

# Process Engineering



Examples of pipe obstructions causing low pressure within PWCS's process water system

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## Case Study: Process Water System

**Client:** Port Waratah Coal Services

### Project Summary

Port Waratah Coal Services (PWCS) Carrington uses a process water system for coal stockpile dust suppression, conveyor transfer point dust suppression and general wash down duties. They identified a number of issues associated with their process water system - the two main problems related to pressure. PWCS asked Advitech to investigate these issues and make recommendations for corrective action.

### Issue 1 - Pressure Surges

The first and highest priority problem was associated with pressure surges in the system. This was identified as a potential safety issue for operators performing hose down duties.

Advitech conducted a process investigation that included measuring pressures and flows for varying operating conditions, including turning coal stockpile sprays on and off. An assessment of the pump control strategy was conducted and identified as the primary cause of pressure surges. The existing process water pumps were controlled to switch on and off based on flow demand - meaning auxiliary pumps could cut in and out at any time should the water demand change on the plant.

Advitech recommended the system be converted to pressure control. To do this, variable speed drives were installed on the process water pumps and the speed of the pumps were varied to achieve a given pressure at the pumphouse outlet. PWCS reported a step change improvement in system performance after implementing the new control strategy.

### Issue 2 - Low Pressure

The second problem was associated with low process water pressures at various parts of the plant. Operators were experiencing low pressures at high locations such as transfer stations and conveyor gantries.

Advitech walked and measured a large section of the process water system in order to input to hydraulic modelling software called Piping Systems Fluid Flow. Pressure measurements were also taken at various points to calibrate the model to real data. During calibration of the model, Advitech identified sections of piping that were likely to have significant restrictions. The actual pressure readings at these sections of pipe were found to be far lower than the model predicted.

Subsequent internal inspection of the pipes revealed significant corrosion and restrictions. Further to this, Advitech modelled various scenarios for improvement of process water pressure for one pumping station that delivered water up a conveyor gantry. Options included altering pump control strategy, increasing pipe diameters and installing booster pumps part way up the conveyor gantry.