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July 31, 2018

U.S. Nuclear Regulatory Commissions
Attn: Document Control Desk
Washington, DC 20555-0001

Cc: Chief, Electrical Vendor Inspection Branch,
Division of Construction Inspection and Operational Programs,
Office of New Reactors

Subject: Reply to a Notice of Nonconformance
Reference: Nuclear Regulatory Commission Inspection Report No. 99900060/2018-201
and Notice of Nonconformance dated July 2, 2018.

Enclosed please find the Curtiss-Wright Flow Control Company, Target Rock Division reply
Nonconformance 99900060/2018-201-01 and 02. These responses are documented on the
enclosed Target Rock (TR) Internal Corrective Action Request Nos. 18-117 and 18-118.

Please contact me if you have any questions or require any additional information.

Sincerely,

John DeBonis
TR Quality Assurance Manager
jdebonis@curtisswright.com
631-396-4429

Enclosure:

TR Corrective Action Requests CAR 18-117 and 18-118

LED9
NRD

<p align="center">CW- TARGET ROCK CORRECTIVE ACTION REQUEST</p>	<p align="center">CAR NO.: 18-117</p>
<p>To: J. DeBonis</p> <p>Cc:</p> <p>Originator / Date: J. DeBonis 5/16/18</p>	<p>Project / Part / Serial No.</p> <p>15Z501 / TRP 9785</p> <p>Response Due Date: 7/31/18</p> <p>Reviewed by: A. DiMeo 5/16/18</p>

Description of the Nonconformance Operations

NRC Notice of Nonconformance 99900060/2018-201-01 states:

TR failed to translate the applicable design basis requirements as specified in NuScale's TO for the Emergency Core Cooling System (ECCS) valves into their specifications, drawings, procedures and instructions. In addition, TR failed to provide objective evidence to NuScale ensuring the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the SSCs were met. Specifically,

- (1) TR failed to translate certificate of conformance requirements from NuScale's TO No. 11, SW-1114-9480 into their ECCS valve proof-of-concept (POC) Test Procedure TRP 9484. In addition,
- (2) TR failed to submit eight certificate of conformance requirements for the ECCS valve POC testing services to NuScale to provide objective evidence for the selection and review for suitability of application of processes that are essential to the safety-related functions of the ECCS valve for the NuScale POC Test design certification process.

Immediate Action Taken to Correct the Identified Nonconformance

TR confirmed the nonconforming condition described above.

Root Cause of the Identified Nonconformance – Reason for the noncompliance

- (1) Note of clarification: TRP 9484 referenced above is the POC test procedure. TRP 9785 is the applicable POC Engineering Test Report.
There is no current procedural requirement for Engineering Test Reports to include requirements for certificates of conformance (C of C). Procedure QMP1004, Design Control, does include a process for the submittal of other project related documents such as drawings, reports and procedures. This existing process requires the manual completion of a Computer Software Entry Form (CSEF) by the Engineering Department. The CSEF lists the required document submittals required for a project. The form is transmitted to and tracked to completion by the Contracts Department. However, QMP1004 did not specifically require a CSEF entry for the submittal of C of C's for Engineering software related projects. The TR QA department is responsible for generating and submitting C of C documents and the need for C of C submittals had been identified directly from QA contract review.
- (2) For this project, the deliverable item was an engineering proof of concept test report. The TR QA Manager was initially aware of the customer purchase order requirement to submit a C of C with the eight C of C requirements. However, for C of C's related to software deliverables there no is no current C of C submittal status tracking or completion check at the time of the final test report delivery. In this case TR QA Manager did not realize the C of C was not completed and was not submitted as C of C's for software products are not normally required. For hardware shipments there is a step in the process and a notification point for the inclusion of QA documentation with the hardware packaging. Engineering test reports are normally submitted to the customer electronically and typically contain sufficient data, test results and technical justification necessary to document the extent of services performed.

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Root Cause Corrective and Preventative Action – Corrective steps taken or will be taken and date actions will be completed

- (1) QMP1004 is in the process of being revised. This revision will incorporate a new automated document submittal and tracking system in the TR Oracle ERP system. The document submittal and tracking system will replace the CSEF (described in Item 1 above). Revision to QMP 1004 will specifically require the entry of a C of C as a deliverable in the new Oracle Document Submittal System as a required document submittal, for when hardware is not supplied and when required by customer purchase order. This action requires the Contracts Department to track the submittal status of the C of C and will prevent close out of the project until all outstanding contract document submittals, including C of C, are provided to the customer.
- (2) The required C of C has been completed and submitted (copy attached). The eight point criteria of NuScale's TO No. 11, SW-1114-9480 are addressed therein. Completion of the above Root Cause Corrective and Preventive Action number (1), will ensure C of C submittals are made for software items when required by customer purchase order. It will still be the responsibility of the TR QA Manager to ensure the contents of the C of C comply with purchase order requirements.

These actions will be completed by 9/15/2018.

Other Hardware / Product Affected

Problem Report Required Yes ☐ No ☒

No hardware is considered to be affected by this certificate of conformance submittal and content noncompliance. The engineering test report documents the proof of concept testing details related to these non-deliverable hardware items.

Response Provided by: J. DeBon 7/31/18
Date
Response Approved by: J. DeBon 7/31/18
Date
QA Manager Approval: A. D. Mer 7/31/2018
Date

CERTIFICATE OF CONFORMANCE

CUSTOMER: NuScale Power

MASTER SERVICE AGREEMENT NO. : CO-1012-2074

TASK ORDER NO. : 11, Rev. 0, SW-1114-9480 R0

TR PROJECT: 15Z501

SERVICE DELIVERED: ECCS Valve Proof of Concept Testing, Including Test Report TRP 9785


Target Rock a business unit of Curtiss-Wright Corporation, certifies conformance with the requirements of the referenced Master Service Agreement, Task Order and SW as indicated below for services performed and documented in TRP 9785, Proof of Concept Test Report for ECC System Valves, (which includes test procedure TRP 9484 as Appendix D). No deliverable hardware items were supplied as part of this task.

Task Order 11, Rev. 0, SW-1114-9480 C of C requirements and TR response:

1. Identifies the purchased material, equipment, or service and is traceable to the NuScale procurement document assigned to the work and required deliverables.
TR response: The above referenced "Service Delivered" and "Task Order" provide the identification and traceability.
2. Identifies the specific procurement requirements met by the purchased material, equipment, or service (e.g., codes, standards, and other specifications);
TR response: The procurement requirements of Task Order 11, Rev. 0, SW-1114-9480 R0 have been met with the exceptions as noted in 3 below.
3. Identifies any procurement requirements that have not been met, together with an explanation and means for resolving the nonconformance(s);
TR response: The procurement requirements which have not been met are documented on the attached TR internal CAR's 18-117, 18-118, 18-119 and 18-120. Note – previously approved NuScale SCAR's are not included herein.
4. Is signed or otherwise authenticated by a person who is responsible for this QA function, and whose function and position are described in the Supplier's NuScale-approved QA program.
TR response: See below authorized signature and Title.

5. Has been generated in accordance with the certification system established by and described in the Supplier's QA program.
TR response: This C of C is generated in accordance with the below referenced NuScale approved TR QA Manual.
6. Certifies conformance with all requirements of the purchase order;
TR response: See certification conformance statement in the first sentence of this C of C.
7. References the QA Program and the title and revision/date of the QA Manual utilized to fulfill the scope of the purchase order;
TR response: See below TR QA Manual reference.
8. Is provided on the letterhead of the company to which the procurement document was issued.
TR response: See letterhead above.

Target Rock Nuclear Quality Assurance Manual, QMP1023 Edition 10, Revision 1, dated 10/27/2016 is applicable.

 7/30/18

John DeBonis Date
Quality Assurance Manager Energy Products

<p align="center">CW- TARGET ROCK CORRECTIVE ACTION REQUEST</p>	<p align="center">CAR NO.: 18-118</p>
<p>To: J. DeBonis</p> <p>Cc:</p> <p>Originator / Date: J. DeBonis 5/17/18</p>	<p>Project / Part / Serial No.</p> <p>15Z501 / TRP 9484</p> <p>Response Due Date: 7/31/18</p> <p>Reviewed by: A. DiMeo 5/17/18</p>

Description of the Nonconformance Operations

NRC Notice of Nonconformance 99900060/2018-201-02 states:

TR failed to establish measures to assure that measuring and test instrumentation used during test activities affecting quality were adequately controlled, calibrated, and adjusted at specified periods to maintain accuracy within necessary limits. Specifically, TR failed to:

1. Control the traceability and calibration of a linear variable differential transducer (LVDT) used during POC test activities to measure the main valve disc position indications. TR did not control the LVDT under its calibration program.
2. Control the traceability and document the pre-test calibration of individual pressure transducers used during POC test activities of the ECCS valve to measure the inlet and outlet pressure, chamber pressure and inadvertent actuation block (IAB) valve pressure. TR did not control pressure transducers under their calibration program.
3. Control the traceability and document calibration status of the micrometer used for pre-test dimensional inspection of: (1) the arming valve disc position, (2) the main valve disc lift measurement, and (3) the IAB valve parts. TR did not control the micrometer under their calibration program.

Immediate Action Taken to Correct the Identified Nonconformance

TR confirmed the nonconforming condition described above.

Root Cause of the Identified Nonconformance – Reason for the noncompliance

1. Note for clarification: an LVDT is a linear variable differential transformer. The LVDT utilized for this test program was specified by the drawing and Engineering bill of material. QMP1004, Design Control, does not currently prohibit the Engineer from releasing M&TE as part of the project bill of material. The LVDT specified was a production unit taken from TR inventory. Since this was specified as a production item (i.e. like a valve part), it was not controlled as part of Target Rock's M&TE program. This item was receipt inspected, and functional operation was verified when installed on the test valve prior to initiation of testing.
2. Pressure transducers' physical configuration is easily modified (via addition of plates of varying thickness) to accommodate the required range for the application. Since pressure transducers configuration can change, they do not lend themselves to identification with a fixed M&TE bar code number. The transducers utilized for this testing were physically labeled with the fixed valve location. The labeling provided traceability to pre and post-test calibrations for inlet, outlet, chamber and IAB pressure transducers. The pressure transducer pre-test calibrations were retrieved from computer traces and verified to be satisfactory. Post-test calibrations were not performed by the technician. Procedure QMP1011, Control of Inspection, Measuring and Test Equipment, did not address pressure transducers nor include the requirement to preform pre and post test calibrations.
3. Regarding Description of the Nonconformance Operations items 3 (1) and 3 (2) above, TRP 9484, Figures 1 through 5 did not include a location for the technician to record the measuring device

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identifier, and calibration date. Procedure A&T001 does not specifically require test technicians to record all M&TE used, regardless whether the test procedure includes a location for recording the information or not. For Description of the Nonconformance Operations items 3 (3) above, the IAB valve parts were inspected in the QC department prior to the assembly and testing process. QMP1010, Inspection and Testing, does require QC personnel to record all M&TE used during an inspection on an inspection attribute sheet. Target Rock verified Project 15Z501 attribute sheets did contain the M&TE bar code numbers used for IAB valve part inspections.

Root Cause Corrective and Preventative Action – Corrective steps taken or will be taken and date actions will be completed

1. QMP1004 shall be updated to specify Engineering shall not release M&TE on a project Bill of Material. Therefore, any M&TE required to satisfy testing requirements will be provided and controlled under TR's calibration program per QMP1011.
2. Procedure QMP1011 will be revised to include pressure transducers and to require the performance of both pre and post test calibrations when they are used.
3. Procedure A&T001 will be revised to require test technicians to record all QMP1011 controlled M&TE used, regardless of whether or not the test procedure or work instruction includes a location for recording the M&TE information.

These actions will be completed by 9/15/2018.

Other Hardware / Product Affected

Problem Report Required Yes ☐ No ☒

No hardware is considered to be affected by the engineering proof of concept testing M&TE issues on these non-deliverable items. Further qualification testing is required prior to delivery of components to be used in nuclear power plant applications.

Response Provided by: [Signature] 7/31/18

Date

Response Approved by: [Signature] 7/31/18

Date

QA Manager Approval: [Signature] 7/31/2018

Date

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CAR 18-117

Attachment to TR Certificate of Conformance

Reference Copies of CAR 18-119 and 18-120

CW- TARGET ROCK CORRECTIVE ACTION REQUEST	CAR NO.: 18-119
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To: J. DeBonis Cc: Originator / Date: J. DeBonis 5/17/18	Project / Part / Serial No. 15Z501 / TRP 9484 Response Due Date: 7/31/18 Reviewed by: A. DiMeo 5/17/18
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Description of the Nonconformance Operations

As identified during NRC Inspection, for NuScale Proof of Concept testing performed per NuScale Task Order 11 and SW-1114-9480, water chemistry requirements were not satisfied. Target Rock's Test Procedure, TRP 9484, pH requirement for the test water is 6.5 to 8.5. The facility water chemistry log for test dates of 11/3/15 and 11/4/15 show an actual pH of 9.0 and 8.8.

Immediate Action Taken to Correct the Identified Nonconformance

TR confirmed the facility water chemistry log entries.

Root Cause of the Identified Nonconformance

TRP 9484 Section 3.2 is titled "Test Water". Paragraph 3.2.1 states: "Water quality shall meet the requirements of ASME NQA-1 Table 304.1 for fresh water."

NQA-1 Part II Paragraph 304.1 states: "The water quality for mixing cleaning solutions, rinsing and flushing shall be specified ... Table 304.1 of this Subpart lists minimum water quality requirements commonly used for such purposes in nuclear cleaning operations."

TR imposes very stringent controls for facility water per TRP 617, "Procedure for Control of Cold Test Facility Water Chemistry". These controls are established to provide compliance with Military Specification MIL-STD-767. TR uses TRP 617 Grade B controlled water for the bulk of preliminary, operational, and production testing involved with completion of valve builds across all product lines. When non-TR standard water chemistry is required by customer contracts, TR will also purchase two-hundred (200) Liter barrels of "special water" to meet the specific customer requirements. However, when special water is imposed, it is typically only used for final rinsing and flushing of all internal wetted surfaces prior to packaging and shipping. This TR practice is in alignment with the water quality requirements of NQA-1 paragraph 304.1 which discusses cleaning operations. Since the valves manufactured for this order were not production valves and were not procured for installation in a nuclear facility, final rinsing and flushing with the special water was not considered required and therefore was not performed.

Root Cause Corrective and Preventative Action

Test Procedure TRP 9484 has been revised to clarify the test water shall be in accordance with TRP 617, Grade B. Since the valves tested to this procedure were not production hardware/deliverable items, there is no requirement to perform final rinsing or flushing with "Fresh water" per NQA-1. The revised test procedure, TRP 9484, and test report, TRP 9785 which includes testing results per TRP 9484 were submitted to NuScale Power, LLC and were approved by NuScale Power, LLC on 7/30/2018.

Other Hardware / Product Affected	Problem Report Required Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
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No product is considered affected by this issue as no deliverable product is involved. Further qualification testing is required prior to delivery of components to be used in nuclear power plant applications.

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Response Provided by: W. V. Miller 7/31/18
Date
Response Approved by: J. Wilson 7/31/18
Date
QA Manager Approval: A. D. Miller 7/31/2018
Date

