

Mines which keep moving need mobile fuelling technologies

Introduction

Located in Queensland's Bowen Basin, this open-cut coal mine is expected to move continuously throughout its lifetime.

Whilst it is normal to deploy fuel infrastructure close to the mining fleet; in this area, mines are known to migrate many tens of kilometres. Repeatedly installing and moving fuel farms represents significant cost. In collaboration with Banlaw; this site has deployed something unique.

Leveraging the latest in mobile fuel management technologies, the fleet does not travel to the fuel on this site. Service Trucks refuel mining equipment in the pit; and staff shift patterns, vehicle maintenance schedules, even the amount of diesel stored on site have all been optimised to drive productivity, whilst remaining lean on cost and effort.

Location

Bowen Basin, QLD, Australia.

The Bowen Basin contains the largest coal reserves in Australia.

Mining methodology on this site is excavator and haul truck strip mining, as well as cast and doze.



Business Challenges

- ▶ A mine site which is going to move a large distance over the next two decades
- ▶ Significant OpEx tied up in stored diesel, and therefore unavailable to the business
- ▶ Inefficient fluid management and administrative processes
- ▶ Fuel Tankers turning up before the full delivery can be received
- ▶ Insufficient reconciliation detail for fuel tax credit and carbon/environmental reporting
- ▶ Large amounts of diesel unaccountable each month



Tracking every litre of diesel from the point it is unloaded until it is consumed by a specific machine has enabled optimisation of refuelling processes, shift patterns, maintenance schedules, stock holdings, and fluid security.

Savings to date are >\$10,000,000 per annum.

Benefits / Business Outcomes

Mining Fleet travel time savings of 43 productive machine hours per day

- ▶ Productivity gains from the mining fleet, which no longer travels to get fuel are significant. Operator shift changes and equipment refuelling now also occurs in the pit, at exactly the same time.

OpEx savings of \$100,000

- ▶ Overall stored diesel levels have been reduced by up to 31% compared to historic norms. This means there's an extra \$100,000 in the bank any day of the week, which the operation can use elsewhere.

Resolved risks to people and process

- ▶ Tankers turning up at a time when insufficient storage is available for them to unload has been resolved. Real time visibility of levels on all bulk storages, as well as lower overall stock holdings ensure there is always room
- ▶ Manual and dangerous process of staff climbing on-top-of and dipping service trucks and bulk storage tanks before collating data has been resolved

Control of all fluids established – delivering savings >\$10,000,000 per annum

- ▶ Monthly reconciliation of diesel purchased, stored, and dispensed on site is consistently in the 99.92% to >99.99% range by volume.
- ▶ Volume of diesel purchased each month has been reduced by 14% on average



LV Ute Module



Service Truck with FMS and Tank Gauging

Banlaw products and services used

Fluid Infrastructure

Tank Farm	▶ 1 x Inwards Metering Skid – inbound metering and temperature compensation (i.e. volumetric correction) of fuel deliveries
	▶ 5 x Precision Automatic Tank Gauge Panel (ATG) – real time tank level visibility at the main fuel farm
	▶ 5 x Fire-safe tank overfill protection solutions (for bulk storage tanks)
Service Trucks	▶ 7 x Mobile ATG – visibility into current service truck fuel stores
	▶ 1 x LV Ute Module – custom tank with OFP and metered LV nozzle
Auto-ID Refuelling Hardware	▶ 2 x HV Dispensing Skids up to 800lpm – for simultaneous fuelling of two service trucks
	▶ 1 x LV Dispensing Skid – for fuelling of light vehicles at the main fuel farm

Electrical Systems for power supply, motor control, communications, and safety

Fuel Management System (FMS) Hardware

Tank Farm	▶ 2 x Banlaw ResTrack™ Advanced Controllers – one for Unloading and LV dispensing, the other for simultaneous HV dispensing into multiple service trucks
Service Trucks	▶ 7 x Banlaw FuelTrack™ 'Classic' Mobile Controllers – installed on a fleet of 7 service vehicles
Auto-ID Refuelling Hardware	▶ Dry Break Auto-ID high speed refuelling hardware across the HV fleet
	▶ Splash Fill Wireless Auto-ID equipment across the LV fleet
	▶ Auto ID refuelling hardware for generators and other static machines

Software

Banlaw ResTrack™ Resource Management System (RMS) – installed on the customers database



Tank Farm



Service Truck TLM Probe

How Business Challenges were Turned into Opportunities

A mine site which is going to keep moving throughout its lifetime

- ▶ The productivity of a mining fleet is all about keeping it in the pit, doing its job for as many hours as possible each day. Businesses pursue this goal by putting fluid infrastructure assets in strategic locations around the site, and then moving some of those installations repeatedly as the operation evolves. This moving of fuel farms is administratively painful, and it also requires an investment in multiple fuelling stations.
- ▶ The choice was taken on this site to invest in the main fuel farm, and to supplement this with 7 high tech service trucks. The service trucks are each fitted with the latest in fuel management, tank gauging, communications, and fleet Auto-ID equipment. Up to 30% of the diesel on this site is now mobile.

The benefits of this setup are numerous:

- ▶ Mining machines no longer stop working to travel to fuel
- ▶ Shift changes occur in the pit and are synchronised with refuelling, so that production equipment only parks-up once
- ▶ Auto-ID refuelling equipment tracks every litre of diesel into the machine which consumes it
- ▶ Machine performance metrics related to fuel consumption, engine hours, and mileage can be analysed and acted-upon to schedule maintenance, even predicting breakdowns prior to them occurring

Significant OpEx tied up in stored diesel, and therefore unavailable to the business

- ▶ With real time visibility into the diesel stored across the site, including updates on service truck levels every time they drive within communication range, the business can schedule deliveries more effectively. Automated notifications from the fuel tracking software means the B-Doubles and B-Triples turn up when they're needed, with up to \$100,000 OpEx saved in the process. This is achieved without anybody driving around the site and standing on top of service trucks or bulk storage tanks to dip for levels.

Inefficient fluid management and administrative processes

- ▶ With diesel consumption approaching 200kL per day, manual processes around hydrocarbons created real challenges from an operational standpoint.
- ▶ Fuel tankers (B-Doubles and B-Triples) deliver fuel to the site every day. When several trucks turned up in quick succession, there were instances where insufficient storage was available for them to unload. A semi-trailer which can't unload is a problem, because it's unable to proceed to its next scheduled job. Additionally, if one of the rear trailers is still full of fuel, the truck may in fact be dangerous to drive.
- ▶ Fuel reconciliation processes were cumbersome, incomplete, and represented safety concerns as well.

To understand if a fuel delivery could be accepted, or to calculate fuel stock usage for the month required staff members to climb onto the 5 bulk storage tanks, dip them, and then move diesel around if more space was required. Reconciliation was between the amount of fuel the operation was invoiced for, and the amount which could be identified in storages. Without knowing the amount of diesel in service trucks with any accuracy, end of month processes could be hundreds of thousands of litres out when reconciliation was attempted.

- ▶ Fuel Tax Credits in Australia are rebates for business fuel use of up to 41 cents per litre. To maximise the Fuel Tax Credits a business can claim, the operation must be able to reconcile liquids purchased, and to the kind of activity it was consumed doing (i.e. plant, heavy vehicles, etc).

Monthly reconciliation of diesel purchased, stored, and dispensed on site is consistently in the 99.92% to >99.99% range by volume.



Technology upgrades to this site enabled:

► Delivery

- Inwards metering & temperature compensation of purchased fuels

► Storage

- Precision real-time automatic tank gauging in the fuel farm
- Automatic tank gauging of all service truck bulk storages

► Dispensing

- Equipment Auto-ID refuelling hardware and dispensing metering

► Software

- ResTrack RMS fuel management system software for real time visibility spanning all bulk storages and service trucks, identifying consumption down to the asset which received the fuel, and automating processes for reporting, fluid security, and actionable data insights
- With the new fuel infrastructure and FMS technology upgrades from Banlaw, the gap has been significantly closed on the large amount of unaccountable diesel fuel. This has resolved security concerns, driven cross-functional efficiencies, and supports the maximisation of fuel tax credits as well.

For More Information

Visit the [Banlaw website](#), where we have pages specific to [Fuel Infrastructure Projects](#), [Fuel Management Systems](#), [Dry Break Refuelling hardware](#) and much more.

Alternatively call us or [send an email](#) to be connected with a specialist.



Taking fuel to the mining fleet with additional service trucks rather than having haul trucks drive to a fuel farm saves on average 12 minutes. Across the fleet this equates to 43 productive hours per day. That's the same as having two extra haul trucks in the pit working full time!



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