PIKE RIVER MINE DISASTER

What went wrong

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Pike River

• 19th November 2010 - 31 men went to work at the Pike River Mine and 29 never returned home

• The Royal Commission was established in late December 2010

• The Commission was chaired by Justice Graham Panckhurst, with David Henry and the author as the other Commissioners

• The final report was presented to the Governor General of New Zealand on the 30th October 2012

• The lessons from Pike River must be remembered
Pike River Mine
Atarau, Greymouth, New Zealand
Pike River

The first explosion occurred at around 3.45 pm on the 19th November

The second explosion 24th November 2.37pm

The third explosion 26th November 3.39pm

The fourth explosion 28th November 1.50pm

Re-entry into the mine has not been achieved to date
Figure 8.10: The surface fan after the first explosion
Rugged Terrain

Pike River Coal – New Zealand’s Only Listed Local Coal Mining Company
Main Fan
(-Installed underground
- Alternative Escapeway)

Incline- 2 km
Drive in-Drive Out

Inbye Workings
3 production units

Pit Bottom
Pike River Mine Plan
Brunner Seam properties

- Depth of cover –110 to 180m
- High quality coking coal (very low ash & sulphur)
- 8 -9m thick (average)
- Gradient variable ( 5 –15)
- Spontaneous combustion propensity (Moderate)
- Gas content –approx 4 –9 m3/t (methane)
Gas monitoring
Monitoring
How to Fight a Fire, Remotely

Loading GAG unit and equipment onto NZ Hercules and final space
Górniczy Agregat Gaśniczy (GAG)
Pike River – QMRS Logistical Operations

- 160,000 m³ mine volume
- 71 days involvement
- 39 days of Jet Operation
- 706 hours of product delivery
- 63,212,000 m³ of product
- 25,416,000 m³ of inert gas
- 1,504 litres per hour - fuel
- 1,061,869.89 litres of fuel
- Fuel cost $700,834 NZ
- 649 shifts over 71 days
- 7,788 hours
- 1,134 person nights accommodation.
- 246 people movements (flights)
- 36 people involvement
- Air Travel - $96,063
- Accom. - $101,591
- Transport/meals/misc – $129,383
First Steps Back In
What happened at Pike River

• Methane explosion. Significant volume of gas involved possibly related to the hydro panel goaf collapsing. Weak explosion inbye the main fan.

• This would have resulted in an oxygen deficient atmosphere with high CO levels. Anyone who didn’t escape from the mine in the first 1-2 hours was not going to survive

• Source of ignition not clear but most likely electrical possibly linked to the earthing system and VSD induced harmonics

• Other possibilities included contraband, diesels and frictional ignition
What Happened

• If entry to the mine stone drive is achieved this could be clarified by examining the VSDs

• No-one survived the initial blast other than the two miners who escaped

• Sealing the mine would possibly have avoided the final three explosions

• There was no clear window of opportunity to re-enter the mine
What went wrong

• Pike was a problem mine from the start, constant changes to the mine plan
• 7 mine managers in 2 years
• Lack of consistent leadership
• Difficult topography, mountainous terrain, high rainfall
• Bad geology- faults and grabens, poor delineation of the coal seam
• Gas issues- high methane content coal
• Hydromining commenced too early before the ventilation was stabilised.
• Pike needed the best of everything
What went wrong

- The commission identified a range of issues
- Production versus safety. The mine was always under financial stress
- Methane drainage issues- free venting of methane into the return
- Expert consultants engaged but advice often not taken, ventilation, methane drainage and hydromining
- Unique electrics- high usage of VSD’s- issues with restricted zones
- Lack of worker involvement in safety
- SHMS not fully developed
- Risk assessment processes were flawed
NO EFFECTIVE
SECOND MEANS
OF EGRESS
FRESH AIR BASE
UNDERGROUND MAIN FAN

- VENTILATION SHORTFALL
- POORLY BUILT STOPPINGS
What went wrong

• Lack of experienced miners- not enough mentors

• contraband issues

• Poor contractor control. Poor training

• Lack of an effective regulator. Only 2 mines inspectors

• Problems with the rescue and recovery effort- non mining incident controller

• Next of kin issues

• Ineffective corporate governance
COMPROMISED GAS MONITORING SYSTEM

NO OPERATIONAL GAS MONITORS IN THE MAIN RETURN
Pike River Mine Plan
What the gas monitoring should have been

Figure 10.2: Plan of required gas sensors at Pike River under Queensland legislation27
Monitoring system failure was evident

Problems with the sensors in the ventilation shaft

19. There were several problems with the gas sensors in the ventilation shaft. First, the sensor at the bottom of the ventilation shaft stopped working on 4 September 2010, nearly 11 weeks before the explosion, and was never repaired or replaced. Indeed, the control room operator's screen on the Safegas system was permanently annotated to say the sensor was 'faulty' and 'waiting for spare'.

![Figure 10.4: Control room operator's screen on the Safegas system](image)
POORLY
INSTALLED
SYSTEMS
OVERALL

IN EVERY AREA WE LOOKED AT, THERE WERE PROBLEMS
Swiss Cheese Model
Applicability to Australia

• Qld and NSW Inspectorates are jointly examining size requirements for explosion panels in mine fans.

• Variable speed drives need to be assessed?

• Ensure risk assessments are done properly and that the controls are the focus

• Training of mine workers re self escape

• Role of the Board
Applicability continued

• Don’t short circuit incident investigations
• Cultural issues such as dealing with families after events such as Pike need to be addressed
• Inexperienced mine workers
• The rescuer model
• Leadership failed
• Don’t think this can’t happen here
In conclusion

• We don’t have any choice here

• Australia and New Zealand must learn from this disaster

• 29 of our colleagues paid the ultimate price
Every miner home safe and healthy every day
Decisions – in a nutshell

Decisions can be life taking
Decisions can be life giving
Its your call…