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Curtiss-Wright Nuclear Division
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CURTISS-WRIGHT

November 16, 2020

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: 10CFR Part 21 Notification for a Curtiss-Wright supplied Royce Compressor

Dear Sir or Madam:

QualTech NP is providing this notification as a potential 10 CFR Part 21 issue. We were notified of a compressor failure by the Duke Energy Robinson Plant on September 22, 2020. According to Duke Energy the failure occurred on August 26, 2020. The compressor is a Royce model CG-040-NTA (nameplate P/N 198P058H01)

Based on details provided by Duke Energy, the compressor failed to provide effective cooling upon start up and subsequently overheated. See attached Duke Energy letter for complete description of the failure. Duke Energy's investigation of the failure determined that an incorrect head gasket had been installed, allowing a path for high pressure and temperature discharge refrigerant to return directly to the low pressure crank case.

Based on a review of the Duke Energy supplied details and normal compressor function/operation, QualTech NP believes that the noted performance anomalies were likely caused by this incorrect gasket.

The root cause of the error was determined to be a lack of detailed acceptance criteria in the dedication plan for the gasket in question. The manufacturer's gaskets are supplied as a set for the left and right side cylinder heads and are not identical in configuration (sealing surface) based on the compressors design. If misapplied the gasket can fit the general outline dimensions of the wrong head without fully covering all sealing surfaces and critical flow paths.

The corrective action taken was to revise the dedication plan to enhance the gasket acceptance criteria and inspection process.

This was the only QualTech NP sale for this model of compressor and we have had no other failures of this type reported from other customers on similar compressor models, thus it is considered to be an isolated incident.

Please phone (513) 528-7900 if you should have any questions.

Sincerely,

Tim Franchuk
Quality Assurance Director
QualTech NP, Curtiss-Wright Nuclear Division
Office: 513-528-7900, ext. 176

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DUKE ENERGY

Berry Foster
General Manager – Nuclear Engineering
H. B. Robinson Steam
Electric Plant Unit 2

Duke Energy
3581 West Entrance Road
Hartsville, SC 29550

843.951.5790

Berry.Foster@duke-energy.com

Serial: RNP-RA/20-0308

Date: September 22, 2020

Curtiss-Wright
4600 East Tech Drive
Cincinnati, OH 45245

ATTN: Mr. Timothy Franchuk
tfranchuk@curtisswright.com

Subject: Duke Energy Carolinas, LLC (Duke Energy)
Robinson Nuclear Plant, Unit 2
Request for Determination of 10 CFR 21 Reportability

References:

Robinson Condition Report:	02346430
Robinson Equipment ID:	WCCU-1B
Duke Energy Catalog ID:	73693939
Manufacturer Part Number:	CG-040-NTA
Manufacturer Serial Number:	KX 621167
Duke Energy Purchase Order:	03096746
Curtiss Wright Dedication Plan:	CJ15907-1

Enclosure: 10 CFR 21 Discovery Checklist

Mr. Franchuk:

On August 26, 2020, a new compressor for WCCU-1B, Control Room Refrigerant Unit, was installed. The initial run lasted approximately 10 minutes. During the start of the run, the suction pressure reduced to approximately 100 psig. The discharge pressure maintained between 130-170 psig. The suction pressure remained constant at approximately 100 psig for 30-45 secs. The suction pressure reduced slowly to approximately 60 psig. Suction pressure remained at approximately 60 psig for ~2 minutes until the #2-Cylinder 58 psig unloader set point was reached. Suction pressure immediately increased to approximately 90-100 psig. The suction line at the compressor appeared to be warmer than normal. WCCU-1B was cycled three times and secured when #2-Cylinder unloaded a third time. Upon securing the WCCU, the suction accumulator was noticeably warm to the touch, and the compressor was noticeably hotter than normal.

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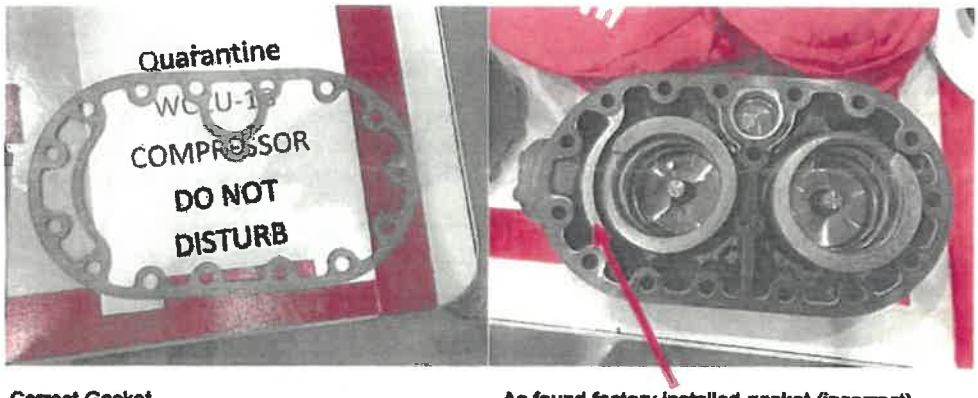
During the investigative disassembly, the cylinder head gasket for cylinders 2 and 4 was found to be the wrong gasket for the CG-040-NTA model compressor. The compressor head gasket was replaced with the correct gasket. The WCCU units are purchased under the 10 CFR 50 Appendix B Safety Related processes.



Correct Gasket

As found factory installed gasket (incorrect)

Robinson initiated Condition Report (CR) 02333923 to document the event. A 10 CFR 21 Discovery Checklist (attached) was completed in accordance with Duke Energy procedure AD-LS-ALL-0018, Evaluating and Reporting of Defects in Accordance With 10 CFR 21. This checklist determined that an evaluation to determine the reportability of this condition is required.

Duke Energy requests that Curtiss Wright, as the supplier of this compressor, accept the responsibility to evaluate this issue against the reporting criteria of 10 CFR 21 and take appropriate action to assure that NRC reportability requirements are met. Duke Energy requests that Curtiss Wright provide documentation of its conclusions relative to 10 CFR 21 reportability for our records.

Please direct any questions to Tomas Bardauskas at (843) 951-1053,
tomas.bardauskas@duke-energy.com

Sincerely,

Berry Foster
General Manager – Nuclear Engineering
Robinson Nuclear Plant

cc: Garry Brewer (gbrewer@CURTISSWRIGHT.com)
Mike Bell (mbell@CURTISSWRIGHT.com)

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<< 10 CFR 21 Discovery Checklist >>

INSTRUCTIONS

1. Duke Energy does **NOT** have a Notification responsibility when a 10 CFR 21 Report has already been submitted by another organization.
2. If the issue involves an installed Basic Component, then start with Section A.
3. If issue involves a Service, then proceed to Section B.
4. If the issue involves only a Delivered Basic Component, then start with Section C
5. The performance of the Discovery Process should be timely and completed without undue delay.
6. When completed, then attach form (or similar) and any supporting documentation to the associated NCR.

NCR Number: 02346430		**Page ___ of ____**	
A	1. Did the issue with the installed Basic Components become known due to an in-service malfunction or failure?	☐ Yes	☐ No
	2. Were any of the following true concerning the in-service malfunction or failure?		
	• The malfunction or failure can be attributed to an end of life issue.	☐ Yes	☐ No
	• The malfunction or failure can be attributed to calibration or instrument tolerance issues.	☐ Yes	☐ No
	• The malfunction or failure can be attributed to the purchaser's storage, handling, installation, usage, maintenance or testing of the component (e.g., the issue occurred due to actions involving installation, rework, repair, post-maintenance testing).	☐ Yes	☐ No
	• The malfunction or failure was environmentally induced by abnormal parameters which exceed operational technical requirements (e.g., dirt/foreign material in the system, or operational temperature, pressure, hydraulic stresses, structural stresses, voltage, amperage, electrical being exceeded).	☐ Yes	☐ No
	3. If Question 1 is 'Yes' and all answers under Questions 2 are 'No', then the issue is potentially subject to 10 CFR 21. a. Go to Section C **AND** document rational.		
	4. If the answer to Question 1 is 'Yes' **AND** any condition under Question 2 is marked 'Yes', then the issue is **NOT** reportable under 10 CFR 21. a. Go to Section D **AND** document the basis for the determinations applicable to Section A.		

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B	1	For Services, does the issue involve a Failure to Comply that is potentially associated with a Substantial Safety Hazard?	☐ Yes ☐ No
		In the context of 10 CFR 21, a Failure to Comply is treated similarly to a Deviation. A Failure to Comply exists if a Basic Component, a design certification, or design approval (under 10 CFR 52), all of which can include computer software, design, analysis, inspection, testing, fabrication, replacement of parts, or consulting services that are associated with component hardware, are found to **NOT** be in compliance with any of the following: • The Atomic Energy Act of 1954 (as amended), **OR** • Any applicable rule, 10 CFR regulation, Order, or license issued by the Commission, **OR** • An approved standard design in accordance with 10 CFR Part 52 A Failure to Comply is considered to be potentially associated with a Substantial Safety Hazard if the Failure to Comply affects the performance of a safety function.	
	2.	If the answer to Question 1 is 'Yes', then the issue is subject 10 CFR 21 and requires an Evaluation to determine if the Failure to Comply constitutes a potential Substantial Safety Hazard. a. Go to Section E **AND** document the basis for the determinations associated with Section B.	
	3.	If the answer to Question 1 is 'No', then go to Section C.	
C	1	Does the issue constitute a Deviation for either of the following?	
		• A Basic Component which was in-service but was identified by normal operational checks, tests, inspections, or trouble alarms, or by other means, prior to an in-service failure.	☐ Yes ■ No
		• A Basic Component that was Delivered for Use (i.e., completed acceptance process or installed) in a facility, or for an activity, subject to the regulations in 10 CFR 21?	■ Yes ☐ No
	2.	If either condition under Question 1 is marked 'Yes', then the issue is subject to 10 CFR 21 and requires an Evaluation to determine whether the Deviation constitutes a potential Substantial Safety Hazard. a. Go to Section E **AND** document the basis for the determinations associated with Sections A and C, as applicable.	
	3.	If both conditions under Question 1 are marked 'No', then the issue is **NOT** reportable under 10 CFR 21 a. Go to Section D **AND** document the basis for the determinations associated with Sections A and C, as applicable.	

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NCR Number:	**Page ___ of ____**

D	**INSTRUCTIONS** Section D is for documenting the basis of a determination that an issue does **NOT** constitute a Deviation **OR** Failure to Comply. Attach this form and any supporting documentation to the NCR (No further action is needed, an Evaluation is **NOT** required). Basis for determination that Evaluation is **NOT** required:

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<< 10 CFR 21 Discovery Checklist >>

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INSTRUCTIONS

Section E is for documenting the basis of a determination that an issue constitutes a Deviation **OR** Failure to Comply, and to record the date this documentation was completed (i.e., Time of Discovery). Ensure an Evaluation assignment is initiated that incorporates the time limits of 10 CFR 21.

- The Time/Point of Discovery Date is the date Section E documentation is completed.
- Attachment 3, 10 CFR 21 Evaluation Checklist, provides guidance for performing the Evaluation.

E

Time/Point of Discovery Date (mm/dd/yyyy): 9/17/2020

Basis for determination that Evaluation is required:

As stated in Section C of this document, a Basic Component that was Delivered for use in a facility that is subject to the regulations in 10 CFR 21 and that has a Deviation requires an Evaluation. Robinson purchased a safety-related Royce compressor, model number CG040NTA, from Curtiss-Wright in 2019. The compressor was received by Robinson and passed through the site acceptance process. The unit was specified to have a net cooling capacity of 40 tons. When the new unit was installed in the plant and initial testing was performed, the unit did not operate normally. The unit was unable to provide effective cooling and began to overheat to the point that it was deemed prudent to shut the unit off before significant damage could occur. The new unit was never placed in service or declared operable. Subsequent investigation revealed that one of the cylinder heads had an incorrect gasket installed by the vendor. The use of the incorrect gasket allowed a path for high pressure and temperature discharge refrigerant to return directly to the low pressure crank case. This was the cause of the abnormal operation and elevated temperatures seen during the initial testing. Engineering personnel from Duke and the vendor agreed that the incorrect gasket prevented the unit from providing design cooling. This Deviation requires an Evaluation.