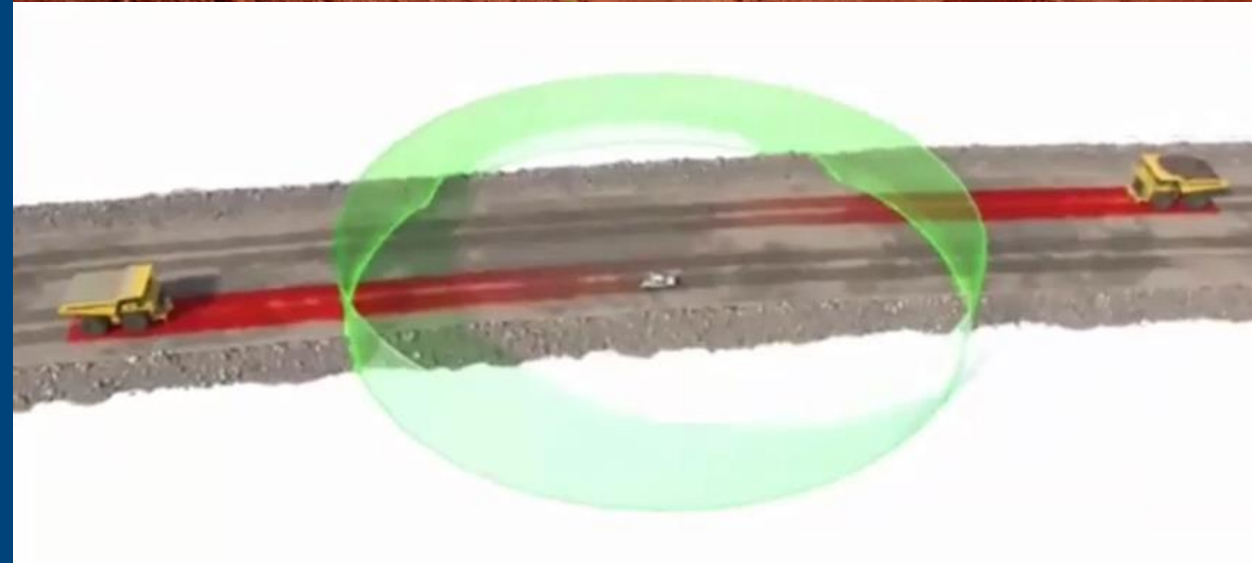




BHP Mitsubishi Alliance

Autonomous Haulage at Goonyella Riverside

State of the Nation - Employee Presentation



The Decision

- Following the successful roll-out of our first fully autonomous haul truck fleet at Jimblebar, BHP has been studying the opportunity to expand implementation of autonomous haulage within our open-cut operations across BMA and WAIO.
- We have been speaking to employees about the changing nature of work through the My Future program and the employee focus groups on how we can prepare ourselves for the future of work.
- The General Manager has decided to implement autonomous haulage at Goonyella Riverside Mine.
- Our transition plan contemplates an autonomous fleet of up to 86 Komatsu trucks over the next two years with the first autonomous trucks expected to be operational in approximately mid 2020.
- Together we want to create a safer, more reliable and sustainable operation.

Why?

Autonomous Haulage is expected to create a safer work environment

Safety benefit

Description



Reduces likelihood of incidents

- Potential for reduction in PL 4 incidents and a similar reduction in injuries/illnesses in the load and haul process
- Reduces likelihood of haul truck/light-vehicle incidents by:
 - Minimising human factors (e.g. fatigue, impairment)
 - Reducing exposure to driving related hazards by removing the requirement for operated haul trucks in the majority of operating environments
 - Introduction of technology to monitor/control unexpected behaviour



Improves identification of risks and events

- Operational data can be used to identify deviations from expected behaviour and help us better understand and address risk



Reduces likelihood of musculoskeletal injury

- Less time in the truck reduces exposure to vibrations and prolonged static postures

Expected benefit from autonomous trucks

~80%↓
Significant truck events

~80%↓
Injuries and illnesses in load and haul

Second to safety

- Potential to build on already strong production performance with increased truck hours and rate over time, enabling productivity improvements and a reduction in haulage cost.
- Potential to set ourselves up for the long term with technology that will further enhance our sustainability and competitiveness.



What does Autonomous Haulage mean for Production?

- Changes to the nature of work and the capabilities of our workforce.
- Whilst there is a reduced need for truck operator roles, there are opportunities for new skills and new development pathways into autonomous roles (e.g. Controllers, Field Officers, Service Technicians).
- There will be no employee redundancies (forced or voluntary) at Goonyella Riverside as a result of this decision.
- It is a long transition before we are fully autonomous. We need our labour hire to support this transition.



What does Autonomous Haulage mean for Maintenance?

New experiences and skills

Autonomous Haulage introduces new equipment that must be managed across all areas of Maintenance. We will expand on existing skillsets to ensure that critical systems within the Autonomous Haulage System are appropriately maintained.

In the Autonomous Zones the maintenance of the new autonomy layer will be heavily supported by Komatsu Tier 1 personnel. As the Autonomous Zones expand, GRM technicians will take on more of the on-board maintenance. This means learning more skills and more opportunities for future development.

Key Changes for Maintenance

- 1 New role requirements
- 2 Inspections
- 3 Improved diagnostic capability
- 4 Reliance on OEM technical capability
- 5 Interfaces with Technology



Creation of new autonomous roles

Operating Equipment



Mine Employee (Production EA)

Operate ancillary equipment (including dig units) to safely meet production targets and safely operate in conjunction with the AHTs within their work area.

In the Field



Field Officer (staff)

Monitors AHT behaviour from load to dump. Ensures the physical mine reflects the virtual mine. Coordinates the clearance of object detections. Supports the Controller & Production crew

Service Technician (Maintenance EA)

Safe completion of refueling AHTs and carries out the daily prestart to identify any defects and confirm operating state of truck fleet

Control



Controller (staff)

Safe and productive management of AHTs and their assignments. Ensures compliance to the 24h mine plan. Communicates with the Supervisor, Field Officer and Production crews. The Controller functionality includes building the virtual mine. Co-ordinates emergency situations

How do we transition?



01

SHMS Consultation

We will consult with workers about what changes we need to make to our SHMS



02

Technology infrastructure

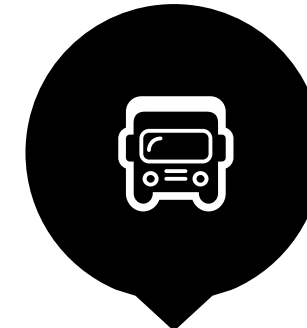
New infrastructure to support autonomous haulage



03

Training

40,000+ hours of training to ensure our people can work safely in an autonomous environment



04

Truck conversions/ civil works

Conversion of autonomous trucks and construction of key infrastructure (e.g. calibration pad)

Interactive Learning Technology

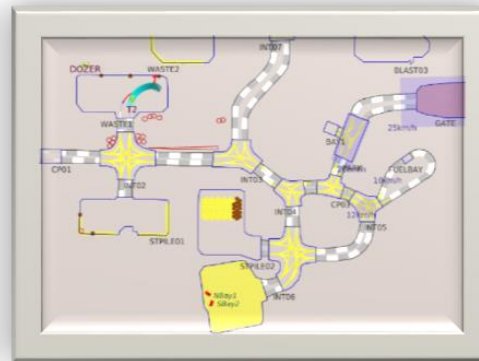
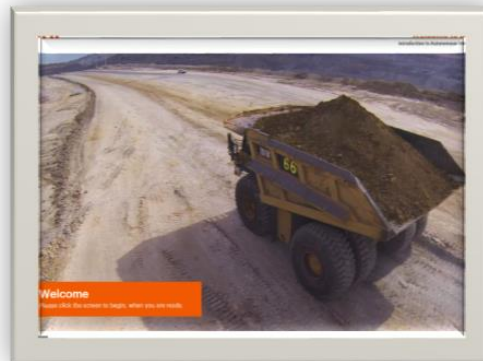
- Lots of training opportunities for people
- Lots of different ways we will deliver training

**BHP E
Learning**

**OEM
Simulators**

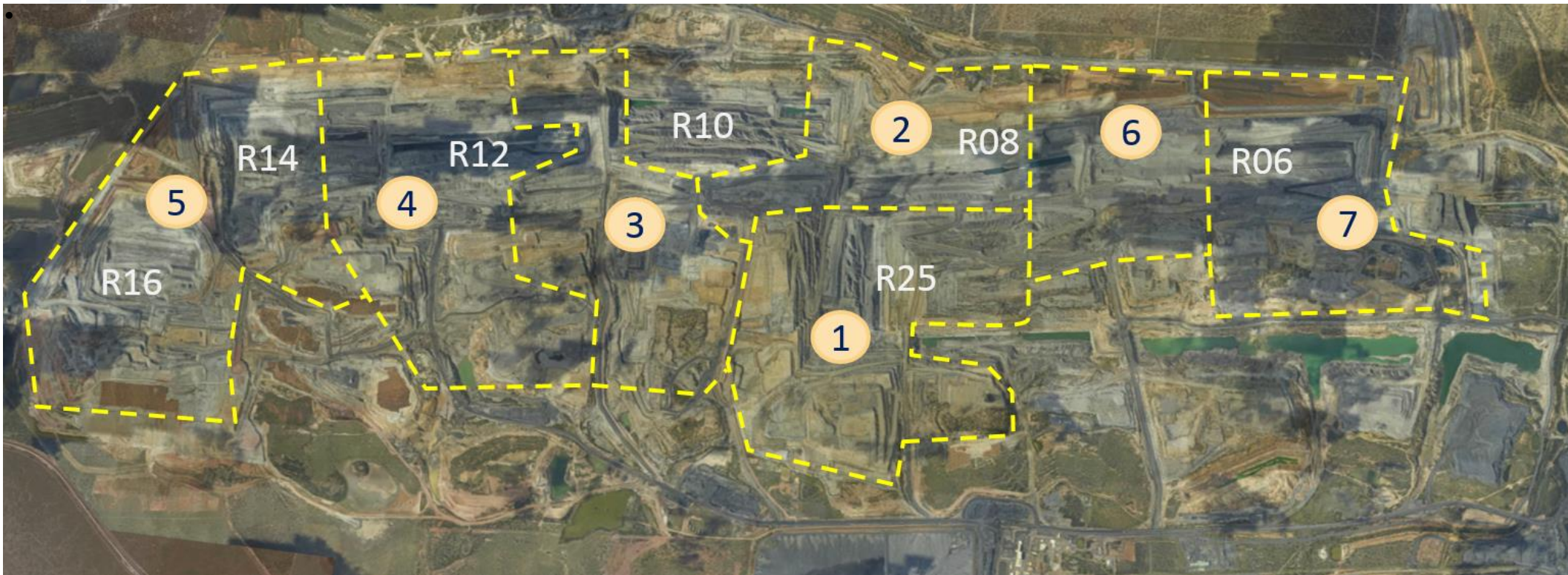
**Touch screen
Learning
programs**

**Interactive
Equipment
Screens**



When will this happen?

- Autonomous Haulage will not happen overnight.
- It will be a staged conversion over two years.



Next Steps

- We will be running further crew briefings in the coming weeks so that everyone can understand the autonomous haulage technology and the safety controls that exist within the system.
- We will be meeting with your employee representatives (unions) to consult about the likely effects of the decision in accordance with the *BMA Enterprise Agreement 2018*.
- We will be seeking expressions of interest from EA employees to move into the Service Technician (EA roles). We will also be recruiting for the new staff roles (Field Officers and Controllers).
- We will run a separate SHMS consultation process which will work through the changes to be made to the SHMS as a result of the introduction of autonomous haulage.
- We are discussing with service contractors and labour hire companies what the decision means for them. We need our labour hire workforce during this transition, and we anticipate that opportunities for labour hire will remain in the long term.
- We are working closely with local communities to support them through this technological change.