



## Pressure Setting Spool Piece

**Customer:** Anglo American – Grasstree Coal Mine

**Location:** Middlemount, QLD

**Case Study ID:** CS-76

**Date:** January 2016

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### Overview

Anglo American have engaged Dowdens Pumping & Water Treatment's Mackay Engineering Department and Fabrication Workshop to rectify an issue with a new valve station installation that was experiencing water hammer, resulting in the longwall mining operation being suspended at their Grasstree Coal Mine, located at Middlemount in the centre of the Bowen Basin, QLD.

Underground mines require water management systems in place to manage working water that is utilised for production, dust suppression, hydraulic jacks etc. Mines employ various methods of underground water transportation systems including Longwall Boost Pump Stations & filtered water from the mine surface networks. The filtered water system is an important piece of infrastructure for underground coal mines providing clean water for dust suppression & feeding the powerful hydraulic piston pumps that are used to jack up the roof in the longwall mining process.

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When water is fed into an underground mine it is received at very high pressure due to the vertical drop to the mine workings. This pressure needs to be reduced & controlled to levels that can be safely managed in the underground operations.

## The Problem

Responding to the urgent help request from Grasstree Mine, Dowdens immediately travelled to the site to undertake system 'fault finding' & begin planning the delivery of a timely and cost-effective solution to a problem with a new valve station installation that was experiencing water hammer, resulting in the longwall mining operation being suspended.

As filtered water flows vertically from the surface the pressure at the mine level can be several thousand kPa. Normal orifice or flow restrictors induce high velocities in a very short space resulting in cavitation & sonic sound which can erode the components & reduce their effect.



## Our Solution

Dowdens Engineers attended the mine site & listened/observed the problems that were being experienced such as pressure surges & water hammer in the feed pipes leading to the longwall operation.

Dowdens Engineering Department designed and developed a Pressure Setting Spool sized specifically to meet the specific duty required. The spool was custom designed using engineered fluid mechanics to reduce the pressure before it entered the valve station, taking part of the load off the station. Pipe supports were also engineered to provide a secure installation of the station.

The timeline to find the solution and manufacture the components was very tight. Engineering – Concept Design – Drawings and In-House Fabrication of the unique Pressure Setting Spool Piece (with roof bolt anchoring points) were completed and delivered to Grasstree Mine within 5 days from the first site meeting! No other pumping/manufacturing/engineering firm in Queensland was able to deliver such an all-encompassing product solution in the above-mentioned time frame.

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## Key Components & Features

- Dowdens customised Pressure Setting Spool Piece dissipates the energies over a larger area resulting in lower component wear & longevity of the performance of the system
- Water hammer was reduced & pressure fluctuations were controlled, allowing the valve station to operate at the flows & pressures for the specific location & duty
- Dowdens Pressure Setting Spool Piece has resulted in no more loss of coal production

Dowdens Pumping & Water Treatment has provided Grasstree Coal Mine with several Pressure Reducing Valve Stations over the life of the mine, enabling reliability & trouble-free operation.

## Brands used in this project



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