

HydraNuts on Main Steam Relief Valves

At Columbia Generating Station

**CURTISS-
WRIGHT**

Nuclear Power Products and Services



ORGANIZATION

Columbia Generating Station is a boiling water reactor (BWR) nuclear facility located near Richland, Washington.

CHALLENGE

Plant personnel identified a need for an efficient, low-dose solution to apply preload to studs and tightening flanges on Main Steam Relief Valves (MSRV) during their spring 2019 outage.

SOLUTION

Columbia selected Curtiss-Wright's HydraNut High-Temperature Hydraulic System to support their outage maintenance.

RESULTS

By using HydraNuts during spring maintenance, Columbia reduced time, labor, and radiation dose while achieving more accurate preloads. This change saved one (1) rem of dose and eliminated four (4) shifts of work.

Background

Columbia Generating Station's plant personnel were looking for ways to remove and install their valves safely and efficiently, while maintaining the integrity of the joint. Columbia selected Curtiss-Wright's HydraNut High-Temperature Hydraulic Bolting System to reduce time and dose during flange installations and removals.

Curtiss-Wright's HydraNut System is a direct retrofit for any torquing or tensioning application, replacing existing tooling and hex nuts or bolts. The system provides 100% simultaneous tensioning of all nuts or bolts.

Columbia installed 60 HydraNuts on 5 MSRV inlet flanges during their 2019 spring outage. The inlet flange in this application is a 12-stud hole flange with 1.375-8 UN-2A studs. This was the first time Columbia had installed HydraNuts in a Section III Class 1 application. Thus, in addition to HydraNuts, Columbia also requested an ASME design report and necessary hydraulic equipment from Curtiss-Wright. The design report is a one-time purchase for any application, which will be applied to future HydraNut installations on the remaining 13 MSRV flanges at Columbia. The hydraulic equipment is completely reusable on all HydraNuts supplied for this application and future applications.

Dose and Time Savings

Columbia personnel estimate that they saved one rem of dose and eliminated four shifts of work by implementing the HydraNuts in this application. Torquing nuts and studs on five inlet flanges using traditional methods previously required five shifts with two workers in each shift. Tensioning with HydraNuts was completed by three workers in one shift.

Conclusion

Following installation of the MSRV HydraNuts, Columbia personnel were able to reduce outage time, labor, and dose while achieving more accurate preloads and minimizing propensity for galling. The site plans to install HydraNuts on four or five inlets and HydraBolts on four or five during each subsequent outage until all eighteen MSRVs are outfitted. In addition, Columbia is pursuing other applications for HydraNut on valve and pump flanges, which could include Main Steam Isolation Valves (MSIV) and reactor water clean-up pumps.

Curtiss-Wright estimates each bolting evolution from tensioning through detensioning could save approximately \$12,700 in dose and labor per flange with HydraNuts. The estimated cost-savings using HydraNuts on all 18 MSRV inlets through 2043 is nearly \$500,000 with a realized dose savings of 35 REM during that period. Significant savings will occur on each removal at an 8 year interval.

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