

Power House Upper Level Service Water (PULSW) Piping Replacement

CLIENT

Ontario Power Generation

LOCATION

Courtice, Ontario

PROJECT DESCRIPTION

The Powerhouse Upper Level Service Water (PULSW) system provides cooling water to reactor auxiliaries including the two Shutdown Cooling Heat Exchangers (SDC HXs). The PULSW supply and return piping to the SDC HXs has minimal flow when the reactor is at full power, which makes it very susceptible to microbiologically induced corrosion (MIC). Inspections performed in 2011 and 2012 indicated that the pipe walls were severely degraded due to MIC, with the majority of piping projected to reach critical wall thickness at the worst pit locations by 2020.

B&M SCOPE OF WORK

Black & McDonald (B&M) was tasked with performing a direct replacement of the large diameter (16 in. and 20 in.) supply and return line piping that runs between the PULSW Pump Room (Rx-013) and the SDC HXs (x-33410-HX1, x-33410-HX2). Approximately 1,200 feet of piping required replacement, and included pipe runs outside containment, inside containment, and beneath the fuelling machine duct. Valves, instrumentation, and branch lines connected to the supply and return lines required removal and reinstallation on the new piping. The piping routes were very congested and included multiple interferences that posed challenges to the replacement work. The interferences included, but were not limited to, cable trays, HVAC ducting, fire line piping, D2O transfer piping, and ECI / LPSW / ESW headers.

As the piping was experiencing MIC degradation in many different locations, multiple simultaneous failures (pinhole leaks) of the piping were possible. This could have had a significant impact on the capability of the SDC system to cool the reactor under both online and shutdown operating conditions. In order to ensure the capability of the SDC system was maintained, the degraded PULSW piping to the SDC HXs required replacement.

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The new piping followed the same route as the existing piping, and any interference for construction was addressed without the use of additional temporary or permanent modifications. This would likely require the use of specialized tooling and equipment as well as non-standard and innovative construction methods.

BENEFITS TO CLIENT

At project completion, B&M completed 1,200 ft. of supply and return piping and more than 530 ft. of drain and vent piping had been replaced.

