

Case Study: Design and Fabrication of Obsolete Let Down Coolers

Project Summary:

Site / Location:

USA

Scope of Work:

Obsolete Letdown cooler
replacement

Design and Fabrication

Tube side: ASME Section III Class 3

Shell side: ASME Section VIII Div 1

N and U Stamped

Basic Equipment Details:

Shell diameter- 43"

No. of tubes: 30

Design Pressure- 2500 psig

Design Temperature- 650° F

Tube mat.- SA 213 T316L

Shell mat. - SA 516 Gr 70

Dry weight- 4700 lbs

Flooded weight- 5800 lbs

Design and fabrication of obsolete coolers helps mitigate obsolescence issue



The Chemical and Volume Control System (CVCS) purifies the reactor coolant, adds and removes boron as necessary, and provides seal water injection within a Pressurized Water Reactor (PWR). A small amount of water is continuously fed to the CVCS from the reactor coolant system, called letdown, to provide cleanup of the reactor coolant. The letdown cooler lowers the letdown fluid temperature, so it is compatible with the ion exchanger resin. The letdown cooler is a critical part of the CVCS in a PWR.

A North American nuclear plant needed to replace their existing let down coolers however the original manufacturer no longer had a nuclear quality program and was unable to supply replacement equipment. Energy Steel was able to solve this obsolescence issue by designing replica coolers and supplying them through their nuclear quality program.

The letdown coolers have a manifold style coil bundle with 30 tubes welded at both ends. The tube side is designed according to ASME Section III, Class 3, Subsection ND and the shell side to Section VIII Division 1. Energy Steel completed the design work leading to "N" and "U" stamps being applied. The tube side is designed for 2500 psig and 650° F and utilizes SA 213 T316L material. The shell side is designed for 200 psig pressure and 350° F. The complete vessel is a seismic class I vessel.

This project was due to an emergent need and Energy Steel was able to provide the equipment in time to meet the scheduled outage, minimizing any disruption to plant operations.