

# KONECRANES®

Lifting Businesses™

Konecranes Nuclear Equipment & Services  
5300 S. Emmer Drive, New Berlin, WI 53151  
P 262.364.5700 F 262.364.5701

Date: October 18, 2017

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

Cc: Chief, Quality Assurance Vendor Inspection Branch-2, Division of Construction Inspection and Operational Programs, Office of New Reactors.

This letter serves as the Konecranes Nuclear Equipment & Services, LLC (KNES) Reply to a Notice of Nonconformance-Additional Information furnished as planned to support final review and closure of Nonconformance 99901451/2017-201-01

Reference: Inspection Report No. 99901451/2017-201

Enclosures: Customer Acceptance Letter and Calculations as follows:

1. Customer Acceptance letter: AI 17-14312-01 dated 10/12/2017 with attachments  
There are (2) complete proprietary copies for NRC view only, and (2) **bracketed** public view copies with proprietary information removed.

2. Palo Verde Nuclear Generating Station-APS Aux Hoist Reeving Calculations Rev. 05 dated September 28, 2017.  
There are (2) complete proprietary copies for NRC view only, and (2) **bracketed** public view copies with proprietary information removed.

2. Palo Verde Nuclear Generating Station-APS Main Hoist Reeving Calculations Rev. 07 dated September 28, 2017.  
There are (2) complete proprietary copies for NRC view only, and (2) **bracketed** public view copies with proprietary information removed.

Konecranes Nuclear Equipment & Services, LLC (KNES) is pleased to furnish the enclosed objective evidence to the NRC in accordance with our corrective action response plan, and feel confident that the review of this information by the NRC will result in the acceptance of our response and ultimate closure of this nonconformance.

Sincerely  
Konecranes Nuclear Equipment & services, LLC



Tom McCann  
Global Director of Nuclear Quality

IE09

NRD

**AI 17-14312-01**

**NRC QUESTION FOR POLAR CRANE REPLACEMENT PROJECT ON THE USE OF  
NYLATRON® MATERIAL FOR SHEAVES**

This action item addresses the NRC requested information on the use of Nylatron® for the sheaves on the main and auxiliary polar crane hoist. The purchase specification 13-CN-0390 required the replacement components for the polar crane trolley meet the requirements of NRC endorsed NOG-1, *Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)*, NUREG-0554, *Single-Failure-Proof Cranes for Nuclear Power Plants*, and NUREG-0612, *Control of Heavy Loads at Nuclear Power Plants*. Konecranes (KNES) took an exception to the requirements of NOG-1, to address weight restrictions in the purchase specification, by using Nylatron® vs steel for the manufacturing of the sheaves. NOG-1, 2004, Section 5427.1, states that sheaves shall be steel. (See SDOC CN390-A00200, Page 82 of 193 for the description of the exception).

KNES provided APS with a justification for the use of Nylatron®, including a white paper dated August 24, 2017. (See attached vendor memo, Subject: *APS Polar Crane Modification Justification for Using NYLATRON® GSM BLUE Sheaves*).

The Nylatron® sheaves were specifically addressed in the Main and Auxiliary Hoist Reeving calculations (See sections 5.3.5 of both SDOCs CN390-A00181 and 204, respectively) each of which went through formal engineering review, comment, and approval from APS modification engineering, civil design engineering and the architect engineering firm mechanical engineer. The sheave design uses Nylatron® GSM Blue material which is designed specifically for sheave applications to provide significant weight savings on trolleys (approximately 8,000 lbs.) and reduced loading on the wire rope, as described in the aforementioned white paper.

The crane vendor failure modes and effects analysis (See SDOC CN390-A00182, Tables 1 and 3 for the Main and Auxiliary Hoist, respectively) documents that a failure of a sheave will not result in a loss of load. In addition, the supporting sheave pins are designed with greater than a 10:1 safety factor as described in the reeving calculations.

KNES has installed single failure proof cranes at Zion, Peach Bottom, Crystal River, and Waterford that use Nylatron® for the sheave material.

The PVNGS Polar Crane replacement is being performed under design modification work order (DMWO) 3282819. The 10 CFR 50.59 for this modification addresses this NOG-1 exception (See Screening S-16-0014), and references the technical justifications for the Nylatron® material with regard to its load carrying capability, containment environmental effects and post-accident sump performance, e.g., no impacts on sump performance or in-vessel effects (See SDOC CN390-A00239 for the technical evaluation).

This issue was originally identified in *Konecranes Nuclear Equipment & Services LLC's Nuclear Regulatory Commission Inspection Report No. 99901451/2017-201, and Notice of Nonconformance*, dated September 13, 2017 (ADAMS Accession number ML 17235B230). KNES initiated corrective/preventive action report (P/CAR) No. 749 to address this issue. KNES is documenting the results of the extent of condition review for this issue and is determining the effects, if any, on any previously delivered safety-related components.

APS provided a letter (ID number 484-09275) dated October 12, 2017, to the crane vendor through the procurement process, accepting the NOG-1 exception for use of the Nylatron® sheaves material, which will support resolution of the identified nonconformance.

**Stephenson, Carl  
J(Z05778)**

Digitally signed by Stephenson, Carl J(Z05778);  
DN: cn=Stephenson, Carl J(Z05778)  
Reason: I am the author of this document  
Date: 2017.10.12 15:12:25 -0700



*A subsidiary of Pinnacle West Capital Corporation*

Mick Mayfield  
Fukushima Project Manager  
Engineering Projects  
Palo Verde Nuclear Generating  
Station

Tel. 623-393-7287  
Cell: 815-985-5091  
email: Mickey.Mayfield@aps.com

Mail Station 7904  
5801 S. Wintersburg  
Tonopah, AZ 85354

**Date:** October 12, 2017

**Project ID # ZC-1311-17363-P**  
**ID #: 484-09275-MM/ac**

Koncranes Lifting Businesses  
Nuclear Equipement & Services  
5300 Emmer Drive  
New Berlin, WI 53151

**Attention:** Jay Edmundson

**Subject:** APS PVGS Acceptance of the use of Nylatron for Sheaves on the Replacement Trolley Assemblies


**Attachments:** CR 17-14312

Jay:

DMWO 3282819 for the replacement of the polar crane trolley assemblies and additional components necessary to meet NOG-1 Compliance for a Single Failure Proof Crane has reviewed Konecranes exception to the NOG-1 compliance and find the use of Nylatron acceptable. The review process included the original exception to NOG-1 with document 36676-22 Rev 0 which prompted APS to request a white paper describing the thought process of KNES for the request of alternative materials. KNES provide a white paper dated August 24, 2017 that provide material properties, methodology, and OE that formed the basis for APS to have this addressed in the appropriate calculations and project documents. All associated documents then went the normal project evaluation process for approval and incorporation into the engineering design modification work order.

With all documents associated with the use of Nylatron and the DMWO Package approved for installation, the exception to NOG-1 for the use of Nylatron is formally accepted by APS for use in the replacement trolleys for all three units.

Regards,

 Mayfield,  
Mickey (ZB8637)  
DN: cn=Mayfield, Mickey  
(ZB8637)  
Date: 2017.10.12 12:18:03 -0700

**Mick Mayfield**

**X** Udall, Brian  
(Z08978)

Digitally signed by Udall, Brian  
(Z08978)  
DN: cn=Udall, Brian (Z08978)  
Reason: APS Responsible  
Engineer  
Date: 2017.10.12 07:23:31 -07'00'

---

**Brian Udall**

**X** Craig,  
Ashley  
(ZP2435)

Digitally signed by Craig,  
Ashley (ZP2435)  
DN: cn=Craig, Ashley (ZP2435)  
Reason: Transmitting on Behalf  
of Mick Mayfield  
Date: 2017.10.12 12:34:43  
-07'00'

---

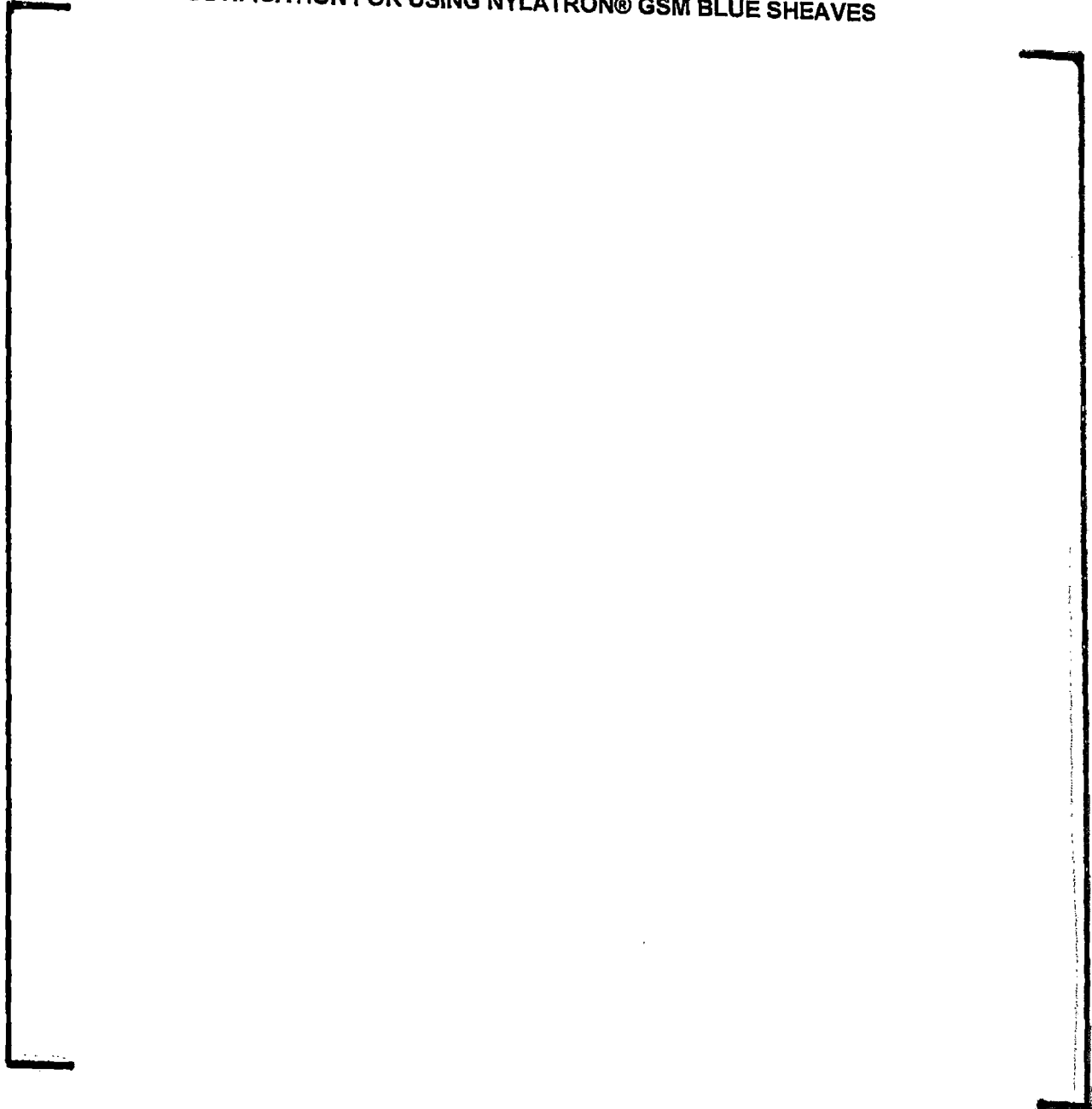
**Ashley Craig**

Cc: Allan Remund  
Ewa Kusnier  
Mathew Cox  
Carl Stephenson  
Hani Al-Nakib  
Patrick Burch  
Brian Udall  
Phillip Relph  
Abel Craig

August 24, 2017

Mr. Mick Mayfield  
SR Project Manager  
Engineering Projects Department  
Palo Verde Nuclear Generating Station  
5801 S. Wintersburg  
Tonopah, AZ 85354

**SUBJECT: APS POLAR CRANE MODIFICATION  
JUSTIFICATION FOR USING NYLATRON® GSM BLUE SHEAVES**





If you have any questions, please do not hesitate to contact me at your earliest convenience.

Sincerely,



Customer Approval Signature / Date

Jay D. Edmundson, P.E.  
Chief Engineer