

# HydraNuts on RHR Heat Exchangers

at Perry Nuclear Power Plant

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Nuclear Power Products and Services



## ABOUT

Perry Nuclear Power Plant engineers identified their Residual Heat Removal (RHR) heat exchangers as having a degrading thermal performance trend. Based on the evaluation, two of the four heat exchangers were selected for cleaning during the Spring 2023 outage.

## CHALLENGE

Plant engineers needed to find an innovative solution to keep the planned outage on schedule and continue to achieve the site's ALARA goals.

## SOLUTION

Curtiss-Wright's HydraNut allowed the plant to save multiple days and shifts for this maintenance activity while improving worker safety and reducing radiation dose exposure. HydraNut also provided an even loading of the gasket to prevent a seal leak.

## Background

The Residual Heat Removal project at Perry Nuclear Power Plant included draining the heat exchangers that are cooled by Emergency Service Water (ESW) and removing the channel covers to gain access to the tubes. Based on previous data from this process, reassembly of the RHR Heat Exchangers could require at least 48 hours per heat exchanger, due to the 60 hex nuts that need retorquing to final closure.

This schedule is based on the graduated manner in which the hex nuts must be tightened in order to assure a uniform stress distribution. However, the potential need to extend the outage to perform these procedures prompted the engineers to procure Curtiss-Wright's HydraNut fastener system, which was already being used on the plant's Main Steam Safety Relief Valves (MSRVs). Perry's Design Engineering group teamed up with Sargent & Lundy to develop an engineering change package (ECP) to permit use of the HydraNut.

## Project Scope

HydraNuts are self-contained tensioning units that are used to replace normal nuts, and remain on the flange after tensioning. By utilizing hydraulic pressure to initially tension/stretch a stud instead of torque, HydraNuts offer accurate loading and minimize propensity for thread galling. Their ability to simultaneously tension/detension all studs on a flange significantly reduces maintenance time while improving worker safety and procedure adherence. After installing the HydraNuts on the studs, hydraulic pressure is used to simultaneously elongate all the studs to a predetermined load. Lock rings are then hand-tightened. Once hydraulic pressure is released, the hoses are disconnected, and the HydraNut is now mechanically retaining the stud load by holding the stud in its elongated state.

## Results

By utilizing HydraNut on the RHR Heat Exchangers at Perry, flange tightening changed from an arduous multi-day torquing process to about a one-hour tensioning job. Because these heat exchangers are located within a radiologically controlled area, the amount of time savings translates to significant dose savings – helping the site achieve its ALARA goals.