Outburst Workshop
A new operator’s perspective
Scott Langley
BHP Billiton Illawarra Coal

Illawarra Coal – Bulli Seam Workings & Longwall Layout
West Cliff Area 5
Appin Area 7
Appin Area 9

Illawarra Coal – Wongawilli Seam Plans & Workings
Dendrobium Mine

Key Threshold Limit Value (TLV) Areas
• Boggy zone
• Low permeability – increasing CO$_2$
• Dykes & Faults
• Low permeability CH$_4$ zones
• Limited drainage window areas

Recent experience – Remote mining
- Boggy Zone MG703 & MG704
  - >200 m width
  - Gas content unknown m$^3$/tonne, >90% methane
  - Remote mining
  - 3 outburst events in MG703
  - Unable to drill into zone
  - 1 sample, post outburst, from lump coal off tail of miner ~9m/tonne
  - Mined from both sides in MG703
  - Currently mining from one side in MG704
  - Achieved a few in-seam holes across the zone
  - 200+m mined to date; No outburst events
- Low permeability zone inbye end TG705
  - 1 entry, 1 pillar, heavily drilled, not below limits
  - Some localised distortion of cleat structure
  - Remote mined
  - No outburst events

Remote mining impacts
- 1/3 normal productivity
  - Reduces longest float time – impacts preparation & increases interaction
  - Additional cost per metre
  - Low interest work – stop & start, work & wait
  - Increased management resources
  - Crosses critical zones safely
  - Used where necessary
Impacts before remote mining

- High intensity in-seam drilling
  - Equipment moves & interactions
  - Drill hole intersections
  - Reduced extraction system performance
  - Diverted in-seam drilling resources

How to improve

- Better drainage
- More efficient remote mining
- Better understanding of the appropriate limits for the various conditions

Better drainage

- Lead time
  - Surface To-In-Seam (STIS) wells
- Better information
  - Down hole tools for desorption levels, gas saturation level and gas content
- Faster short term drainage
  - Coiled Tubing Drilling (CTD)
- Low permeability / high CO2
  - Nitrogen flushing
- Boggy zone
  - Surface vertical or STIS drilling
  - Tight radius drilling (TRD)
  - Large diameter augers
  - Advancing casing

More efficient remote mining

- Remote flying with shuttle cars
- Remote operation of a road header
- Automated bolting – ACARP roadway development
- Haulage system alternatives

Understanding Threshold Limit Values

- Appin – West Cliff plan consolidation
- Wongawilli appropriate levels for future mining
- Different CH4 sources
- Nitrogen flushing impact
- Oil & gas industry tools for determining gas saturation levels and under saturated fields
  - Compare different gas regimes
  - Create an alternate to cores for evaluating gas content

Conclusion

- Seam degasification is a major component of Bulli Seam operations;
  - ~160,000 metres per year drilled at Appin alone
- Meeting TLV’s drive significant effort in localised areas
- Reduction to 3.4 m³/tonne yields highest mining productivity
- Efforts are focused on improving drainage & remote mining productivity
- Integration of the West Cliff & Appin management plans is the key activity regarding levels.
- Recent experience shows outburst events occur at levels above the current thresholds
- Improved tools are the preferred method to re-evaluation of the appropriate TLV’s