RAISING THE OUTBURST THRESHOLD AT TAHMOOR COLLIERY
TAHMOOR OUTBURST HISTORY

- SOME 90 OUTBURSTS BETWEEN 1981 AND 1992
- 1 FATALITY IN 1985 (MINER DRIVER CUTTING DYKE, 400t OF COAL INVOLVED)
- WITH WESTCLIFF, PIONEERED OUTBURST MANAGEMENT PLANS IN EARLY 1990’S
- STARTED PRE-DRAINAGE IN EARLY 1990’S
INITIALLY ROTARY DRILLING TARGETING STRUCTURES. WHILST SOMEWHAT “HIT & MISS”, IT WAS QUITE EFFECTIVE – OUTBURSTS CEASED.

DIRECTIONAL DRILLING INTRODUCED MID-1990’S, FOR ALL DEVELOPMENT ROADS. VERY EFFECTIVE – MANAGEMENT AND WORKFORCE WERE CONFIDENT OUTBURST PROBLEM WAS VIRTUALLY SOLVED.
DRAINAGE PROBLEMS – “TIGHT” COAL

1990’S
- OCCASIONALLY ENCOUNTERED A PILLAR THAT WOULDN’T DRAIN NORMALLY. USUALLY RECTIFIED BY RE-DRILLING AT MUCH CLOSER SPACING &/OR MORE TIME ON DRAINAGE.

ABOUT 2000
- STARTED TO ENCOUNTER SIGNIFICANT ZONES THAT WOULDN’T DRAIN, EVEN @ 5m SPACING AND 6 MONTHS DRAINAGE TIME.
- MAJOR LW CONTINUITY PROBLEMS – MINE BECOMING NON-VIABLE.
“TIGHT” COAL

- GAS TYPICALLY (BUT NOT NECESSARILY) >85% CO$_2$

- NOT LIKE USUAL BULLI SEAM COAL – MINIMAL BEDDING OR CLEAT (“BLACK CONCRETE”). SOMETIMES CALCITE INCLUSIONS.

- TRIALLED SLOTTING AND FRACCING, WITHOUT SUCCESS
GRUNCHING EXPERIENCE

- INTRODUCED AS A MEANS OF REMOTE MINING FOR ABOVE-THRESHOLD COAL (AS PER 1994 SECTION 63)

- >3km OF ROADWAYS GRUNCHED WITHOUT INJURY

- FIRED >1,000 ROUNDS BUT NO OUTBURSTS OCCURRED IN COAL CONTAINING UP TO 14m³/tonne
TECHNICALLY SUCCESSFUL BUT:

- NOT ECONOMICALLY SUSTAINABLE AT 2-3m ADVANCE PER SHIFT

- ONGOING CONCERNS RE SAFETY RISKS OF HANDLING EXPLOSIVES CONTINUALLY

- MAJOR PROBLEMS WITH AVAILABILITY OF PERMITTED EXPLOSIVES. THE ONLY AVAILABLE P5 WAS VERY UNRELIABLE. (TAHMOOR COULD GENERALLY USE P1 BECAUSE OF CO₂ CONTENT).
“PROBLEM” WAS THAT BECAUSE THE EXISTING THRESHOLD WAS SO SUCCESSFUL, THERE WAS EXTREME RELUCTANCE TO MAKE ANY CHANGE.

- RESEARCH WITH CSIRO – COULD OTHER OUTBURST PARAMETERS BE APPLIED?
- DETAILED REVIEW OF ALL PREVIOUS OUTBURSTS
- WENT BACK TO RIPU LAMA’S ORIGINAL PROPOSALS
CSIRO MATHEMATICAL MODEL INCORPORATES MULTIPLE PARAMETERS, e.g. COAL STRENGTH, STRESS.

COULD THE INCREASED STRENGTH OF THE “TIGHT” COAL BE THE BASIS FOR A HIGHER THRESHOLD?

RESEARCH WAS UNABLE TO COME UP WITH A DEFINITIVE ANSWER THAT COULD BE APPLIED WITH THE SAME DEGREE OF CONFIDENCE AS THE CURRENT THRESHOLDS.
REVIEW OF ALL PAST OUTBURSTs

- REVIEWED AND SORTED ALL 90 OUTBURSTs
- OF THE 90, ABOUT 10 WERE CATEGORISED AS LIFE-THREATENING (>10t)
- ALL THESE 10 OCCURRED ON FAULTS OR DYKES!
- THE LARGEST FIVE WERE ALL ON DYKES
- THE NEXT FIVE LARGEST WERE ON DYKES OR FAULTS BIGGER THAN HALF SEAM THICKNESS

CONCLUSION:
TAHMOOR’S DRILLING PROGRAM WOULD FIND ALL THE STRUCTURES THAT COULD CAUSE LIFE-THREATENING OUTBURSTs.
Fig. 10 Total gas content data close to structures*, Tahmoor and West Cliff Mines
IF ADVANCE RATES ARE LOWER (10-12m/DAY), THRESHOLDS CAN BE INCREASED BY 20%.

IF THERE ARE NO STRUCTURES WITH 5m OF FACE, THRESHOLD CAN BE 10m$^3$/t ($\text{CO}_2$) AND 12m$^3$/t ($\text{CH}_4$) - DOTTED LINE ON THE GRAPH.
THE PROPOSAL

- APPLY RIPU LAMA’S OTHER THRESHOLD LINES

- HAD CONFIDENCE THAT THIS WAS SAFE AT TAHMOOR BECAUSE:
  - EXTENSIVE GRUNCHING EXPERIENCE (NO OUTBURSTS IN “TIGHT” COAL UP TO 14m$^3$/t)
  - ANALYSIS OF PAST OUTBURSTS – ALL PAST DANGEROUS OUTBURSTS WERE ON STRUCTURES THAT DRILLING WOULD LOCATE.
THE NEW THRESHOLDS

Tahmoor Data - Defined Threshold Values

- Unrestricted Normal Mining
- Normal Mining (Structured) - 12m/day Advance Limit
- Normal Mining (Unstructured) - 25m/day Advance Limit
THE OUTCOMES

• TAHMOOR SURVIVES!

• WHEREVER POSSIBLE COAL STILL DRAINED TO BELOW THE LOWEST THRESHOLDS

• MANY KM’S OF DEVELOPMENT HAVE BEEN COMPLETED IN COAL ABOVE THE ORIGINAL THRESHOLD, WITHOUT A SINGLE OUTBURST.
THE BIG QUESTION

CAN OTHER BULLI SEAM MINES SAFELY RAISE THEIR THRESHOLDS?