valves, and yokes. This yielded the orders that involved possible yokes with integral threaded hubs. The assembly drawings for each order in the population were reviewed to determine if a yoke with an integral hub was produced.

ATTACHMENT NO. 4

Identification of Potentially Affected Components
Each order was reviewed against original OEM requirements and order requirements. Possible categorized by one of the following:

Met OEM requirements for a Like-for-Like order
Processed consistent with retaining ring requirements
Processed not meeting retaining requirements

Secondarily, assembly drawings were reviewed to determine how yokes with integral hubs were identified on parts lists. There will be an assembly drawing revision processed to reflect identification if required.

In addition to the above, the classification of separate retaining rings was also reviewed. No occurrence of inadequate processing was found.

Investigation Summary
Based on a review of the orders identified as potentially having misclassified yokes, it was found that the following order had a yoke with an integral threaded hub that was processed in a manner that conflicts with the intent of the classification methodology.

39501-01, (Georgia Power, Hatch, P.O. SNG10016537) – Crane, 3", Figure 776U, Class 600, ASME Class 3, 71 Ed., W71 Add. The yoke was supplied as A216 Gr. WCB. The yoke was processed as a safety-related, non-pressure retaining part. The procedure requires "SA" material. The code required NDE per the material spec.

Containment and Corrective Actions
Review documentation of supplied material to determine if it can be recertified as SA material.

Revise Procedure 03-107 to add figures reflecting configurations and clarify classifications.

Training held for engineers involved in classification of components. Completed 5/7/15.

Revise assembly drawings to correct item identification to be consistent with Procedure 03-107 classification.

CRANE Nuclear, Inc.

ATTACHMENT NO. 5

ISSUED 07/03/15

CAR NO. 15-25

*Corrected 08/07/15

CORRECTIVE ACTION REPORT

DEPT. / SUPPLIER *Engineering DISCUSSED WITH K. Kelhofer-President and B. Anderson-Site Leader

PREPARED BY Rosalie Nava TITLE Director Safety and Quality AUDIT DATE N/A

REQUIREMENT / AUDIT CRITERIA (Verbatim reference to the applicable QA Manual; Procedure, and or regulatory requirement and paragraph)

10CFR21 Notification 21.21 states in part (a) Each individual, corporation, partnership, dedicating entity, or other entity subject to the regulations in this part shall adopt appropriate procedures to .... (2) Ensure that if an evaluation of an identified deviation or failure to comply potentially associated with the substantial safety hazard cannot be completed within 60 days from discovery of the deviation or failure to comply, an interim report is prepared and submitted to the Commission through a director or responsible officer or designated person as discussed in 21.21(d)(5). The interim report should describe the deviation or failure to comply that is being evaluated and should also state when the evaluation will be completed. This interim report must be submitted in writing within 60 days of discovery of the deviation or failure to comply".

FINDING / CONDITION ADVERSE TO QUALITY - Check box when the issue is considered a significant condition adverse to quality (SCAQ) ☒

Contrary to the above, Crane Nuclear Inc. notified three (3) customers of a potential 10CFR21 issue (Yokes with Integral Pressure Retaining Hubs Used in Pressure Seal Valves) and failed to provide as a minimum, an interim report to NRC.

RECOMMENDED ACTION

Complete and submit an interim report as soon as practical based on gathering and documenting the facts and expected to be delivered week of 7/6/15. Revised the procedure 15-100 Rev. 8 "10CFR21 Reporting of Defects and Non-Compliance" so that the above requirements are clarified. Document training on the procedure revision and provide all documents to NRC by 07/28/15 or sooner.

RESPONSE REQUIRED BY (NAME & TITLE): Rosalie Nava, Director Safety and Quality DATE DUE: 07/28/15

CAUSE OF THE CONDITION (Response shall address the root cause and the extent of condition when SCAQ box is checked above)

See additional Page 4 for "Cause of Condition"

CORRECTIVE ACTION TAKEN (Response shall address preventative measures when SCAQ box is checked above)

See additional Page 4 for "Containment and Corrective Actions"

ENTER COMPLETED DATE OR PROPOSED DATE(S) FOR COMPLETION See attached email from Jason Klein **

COMPLETED BY ** TITLE ** DATE ** Return to issuer with objective evidence

ACCEPTED BY Rosalie Nava TITLE Director Safety & Quality DATE 08/31/15 Identify objective evidence reviewed below

In addition to the actions on the attached pages the notification letter was sent to NRC on 08/07/15. Customers were notified and later closure letters were sent to the affected customers with revised general assembly drawings and correct design reports. Procedure 16-100 Rev. 6 Corrective Action Reports was released to clearly address Significant Conditions Adverse to Quality (SCAQ) both in the text and the CAR form.

Procedure 15-100 "10CFR21 Reporting of Defects and Non-Compliance" was revised to empower all personnel to report a potential defect (paragraph 1.4); added definitions for "Discovery", "Evaluation" and "Notification". For clarity, the definition of "Notification" now clarifies (paragraph 5.8.1) that "Part 21 notifications to affected customers shall be completed at the same time the notification is sent to the NRC".

Objective evidence include training on the revised procedures is attached.

VERIFIED BY Rosalie Nava RNava TITLE Director Safety & Quality DATE 09/30/15

☐ REJECTED DATE ☒ ACCEPTED DATE 9/30/15 RNava CLOSED ☒ CAR log updated PART 21 EVAL REQ'D YES ☒ NO ☐

CORRECTIVE ACTION REPORT

Issue

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. The procedure classifies threaded retaining rings and retaining ring segments as N/NS for ASME Class 1, 2 and 3 valves. A retaining ring should be treated in the same manner as a pressure retaining part. Yokes with integral retaining ring hubs may have been processed to requirements contrary to the intent of the classification methodology.

Background

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.

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.

Failure Mechanism

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 these threads failing in any application – nuclear or non-nuclear.

Identification of Potential Scope

Data in the engineering database was reviewed by model number against OEM catalog data to determine pressure seal vs. bolted bonnet designs. This information was added to the "Valve Type" field to better identify the valve type.

The database search was conducted 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. We identified a total of 112 orders that required review. 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 that were not within the 1992 databases. The search consisted of manually retrieving 2511 order files and reviewing the order content for pressure seal valves or parts orders.

Each order was reviewed against the original OEM requirements and order requirements. Possible categorized by one of the following:

Processed consistent with retaining ring requirements
Processed not meeting retaining requirements

The search found 55 total orders as pressure seal designs. The results did not uncover any other misclassified yokes with integral retaining ring hubs. The following chart in Figure 1 shows the decision tree for the investigation.

CORRECTIVE ACTION REPORT

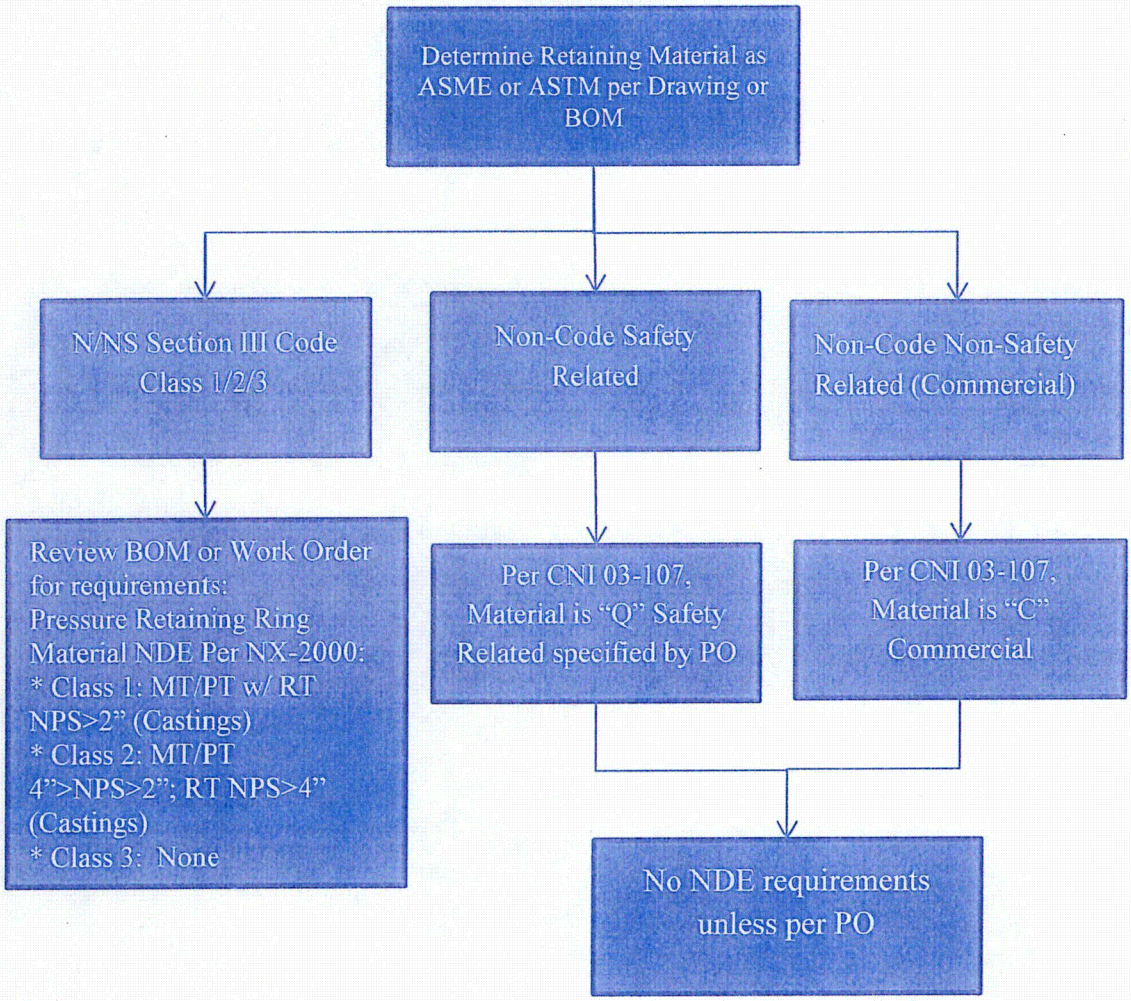

Figure 1: Decision Tree Chart for Retaining Ring Investigation

Investigation Summary
Based on a review of the orders identified as potentially having misclassified retaining rings, it was found that the following order was processed in a manner that conflicts with the design for pressure retaining material per the Code (NX-2000).

CNI Sales Order #: 24237-01
Customer: TVA, Browns Ferry
Customer P.O. 00031943
Valve Description: Chapman, 8", Figure L953, Class 900, ASME Class 2, 1995 Ed., '96 Add., no N stamp
Summary: The original valve was supplied safety-related. The replacement valve supplied by this order was specified as ASME, no N stamp. Class 2 Retaining Rings over 8" NPS are pressure retaining materials, which require additional NDE than N-62 (volumetric examination required). The components were processed as safety-related, non-pressure retaining parts. The yoke was supplied as cast ASTM A216 Gr. WCB and locking ring as ASTM A516 Gr 70 Forged. The Code Requires RT/UT cast material over 4" NPS; no volumetric NDE is required for A516 Gr 70 Forged.

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.

CORRECTIVE ACTION REPORT

CNI Sales Order #: 39501-01
Customer: Georgia Power, Hatch
Customer P.O. SNG10016537
Valve Description: Crane, 3", Figure 776U, Class 600, ASME Class 3, 71 Ed., W71 Add.
The yoke was supplied as A216 Gr. WCB. The yoke was processed as a safety-related, non-pressure retaining part. The Code requires no NDE for Class 3 components.

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

CNI Sales Order #: 39745-01
Customer: Southern California Edison, San Onofre
Customer P.O. 4500456451
Valve Description: Aloyco, 4", Figure N5247PSB, Class 900, ASME Class 3, 71 Ed., S73 Add.
The yoke was supplied as A216 Gr. WCB. The yoke was processed as a safety-related, non-pressure retaining part. The Code requires no NDE for Class 3 components.

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# 24237: The original valve was supplied safety-related. The replacement valve supplied by this order was specified as ASME, no N stamp. The yoke was misclassified without consideration of the pressure retaining portion to the Code and was not detected. The occurrence was due to reclassifying the valve from Safety Related to Code construction. The reason for the issue was lack of training to the yoke pressure retaining design feature.

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 without consideration of the pressure retaining portion to the Code 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 yoke pressure retaining design feature.

CNI SO# 39745: 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, which misclassified the Yoke without consideration of the pressure retaining portion to the Code 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 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 Procedure 03-107 to add figures reflecting configurations and clarify classifications completed 8/24/15.

Revise assembly drawings of orders impacted to correct item identification as pressure retaining material, reconcile materials from ASTM to ASME classification, and revise Design Reports (SR-270 for SO# 24237 and Reconciliation for Yoke material w/out RT, SR-331 for SO# 39501) to show correct material designation and drawing revision completed 8/27/15.

ATTACHMENT NO. 6 P. 1

* * * COMMUNICATION RESULT REPORT (AUG. 6. 2015 6:51PM) * * *

FAX HEADER:

TRANSMITTED/STORED : AUG. 6. 2015 6:50PM FILE MODE	OPTION	ADDRESS	RESULT	PAGE
312 MEMORY TX		13018165151	OK	3/3

REASON FOR ERROR
E-1) HANG UP OR LINE FAIL
E-2) BUSY
E-3) NO ANSWER
E-4) NO FACSIMILE CONNECTION

TELEPHONE (630) 226-4900
FAX (630)226-4646
www.cranenuclear.com

CRANE NUCLEAR

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

Date: August 6, 2015

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

Subject: 10 CFR Part 21 Investigation Report
Notification of Pressure Seal Valve Yoke Material Compliance

Dear Sir or Madam:

This letter provides interim notification of Crane Nuclear's 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
Sustaining 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.

Crane Nuclear
860 Remington Blvd
Bolingbrook, IL 60440

(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.

PAGE 1 OF 4

ATTACHMENT NO. 6

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FAX (630)226-4646
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(i) Name and address of the individual or individuals informing the Commission.

Jason Klein
Sustaining 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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860 Remington Blvd
Bolingbrook, IL 60440

(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.

PAGE 2 OF 4

ATTACHMENT NO 6

TELEPHONE (630) 226-4900
FAX (630)226-4646
www.cranenuclear.com

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

Crane Nuclear "Classification of Valve Parts", Procedure 03-107, provides guidance for appropriate material and NDE requirements for processing valve and valve part orders. The procedure is based on the ASME Code Case N-62, which is ASME B&PV Section III, 2015 Edition, Non-Mandatory Appendix HH "Rules for Valve Internal and External Items".

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.

Crane Nuclear has completed the sales orders search of the ASME Section III Code Pressure Seal Valve designs with retaining rings from 1992 to present. We identified a total of 112 orders that required review. Of these orders, three orders were supplied with non-compliant retaining ring material for the valve assemblies. The three 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.

Crane Nuclear is currently investigating sales orders from 1968 to 1992. We require an additional 30-60 days to complete our review.

(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.

Corrective action being taken by Crane Nuclear is to review documentation of the supplied material on the affected orders to determine if the yokes can be recertified as currently supplied, amend Crane Nuclear Procedure 03-107 to add figures reflecting configurations and clarify classifications, and train Engineering personnel by August 24, 2015.

PAGE 3 OF 4

ATTACHMENT NO. 6

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FAX (630)226-4646
www.cranenuclear.com

CRANE NUCLEAR

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

(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 has notified the respective customers for the four orders that have been identified to date. Crane will notify the respective customers for any additional orders that are 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, Sustaining Engineering Manager at (630) 226-4953 or Rosalie Nava, Director of Safety and Quality at (630) 226-4940.

Regards,

Jason Klein

PAGE 4 OF 4

ATTACHMENT NO. 7

CRANE NUCLEAR, INC.	CNI PROCEDURE NO.: 16-100	
	REVISION 6	PAGE 1 OF 7
TITLE: Corrective Action Reports		

REVISION SUMMARY

PREPARED BY	QA REVIEW	APPROVAL	EFFECTIVE DATE	REV.
R. Hillis 05/30/96	J.A. Kurowski 05/30/96	L.J. Parnell 05/30/96	05/31/96	0
G. Petrovich 09/11/96	J.A. Kurowski 09/11/96	L.J. Parnell 09/11/96	09/11/96	1
J.A. Kurowski 07/24/97	R. Hillis 07/25/97	G. Hillis 07/25/97	07/25/97	2
J.A. Kurowski 01/28/00	R. Hillis 01/28/00	L.J. Parnell 02/10/00	02/22/00	3
R. Nava 07/01/10	R. Nava 07/01/10	D. Dwyer 07/01/10	07/06/10	4
R. Nava 07/27/12	R. Nava 07/27/12	D. Dwyer 07/27/12	07/27/12	5
C. Bressy 06-19-15	J. Pellegrini 06/19/15	R Nava 6/22/15	06/22/15	6
				7
	UNCONTROLLED			8
				9
				10
				11
				12
				13
				14
				15

ATTACHMENT NO. 7

1.0 PURPOSE AND SCOPE

1.1 To establish a written set of guidelines covering the generation, control, interface and activities necessary to process Corrective Action Reports (CAR).

1.2 To provide written instructions that will ensure that conditions adverse to quality are promptly identified, and corrected with follow-up to verify implementation of corrective action.

1.3 To document, preclude repetition and report to appropriate levels of management, the condition, corrective action, root cause **and extent of condition for any significant conditions adverse to quality (SCAQ).**

2.0 RESPONSIBILITY

2.1 The Director Safety and Quality, QA Engineer, Lead Auditor or other qualified individual shall be responsible for the identification of conditions adverse to quality which include, but are not limited to, the following:

2.1.1 Deficiencies relating to the QA Program and its implementation
2.1.2 Adverse quality trends (both supplier and in-house)
2.1.3 Audit findings (internal and external)
2.1.4 When required by a deficiency report

3.0 REFERENCES

3.1 CRANE Nuclear, Inc. (CNI) Nuclear Quality Assurance Manual (NQAM)
3.2 Crane Nuclear, Inc. Procedure 15-100 "10CFR21 Reporting of Defects and Non-compliance"
3.3 **Crane Nuclear, Inc. Procedure CCP-1 "Customer Complaint Procedure"**
3.4 **10CFR50 Appendix B Criterion XVI**
3.5 **ASME Boiler & Pressure Vessel Code, reference NCA-3859.2 (latest code edition)**
3.6 **ASME Boiler & Pressure Vessel Code, reference NCA-4134.16 (latest code edition)**
3.7 **NQA-1 Basic Requirement 16 (latest code edition)**

4.0 PROCEDURE

4.1 Deficiencies relating to the QA Program and its implementation, internal or external audit findings, and discrepant activities determined from deficiency reports needing corrective action will be documented on the Corrective Action Report Form (Exhibit 16.1).

4.2 The **initiator of the** Corrective Action Report (CAR) **shall identify the condition adverse to quality, and when the issue is considered a significant condition adverse to quality (SCAQ) the box on the CAR form shall be checked. An item shall be considered a significant condition adverse to quality when:**

4.2.1 **Other customers may be affected and an extent of condition is required.**

4.2.2 **May affect the integrity of the reactor coolant pressure boundary.**

4.2.3 **May affect the capability to shut down the reactor and maintain it in a safe shutdown condition.**

4.2.4 **May affect the capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures.**

ATTACHMENT NO. 7

4.7.1.1 The Director Safety and Quality shall review all potential Part 21 notifications in accordance with Procedure 15-100 "10CFR21 Reporting of Defects and Non-Compliance".

4.7.2 If the response to the CAR is found complete, acceptable, and the implemented corrective action has been verified the CAR can be closed. The QA Engineer or Lead Auditor will describe the objective evidence and or the implemented corrective action that was verified at the bottom of the form and shall sign and date. **A password protected electronic signature is also acceptable for use.**

4.7.2.1 If the implementation of the corrective action taken cannot be verified within the thirty days, restrictions or other steps shall be taken to prevent recurrence of the deficiency until such time that it can be verified. A re-audit is not necessary if adequate objective evidence of implemented corrective action is provided and is deemed acceptable.

4.8 Upon closure of the CAR the Corrective Action Report Log shall be updated and the following action shall be taken.

4.8.1 A copy of the closed CAR shall be filed in the corrective action closed file/binder.

4.8.2 When a CAR affects a specific sales order, a copy shall be included in the sales order file.

4.8.3 When the CAR was written to identify and track an audit finding the original closed CAR shall be file with the audit report with a copy of the close CAR being filed in the corrective action closed file/binder.

4.9 The Director Safety and Quality shall review Corrective Action Reports annually for the identification of any trends adverse to quality. This annual review will be completed for the previous 12 months. The trend analysis shall be documented and forwarded to the Site Leader and President for their review.

4.10 All Corrective Action Reports will be available to the Authorized Nuclear Inspector upon request, or during his audit or monitoring activities.

5.0 RECORDS

5.1 **The current controlled revision of the forms for this procedure can be located on the LAN at the following location T:\PUBLIC\FORMS. The current controlled revision of the form and the controlled revision of this procedure shall be identified on the "Procedure-Manual-Form Index" which can be located on the LAN at T:\PUBLIC\Procedure-Manual-Form Index.**

5.2 Records identified herein shall be maintained in accordance with Section 17 of the NQAM **and Procedure 17-100 "Record Retention Procedure".**

ATTACHMENT NO. 7

Corrective Action Report Log
(Exhibit 16.2)

CRANE

20XX CORRECTIVE ACTION REPORTS LOG

CAR#	DESCRIPTION	BY	SUPPLIER/ CNI DEPT.	ISSUED DATE	DUE DATE	PROPOSED / EXTENSION DATE	2ND REQUEST	DUE DATE	FOLLOW-UP	CLOSED DATE

Exhibit 15.2 Rev. 2

CRANE NUCLEAR, INC.

Due By: 09/11/15

TRAINING RECORD

DATE: 09/03/15 INSTRUCTOR: Self-Read DURATION: Self-Read

___ INDOCTRINATION X TRAINING ___ REVIEW

TOPICS: 16-100 Rev. 6 Corrective Action Reports

NAME AND TITLE (print or type)	SIGNATURE AND DATE
Nava, Rosalie - Director Safety and Quality	Rosalie Nava 09/0 09/15/15 RN

INSTRUCTOR NAME AND TITLE (print or type below)	INSTRUCTOR SIGNATURE AND DATE (below)
Self-Read	Self-Read

Exhibit 2.3 Rev. 6

CRANE NUCLEAR, INC.

TRAINING RECORD

DATE: 06/23/15 INSTRUCTOR: Self-Read DURATION: Due by: 07/23/15

___ INDOCTRINATION X TRAINING ___ REVIEW

TOPICS: 16-100 Rev. 6 Corrective Action Reports

NAME AND TITLE (print or type)	SIGNATURE AND DATE
Bregovy, Jennifer - Quality Assurance Engineer	Jennifer Bregovy 8/4/15

INSTRUCTOR NAME AND TITLE (print or type below)	INSTRUCTOR SIGNATURE AND DATE (below)
Self-Read	Self-Read

Exhibit 2.3 Rev. 6

ATTACHMENT NO. 8

CRANE NUCLEAR, INC.

TRAINING RECORD

DATE: 06/23/15 INSTRUCTOR: Self-Read DURATION: Due by: 07/23/15

___ INDOCTRINATION X TRAINING ___ REVIEW

TOPICS: 16-100 Rev. 6 Corrective Action Reports

NAME AND TITLE (print or type)	SIGNATURE AND DATE
Nelsen, Chris - Manufacturing Manager	CDN 7/8/15

INSTRUCTOR NAME AND TITLE (print or type below)	INSTRUCTOR SIGNATURE AND DATE (below)
Self-Read	Self-Read

Exhibit 2.3 Rev. 6

CRANE NUCLEAR, INC.

Due By: 09/11/15

TRAINING RECORD

DATE: 09/03/15 INSTRUCTOR: Self-Read DURATION: Self-Read

___ INDOCTRINATION X TRAINING ___ REVIEW

TOPICS: 16-100 Rev. 6 Corrective Action Reports

NAME AND TITLE (print or type)	SIGNATURE AND DATE
Klein, Jason - Engineering Manager	JKL 9/7/15

INSTRUCTOR NAME AND TITLE (print or type below)	INSTRUCTOR SIGNATURE AND DATE (below)
Self-Read	Self-Read

Exhibit 2.3 Rev. 6

Attachment No. 8

CRANE NUCLEAR, INC.

TRAINING RECORD

DATE: 06/23/15 INSTRUCTOR: Self-Read DURATION: Due by: 07/23/15

___ INDOCTRINATION X TRAINING ___ REVIEW

TOPICS: 16-100 Rev. 6 Corrective Action Reports

NAME AND TITLE (print or type)	SIGNATURE AND DATE
Scallate, Rick - QC Inspector/ Cell Leader	7-8-15

INSTRUCTOR NAME AND TITLE (print or type below)	INSTRUCTOR SIGNATURE AND DATE (below)
Self-Read	Self-Read

Exhibit 2.3 Rev. 6

CRANE NUCLEAR, INC.

Due By: 09/11/15

TRAINING RECORD

DATE: 09/03/15 INSTRUCTOR: Self-Read DURATION: Self-Read

___ INDOCTRINATION X TRAINING ___ REVIEW

TOPICS: 16-100 Rev. 6 Corrective Action Reports

NAME AND TITLE (print or type)	SIGNATURE AND DATE
Fangman, Matt - Business Line Manager	9/10/15

INSTRUCTOR NAME AND TITLE (print or type below)	INSTRUCTOR SIGNATURE AND DATE (below)
Self-Read	Self-Read

Exhibit 2.3 Rev. 6

ATTACHMENT No 8

ATTACHMENT NO 9

CRANE NUCLEAR, INC.	CNI PROCEDURE NO.: 15-100	
	REVISION 9	PAGE 1 OF 7
TITLE: 10CFR21 Reporting of Defects and Non-Compliance		

REVISION SUMMARY

PREPARED BY:	QA REVIEW	APPROVED	EFFECTIVE DATE	REV.
V. Pauperas 01/10/86	D. A. Bowers 01/10/86	J.C. Quinn 01/10/86	01/10/86	0
D. Risberg 09/15/92	R.F. Hornyak 09/19/92	B.W. Harry 10/02/92	10/05/92	1
R. Eisenhower 08/20/93	R.F. Hornyak 10/19/93	B.W. Harry 08/21/93	10/29/93	2
J. A. Kurowski 09/26/96	R. Hillis 09/26/96	L.J. Parnell 09/26/96	09/26/96	3
R. Hillis 05/04/99	R. Hillis 05/04/99	L.J. Parnell 05/05/99	05/06/99	4
J. A. Kurowski 05/02/00	R. Hillis 05/02/00	L. J. Parnell 05/02/00	05/02/00	5
R. Hillis 04/08/02	R. Hillis 04/08/02	L. J. Parnell 04/08/02	04/08/02	6
R. Nava 04/28/06	R. Nava 04/28/06	D. Dwyer 04/28/06	04/28/06	7
R. Nava 05/11/12	R. Nava 05/11/12	D. Dwyer 05/14/12	06/14/12	8
RNava 8/27/15	RNava 8/27/15	8-28-15	8-31-15	9
				10
	UNCONTROLLED			11
				12
				13
				14
				15

ATTACHMENT NO. 9

1.0 PURPOSE AND SCOPE

1.1 To establish the requirements for the evaluation of a potential defect or deviation, notification, reporting, and failure to comply on a basic (safety-related) component, or part thereof that affects their safety function.

1.2 **To establish a procedure and requirements for the implementation of Section 206 of the Energy Reorganization Act of 1974. Any individual director or responsible officer of a firm constructing, owning, operating or supplying the components of any facility or activity which is licensed or otherwise regulated pursuant to the Atomic Energy Act of 1954, as amended or the Energy Reorganization Act of 1974, who obtains information reasonably indicating: (a) that the facility, activity or basic component supplied to such a facility or activity fails to comply with the Atomic Energy Act of 1974, as amended, or any applicable rule, regulation, order, or license of the Commission (US NRC) relating to substantial safety hazard, to immediately notify the Commission of such failure to comply or such defect, unless he has actual knowledge that the Commission has been adequately informed of such defect or failure to comply.**

1.3 **The procedure applies to each individual (employee), corporation, partnership, or other entity doing business within the United States, and each director and responsible officer of such an organization, that constructs or supplies basic components for a facility or activity licensed, other than for export under Title 10 of the Code of Federal Regulations Part 50 Appendix B (10CFR50 App. B).**

1.4 **Every employee of Crane Nuclear Inc. is empowered to generate a Corrective Action Report (Form 16.1) in accordance with procedure 16-100 "Corrective Action Reports" when they have a concern that there may be a significant condition adverse to quality.**

1.5 **During the review of Deficiency Reports (Form 15.1) in accordance with procedure 15-104 "Deficiency Report Control" the item identified shall be reviewed to determine if the deficiency is a significant condition adverse to quality and when so defined a Corrective Action Report shall be generated in accordance with procedure 16-100 "Corrective Action Reports".**

2.0 RESPONSIBILITY

2.1 Employees shall report any potential defects, deviations, or failures to comply on a basic (safety-related) component or part thereof that affects their safety function to their immediate supervisor.

2.2 The Manager of Engineering and the Director Safety and Quality shall review reported incidents to determine further processing in accordance with this procedure.

2.3 The Purchasing Specialist shall communicate the applicability of 10CFR21 to suppliers in Purchase Orders where applicable.

2.4 The Director Safety and Quality shall ensure that all potential defects, deviations, notifications, reports, and or failures to comply on a basic (safety-related) component, or part thereof that affects their safety function shall be reviewed and reported as necessary in accordance with this procedure.

2.5 Contracts / Inside Sales shall document all customer complaints in accordance with procedure CCP-1 "Customer Complaint Procedure" for review to determine if the issue is a potential Part 21. **Contracts Administration shall notify the customer in writing of any Part 21 notifications and shall file a copy into the applicable Sales Order file.**

5.4.1 The installation, use or operation of a basic component containing a defect as defined in 10CFR21; or

5.4.2 A deviation on the basis of an evaluation, create a substantial safety hazard and the item or service has been offered to the purchaser for acceptance; or

5.4.3 A condition or circumstance involving a basic component that could contribute to the exceeding of a safety limit, as defined in the technical specifications.

5.5 Deviation - means a departure from the technical requirements included in a procurement document, **a standard design certification or standard design approval.**

5.6 **Discovery – means the completion of the documentation first identifying the existence of a deviation or failure to comply potentially associated with a substantial safety hazard within the evaluation in accordance with 10CFR21 paragraph 21.21(a).**

5.7 **Evaluation – means the process of determining whether a particular deviation could create a substantial hazard or determining whether a failure to comply is associated with a substantial safety hazard.**

5.8 **Notification – means the telephonic communication to the NRC Operations Center or written transmittal of information to the NRC Document Control Desk.**

5.8.1 Part 21 notifications to affected customers shall be completed at the same time the notification is sent to the NRC.

5.9 **Substantial safety hazard means a loss of safety function to the extent that there is a major reduction in the degree of protection provided to public health and safety for any facility or activity licensed or otherwise approved or regulated by the NRC, other than for export.**

5.9.1 Customers outside the U.S. will be notified when their purchase order defines the items as safety related.

6.0 PROCEDURE

6.1 It is the responsibility of each employee to immediately report to the Director Safety and Quality, any known defects, deviations, failures to comply and those potential issues which need a review to determine any if the item is in needing of reporting.

6.2 The Director Safety and Quality shall record any potential reportable notifications and reported notifications in the 10CFR21 Log (Exhibit 15-100.1).

6.3 The President and the Site Leader shall immediately be made aware of any potential reportable notifications.

6.4 CNI purchase orders for safety related items and services shall include a statement that the requirements of 10CFR Part 21 apply.

6.5 If CNI determines that it does not have the capability to perform the evaluation to determine if a defect exists then CNI shall inform the purchasers or affected licensees within five (5) working days.

6.6 The Manager of Engineering and the Director Safety and Quality shall evaluate any deviations and failures to comply to identify defects and failures to comply associated with substantial safety hazards as soon as practical, and in all cases, within sixty (60) days of discovery.

ATTACHMENT NO. 9

10CFR Part 21 Log
(Exhibit 15-100.1)

CRANE

CRANE Nuclear, Inc. **10CFR PART 21 LOG** Page 1 of 1

DISCOVERY DATE: _____ SALES ORDER _____ REPORT REQUIRED: ☐ YES ☐ NO

DATE	ACTIVITY / ACTION

Exhibit 15-100.1 Rev. 2

CRANE NUCLEAR, INC.

Due By: 09/30/15

TRAINING RECORD

DATE: 08/31/15 INSTRUCTOR: Self-Read DURATION: Self-Read

___ INDOCTRINATION X TRAINING ___ REVIEW

TOPICS: 15-100 Rev. 9 10CFR21 Reporting of Defects and Noncompliance

- Added Part 21 definitions
- All employees empowered to identify significant conditions adverse to quality (SCAQ) – see paragraph 1.4
- Tied the Deficiency Report (DR) evaluation process relative to SCAQs with 16-100 "Corrective Action Reports" and 10CFR Part 21 evaluation. Paragraph 1.5.
- Clarified that Contracts Administration shall make any notifications on any Part 21s to the customer. See paragraph 2.5
- Items dedicated in accordance with procedure DED-4 "Dedication of Commercial Material, Items & Calibration Services for Safety Related Applications" also apply to this procedure. Paragraph 3.2

NAME AND TITLE (print or type)	SIGNATURE AND DATE
Nava, Rosalie - Director Safety and Quality	Rosalie Nava 8/31/15

INSTRUCTOR NAME AND TITLE (print or type below)	INSTRUCTOR SIGNATURE AND DATE (below)
Self-Read	Self-Read

Exhibit 2.3 Rev. 6

CRANE NUCLEAR, INC.

Due By: 09/30/15

TRAINING RECORD

DATE: 08/31/15 INSTRUCTOR: Self-Read DURATION: Self-Read

___ INDOCTRINATION X TRAINING ___ REVIEW

TOPICS: 15-100 Rev. 9 10CFR21 Reporting of Defects and Noncompliance

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- Tied the Deficiency Report (DR) evaluation process relative to SCAQs with 16-100 "Corrective Action Reports" and 10CFR Part 21 evaluation. Paragraph 1.5.
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NAME AND TITLE (print or type)	SIGNATURE AND DATE
Bregovy, Jennifer - QA Engineer	Jennifer Bregovy

INSTRUCTOR NAME AND TITLE (print or type below)	INSTRUCTOR SIGNATURE AND DATE (below)
Self-Read	Self-Read

Exhibit 2.3 Rev. 6

Attachment No. 10

CRANE NUCLEAR, INC.

Due By: 09/30/15

TRAINING RECORD

DATE: 08/31/15 INSTRUCTOR: Self-Read DURATION: Self-Read

___ INDOCTRINATION _X_ TRAINING ___ REVIEW

TOPICS: 15-100 Rev. 9 10CFR21 Reporting of Defects and Noncompliance

- Added Part 21 definitions
- All employees empowered to identify significant conditions adverse to quality (SCAQ) – see paragraph 1.4
- Tied the Deficiency Report (DR) evaluation process relative to SCAQs with 16-100 "Corrective Action Reports" and 10CFR Part 21 evaluation. Paragraph 1.5.
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NAME AND TITLE (print or type)	SIGNATURE AND DATE
Stear, Eric - QA Engineer	9/21/15

INSTRUCTOR NAME AND TITLE (print or type below): Self-Read

INSTRUCTOR SIGNATURE AND DATE (below): Self-Read

Exhibit 2.3 Rev. 6

CRANE NUCLEAR, INC.

Due By: 09/30/15

TRAINING RECORD

DATE: 08/31/15 INSTRUCTOR: Self-Read DURATION: Self-Read

___ INDOCTRINATION _X_ TRAINING ___ REVIEW

TOPICS: 15-100 Rev. 9 10CFR21 Reporting of Defects and Noncompliance

- Added Part 21 definitions
- All employees empowered to identify significant conditions adverse to quality (SCAQ) – see paragraph 1.4
- Tied the Deficiency Report (DR) evaluation process relative to SCAQs with 16-100 "Corrective Action Reports" and 10CFR Part 21 evaluation. Paragraph 1.5.
- Clarified that Contracts Administration shall make any notifications on any Part 21s to the customer. See paragraph 2.5
- Items dedicated in accordance with procedure DED-4 "Dedication of Commercial Material, Items & Calibration Services for Safety Related Applications" also apply to this procedure. Paragraph 3.2

NAME AND TITLE (print or type)	SIGNATURE AND DATE
Osbourne, Robert - QA Engineer	8/31/15

INSTRUCTOR NAME AND TITLE (print or type below): Self-Read

INSTRUCTOR SIGNATURE AND DATE (below): Self-Read

Exhibit 2.3 Rev. 6

ATTACHMENT NO 10

CRANE NUCLEAR, INC.

Due By: 09/30/15

TRAINING RECORD

DATE: 08/31/15 INSTRUCTOR: Self-Read DURATION: Self-Read

___ INDOCTRINATION X TRAINING ___ REVIEW

TOPICS: 15-100 Rev. 9 10CFR21 Reporting of Defects and Noncompliance

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- Tied the Deficiency Report (DR) evaluation process relative to SCAQs with 16-100 "Corrective Action Reports" and 10CFR Part 21 evaluation. Paragraph 1.5.
- Clarified that Contracts Administration shall make any notifications on any Part 21s to the customer. See paragraph 2.5
- Items dedicated in accordance with procedure DED-4 "Dedication of Commercial Material, Items & Calibration Services for Safety Related Applications" also apply to this procedure. Paragraph 3.2

NAME AND TITLE (print or type)	SIGNATURE AND DATE
Chilukuri, Swapna - Design Engineer	9/8/15
Ciotti, Ben - Lead Engineer	9/4/15
Dwyer, David - Engineering Manager	9/2/15
Folkens, Jerry - Lead Engineer	9/4/15
Golz, James - Project Engineer	9/4/15
Gonsoulin, LuAnn - CAD Drafter	9/2/15
Kay, Samson - Project Engineer	9/8/15
Kornijenko, John - Sr. Mech. Designer/CAD Lead	9-2-15
Lambin, Jason - Lead Engineer	9/4/15
Rasti, Lotfi - Sr. Project Engineer	9/8/15
Riegle, Joshua - CAD Drafter	09/02/15
Sund, Paul - Project Engineer	09/04/15
Williams, Ben - NPD Design Engineer	09/04/15
Durawa, Debbie - Administrative Assistant	9/8/15

INSTRUCTOR NAME AND TITLE (print or type below): Self-Read

INSTRUCTOR SIGNATURE AND DATE (below): Self-Read

Exhibit 2.3 Rev. 6

CRANE NUCLEAR, INC.

Due By: 09/30/15

TRAINING RECORD

DATE: 08/31/15 INSTRUCTOR: Self-Read DURATION: Self-Read

___ INDOCTRINATION X TRAINING ___ REVIEW

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- Clarified that Contracts Administration shall make any notifications on any Part 21s to the customer. See paragraph 2.5
- Items dedicated in accordance with procedure DED-4 "Dedication of Commercial Material, Items & Calibration Services for Safety Related Applications" also apply to this procedure. Paragraph 3.2

NAME AND TITLE (print or type)	SIGNATURE AND DATE
Brown, Antoine - Material Handler	9-15-15
Dabulskis, Jim - Manufacturing Specialist	9/14/15
Hobbick, Greg - Operations Scheduler	9/15/15
Price, Chris - Operations Planner	9-15-15
Studnicki, Adam - Manuf. Specialist (CNC Tooling/PRG	9-21-15
Sanchez, Jose - CNC Programmer	9-14-15

INSTRUCTOR NAME AND TITLE (print or type below): Self-Read

INSTRUCTOR SIGNATURE AND DATE (below): Self-Read

Exhibit 2.3 Rev. 6

ATTACHMENT NO. 10

TELEPHONE (630) 226-4932
FAX (630) 226-4648

CRANE NUCLEAR

ATTACHMENT NO. 11

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

August 31, 2015

TVA Nuclear
Nuclear Assurance and Licensing
1101 Market Street
Chattanooga, TN 37402-2801

Attention: Manager, Operating Experience

Reference: P.O. 00031943
CNI Sales Order 24237

Subject: 10CFR21 Investigation Summary and Deliverables
Yokes with integral Retaining Ring Hubs Used in Pressure Seal Valves

This is a letter close out the 10CFR Part 21 investigation related to pressure retaining rings classified during processing of valve orders.

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. The procedure classifies threaded retaining rings and retaining ring segments as N/NS for ASME Class 1, 2 and 3 valves. A retaining ring should be processed in the same manner as a pressure retaining part. Retaining rings may have been processed to requirements contrary to the intent of the classification methodology.

Investigation Summary
Based on a review of the orders identified as potentially having misclassified yokes with integral retaining ring hubs, it was found that the following order was processed in a manner that conflicts with the design for pressure retaining material per the Code (NX-2000).

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

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.

ATTACHMENT No. 11

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.

If you have any questions or comments, please feel free to contact me.

Regards,

Jason Klein
Engineering Manager
630 226-4953
jklein@cranevs.com

CRANE NUCLEAR

Telephone: 630-226-4900
Fax: 630-226-4646

ATTACHMENT NO 11

CRANE Nuclear, Inc. 860 REMINGTON BOULEVARD BOLINGBROOK, ILLINOIS 60440

DOCUMENT SUBMITTAL & APPROVAL FORM

TO: Georgia Power Co.
Hatch Electric Generating Plant
11028 Hatch Parkway North
Baxley, GA 31513

CUST. P.O.: SNG10016537

ATTN: Sharon Johnson

CNI ORDER: 39501

SUBMITTED BY: John Visser

DATE: September 2, 2015

The following document(s) are being submitted for your:

1. Approval 2. Information 3. Reference 4. Other: _____

ITEM	DOCUMENT NUMBER OR DESCRIPTION	REVISION	SUBMITTAL TYPE (ABOVE)	STATUS (BELOW)	REMARKS
001	CC05546	C	1		Assembly Drawing
002	SR-331	1	1		Seismic/Weaklink Report
003	Material Reconciliation	8/12/15	1		Yoke

For approvals, in order for work to continue, ***please review and return this submittal form to us with an authorized signature*** (by fax or mail) indicating which status listed below applies.

1 - Approved, work may proceed.
2 - Revise and resubmit. Work may proceed subject to resolution of indicated remarks.
3 - Revise and resubmit. Work may not proceed

Customer _____ Phone: _____ Date: _____

TELEPHONE (630) 226-4932
FAX (630) 226-4648

ATTACHMENT NO. 11

CRANE NUCLEAR

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

August 31, 2015

Edison Material Supply
14300 Mesa Road
San Clemente, CA 92672

Attention: Oversight Manager

Reference: P.O. 4500456451
CNI Sales Order 39745

Subject: 10CFR21 Investigation Summary and Deliverables
Yokes with integral Retaining Ring Hubs Used in Pressure Seal Valves

This is a letter close out the 10CFR Part 21 investigation related to pressure retaining rings classified during processing of valve orders.

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. The procedure classifies threaded retaining rings and retaining ring segments as N/NS for ASME Class 1, 2 and 3 valves. A retaining ring should be processed in the same manner as a pressure retaining part. Retaining rings may have been processed to requirements contrary to the intent of the classification methodology.

Investigation Summary
Based on a review of the orders identified as potentially having misclassified yokes with integral retaining ring hubs, it was found that the following order was processed in a manner that conflicts with the design for pressure retaining material per the Code (NX-2000).

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 yoke pressure retaining design feature.

ATTACHMENT NO. 11

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.

If you have any questions or comments, please feel free to contact me.

Regards,

Jason Klein
Engineering Manager
630 226-4953
jklein@cranevs.com

ATTACHMENT NO. 12

CRANE Nuclear, Inc.

PAGE 1 OF 1
ISSUED 6/30/2015
CAR NO. 15-15

CORRECTIVE ACTION REPORT

DEPT. / SUPPLIER Engineering DISCUSSED WITH

PREPARED BY Ben Ciotti TITLE Sr. Design Engineer AUDIT DATE N/A

REQUIREMENT / AUDIT CRITERIA (Verbatim reference to the applicable QA Manual; Procedure, and or regulatory requirement and paragraph)

Citing the 1989 Edition of ASME Section III, NB-2121 "Pressure retaining material and material welded thereto, except as permitted in NB-4435.....shall conform to the requirements of one of the specifications for material given in Tables I-1.0 and to all of the requirements of this article which apply to the product form in which the material is used."

FINDING / CONDITION ADVERSE TO QUALITY - Check box when the issue is considered a significant condition adverse to quality (SCAQ) ☒

SO #43768-01 is an ASME Class 1 valve with non-pressure retaining parts (wedge guides) welded to the pressure retaining valve body. Contrary to the requirement of NB-2121, the wedge guide (Item #12 on Assembly Drawing CD06683 Rev. E) was not made of material conforming to the requirements of ASME Tables I-1.0, nor did it meet the additional NDE requirements set forth in NB-2000 for the product form.

In short, the wedge guide material should have been SA-182 Gr. F316L rather than A-182 Gr. F316L.

RECOMMENDED ACTION

An extent of condition should be performed to identify any other Class 1 valves with the same oversight. Corrective actions should be initiated to bring the affected valves into compliance with applicable ASME requirements.

RESPONSE REQUIRED BY (NAME & TITLE): Jason Klein, Manager of Engineering DATE DUE: 7/15/15

CAUSE OF THE CONDITION (Response shall address the root cause and the extent of condition when SCAQ box is checked above)

CITED REQUIREMENT NEED NOT BE MET. SEE ATTACHED ASSESSMENT. CONDITION IS A NON-ISSUE AND IS NOT A SCAQ.

CORRECTIVE ACTION TAKEN (Response shall address preventative measures when SCAQ box is checked above)

NO ACTION REQUIRED. BEYOND ASSESSMENT (ATTACHED)

ENTER COMPLETED DATE OR PROPOSED DATE(S) FOR COMPLETION 7/8/15

COMPLETED BY D. B. Dwyer TITLE MGR OF ENG DATE 7/8/15 Return to issuer with objective evidence

ACCEPTED BY Eric T. Stear TITLE Quality Assurance Engr. DATE 07/15/15 Identify objective evidence reviewed below

The attached "CAR 15-15 Assessment" as defined by David Dwyer and its sub-attachments clearly define that the requirements of ASME Section III, 1989 Edition, No Addenda have been met. Procedure 03-107 rev. 4 is in place to prevent any instance of the defined action finding condition adverse to quality occurring again.

VERIFIED BY E.T.S. TITLE QAE DATE 07/15/15

☐ REJECTED DATE ☒ ACCEPTED DATE CLOSED ☒ CAR log updated PART 21 EVAL REQ'D YES ☐ NO ☒

Exhibit 16.1 Rev. 10

ATTACHMENT No. 12

CAR 15-15 Assessment

Requirement as identified in CAR:

Citing the 1989 Edition of ASME Section III, NB-2121 "Pressure retaining material and material welded thereto, except as permitted in NB-4435.....shall conform to the requirements of one of the specifications for material given in Tables I-1.0 and to all of the requirements of this article which apply to the product form in which the material is used"

The exception to the above is permitted provided the requirements of the four Subparagraphs, (a) through (d) of Paragraph NB-4435 (Nonstructural Attachments) are met. In addition, the requirements of Article NB-2000 do not apply to material for items not associated with the pressure retaining function of the component (Ref. NB-2121 (b)).

The guides are joined to the body with longitudinal welds. Both the top and bottom portions of the perimeter are not welded thus exposing all surfaces to system pressure. Also with the valve in the closed position, the wedge is held between the seats and the guides are not loaded. The guides are not in the component load path.

The criteria for material exemption per NB-4435 are discussed below with bolding added to highlight key information.

NB-4435(a) Welding and welder have been qualified in accordance with NB-4321. The guides were welded to the body using CNI procedure CWP-38, Rev. 5 by Ali Gashi. The procedure and the welder were qualified per NB-4321. (See Attachment 1a and 1b) criterion met.

NB-4435(b) The **material is identified and compatible** with the joined metal. The guide material is A182 Gr. F316. The body material is CF8M. Both are 316 stainless steel criterion met. (See Attachment 2)

NB-4435(c) The **weld material is identified and compatible** with the joined metal. The weld material used to join the pieces was ER316 (See Attachment 2) - criterion met.

NB-4435(d) The **weld is post-weld heat treated in accordance with NB-4620 as required.** P-8 to P-8 welds do not require PWHT per NB-4620 – criterion met.

The criteria to satisfy SA material exemption are satisfied. The design, incorporating ASTM material for the guides meets the requirements of the PO and ASME Class 1 (NB). This is also consistent with the applicable requirement called out in NB-2190 NONPRESSURE-RETAINING MATERIAL Subparagraph NB-2190(b), *Material not performing a pressure retaining function and not in the component support path (nonstructural attachments) welded at or within 2t of the pressure retaining portion of the component need not comply with NB-2000 nor NF-2000 provided the requirements of NB-4430 are met.* This subsubarticle refers back to NB-2190 and NB-4435 previously discussed.

Furthermore, per CNI Procedure No. 03-107, welded guides are classified as "Q" for ASME valves and are in Code Case N-62 Category 4. This is the same classification and categorization as seat rings.

Through ASME Interpretation NI-77-337 (Attachment 3), valve seats welded to Class 1 valves are exempted from the requirements of NB-2121.

CRANE NUCLEAR

CRANE NUCLEAR
860 REMINGTON BOULEVARD
BOLINGBROOK, ILLINOIS 60440

neopc
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US F

U.S. Nuclear Regulatory Commissi.
attn: Edward H. Roach Chief
Mechanical Vendor Inspect.
Washington D.C. 20555-0001
T-7D24