CENTENNIAL HYDRAULIC ISOLATION CONTROL SYSTEM (CHICS)

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Centennial Newstan

In conjunction with APT Training


WANT LONGER LASTING BALL VALVES ???


HAVE YOU
SUFFERED
FROM
PREMATURE
RESTORATION?


FAILED TO
HANDLE YOUR
PRESSURE
SAFELY ?

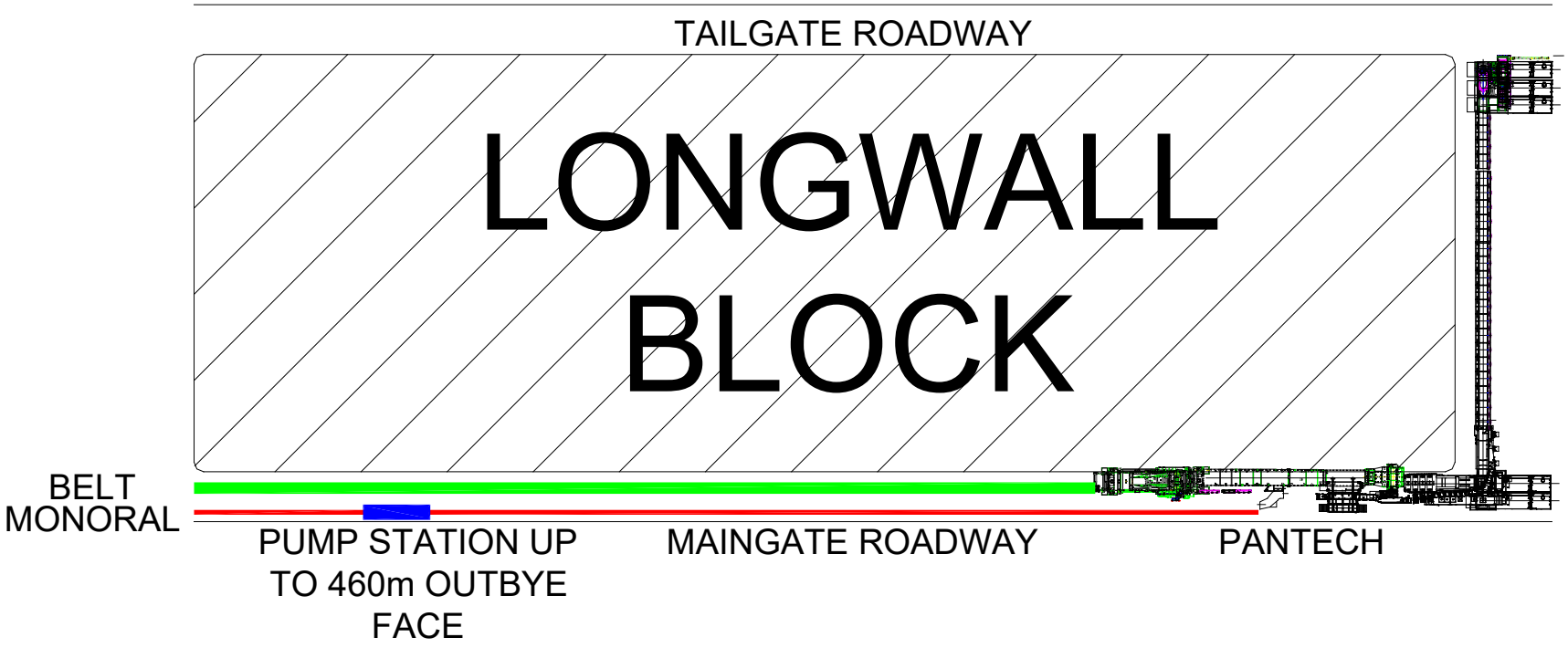

Queen Mary 2
CUNARD
Queen Mary 2
ANSWERED YES?, THEN YOU NEED...


1800 CHICS
CENTENNIAL HYDRAULIC
ISOLATION CONTROL
SYSTEM
FUEL

BACKGROUND

- Maintenance/relocation on the longwall requires the isolation of the incoming hydraulic supply from the pump station located on the Pantech.
- Incoming supply is via 40mm hoses that are isolated by a simple ball valve.

NEWSTAN ISOLATION POINTS



THE ISSUE

- An incident at Newstan Colliery occurred after the crew had isolated the incoming hydraulic supply during a longwall relocation.
- Isolation had been carried out correctly.
- Whilst the crew were temporarily taken off the job the system pressure had re-established itself
- When the crew resumed their initial task the system had re-pressurised resulting in a near miss.

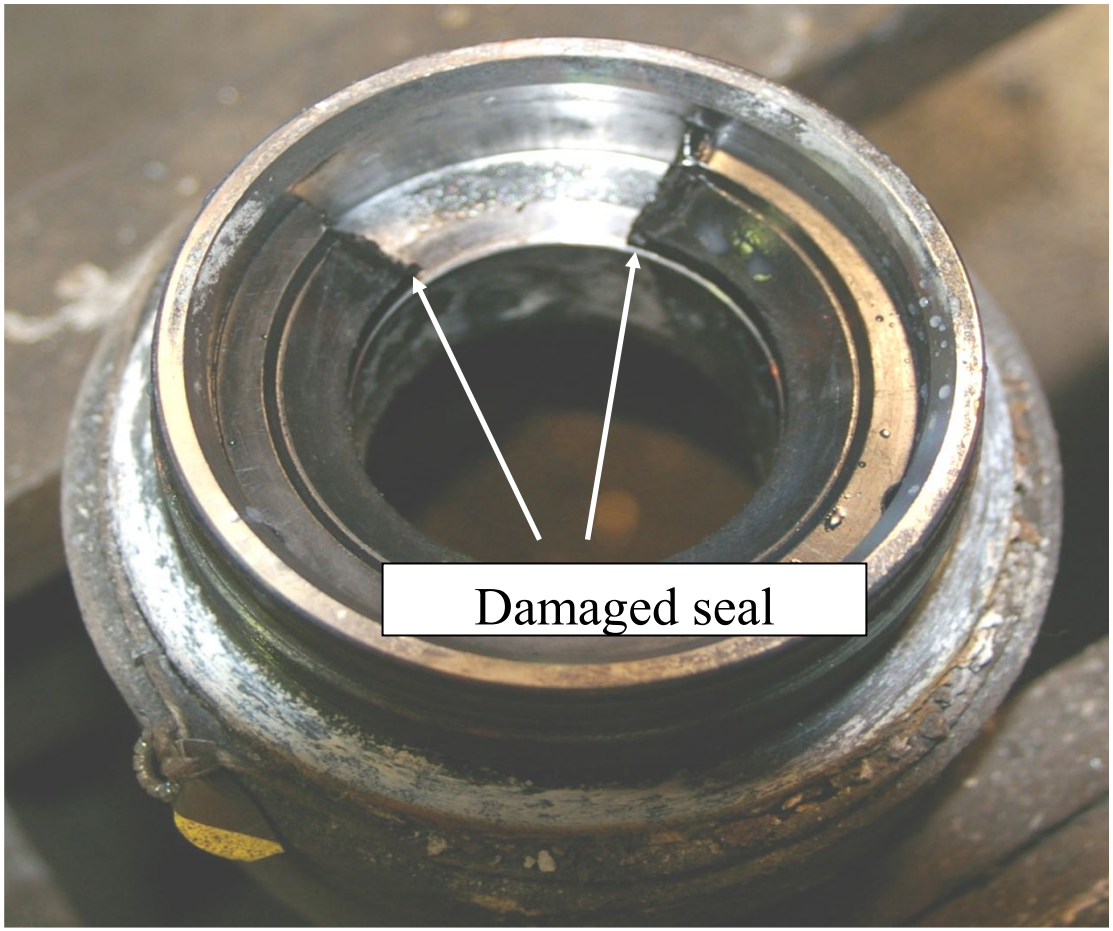
KEY CAUSAL FACTORS

- Faulty isolation equipment (failed seal in isolating ball valve)
- Verification methods used to prove isolation.
- Damage caused to ball valves by ‘throttling’ the high velocity fluid flow when restoring pressure to the system.

THE ISSUE

- Unintentional re-pressurisation of the hydraulic system.
- Investigation determined that the “root cause” was the damage to the seals in the 40mm ball valve
- The seals were damaged by hydraulic fluid flowing across the seals at high velocities causing erosion.

THE ISSUE



THE ISSUE

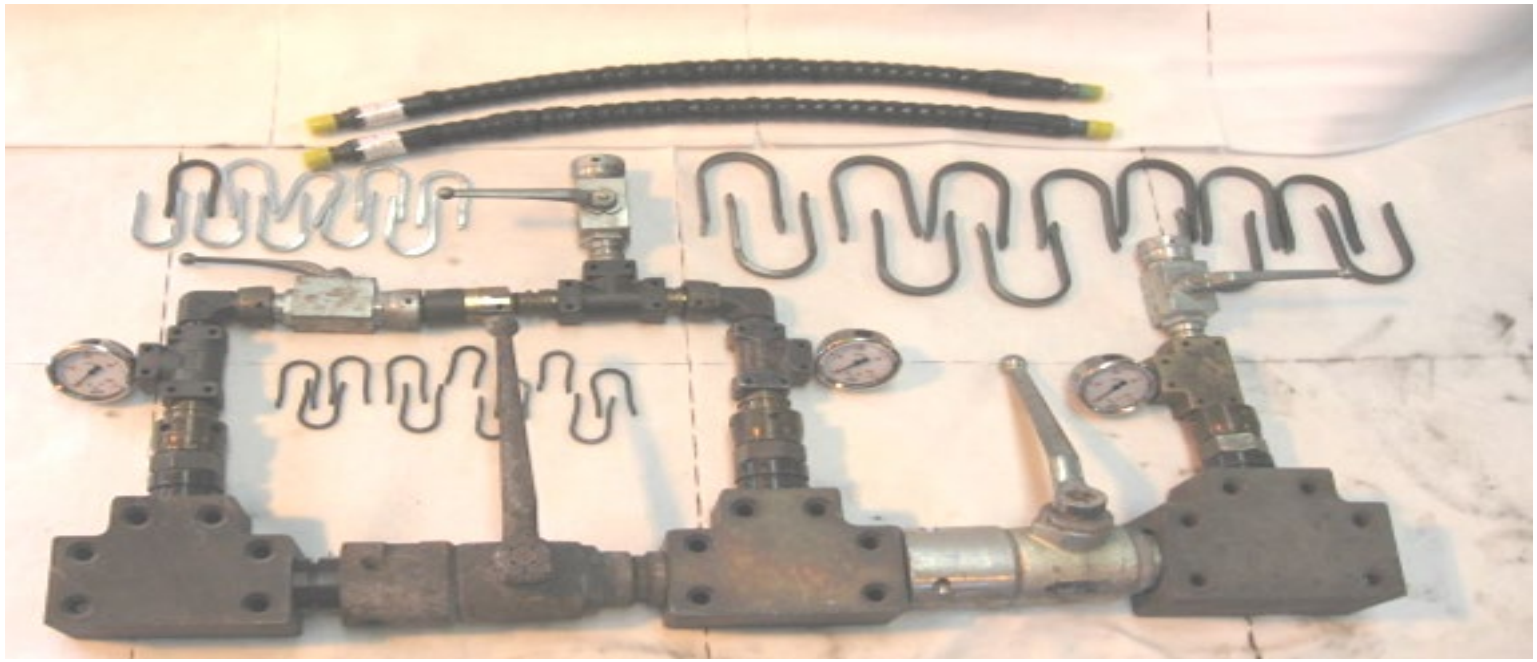
THE SOLUTION

A valve system with the ability to allow:

- the isolation and restoration of pressure with a sequenced key system;
- the pressure to be re-applied to the system at a controlled rate to prevent damage to seals;
- the dissipation of pressure at the isolation points; visual verification of the isolation procedure.

THE SOLUTION

- using standard ‘off the shelf’ fittings was found to be problematic due to the size and complexity of the finished product (70 components).

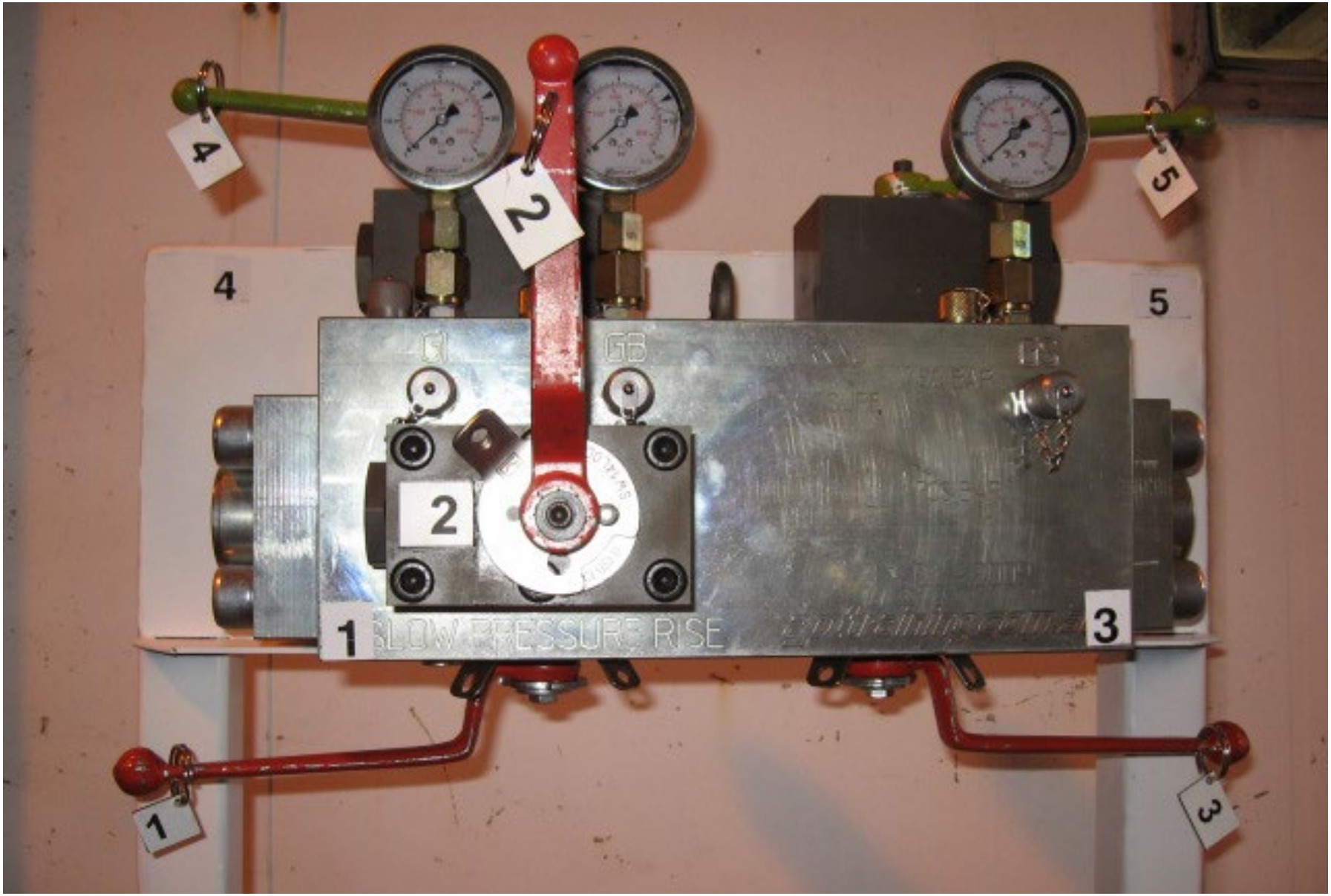


INTEGRAL ISOLATION BLOCK

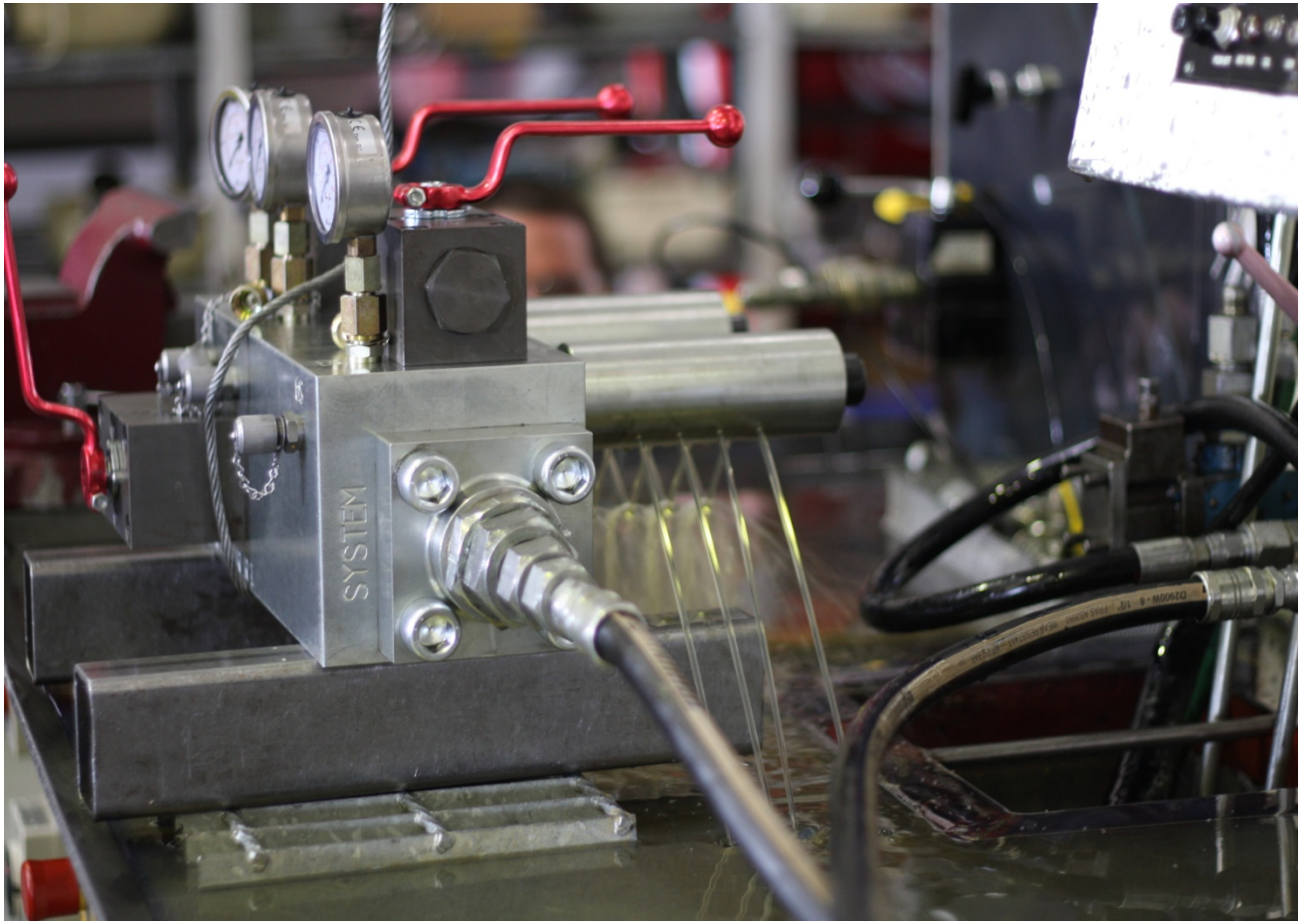
The integral isolation block addresses the issues.

- double isolation
- pressure dissipation
- verification of both isolation points
- slow pressure rise for re-energising the system.
- locking actuators (“Fortress”) allow for a keyed, sequenced system to ensure correct operation of the valves.

THE INTEGRAL ISOLATION BLOCK



THE INTEGRAL ISOLATION BLOCK



THE SOLUTION

The following animation demonstrates the sequencing of the valves and Fluid Flow

BENEFITS AND EFFECTS

The Integral Isolation block ***eliminates*** the possibility of the incident occurring again.

It is a positive means of:

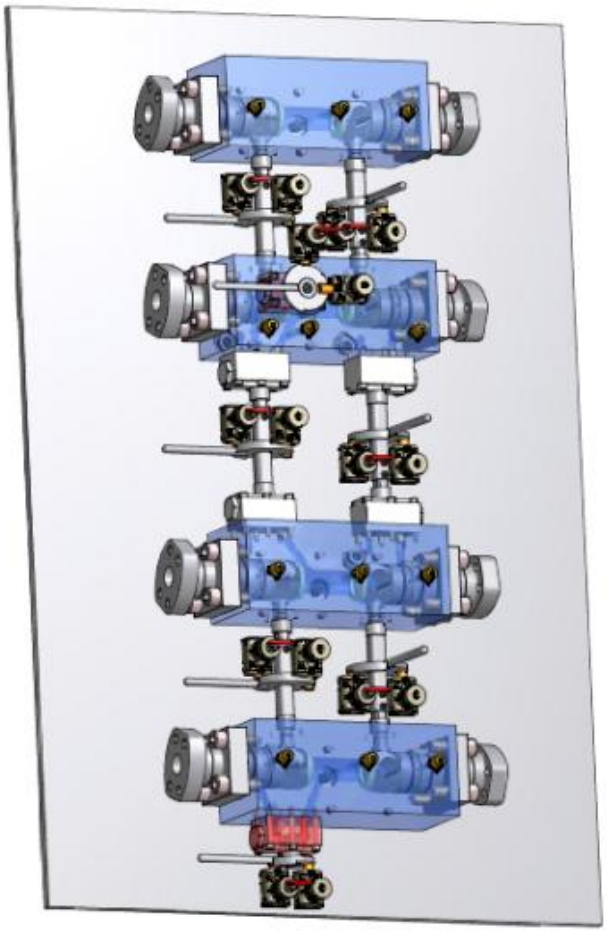
- Isolating with a sequenced key system
- Dissipating residual pressure
- Confirming the effectiveness of isolation, using two visual methods, ***all at the one point.***

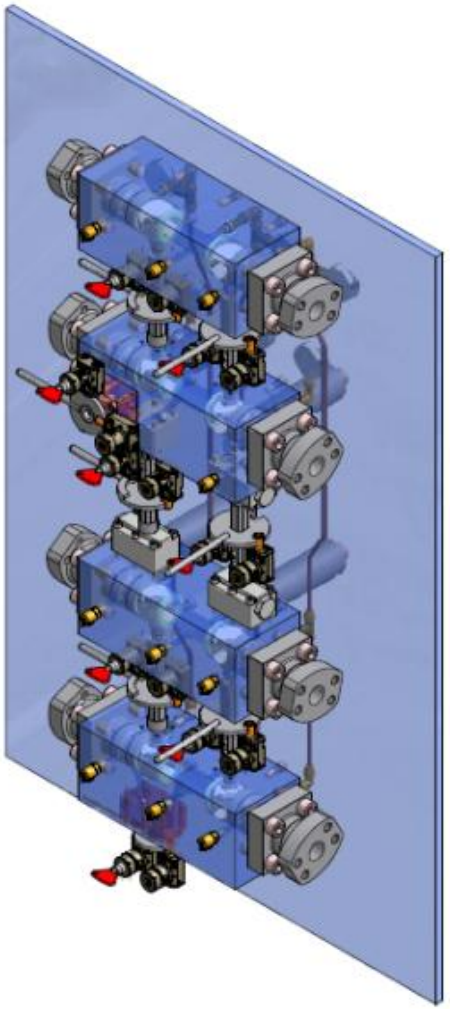
BENEFITS AND EFFECTS

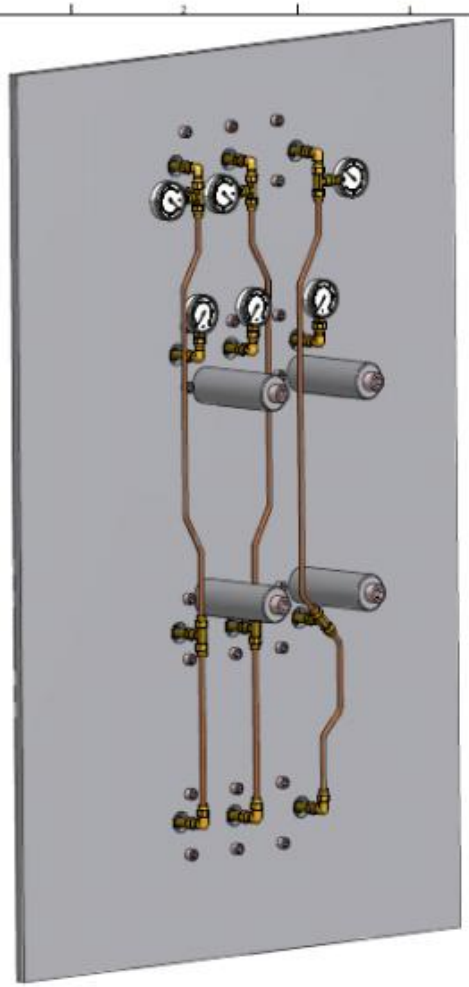
It incorporates a bypass metering system which will:

- reduce high pressure spikes during restoration
- prevent operators from deliberately metering the flow
- increase the reliability of the valve system
- reduce maintenance costs.

The valve can also be placed in multiple banks to enable zones of isolation, as can be seen in the following drawing. This prototype is ready for manufacture and installation on the longwall at the Centennial Coal Mandalong Mine .







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DRAWN	Administrator	20/03/2009
CHECKED		
QA		
MFG		
APPROVED		
ISSUED		

TITLE
APT
HYDRAULIC SAFETY PANEL
ARRANGEMENT
Part No: -

SIZE	DWG NO.	REV
A2	2009-07-15-PANEL	A

SCALE

SHEET 1 OF 2

BENEFITS AND EFFECTS

- There are isolation systems commercially available but this is the first isolation valve to incorporate all of these features in one integral unit.

- The valve internal components including seals are identical to “off the shelf” isolation valves, rated for modern high pressure longwall hydraulic systems. To pressurise the main hydraulic system the flow of oil is metered through a by-pass orifice. This eliminates the risk of the main isolation valves being exposed to high velocity fluid when operated resulting in damage to seals.

BENEFITS AND EFFECTS

Assessed to meet

- Safety Integrity Level (SIL) 2/3
- AS 4024.1501- section 7 and achieved a (CAT) 4 rating

INNOVATION & ORIGINALITY

This innovative system limits personnel exposure to the failure of high pressure fluid system components.

It has been developed at Centennial Newstan and is the first such system that integrates the complete isolation/restoration process.

RISK MANAGEMENT & CONSULTATION

When developing this system the Mine sourced information from relevant industry personnel including:

- Newstan Management team
- NSW Department of Primary Industry – Mine Mechanical Inspector
- APT Training
- OH & S Committee.

SIGNIFICANCE

This was an incident that could have had significant consequences.

A risk assessment was conducted with the following results:

Likelihood	- C -	Could happen
Consequence	- 3 -	Serious/Disabling injury
Risk ranking	- **13** -	**Significant**

Corrective action required, senior management attention needed to eliminate or reduce risk.

SIGNIFICANCE

Following development of the system, a further Risk Assessment was conducted and the results are as follows:

Likelihood -	D	Not likely
Consequence -	3	Serious/Disabling injury
Risk ranking -	**17**	**Low Risk**

TRANSFERABILITY

This system is applicable for use in any industry that requires the isolation and dissipation of high pressure fluids.

CALL

Centennial

Fighting to keep the workforce fit.