

Refuelling Solutions for Multiple Fuel Tanks – Cat 992 Loader

Customer Name

Evolution Mining

Location

Cowal Gold Mine, West Wyalong, NSW
(350km west of Sydney)

Customer Business

Evolution Mining is the 2nd largest ASX listed gold miner. They operate five gold mines in Australia. The Cowal Gold Mine is a conventional load and haul, drill and blast open-pit operation. This site is Evolution Mining's largest operation by far.

In FY18 Evolution forecast production of 750,000 - 805,000 ounces of gold, at an all-in sustaining cost of A\$820 – A\$870 per ounce.

Evolution has a reputation for reliability. It has a track record of consistently achieving production and cash cost guidance, whilst pursuing superior safety and environmental management outcomes.

Evolution has been announced as winner of the NSW Mining Safety Excellence Award, and has an ISO 14001 certified Environmental Management System.





Before

Business Challenges

Evolution is committed to outstanding levels of environmental performance, as well as reducing the safety risks to which its 520 employees and contractors are exposed at the Cowal site.

Lake Cowal; located directly beside the mine site is a dedicated bird and wildlife sanctuary. The lake is New South Wales' largest natural inland lake, and is a protected ecosystem with over 180 different species of birds. Evolution is very careful not to put anything into, or take anything out of the lake.

Cat 992G Wheel Loaders – Refuelling System Reliability

A number of challenges related to the refuelling of two 992 Cat Loaders which were exhibiting similar issues related to refuelling. Cowal is a 24 hour operation, and these loaders were refuelled by a service truck, which was scheduled to fill them twice a day.

These particular machines have three fuel tanks. They are refuelled from a single high volume (HV) fill point at around 400lpm (106gpm). Diesel pumped into tank 1 then needs to make its way into tanks 2 and 3 via a 4" balance pipe.

Refuelling Problems:

Overfill

- ▶ During refuelling, the near-side fuel tank would become full, pressurise, and then spill diesel from the tank vent onto the vehicle and onto the ground, increasing the probability of machine damage from tank over-pressurisation or fire. The spilled diesel was also a significant environmental concern for teams on site, a situation that needed to be resolved proactively

Staff Safety

- ▶ Because the dry break fuel systems were not filling the Cat 992G Wheel Loaders with a sufficient amount of diesel, operators either needed to fill, wait 15 minutes, and then fill again, or open the splash fill hatches on the tanks and visually check the levels as the tanks filled at high speed. Opening the splash fill hatches overrides the auto shut-off functionality of the refuelling system. In the interests of staff safety, the slower process had to be chosen until a solution was found.

Underfill

- ▶ Refuelling would cease when tank 1 was full, but tank 2 and tank 3 had still received insufficient diesel. The wheel loaders did not have enough fuel onboard to complete another shift before the service truck returned. This caused situations where the service truck would need to be called back from the other side of the mine site to refuel a wheel loader again, reducing the productivity of the loader, and also delaying refuelling for the hundreds of other fuel-consuming assets on site.
- ▶ The process of filling the wheel loaders was to fill tank 1, wait for up to 15 minutes for the diesel to settle across all three tanks, and then fill tank 1 again. This issue with both loaders represented a significant process inefficiency.



No refuelling system manufacturer had an off-the-shelf solution for multi-tank refuelling that effectively addressed Cowal's issues around tank overfill, underfill, pressurisation, and the slow refuelling of wheel loaders.

During

The Engagement

Evolution Mining agreed to a three-month field trial, with Banlaw to provide a custom deployment of our FillSafe Zero tank overflow protection solution. Banlaw mechanical engineers identified products from our range, along with improvements to the tank venting and pressure equalisation arrangement on the loaders.

Banlaw service team members performed the upgrade in collaboration with site maintenance, and then monitored performance both during and after the trial period. The outcome was a permanent and reliable solution, that delivered outstanding productivity improvements.

Following the success of the field trial, and subsequent multi-tank installations of FillSafe Zero, the solutions deployed for the Cowal Gold Mine have now been distilled into standardised and integrated Banlaw refuelling and overflow protection products.

Summary of technologies deployed on each vehicle

Banlaw products

Refuelling

Dry Break Receiver with integrated Auto ID technology	x1
Unfiltered Tank Vent	x1
Remote Tank Breather solution	x1
Fine Filtered Vent Canister 3µm abs.	x1

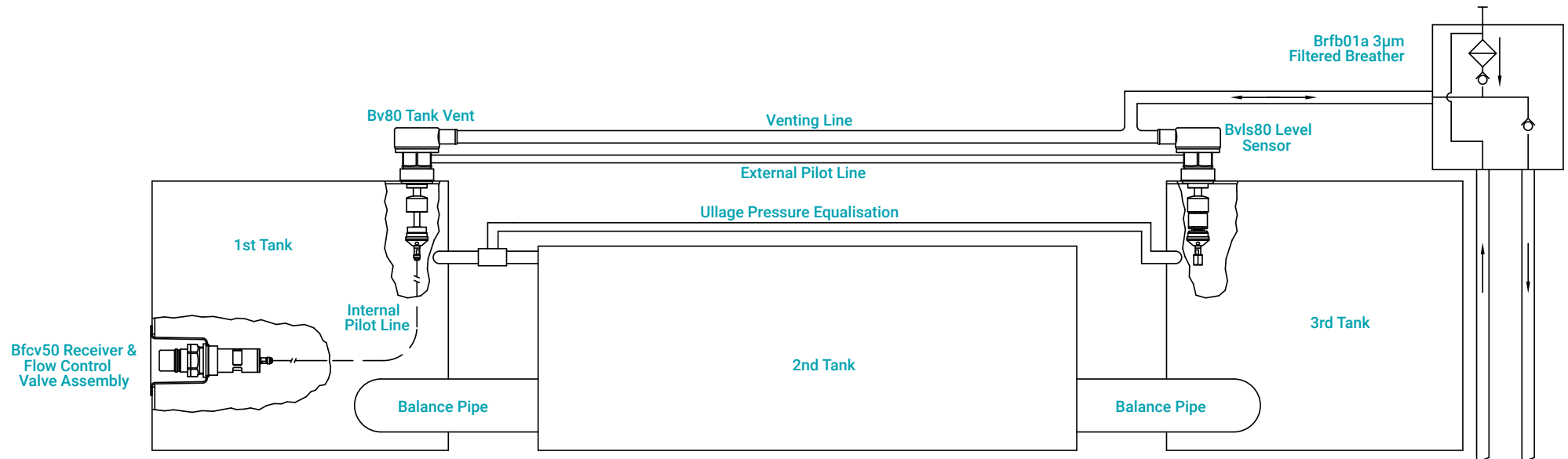
Overflow Protection

Banlaw FillSafe™ Zero Flow Control Valve	x1
Banlaw FillSafe™ Zero Venting Level Sensor	x1
Pilot Line	x2

Other fuel system upgrades

Ullage pressure equalisation pipework to allow rapid air flow/venting between all three tanks, at a rate that complements the high speed refuelling process

Flow Control Valve with integrated Auto ID receiver being installed



After

Improvement Metrics

Safe, high speed, reliable, pressureless, and automated filling of machines with multiple fuel tanks has been achieved.

Regular tank overfills	Resolved	✓
Regular tank underfills	Resolved	✓
Staff safety concerns due to spills and sprays	Resolved	✓
Environmental concerns	Resolved	✓

Previous Cat 992 Loader refuelling time	
Fill Tank	1 – 4 minutes
Wait for fuel to settle across three tanks	15 minutes
Fill Tank 1 again	3 minutes
Total time	22 minutes 🕒

New Cat 992 Loader refuelling time	
Fill Tank 1/2/3 simultaneously	6 minutes 🕒

Productivity improvement:

16 minutes per refuelling

389 productive machine hours gained per year

Note: This does not include the additional productivity improvements from avoiding the unscheduled refuelling's that resulted from underfilled tanks

Average fuel transaction size increased by 12% for one loader and 27% for the other, immediately following the refuelling system upgrade.



Flow Control Valve with Integrated Receiver



Remote Tank Breather solution



Venting Level Sensor

For more information

To learn more about filling machines with multiple fuel tanks quickly and reliably, please email sales@banlaw.com and we'll connect you with a specialist.

If you have machines on your site that are prone to these issues specifically, send us photographs of your refuelling setup, along with the equipment make and model, and we'll specify which kit you need.



Venting Level Sensor being installed



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