Canadian Light Source — Centre canadien de rayonnement synchrotron

Use of Variable Frequency Drive (VFD) pump motors to supply cooling water for CLS beamlines

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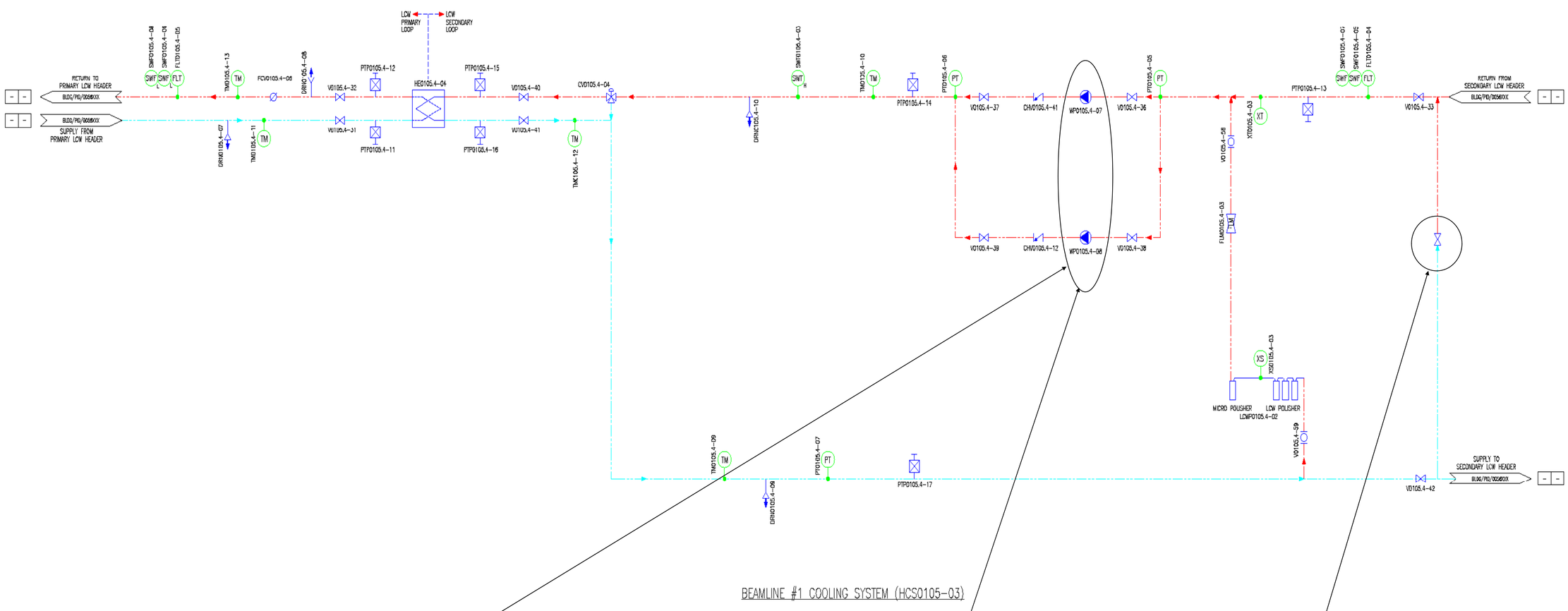
Problem: Beamline cooling water flowing through by-pass valves created a high level of noise in the experimental hall.

Background: The CLS uses low conductivity cooling water (LCW) to cool beamline equipment. The LCW is circulated by pumps which were originally sized for a fully utilized storage ring and therefore have a capacity that exceeds the current demand. As a result a portion of the flow must be bypassed using valves located above the storage ring. The pump motors will overload and trip if the bypass valves are either opened or closed fully. The demand on the cooling system will increase gradually as more beamlines are added to the storage ring.

Solution: Install Variable Frequency Drives (VFD) to control the pump motor speed. VFD's will control the pump motor speed to maintain a set pressure differential between the LCW supply and return lines. The pump will therefore only deliver the flowrate of water required by the various beamline cooling systems. The need to by-pass water will be eliminated and the velocity of water in the pipe will be reduced to match the system requirements. Both of these factors will reduce the piping noise.

Results: The VFD's were installed during the April 2008 outage and are currently operating at ~ 52Hz which is 87% of rated speed. The bypass valves have been closed and the resulting noise in the experimental hall has been noticeably reduced. In addition the power consumption of the pumps has been reduced by ~19% resulting in an estimated energy savings of 20,700kWh per year.



Emerson Variable Frequency Drives

Goulds 6SV 3 stage pumps with 15hp motors

Existing bypass control valve system will be removed.

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