

Case Study

Fuelling Rio's bauxite expansion

Customer Name

Rio Tinto – Amrun Project

Location

Australia's Cape York, near Weipa

Customer Business

- ▶ The Amrun Project is to produce some 22.8mtpa of Bauxite for the local production of Aluminium, as well as direct export to markets north of Australia
- ▶ US\$1.9b is being spent to expand production from one of the world's premier Bauxite deposits, which has the potential for expansion to around 50mtpa
- ▶ Banlaw's involvement is the design, engineering, and supply of two fuel facilities



Summary of Banlaw technologies deployed

Refuelling

- ▶ Banlaw FuelTrack™ Dry Break Auto ID dispensing hardware (for heavy vehicles)
- ▶ Banlaw FuelTrack™ Splash Fill Auto ID dispensing hardware (for light and medium vehicles)

Fuel Management

Software

- ▶ Banlaw ResTrack™ RMS (Resource Management System)

Controllers

- ▶ Banlaw FuelTrack™ Advanced Controllers
- ▶ Banlaw FuelTrack™ Tank Side Controllers

Infrastructure

- ▶ Unloading skids
- ▶ Transfer skids
- ▶ Dispensing skids
- ▶ LV Browsers
- ▶ Bulk Air Eliminators
- ▶ Temperature-compensated Metering
- ▶ Self-bunded Tanks
- ▶ Loading Arms
- ▶ Filtration solutions
- ▶ Custom process control systems (PLC, MCC, SCADA)

Banlaw products and services used

Engineering

- ▶ Design of two distinct fuel farms from a mechanical, electrical, and operational/process perspective
- ▶ Engineer two tank facilities, each with two tanks deployed immediately, and the ability to add two additional tanks to each facility in the future (400kl to 880kl of Diesel storage)
- ▶ All fluid management functions are deployed on pre-fabricated skids. The skids are pre-assembled, pre-wired, pre-tested and ready to drop-and-go. On-site commissioning is as simple as connecting inlets, outlets, and power. The skids are self-bunded, and incorporate custom pipework as well as pumping, filtration, metering, air-elimination, and fuel management functions
- ▶ Significant PLC and motor control functionality enables advanced remote process control, and the automation of stock management

Supply

Unloading

- ▶ 2 x Unloading Skids equipped with a single pump and specified to unload 1100lpm of diesel. Both skids incorporate a bypass line for unloading using the tanker pump when needed, and are self-bunded
- ▶ 2 x Banlaw Bulk Air Eliminators are incorporated into the Unloading Skids (one for each fuel farm). This functionality removes free air from bulk fluids, dramatically increasing metering accuracy, and protecting flow meters in the process
- ▶ Unloading Skids incorporate a user interface for the Fuel Management System to capture delivery manifest information and allow inwards transactions to be initiated

Storage

- ▶ Tanks
 - 3 x 110,000 litre self-bunded tanks delivered to site. Appropriately engineered, and constructed of all-Australian steel
 - Tanks incorporate filtered tank breathers with local analogue display
- ▶ Automatic Tank Gauging
 - Banlaw Precision ATG monitors all tank levels and temperatures in real time, interfacing directly with the fuel management architecture
- ▶ Overfill Protection Systems (for each tank)
 - Primary method
 - Actuated valves on the inlet of each tank are triggered to close based on a configurable high level signal from the guided-wave radar level probes
 - Secondary method
 - A SIL-rated high/high level probe is connected to a safety-rated controller. This triggers a fail/closed valve, and also disables the pumps on the unloading skid
- ▶ Transfer
 - 1 x Diesel Generator Transfer Skid. This skid pumps fuel on request to the diesel generator day tanks. Automated requests from the power station are PLC controlled
 - An NMI-certified Coriolis 'mass flow meter' is incorporated into the Transfer Skid. The NMI / Custody Transfer certified meter allows highly-accurate reconciliation of diesel consumed by 3rd parties

Dispensing

- ▶ Light / Medium vehicles
 - 2 bowzers
 - 1 x LV 40lpm bowser
 - 1 x MV 80lpm bowser
 - Splash Fill Auto ID vehicle identification equipment, wirelessly communicates with the Fuel Management Controller, eliminating manual process steps
- ▶ Heavy vehicles
 - 1 x Heavy Vehicle Dispensing Skid, self-bunded, with 2 pumps (duty/standby configuration) and two-stage filtration integrated into the skid
 - 1 x Dispense Metering Skid, self-bunded, with flow meter and FMS control valves. This skid is located adjacent to a Banlaw-manufactured loading arm
 - Dry Break Auto ID dispensing nozzles make a direct electronic ID connection due to Auto ID technology being integrated inside of the refuelling hardware. This allows for process automation and industry-best diesel flow rates for an expected fleet of 67 heavy vehicles

- ▶ Fuel Management System
 - 5 x Fuel Management Controllers provide local user interface, fluid security, collect temperature-compensated flow data, and trigger the activation of pumps and valves
 - Flow and temperature-compensated fluid measurements are captured throughout the site to enable industry-best reconciliation accuracy
 - PLC-controlled automated stock rotation capabilities have been deployed to minimise fluid degradation within both storage facilities
 - 2 x 6 metre Motor Control Centre (MCC) platforms provide powered-hardware control for the facilities
 - All Banlaw systems have been configured to interface with the site control network, allowing control room visibility and interaction with pumps, alarms, tank levels, and PLC systems (SCADA)
 - Banlaw's ReTrack RMS (Resource Management System) is the overarching software for enterprise reporting, and the configuration of all fluid storages, moves, and access for fuel-consuming assets

Support

Go-live

- ▶ Go-live support includes Banlaw presence on site for the period directly after system activation. Banlaw technicians focus on the training of users to enable safe fuelling and fluid-management processes, establishing accurate FMS reporting, and ensuring all systems are functioning correctly

Service Level Agreement

- ▶ Ongoing remote services support reconciliation accuracy, identify continuous improvement opportunities, and ensure software maintenance is conducted in a timely manner
- ▶ Site visits are conducted quarterly. During these visits, meter calibration services (using NMI-certified master meters) are performed to ensure the reconciliation target of >99.5% accuracy is achieved. These visits also focus on safety checks, and improvement plans aiming to deliver cost reductions, and efficiency gains

Heavy Vehicle Dispensing Skid



Unloading Skid



Dispense Metering Skid



The Engagement

Banlaw was engaged at EOI stage. Rio Tinto have some history with Banlaw solutions from other current operations. This allowed for references from existing sites to be obtained, and the benefits of choosing Banlaw once again to be made-evident.

Banlaw crafted a design solution, customised to meet what was a complex specification (from a technology and assurance standpoint). Banlaw specialists in the fields of mechanical, electrical, software, automation, hazardous areas as well as machine and facilities maintenance were all involved in the planning process.

Leveraging our team's wide range of skills, Banlaw proposed a creative blend of technologies to deliver the required project scope at a competitive price-point.

The Banlaw proposal also focused heavily on the environmental considerations of the project site itself with a view to enable ease-of-deployment and long-term reliable operation.

Business Challenges

Environmental

- ▶ The area of operation is prone to cyclones, and therefore all structures need to be cyclone-rated. This was of particular importance for the Motor Control Centres (MCCs), due to the large platforms (around 6 metres in length).
- ▶ During the 'wet season', humidity remains above 85% for months on end, and rainfall per year exceeds 2 metres for the work site. Besides influencing in which months deployment of the fuel management project would be possible, these local conditions mean that tropics-rated (very high humidity) electrical motors needed to be used to ensure reliable long-term operation of equipment.
- ▶ During the 'dry season' there are some months with average rainfall of just 1mm, and humidity averages 61%. For this reason, both storage and dispensing functions include particulate dust controls.
- ▶ Bauxite, the resource being mined, has significant corrosive properties. Tanks, pipework, skid frames and more have been specially treated to make them resilient to constant exposure to the minerals it contains.

Governance

- ▶ Large and long-term resource projects such as Amrun, engender a great deal of attention and also concern from the public and government.
- ▶ Governance and visibility is critical for all stakeholders. And therefore, systems which offer industry-best accuracy as well as the ability to report, learn, and react quickly have been selected across the board.

Benefits / Business Outcomes

Robust processes around governance and assurance mean that a premium fuel management capability has been delivered. Rio Tinto specifications demand a higher quality-level than those outlined in the Australian Standards. The aim is a seamless installation and commissioning process onsite, however very tight standards compliance is also assured. Rigorous QA and testing has been conducted prior to the delivery of equipment, and all-Australian steel has been used in the fabrication of tanks and structures.

Technologies selected for Amrun are resilient to humidity, dust, cyclones, corrosive environments, and constant utilisation in a heavy-industrial environment. Systems have been specified to offer reliable and safe long-term operation. This focus on quality and durability should minimise downtime due to the availability of fuel, or the degradation of diesel impacting the mining fleet.

From go-live the site will manage an expected 300,000 litres of diesel per week, with superior safety and environmental controls, along with reconciliation accuracy levels in excess of 99.5%.

The choice to develop two distinct fuel facilities at this point in the project offers a great deal of flexibility in terms of how vehicle traffic is managed in the near term, and for future expansion to be supported.

For more information

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