

EMPOWERED

Gas Drainage at Metropolitan

June 2016



Metropolitan Colliery

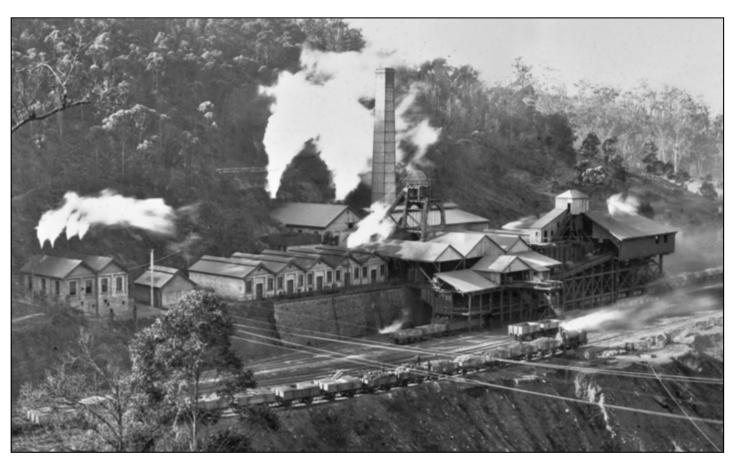


Lithgow Woy Woy Richmond Hornsby Baulkham Katoomba Penrith Hills **o**Manly Parramattao Sydney Fairfieldo Bankstown Narellan Sutherland Campbellt Located in the Township of Helensburgh approximately Thirlmereo 50km south of Sydney and 40km north of Port Kembla Port facility Mine operates within the Bulli Wollongong Seam covering an area of Roslyn Port Kembla over 5000 hectares Moss Vale Shellharbour Kiama Goulburn

Metropolitan Colliery



- Surface drilling started in 1884, the mine officially opened in 1886 making it the oldest operational coal mine in Australia
- The mine has the longest history of outbursts in the Bulli Seam
 - There are 155 recorded outbursts at Metropolitan Colliery
 - 7 Lives have been lost the last in 1954



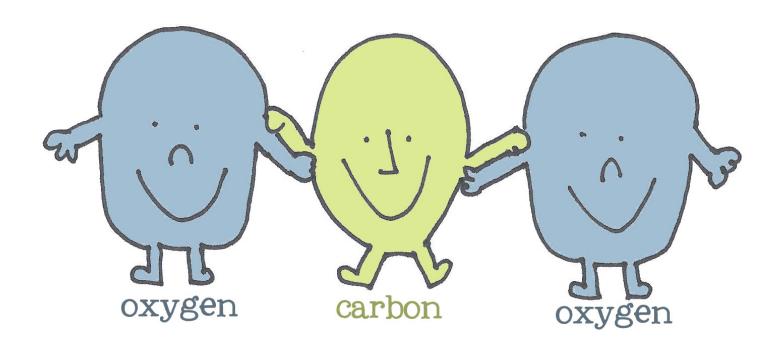
Mine Plan



Seam Characteristics and Drilling Equipment



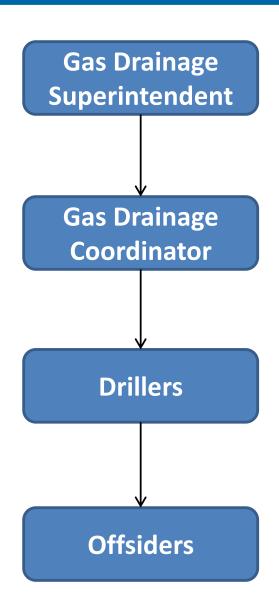
- Bulli Seam
- Seam height Varies between 2.8 3.2
- Gas composition ranges from 100% 83% CO₂ at approximately 16m³/tonne



Gas Drainage Organisation and Structure Pealt



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Shift Structure

Day Shift – 7am-7pm (4 and 3 Roster)

Night Shift – 8:30pm-8:30am (4 and 3 Roster)

Weekend Day Shift 7am-7pm (Fri-Sun)

Drilling Equipment



- Metropolitan uses 2 Boart Longyear LMC55 Inseam Drill Rigs and 1 Longyear LMC90 for gas drainage, core sampling and exploration drilling
 - General Electric DGS Survey Tool
 - Accudrill Downhole Motors
 - CHD Drill Rods
 - 96mm Poly Crystalline Diamond Drill Bits
 - Asahi Core barrels

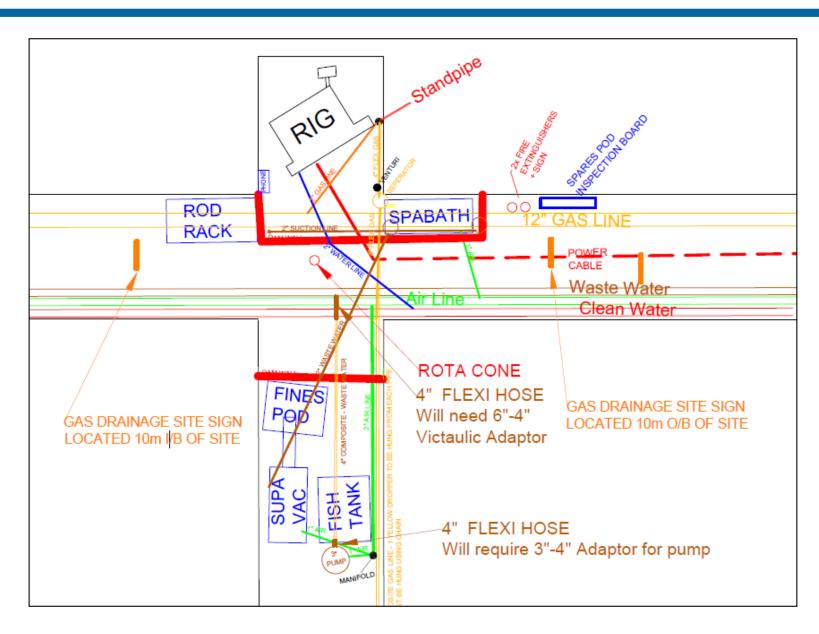


Boart Longyear LMC55

Boart Longyear LMC90

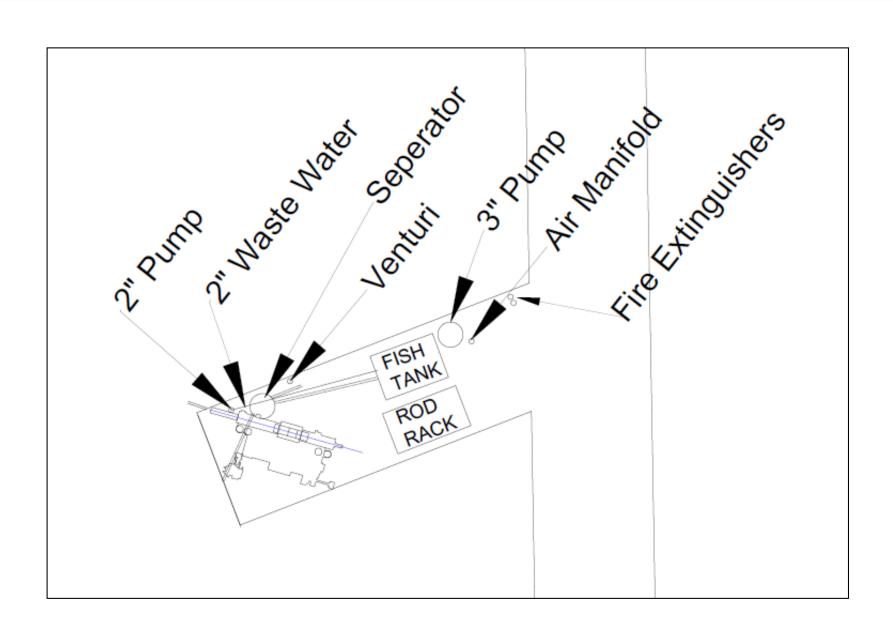
Site Set-up – Cross Block Holes





Site Set-up – Cross Block Holes

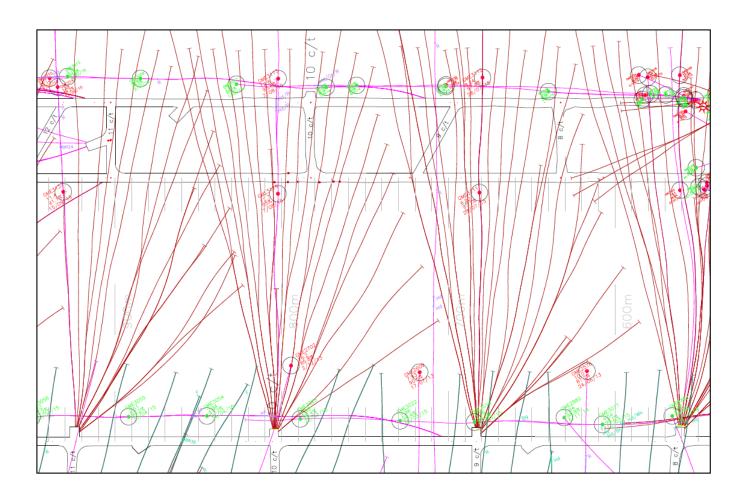




Gateroad Gas Drainage at Metropolitan



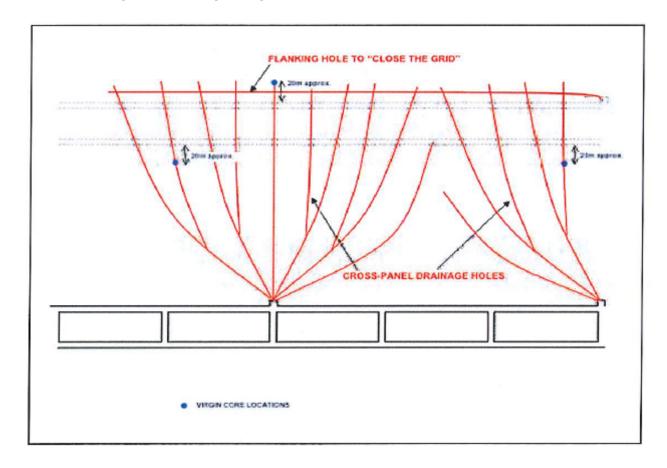
- Initial seam drainage uses DHM directional drilling, and surveying using the DGS system.
- Fan patterns are based on approximately 20m spacing, designed to give 200 days of drainage time



Gateroad Gas Drainage at Metropolitan



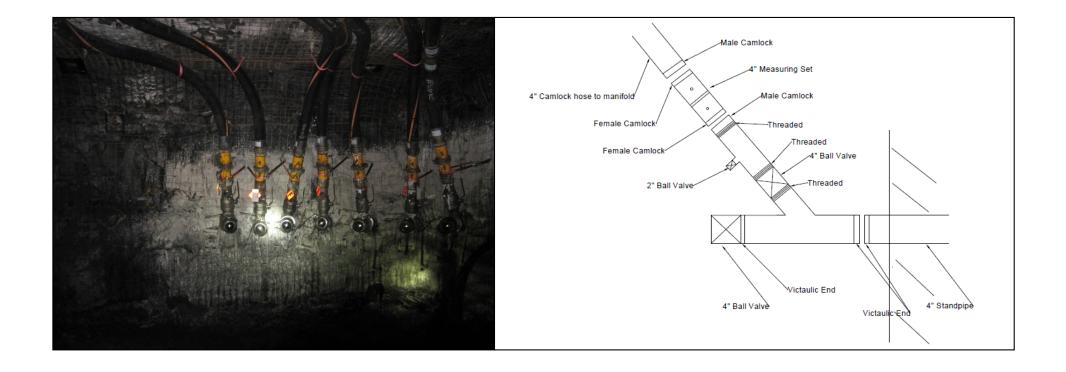
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- Once the fan pattern has been drilled and drainage times have been reached, flanking holes are drilled to 'close the grid'
- Closing the grid allows for extra drainage if required, confirms any predicted structure that
 may be ahead and allows for compliance core samples to be taken to confirm the
 effectiveness of the gas drainage regime



Standpipe Assembly



- 4" Camlock hoses for effective drainage
- 3m fibre-glass standpipes
- Each standpipe is plastered and grouted prior to drilling



Gas Drainage Management



- Holes are plumbed into the mine's gas pipe range which vents the gas to the bottom of the mines main ventilation shaft
- Gas flow is generated from from the seam pressure and the Main Fan no vacuum plant is used



Gas Reticulation System- pros/cons



Positives

Simple system

Negative

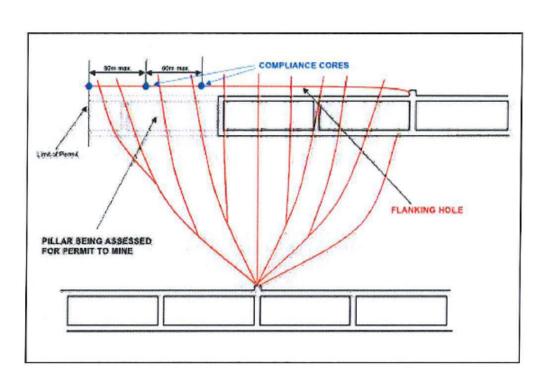
- Potential blockages from fines/debris
- Requires greater care by operators at drill site when interfering with gas drainage system
- Intersection of borehole with a continuous miner can cause seam gas to flow from the system into the working face due to the high pressure within the pipe range

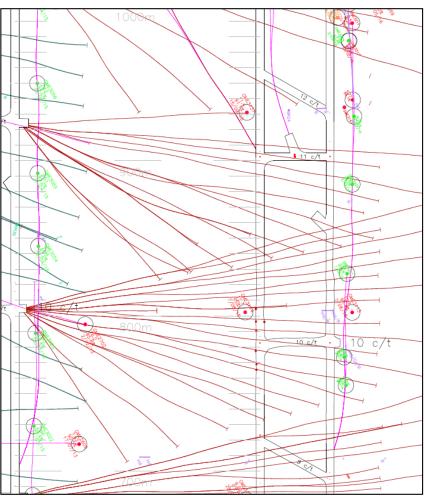


Gateroad Core Sampling at Metropolitan



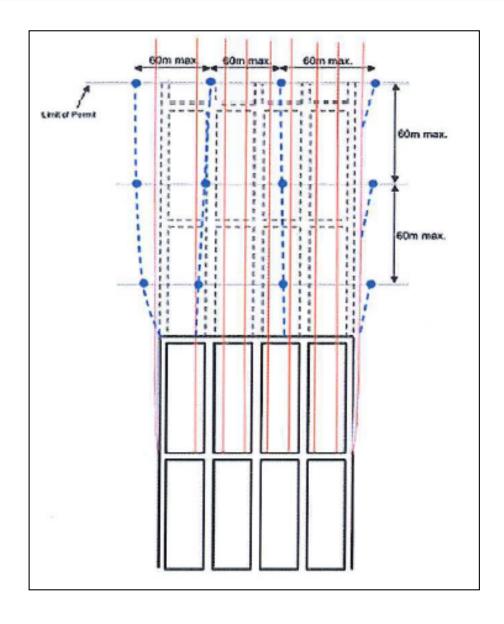
- As part of issuing a Permit to Mine (PTM) compliance cores are taken to confirm that the remaining gas content is below threshold levels
- Compliance core sample spacing in gateroads is taken at a maximum of 60m





Mains Core Sampling at Metropolitan

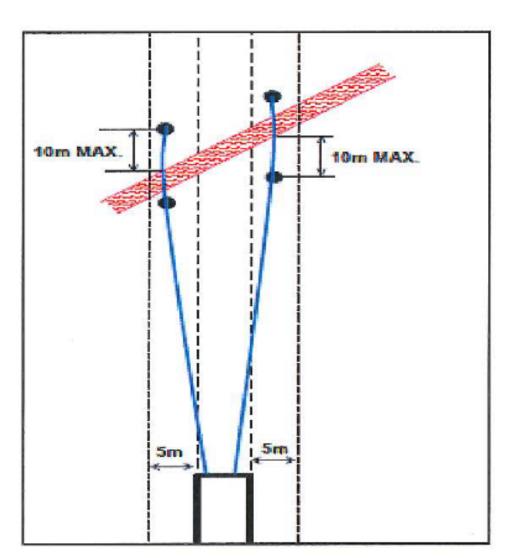




Cores around Geological Structure



- If geological structures are predicted
 - Holes are drilled to confirm the predicted location of structure
 - Cores are taken 10m inbye and outbye of the predicted structure to assess the effectiveness of gas drainage in that area



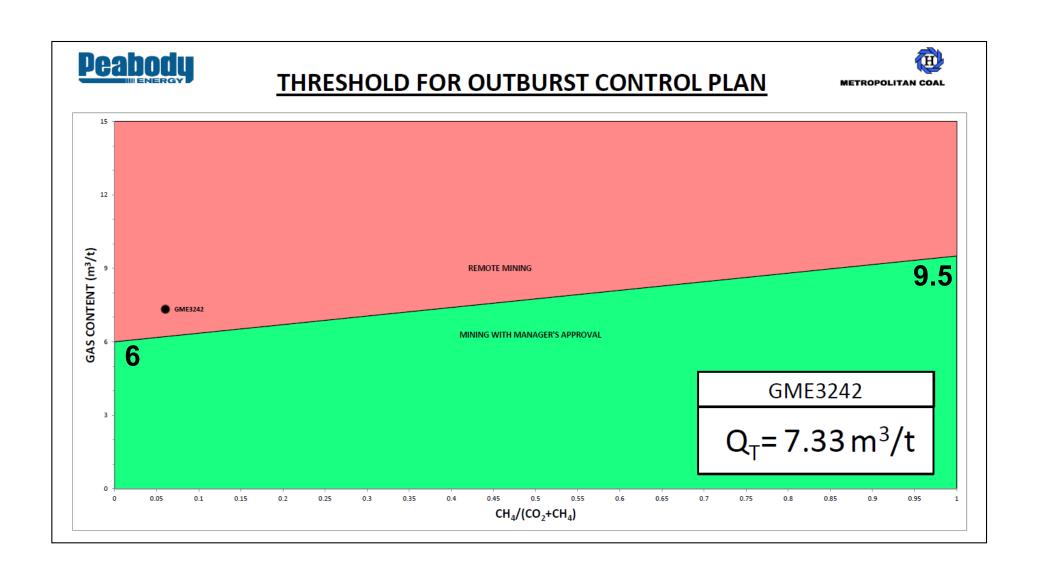
Q1 Testing Underground



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Outburst Threshold Levels and Restricted Rate Mining

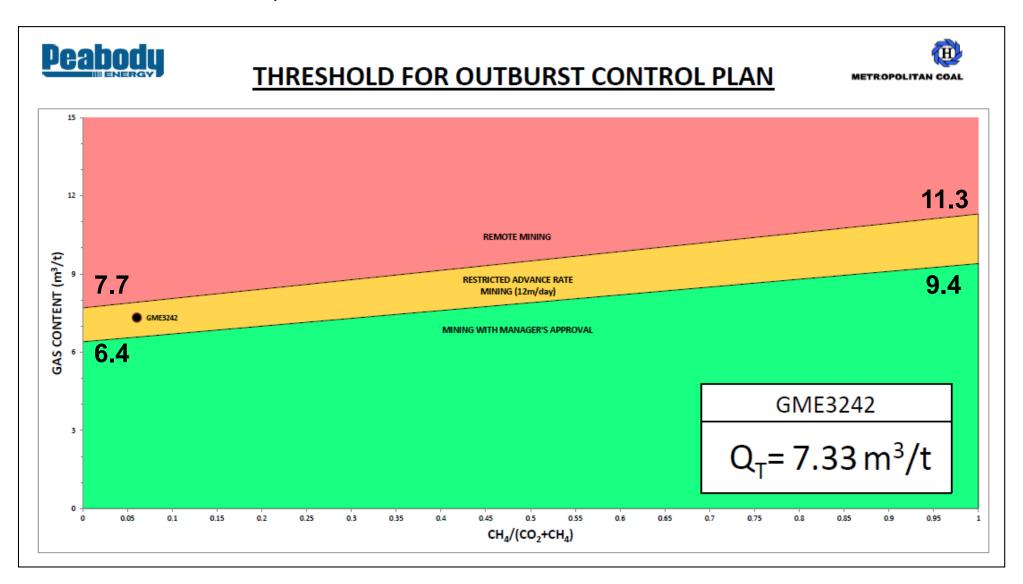




Outburst Threshold Levels and Restricted Rate Mining



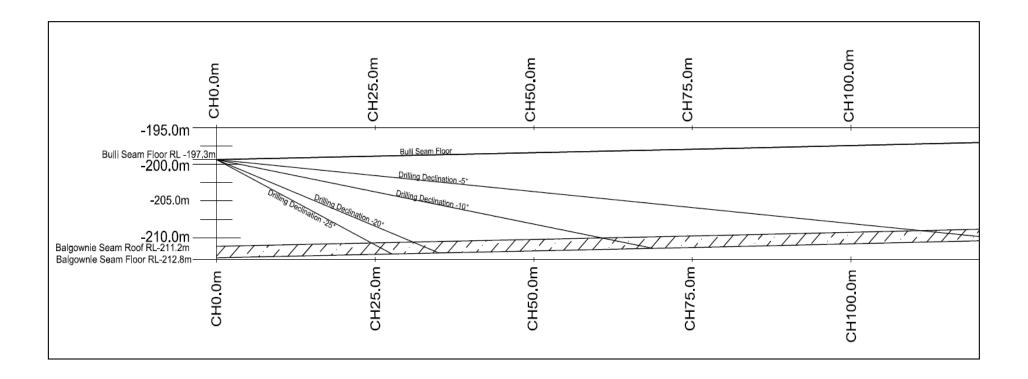
- Currently working through the process of a restricted rate mining threshold
- Successful trial completed in MG26



Down-hole Drilling



- Incident LW22B Floor Break
- Control measure was downhole drilling
- Targeted drilling around predicted floor break structure



General Issues



Water Management

 Drill rig operators and off-siders are responsible for keeping the roadway as dry as reasonably practical

Gear Storage Underground

At times, delays occur due to not being able to quickly locate equipment

Operational Pressure

- Reduced available gas drainage time resulting from increased development rates, places the gas drainage department under pressure
- This results in limited time for site set-ups and drilling (particularly for compliance coring) and little room for delay



THANK-YOU

Any Questions?