Negotiating Adverse Drilling Environments
– Tahmoor 900 Panel

Frank Hungerford
Valley Longwall Drilling
Development into Tahmoor North Longwall Domain

- Main Development – 900 Panel from the northern point of the mine.
900 Panel

- Angled away from the previous workings
- Limited access from which to drill for gas drainage
- Negotiate through known dyke structure and geologically disturbed zone
- Negotiate between previously drilled boreholes
900 Panel Gas Drainage Boreholes
Initial Drilling
from 2c/t, B Heading

Broken Coal from 111m
Bogged at 208m & 159m

Broken Stone from 81m
Bogged in coal at 180 & 207m
Revised drilling in strata above seam

- Broken Stone from 99m
- Bogged beyond 190m
- Broken Coal from 111m
  Bogged at 208m & 159m
- Broken Stone from 81m
  Bogged in coal at 180 & 207m
- Soft Stone - 222m
2nd Borehole 2c/t, 900 Panel

- Bogged in Coal - 117m
- Bogged in Stone - 270m
- Possible Fault - 497m
- Broken Coal and Floor stone 660 - 693m
**Improved Drilling Sequence**

**3rd Borehole**

- Vertical Displacement (m)
- Broken Stone 150-220m
  - Stable drilling - collapsed later
- Broken Stone 312-327m - bogged
  - V.Soft Coal 327-357m
Bogged Rods – Borehole 8

Dyke 38-40m

HQ over NQ Rods 151-225m

NQ Rods, DDM, DHM 0-249m
Over Roadway Drilling from 6c/t, C Heading

- Late in getting in to the site due to more pressing issues at the mine
  - Recovery operations of equipment in 802 panel
- Mining had advanced past 7c/t
- Boreholes had to flank A, B and C Headings
- Holes not to be intersected early by mining
- Design to clear 9c/t and re-enter seam beyond 10 c/t
- High enough above seam to avoid roof bolts
- Boreholes have to traverse cut-throughs and adjacent roadways
Drilling over current and future roadways – Hole 1

Higher in Sandstones past mining face 12.8deg

Bogging in Claystones adjacent to mining face
Drilling over current and future roadways – Hole 2

Broken saver sub left in hole
- branch to bypass
Inseam Drilling from 9c/t, D Heading

- Did not have to traverse roadways
- Negotiate a known fault zone associated with roll over of the seam
- Profile defined by previous adjacent drilling
Inseam Drilling from 9c/t, D Heading
Summary

• Drilling through adverse environment involved numerous trips in and out of hole to clear blockages or replace equipment
• Damaged transmitter cable in DDM-MECCA regularly had to be pulled out and replaced
• DHM sheared shaft on 3 occasions, bits required replacing regularly
• 2 DDM-MECCA instruments were bogged and ‘parked’ for a long period before recovery by mining
  – Shotfiring damaged sensors in DDM-MECCA’s at $18,000 repair cost per sensor
• Average drilling rate of only 35m/shift from 2c/t and 56m/shift from 6c/t.
• Drilling rate of 127m/shift from 9c/t.
Questions

Ken Mills, SCT – What were your options for stabilizing the hole?
Frank – We would typically ream out the hole. We used polymer muds. In China, we used a bentonite mixture. In Queensland, we used a bentonite mud mix to drill through a shear zone, but this was very expensive as the mud is lost and not recycled.

Mark Blanche, GeoGas – Does the bentonite create a skin effect?
Frank – Some people think the drainage is affected, but the gas pressure should usually be sufficient to allow the gas to cross the bentonite skin. It could be a problem at low gas pressure or flow.