

August 14, 2015

Ms. Rosalie Nava, Director of Safety and Quality  
Crane Nuclear, Inc.  
860 Remington Boulevard  
Bolingbrook, IL 60440

SUBJECT: NUCLEAR REGULATORY COMMISSION INSPECTION REPORT OF CRANE  
NUCLEAR, INC NO. 99901450/2015-202, NOTICE OF VIOLATION AND  
NOTICE OF NONCONFORMANCE

Dear Ms. Nava:

On June 29-30, 2015, the U.S. Nuclear Regulatory Commission (NRC) staff conducted a limited scope inspection at the Crane Nuclear, Inc. (Crane) facility in Bolingbrook, IL. The purpose of the inspection was to assess Crane's compliance with provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 21, "Reporting of Defects and Noncompliance," and selected portions of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities." The enclosed report presents the results of this inspection. This NRC inspection report does not constitute NRC endorsement of your overall quality assurance (QA) or Part 21 programs.

Based on the results of this inspection, the NRC staff determined that a violation of NRC requirements occurred. The violation is cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding it are described in detail in the subject inspection report. The violation is being cited in the NOV because Crane did not conduct an evaluation for reportability or provide notification of a deviation associated with a potential substantial safety hazard, which was 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.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice of Violation when preparing your response. If you have additional information that you believe the NRC should consider, you may provide it in your response to the Notice. The NRC review of your response to the Notice will also determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

During this inspection, NRC inspectors also found that the implementation of your QA program failed to meet certain NRC requirements imposed on you by your customers. Specifically, the NRC inspection team determined that Crane was not fully implementing its QA program in the area of corrective actions. The specific finding and references to the pertinent requirements are identified in the enclosures to this letter.

Please provide a written explanation or statement within 30 days of this letter in accordance with the instructions specified in the enclosed Notice of Nonconformance. We will consider extending the response time if you show good cause for us to do so.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (Agencywide Documents Access and Management System), accessible at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response, (if applicable), should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request that such material is withheld from public disclosure, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If Safeguards Information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

Sincerely,

**/RA/**

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

Docket No.: 99901450

Enclosures:

1. Notice of Violation
2. Notice of Nonconformance
3. Inspection Report No. 99901450/2015-202  
and Attachment

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Docket No.: 99901450

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OFC	NRO/DCIP/MVIB	NRO/DCIP/MVIB	NRO/DCIP	NRO/DCIP/MVIB
NAME	RMclntyre	LMicewski	TFrye (ABelen for)	ERoach
DATE	08/12/15	08/11/15	08/12/15	08/14/15

**OFFICIAL RECORD COPY**

## NOTICE OF VIOLATION

Crane Nuclear, Inc.  
Bolingbrook, IL

Docket No. 99901450

During a U.S. Nuclear Regulatory Commission (NRC) inspection conducted at Crane Nuclear, Inc. (Crane) in Bolingbrook, IL from June 29, 2015 to June 30, 2015, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 21.21, "Notification of failure to comply or existence of a defect and its evaluation," Section (a)(1) requires "Each individual, corporation, partnership, dedicating entity, or other entity subject to the regulations in this part shall adopt appropriate procedures to evaluate deviations and failures to comply to identify defects and failures to comply associated with substantial safety hazards as soon as practicable, and, except as provided in paragraph (a)(2) of this section, in all cases within 60 days of discovery, in order to identify a reportable defect or failure to comply that could create a substantial safety hazard, were it to remain uncorrected."

Section 21.21(a)(2) requires "Each individual, corporation, partnership, dedicating entity, or other entity subject to the regulations in this part shall adopt appropriate procedures to ensure that if an evaluation of an identified deviation or failure to comply potentially associated with a 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 Section 21.21(d)(5). This 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."

Crane Procedure 15-100, "10CFR21 Reporting of Defects and Non-Compliance," revision 8, dated June 14, 2012, states, in part, that, "The Manager of Engineering and the Director of 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) of discovery. If an evaluation cannot be complete within sixty days from discovery, the Director Safety and Quality shall file an interim report to the NRC within sixty days of the discovery."

Contrary to the above as of June 30, 2015, Crane failed to evaluate a deviation potentially associated with a substantial safety hazard in accordance with 10 CFR 21.21(a)(1) or provide an interim report in accordance with 10 CFR 21.21(a)(2). Specifically, Crane 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.

This issue has been identified as Violation 99901450/2015-202-01.

Enclosure 1

This is a Severity Level IV violation (Section 6.9.d of the NRC Enforcement Policy).

Pursuant to the provisions of 10 CFR 2.201, Crane is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001 with a copy to the Chief, Mechanical Vendor Inspection Branch, Division of Construction Inspection and Operational Programs, Office of New Reactors, within 30 days of the date of the letter transmitting this Notice of Violation. This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation, or if contested, the basis for disputing the violation or severity level, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken, and (4) the date when full compliance will be achieved. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system, Agencywide Documents Access Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>, to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information.

If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

Dated this 14<sup>th</sup> day of August 2015.

## NOTICE OF NONCONFORMANCE

Crane Nuclear, Inc.  
Bolingbrook, IL

Docket No. 99901450

Based on the results of a U.S. Nuclear Regulatory Commission (NRC) inspection conducted at the Crane Nuclear, Inc. (Crane) facility located in Bolingbrook, IL, on June 29, 2015, through June 30, 2015, certain activities were not conducted in accordance with NRC requirements which were contractually imposed on Crane by its customers or NRC licensees:

Criterion XVI, "Corrective Action," of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," states, in part, that "Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition. The identification of the significant condition adverse to quality, the cause of the condition, and corrective action shall be documented and reported to appropriate levels of management."

Crane Procedure 16-100, "Corrective Action Reports," Revision 6, dated June 22, 2015, states, in part, that "conditions adverse to quality are promptly identified and corrected with follow up to verify implementation of corrective action; and preclude repetition," and "report to appropriate levels of management the condition, corrective action, and root cause of any conditions significantly adverse to quality."

Contrary to the above, as of June 30, 2015, Crane failed to implement measures to assure that conditions adverse to quality were determined, and corrective action was taken to resolve repetition. Specifically, two examples were identified where Crane failed to "assure that conditions adverse to quality were promptly identified and corrected, with follow up to verify implementation of corrective action; and to preclude repetition," and to "report to appropriate levels of management the condition, corrective action, and root cause of any conditions significantly adverse to quality."

1. Crane did not initiate a Corrective Action Report (CAR) to evaluate and implement measures to correct multiple assembly drawing errors that would require revision to properly identify the valve yoke material as pressure retaining on the bill of materials. This was discovered as part of the Crane efforts to determine the extent of condition of the misclassification of valve yokes as non-pressure retaining items, as described in NOV 99901450/2015-202-01.
2. Crane did not initiate a CAR to evaluate a potential issue where non-pressure retaining parts (wedge guides) for an ASME class 1 bolted bonnet gate valve were welded to the pressure retaining valve body.

These issues have been identified as Nonconformance 99901450/2015-202-02.

Enclosure 2

Please provide a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001 with a copy to the Chief, Mechanical Vendor Inspection Branch, Division of Construction Inspection and Operational Programs, Office of New Reactors, within 30 days of the date of the letter transmitting this notice of nonconformance. This reply should be clearly marked as a "Reply to a Notice of Nonconformance" and should include for each noncompliance: (1) the reason for the noncompliance, or if contested, the basis for disputing the noncompliance, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid noncompliances, and (4) the date when your corrective action will be completed. Where good cause is shown, consideration will be given to extending the response time.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system, Agencywide Documents Access Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>, to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information.

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Dated this 14<sup>th</sup> day of August 2015.

**U.S. NUCLEAR REGULATORY COMMISSION  
OFFICE OF NEW REACTORS  
DIVISION OF CONSTRUCTION INSPECTION AND OPERATIONAL PROGRAMS  
VENDOR INSPECTION REPORT**

Docket No.: 99901450

Report No.: 99901450/2015-202

Vendor: Crane Nuclear, Inc.  
860 Remington Blvd.  
Bolingbrook, IL 60440

Vendor Contact: Ms. Rosalie Nava  
Director of Safety and Quality  
E-mail: rnav@cranevs.com  
Phone: (630) 226-4940

Nuclear Industry Activity: Crane Nuclear, Inc. (Crane) manufactures safety-related ball and plug valves for the Westinghouse Electric Company AP1000 reactor design as well as valves and valve parts for the operating reactor fleet.

Inspection Dates: June 29-30, 2015

Inspectors: Laura Micewski NRO/DCIP/MVIB Team Leader  
Richard McIntyre NRO/DCIP/MVIB

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



## **EXECUTIVE SUMMARY**

Crane Nuclear, Inc.  
99901450/2015-202

The U.S. Nuclear Regulatory Commission (NRC) staff conducted a vendor inspection at the Crane Nuclear, Inc. (hereafter referred to as Crane) facility to verify that it had implemented an adequate quality assurance (QA) program that complies with the requirements of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities." In addition, the NRC inspection also verified that Crane implemented a program under 10 CFR Part 21, "Reporting of Defects and Noncompliance," that met the NRC's regulatory requirements. The NRC inspection team conducted the inspection from June 29-30, 2015. This was the second NRC inspection at the Crane facility in 2015.

This technically-focused inspection specifically evaluated Crane's corrective actions related to the NRC inspection findings identified and documented in Crane Inspection Report No.: 9990145/2015-201.

The following regulations served as the bases for the NRC inspection:

- Appendix B to 10 CFR Part 50
- 10 CFR Part 21

During the course of this inspection, the NRC inspection team implemented Inspection Procedure (IP) 43003, "Reactive Inspections of Nuclear Vendors" and IP 36100, "Inspection of 10 CFR Part 21 and Programs for Reporting Defects and Noncompliance."

The information below summarizes the results of this inspection.

### **10 CFR Part 21 Program**

The inspectors issued Violation 99901450/2015-202-01 in association with Crane's failure to implement the regulatory requirements of 10 CFR Part 21, "Reporting of Defects and Noncompliance." Violation 99901450/2015-202-01 cites Crane for failing to evaluate 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.

### **Corrective Action**

The inspectors issued Nonconformance 99901450/2015-202-02 in association with Crane's failure to implement the regulatory requirements of Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. Nonconformance 99901450/2015-202-02 cites Crane for failing to initiate corrective action reports (CARs) for conditions adverse to quality, and as a result, failing to determine the significance, root cause and actions to prevent recurrence.

Design Control and Control of Purchased Material, Equipment, and Services Corrective Actions

The inspectors concluded that Crane's corrective actions in the areas of design control and control of purchased material, equipment, and services in response to the Notices of Nonconformance from inspection report 99901450/2015-201 were adequate. No findings of significance were identified.

## REPORT DETAILS

### 1. 10 CFR Part 21 Program

#### a. Inspection Scope

The NRC inspection team reviewed the policies and implementing procedures of Crane that govern the facility's compliance with the requirements of 10 CFR Part 21, "Reporting of Defects and Noncompliance." In addition, the NRC inspection team evaluated the 10 CFR Part 21 postings. The NRC inspection team also verified that Crane's nonconformance and corrective action procedures provide a link to the 10 CFR Part 21 program. Furthermore, the NRC inspection team discussed the 10 CFR Part 21 program with Crane's management and technical staff. The attachment to this inspection report lists the documents reviewed by the NRC inspection team.

#### b. Observations and Findings

On or about February 20, 2015, Crane staff identified three known instances of valve yokes that had been improperly classified as non-pressure retaining. The yokes incorporated a threaded hub and thus should have been treated as a pressure retaining boundary. A yoke incorporating a threaded hub should be treated in the same manner as a threaded retaining ring. The design of this valve has the yoke performing the function of the retaining ring, and therefore is considered pressure retaining. This misclassification resulted in the use of incorrect ASTM materials as opposed to the required ASME Section II SA material for this pressure retaining application. The differences between the ASME SA216 and the ASTM A216 material specifications include supplementary nondestructive examination (NDE) testing requirements and documentation on a certified material test report (CMTR) for ASME SA material. Crane did not document this deviation in their corrective action program or their 10 CFR Part 21 Log, however Crane commenced an informal evaluation process documented only on company electronic mail.

In electronic mail dated March 20, 2015, Crane engineering staff noted that the three instances that were discovered in February had been evaluated as acceptable, but also stated that this issue potentially impacted 9 orders for Dresden and Quad Cities, as well as six other plants and a purchase order for the US Navy.

In electronic mail dated June 24, 2015, Crane management staff stated that Crane was still in the process of pulling all the drawings, design reports and other files to address each specific valve yoke and the necessary corrective actions.

As of June 30, 2015, Crane had not documented the deviation in their 10 CFR Part 21 Log, had not formally documented an evaluation for reportability or extent of condition, had not completed the extent of condition evaluation for orders placed prior to March 30, 2001, and had not filed a report or interim report with the NRC or all affected customers in accordance with 10 CFR Part 21. This is contrary to the

requirements of 10 CFR 21.21(a)(1), which requires timely evaluation of deviations and failures to comply potentially associated with substantial safety hazards and 10 CFR 21.21(a)(2), which requires submission of an interim report if the evaluation cannot be completed within 60 days of discovery.

c. Conclusion

The inspectors issued Violation 99901450/2015-202-01 in association with Crane's failure to implement the regulatory requirements of 10 CFR Part 21. Violation 99901450/2015-202-01 cites Crane for failing to evaluate a deviation associated with a potential substantial safety hazard in accordance with 10 CFR 21.21(a)(1) or provide an interim report in accordance with 10 CFR 21.21(a)(2). Specifically, Crane 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.

2. Corrective Action

a. Inspection Scope

The inspectors reviewed Crane's policies and implementing procedures that govern the corrective action program to verify compliance with the requirements of Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. The inspectors reviewed Crane's corrective actions as documented in their response letter dated June 22, 2015, to the Notices of Nonconformance (NONs) documented in inspection report 99901450/2015-201.

Crane initiated CAR 15-05 in response to NON 99901450/2015-201-02, which cited Crane for deficiencies in their corrective action program (CAP). The inspectors reviewed the associated report and the resultant commitments to implement specific corrective actions. The inspectors also reviewed a sample of CARs to verify the adequacy of Crane's implementation and control of its CAP. In addition, the inspectors verified that Crane's corrective action process provides a connection to the 10 CFR Part 21 program. The inspectors discussed the CAP with Crane's management and technical staff. The attachment to this inspection report lists the documents reviewed by the inspectors.

b. Observations and Findings

During review of corrective actions for previous NRC inspection findings and discussion with Crane management and staff, the inspectors were made aware of a potential significant condition adverse to quality that had not been entered into the Crane corrective action process. The inspection team discussed this ongoing issue with Crane staff as related to a Part 21 notification they had made to three utilities in June 2015. This issue is discussed further in Section 1.0 of this report.

During these discussions with Crane management, the inspector's determined that Crane had not initiated a CAR to evaluate and determine the extent of condition for their failure to correctly classify the valve yoke incorporating a threaded hub located within an ASME Class 2 pressure seal gate valve, as a pressure retaining item. This issue was first identified and reported to the Manager of Engineering on February 20, 2015, and was acknowledged by management in an email on March 20, 2015. Crane did not document this deviation in their corrective action program, however, Crane initiated an informal evaluation process documented only on company electronic mail.

Numerous iterations of internal emails were generated over a three month period between the Crane Nuclear President, the Director Safety and Quality, the Manager of Engineering, the Site Leader, and a senior design engineer to discuss Crane proposed actions related to this technical issue. However, at no time did anyone enter this potential significant condition adverse to quality into the corrective action process. Crane ultimately identified three specific examples to date where valves have been delivered to nuclear utilities and notified them by letters of a "10 CFR Part 21 Notification." After discussions during this inspection, Crane opened CAR 15-26 on July 3, 2015, to evaluate this issue.

During review of the above records and discussions with Crane, the inspectors determined that the Crane extent of condition appeared sufficiently thorough to identify any potentially affected components. Based on this extent of condition evaluation, it was also determined that several assembly drawings would require revision to properly identify the yoke material as pressure retaining on the bill of materials. The failure to initiate a CAR to evaluate and implement measures to correct drawing errors that were discovered as part of efforts to determine the extent of condition of misclassification of valve yokes as pressure retaining items was identified as an example of the issue cited in Nonconformance 99901450/2015-202-02.

During a discussion with a Crane senior design engineer during the inspection, a second example was identified where Crane failed to initiate a CAR to evaluate a potential technical concern. This issue involved an ASME class 1 bolted bonnet gate valve, where non-pressure retaining parts (wedge guides), were welded to the pressure retaining valve body. The wedge guide, which is welded to the valve body, used ASTM A-182 Gr F316L instead of the required ASME SA-182 material. This could lead to welding materials not conforming to ASME Section III, NB Class 1 code requirements. This valve was related to Purchase Order number 10408625 for the Pilgrim Nuclear Power Station. This issue was first identified in an email from the senior design engineer to the Manager of Engineering on May 7, 2015. After the completion of the inspection, on June 30, 2015, Crane opened CAR 15-15 to evaluate the technical validity of this issue. The failure to initiate a CAR to evaluate a potential issue where an ASME Class 1 bolted bonnet gate valve had non-pressure retaining parts (wedge guides) welded to the pressure retaining valve body was identified as part of Nonconformance 99901450/2015-202-02.

c. Conclusion

The inspectors issued Nonconformance 99901450/2015-202-02 in association with Crane's failure to implement the regulatory requirements of Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. Nonconformance 99901450/2015-202-02 cites Crane for failing to enter potential significant conditions adverse to quality into the corrective action program as required per Crane procedure. Specifically, for drawing errors that required revision to properly identify the yoke material as pressure retaining on the bill of materials, and for an issue where an ASME class 1 bolted bonnet gate valve, with non-pressure retaining parts (wedge guides), were welded to the pressure retaining valve body, Crane did not initiate corrective action reports, and thus did not determine the significance or root cause, or identify actions to prevent recurrence.

3. Design Control and Control of Purchased Material, Equipment, and Services

a. Inspection Scope

The inspectors reviewed the implementation of Crane's follow-up actions in response to NONs 99901450/2015-201-01 and 99901450/2015-201-03. Crane initiated CAR 15-04 and 15-06 in response to these NONs. The inspectors reviewed the associated Corrective Action Reports and the resultant commitments to implement specific corrective actions.

Crane initiated CAR 15-04 dated March 20, 2015, in response to NON 99901450/2015-201-01, which cited Crane for deficiencies in design control and commercial-grade dedication. The inspectors reviewed CAR 15-04, including the investigation of the root causes and verified that Crane had revised the CNI DED-4 procedure to clarify requirements for identification of critical characteristics and to incorporate by reference, the use of procedure CNI 03-106 specific to design calculation preparation, review, and approval. The inspectors verified the proposed revisions were incorporated into CNI DED-4, revision 1, dated June 2, 2015. The team also reviewed and verified that the Engineering Evaluation revision (calculation for disc material equivalency) had received final review and approval as required by Crane procedures. Finally, the inspectors reviewed the training records for all applicable engineering staff related to the CNI DED-4, revision 1. The inspectors concluded that Crane adequately evaluated and documented the cause of the condition, the corrective action taken, the QA acceptance of the responses, and whether a Part 21 evaluation was required.

Crane initiated CAR 15-06 in response to NON 99901450/2015-201-03, which cited Crane for deficiencies in the control of purchased material, equipment, and services. The inspectors reviewed a sampling of procurement documents issued subsequent to implementation of the corrective actions to verify the issues resulting in the notices of nonconformance have not recurred. The inspectors also reviewed procurement documents and Certified Material Test Reports (CMTRs) that had been issued and received prior to the NRC issuance of the NON, and verified that Crane's extent of condition review recognized, evaluated, and corrected all similar issues, in addition

to the specific examples the NRC had identified in the NON. The inspectors reviewed procedural changes and training plans that Crane has established as a barrier to prevent recurrence. The inspectors concluded that Crane adequately evaluated and documented the cause of the condition, the corrective action taken, and the QA acceptance of the responses.

The attachment to this inspection report lists the documents reviewed by the inspectors.

b. Observations and Findings

No findings of significance were identified.

c. Conclusion

Based on the samples reviewed, the inspectors determined that Crane's corrective actions in response to the Notices of Nonconformance were adequate. No findings of significance were identified.

4. Entrance and Exit Meetings

On June 29, 2015, the NRC inspection team discussed the scope of the inspection with Ms. Rosalie Nava, and Mr. Kirk Kelhofer, President, participating by telephone, and other members of Crane's management staff. On June 30, 2015, the NRC inspection team presented the inspection results and observations during an exit meeting with Ms. Rosalie Nava, with Mr. Kirk Kelhofer participating by telephone, and other members of Crane's management and technical staff. The attachment to this report lists the attendees of the entrance and exit meetings, as well as those individuals whom the NRC inspection team interviewed.

## ATTACHMENT

### 1. ENTRANCE AND EXIT MEETING ATTENDEES

Name	Title	Affiliation	Entrance	Exit	Interviewed
Laura Micewski	Inspection Team Leader	NRC/NRO	X	X	
Richard McIntyre	Inspector	NRC/NRO	X	X	
Kirk Kelhofer	President	Crane Nuclear	X	X	
Rosalie Nava	Director, Safety and Quality	Crane Nuclear	X	X	X
Burt Anderson	Site Leader	Crane Nuclear	X	X	X
David Dwyer	Manager, Engineering	Crane Nuclear		X	X
Chris Dee	Corporate Legal	Crane Nuclear	X	X	
Jason Lambin	Senior Design Engineer	Crane Nuclear		X	X

### 2. INSPECTION PROCEDURES USED

Inspection Procedure (IP) 36100, "Inspection of 10 CFR Part 21 and Programs for Reporting Defects and Noncompliance," dated February 13, 2012.

IP 43003, "Reactive Inspections of Nuclear Vendors," dated October 3, 2013.

IP 43004, "Inspection of Commercial-Grade Dedication Programs," dated November 29, 2013.



3. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

<b>Item Number</b>	<b>Status</b>	<b>Type</b>	<b>Description</b>	<b>Applicable ITAAC</b>
99901450/2015-202-01	Opened	NOV	10 CFR Part 21	N/A
99901450/2015-202-02	Opened	NON	Criterion XVI	N/A
99901450/2015-201-01	Closed	NON	Criterion III	N/A
99901450/2015-201-02	Closed	NON	Criterion XVI	N/A
99901450/2015-201-03	Closed	NON	Criterion VII	N/A

4. INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA

The U.S. Nuclear Regulatory Commission (NRC) inspection team identified no inspections, tests, analyses, and acceptance criteria (ITAAC) related to components being fabricated and inspected by Crane.

DOCUMENTS REVIEWED

**Policies and Procedures**

Crane Nuclear Inc. (CNI) Procedure 15-100, "10CFR21 Reporting of Defects and Non-Compliance," revision 8, dated June 14, 2012

CNI Procedure 16-100, "Corrective Action Reports," revision 6, dated June 22, 2015

CNI Procedure CCP-1, "Customer Complaint Procedure," revision 3, dated June 10, 2015

CNI Procedure DED-4, "Dedication of Commercial Material, Items and Services for Safety Related applications," revision 2, dated June 2, 2015

CNI Procedure 03-106, "Design Calculation Preparation, Review, and Approval," revision 7, dated September 9, 2011

CNI Procedure 03-107, "Classification of Valve Parts," revision 4, dated August 15, 2015

### **Design Documents**

Revised Engineering Evaluation for S.O. 42390 Entergy – Pilgrim, Disc for 1-inch swing check valve (EPDM rubber), and dated June 15, 2015.

CGIE 42390-01, PO item no. 0001, RD3 – E69Q disc for 1” swing check valve

### **Training and Qualification Records**

Training Record, “Review of Receiver/CMTR review process,” dated April 20, 2015

Training record, “DED-4, Rev 1, Dedication of Commercial Material, Items and services for Safety-related applications,” dated May 5, 2015

Training record, “DED-4, Rev 2, Dedication of Commercial Material, Items and services for Safety-related applications,” dated June 29, 2015

### **Corrective Action Reports**

2015 Crane Corrective Action Reports (CAR) Log, as of June 29, 2015

CAR 15-04, Design Control/Commercial Grade Dedication, dated March 20, 2015

CAR 15-05, Accepted Non-conforming Bar, dated March 20, 2015

CAR 15-06, Customer complaint process not managed properly, dated March 20, 2015

### **Procurement Documents**

Purchase Order 85665 from Exelon Generation Company, LLC for 4 in. gate valve for Quad Cities, dated June 30, 2005

Purchase Order 500302750 from Arizona Public Service Company for gate valve, SCH 120 pipe, 4in 900 pound for Palo Verde Nuclear Generating, dated August 10, 2006

Purchase Order 85665 from Exelon Generation Company, LLC for 3 in. gate valve for Quad Cities, dated January 8, 2007

Purchase Order 90040766 from Exelon Nuclear for 3” gate valve for Peach Bottom Atomic Power station, dated March 18, 2011

Purchase Order 500514379 from Arizona Public Service Company for yoke for 4in 783-U9 pressure seal gate valve for Palo Verde Nuclear Generating, dated November 14, 2011

Certificate of Conformance/Compliance from TW Metals for socket head capscrews, dated December 16, 2014

Certified Material Test Report/Certificate of Compliance from Diversified Machine Components to TW Metals for verification that material is in accordance with ASTM A193-2012b, Grade B6, of socket head capscrews, dated December 2, 2014

Test Report from Element Materials Technology to TW Metals for chemical analysis and materials testing of two 1.5" dia x 6.00" long test pieces, dated December 2, 2015

Inspection Certification from Diversified Machine Components from My Heat Treat, Inc. for 1.50" dia. bar, dated November 24, 2014

Certificate of Compliance from Valbruna Stainless, Inc. to Crane Nuclear, Inc. for 132 lbs. of 316 1.125" x 12' round bar, dated August 24, 2012

Certificate of Compliance/Certificate of Conformance from Regal Cast, Inc. to Crane Nuclear, Inc. for ASME SA351 grade 6" Gate Wedge, dated December 11, 2014

Material Test Report from PRL Metallurgical Laboratory to Regal Cast, Inc. for ASTM A351-65 ASME SA351 CF3M/8M, dated December 8, 2014

Certificate of Conformance/Compliance/CMTR from Dubose National Energy Services, Inc. to Crane Nuclear, Inc. for 5" dia x 20" round bar ASTM 182-12A, dated March 20, 2015

Certified Test Report from LTI Laboratory Testing to Dubose National Energy Svcs. for testing of chemical and physical properties of 5" diameter round bars, dated February 2, 2009

Certified Test Report from Tensile Testing Metallurgical Laboratory to TW Metals for testing of 2" dia. x 6" Long Round Bar, dated March 11, 2015

### **Valve Drawings**

Crane Nuclear CD05919, Gate Valve Assembly, Pressure Seal with SMB-00 Actuator, Revision D, dated August 16, 2013

Crane Nuclear CD05567, Gate Valve Assembly, Pressure Seal with SMB-00 Actuator, Hard Faced wedge Guide and Smart stem, Revision A, dated May 16, 2012

Crane Nuclear CD06683, general Assembly, Bolted Bonnet Gate Valve with Motor Operator, Revision E, dated April 20, 2015

Crane Nuclear CD06685, body Machining & Weldment, Crane Sentinel Gate, Revision C, dated March 4, 2015

## **Miscellaneous**

Process Review Sheet for “QA Receiver and Supplier Doc Review for Nuclear VALVES and PARTS,” revision 0, dated December 31, 2014

2015 Corrective Action Reports Log, dated January 8, 2015 to present

Letter from Crane Nuclear, Inc. to Edison Material Supply, “10CFR21 Notification Yokes with Integral Pressure Retaining Hubs Used in Pressure Seal Valves,” dated June 12, 2015

Letter from Crane Nuclear, Inc. to TVA Nuclear, “10CFR21 Notification Yokes with Integral Pressure Retaining Hubs Used in Pressure Seal Valves,” dated June 12, 2015

Letter from Crane Nuclear, Inc. to Southern Nuclear Operating Company, “10 CFR Part 21 Notification Yokes with Integral Pressure Retaining Hubs Used in Pressure Seal Valves,” dated June 12, 2015

## **Emails**

Email from Senior Design Engineer, Crane Nuclear, to Director of Safety and Quality, Crane Nuclear, subject: “Potential Part 21 Issue,” dated February 20, 2015

Email from Senior Design Engineer, Crane Nuclear, to Manager of Manufacturing, Crane Nuclear, subject: “Potential Part 21 Issue,” dated February 26, 2015

Email from Manager of Manufacturing, Crane Nuclear, to Manager of Engineering, Crane Nuclear, subject: “Potential Part 21 Issue,” dated February 26, 2015

Email from Manager of Engineering, Crane Nuclear, to Director of Safety and Quality, Crane Nuclear, subject: “Potential Part 21 Issue,” dated March 20, 2015

Email from Manager of Engineering, Crane Nuclear, to Director of Safety and Quality, Crane Nuclear, subject: “Potential Part 21 Issue,” dated May 4, 2015

Email from Manager of Engineering, Crane Nuclear, to Director of Safety and Quality, Crane Nuclear, subject: “Potential Part 21 Issue,” dated May 17, 2015

Email from Manager of Contract Administration, Crane Nuclear, to President, Crane Nuclear and Director of Safety and Quality, Crane Nuclear, subject: “10CFR Part 21 Letter for Review,” dated May 22, 2015

Email from: Manager of Quality Assurance, Crane Nuclear, to President, Crane Nuclear, subject: “Part 21 Letter,” dated June 9, 2015

Email from President, Crane Nuclear, to Director of Safety and Quality, Crane Nuclear, subject: “Part 21 Letter,” dated June 9, 2015

Email from: Director of Safety and Quality, Crane Nuclear, to Site Leader, Crane Nuclear, subject: "10CFR Part 21 Letter for Review," dated June 12, 2015

Email from Manager of Engineering, Crane Nuclear, to Site Leader, Crane Nuclear, subject: "10 CFR Part 21 Letter for Review," dated June 12, 2015

Email from Regulatory Affairs, Southern Nuclear, to Site Leader, Crane Nuclear, subject: "Part 21- Crane Valve Yokes," dated June 23, 2015

Email from Site Leader, Crane Nuclear, to Manager of Engineering, Crane Nuclear, subject: "Part 21- Crane Valve Yokes," dated June 23, 2015

Email from Site Leader, Crane Nuclear, to Regulatory Affairs, Southern Nuclear, subject: "Part 21- Crane Valve Yokes," dated June 24, 2015

Email from Site Leader, Crane Nuclear, to Manager of Engineering, Crane Nuclear, subject, "10 CFR Part 21 Letter for Review," dated June 26, 2015

Email from Senior Design Engineer, Crane Nuclear, to Manager of Engineering, Crane Nuclear, subject: "43768 Class 1 Sentinel Valve," dated May 7, 2015

Email from Manager of Engineering, Crane Nuclear, to Senior Design Engineer, Crane Nuclear, subject: "43768 Class 1 Sentinel Valve," dated June 22, 2015