Steering a sustainable future for metallurgical coal mining

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The world's ever-increasing need for steel in the coming decades dictates that demand for high-quality metallurgical coal (met coal) will undoubtedly remain strong and continue to grow over the next 20 years – and even well beyond 2050.

To ensure demand for steel is delivered sustainably, met coal producers such as Coronado, must uphold the highest level of safety on their operating sites, strive to have a positive impact on the communities which surround their operations and ensure this critical material is produced efficiently and with the least possible environmental impacts.

While producers in Australia are fortunate that our high-quality met coal is more efficient and delivers lower emissions than many other locations in the world, the industry still needs to continue investing and implementing new technologies to eliminate activities that involve safety risks, enhance the work experience of their employees, and to deliver on emission reduction targets.

Some of the recent new technologies and innovations we have been exploring to bolster safety, efficiency, and sustainability include:

Dragline Proximity Awareness Project

Coronado's Curragh mine complex in the Bowen Basin owns and operates four draglines. In 2022, the mine began an engineering study to identify risk control opportunities that decreased the likelihood of people entering the operating area of a dragline without prior operator warning. This project is known as the Dragline Proximity Awareness Project and has resulted in major findings not just for Coronado but for the greater mining industry.

The project included a review of proximity detection systems, as well as a review of equipment interactions such as working in and around dragline operational areas. In Australia, there are approximately 70 draglines that have similar personnel and equipment interaction risks across multiple coal mining operations.

Some of these draglines are up to 40 years of age with minimal technology changes to control systems or safety functions in that time.

To assist in ensuring the functionality of operational controls in the safety context, our Curragh site followed the Australian Standard AS4024 Safety of Machinery Series in developing an innovative solution. While undertaking the project and implementing the technological solutions, we saw an opportunity to reduce the residual operating risk profile for the machine to machine; and machine-to-personnel interactions by using additional new technologies with different sensing technologies: radar (short), LiDAR (medium); and cameras (long).

By utilising a layered approach with disparate technologies, the outcome of the project has been to effectively reduce the risk of personnel and equipment interactions with draglines to promote an enhanced safe working environment.

Other technologies or efficiencies that we have introduced at Curragh, which will have a positive impact on our safety and sustainability include:

- using artificial intelligence to build coal processing capabilities
- our Gas Pilot Project to utilise waste mine coal gas to operate truck fleets and power generation.

Using artificial intelligence (AI) to build coal processing capabilities

Our Coal Handling and Preparation Plant (CHPP) team is building coal processing capabilities by implementing Optimus AI. This AI solution, which the team has renamed POPPI (Plant Operational Process Planning Interface), helps control room operators in setpoint selection and maximises primary yield under all feed types and operating conditions. POPPI enables tighter control of ash in clean coal and standardises plant operations across different crews, resulting in increased yield.

Gas Pilot Project

Significant progress is being made on our Gas Pilot Project at Curragh. The project is targeting the capture and beneficial use of open-cut waste mine coal gas from our operations, with numerous downstream use cases being explored, including gas turbines to generate electricity and use as a diesel substitute in mining fleets to reduce cost and environmental impact.

Drilling works for the pilot program were completed in early July 2023, and subsequent surface and production facilities have been procured and are in the final stages of installation.

The dual-fuel mine truck 12-week trial using gas transported from Brisbane was completed without incident. The part substitution of gas for diesel showed no discernible difference to a full diesel run truck (haulage speed/time) and performed safely and as expected. Workshops are planned between Coronado and support partners to analyse the data and begin the development of a roadmap to potentially roll out the conversion to the broader truck fleet. This is the first step towards the conversion of a fleet of 5-6 trucks, that will utilise extracted waste mine coal gas, targeted to occur in 2024.

This project is expected to reduce emissions at Curragh, but also realise a reduction in costs given the substitution of diesel for gas to power the fleet.

We know that, as met coal producers, we have a critical role to play in building a sustainable future as global met coal demand increases and we sincerely thank our staff, partners, and businesses across the Bowen Basin for their role in assisting us with this cause, and in supporting our met coal growth strategy. ■