Queensland

Mines Rescue

Control of major Coal Mine fire by Jet Engine Inertisation Technology

WHO IS QMRS

- QMRS is a not for profit company owned by the coal mine operators of Qld.
- Through our training, equipment and people, QMRS assists members to meet their mines rescue capability.
- Our competent people train volunteers and provide / maintain specialised rescue equipment.
- Our staff are mining professionals drawn from the industry with extensive industry experience.
- All of our mines rescue volunteers are employed at our owning member mines.
- Majority of industry supervisors, management and senior executives are past or current members of mines rescue.

HISTORY OF QMRS

- 2019 marks 110 years of mines rescue in Queensland.
- First mines rescue service in Australia.
- Over the years we have followed industry to where mining occurs.
- QMRS formed by the merger of regional mines rescue brigades in 1997.
- Today QMRS services the coal industry from rescue stations in Blackwater and Dysart.

MINE INERTISATION UNIT

QMRS continues to meet its obligations to intertise mine fires using the GAG

Previous deployments:

- Loveridge Mine West Virginia USA
- Pike River Mine NZ
- Narrabri NSW
- North Goonyella Qld

Successful application of inertisation technology makes mine recovery possible

Queensland

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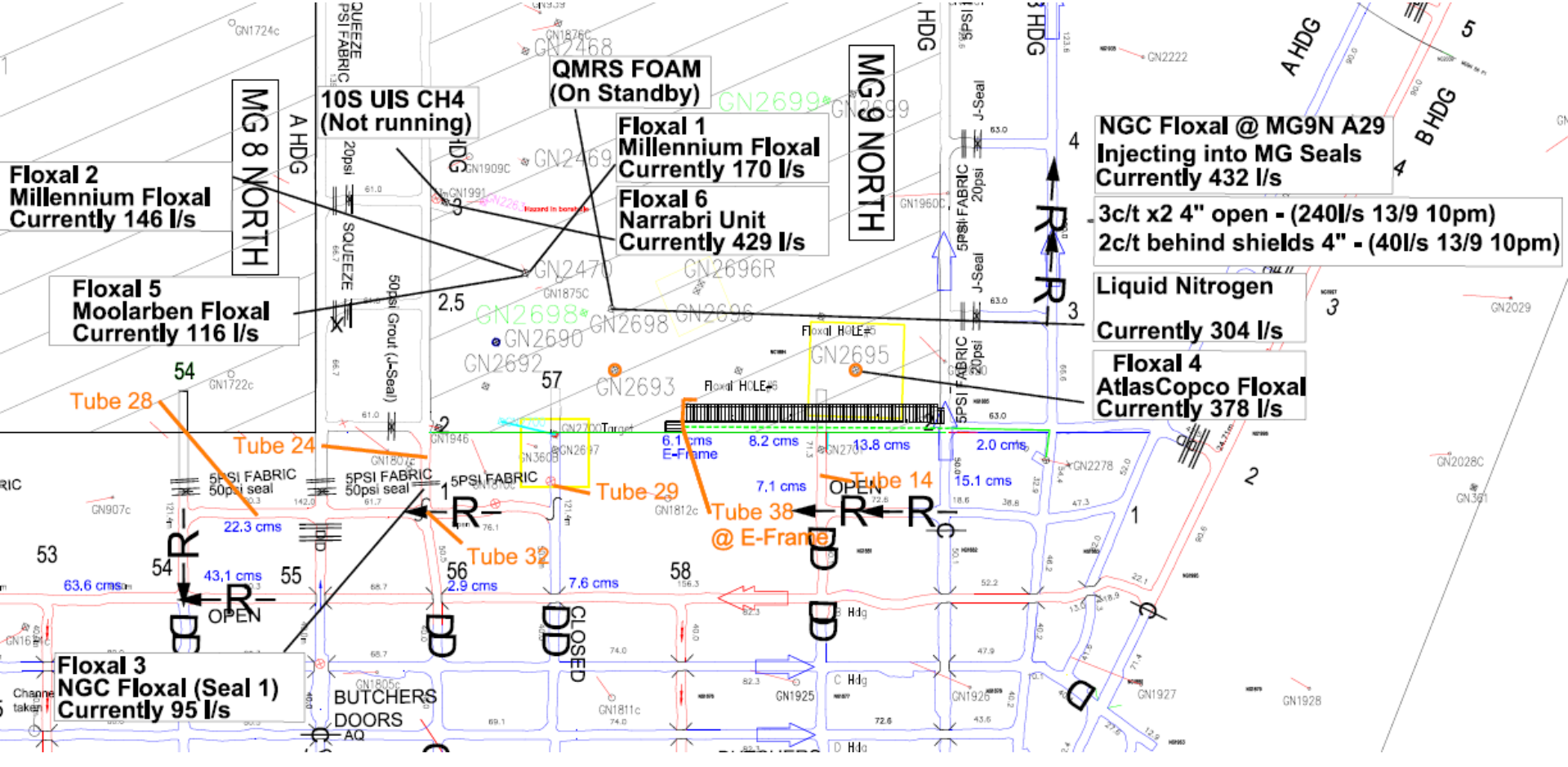
NORTH GOONYELLA MINE FIRE

September 2018

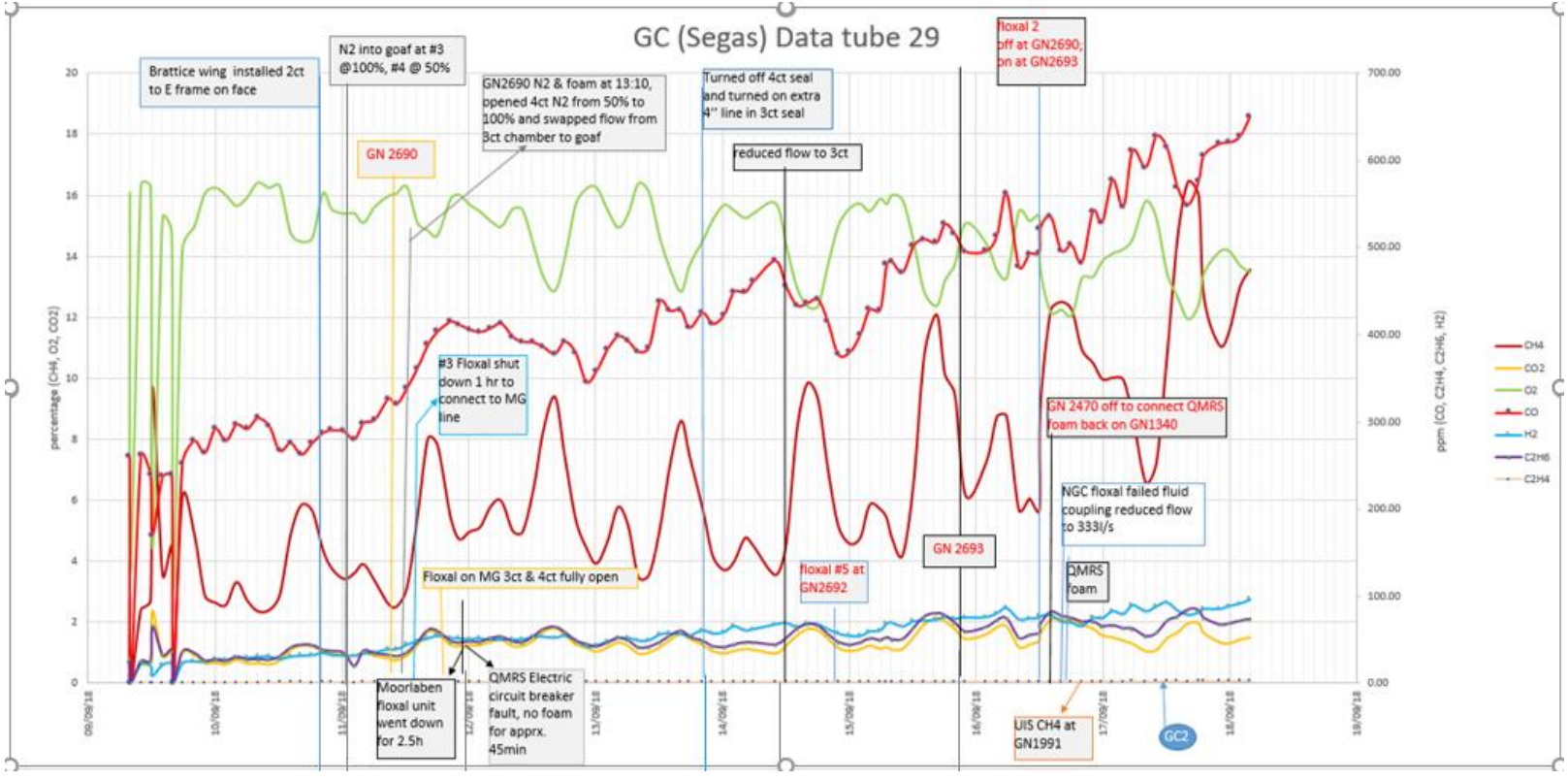
Introduction

- Over August & September 2018, North Goonyella mine was conducting a longwall relocation from 9 North to 10 North Panels.
- Early in September a coal heating commenced behind the longwall face towards the tailgate side of mid face.
- Once carbon monoxide reading exceeded mine safety triggers all personnel were withdrawn to the surface
- Over the next 2 weeks nitrogen injection from surface via existing and newly drilled boreholes was increased as capacity was sourced
- Despite these efforts gas levels continued to rise

Longwall 9 North Face and Surface Nitrogen Gas Injection Locations
September 2018



Tailgate Chute Road Gas Readings – September Trending



At 4pm on 27th September 2018 Peabody asked QMRS to mobilse its Inertisation unit to Nth Goonyella mine

QMRS Jet Engine Inertisation Technology

- GAG 1 is a truck mounted unit
- Produces 25cu.m of wet product per second
- 7cu.m per sec of dry inert gas (CO_2/N_2)

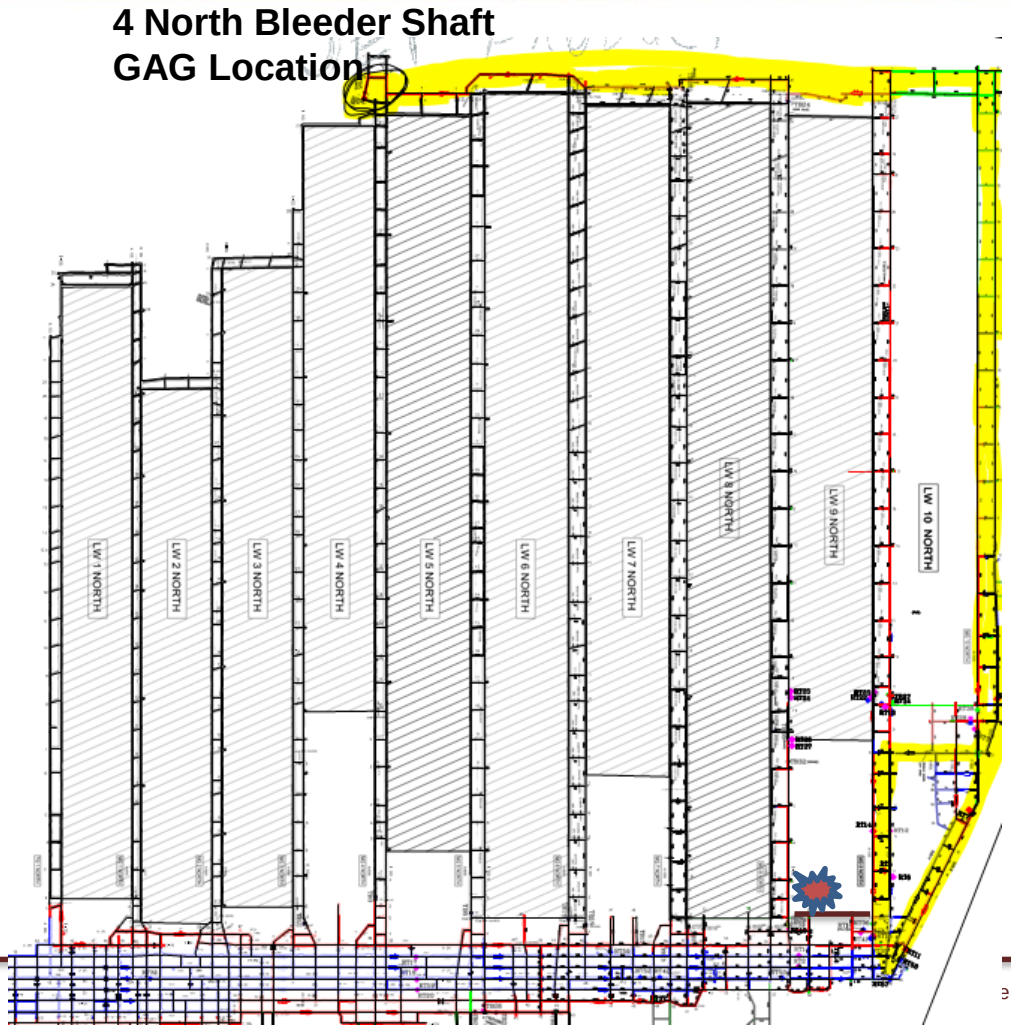
- GAG 2 is a portable sectionalised system transportable by road or air

4 North Bleeder Shaft

- Equipment to site
- Earth bund to be constructed between jet & shaft
- Risk assessments completed
- Water infrastructure & fuel delivery set up

Ventilation Modelling
Inert Gas Distribution

- Model gas distribution using VentSim software
- Expected product arrival at heating location 5.5hrs after commencing operation



Operational Setup

- GAG set up complete
- Solved issues with water accumulation in tubes
- Commenced sending inert product underground at 1:50pm 30th Sept

Product into mine,
all items in place
5hrs into operation

- 5.5hrs into operation
- Shaft pressure relief cover displaced and product back out of mine

- Replacement cover fitted to shaft pressure relief & sealed
- 6hrs and 50min after starting operation product back underground

- October 1, Gag running 24 hrs
- Black smoke replaced by white
- H9 shaft emitting predominantly GAG product
- Essentially continuous operation from this point onwards
- Longwall 9N sealed by remotely placed concrete seals
- Mine sectionalised by remotely placing foamed polyurethane plugs

Fire damage to main headings belt remotely photographed via borehole camera

12 October 2018
Minister for Natural Resources & Mines visits GAG operation

Day 19 shut down
(19th October 2018)

- 456 hours active (19 days)
- 335 engine run hours
- 90 hours downtime-Maint etc
- 31 hours downtime- lightning tarps
- 480 000 litres of fuel used- 1400/hr
- Surface temperature above 40 deg C for 13 days of 19
- Equipment maintained on site for a further month before demobilisation

Conclusions

- Application of jet product has controlled flaming combustion eliminating explosion risk in high methane environment
- Remote sealing of longwall should control spontaneous combustion
- Staged recovery of the mine sections utilising mines rescue team deployment and infrastructure restoration to occur over 2019.