

Extracts from Deputies' Reports immediately prior to Explosion with comments contained in brackets.

No. 150746 - 19/9/75 by Fletcher,

"Stone dust warm in one spot at fire area. M/S heating area appears O.K.". (These remarks probably relate to area where fire occurred on 8/9/75 and heating which was first detected in 1972).

No. 150747 - 19/9/75 by Booth,

"Heating areas appear to be under control". (Comment as above).

No. 178262 - 19/9/75 by Butterfield,

"Heating areas appear under control". (Comment as above).

No. 178263 - 20/9/75 by Allison,

Time of descent 6.0 am.  
"Fire in goaf area 4 north"  
"Manager notified of smoke coming up main return 7.30 am".

No. 178264 - 20/9/75 also by Allison. Time of descent 8.15 am.

"10 p.p.m. CO. where men working in return.  $1\frac{1}{2}$  CH<sub>4</sub> in goaf area G/Body."  
"Last inspection 80 p.p.m. CO." (This was probably written by Allison at 3.25 pm when he returned to surface after being relieved underground by Fletcher, as it refers to his last inspection).  
"Smoke building up behind stoppings". (This might well have been written after he returned to surface at 3.25 pm).

Note any remarks written by Allison after his return to surface at end of his shift would not have been seen by Fletcher.

<u>Barometer readings</u>	19/9/75	2.0 pm	30.32"
	20/9/75	6.0 am	30.36"
		9.0 am	30.37"
		2.15pm	30.26"

*Prepared for M. Moynihan  
6/11/75*

ORIGINAL TO GO TO MANAGER AND BE FILED IN OFFICE  
"THE COAL MINING ACTS, 1925 TO 1952."

No. 178264

Report of Inspection before commencing work at Phillips Colliery.

Commenced Inspection at 9:00 o'clock on the 20th day of Sept 1957.

District Examined 4th

I, the undersigned, being the certificated Deputy duly appointed for that purpose, have carefully inspected (as required by the above Act) with a locked flame safety lamp of Probert Methanometer and approved electric lamp, and report as follows:—

Gas present: 10 ppm CO where men working in return  
(State whether noxious or inflammable, where found, and quantity.)

1.5% CH<sub>4</sub> in gas area G/Beds  
1st inspection 80 ppm CO 1.1% CH<sub>4</sub> at top of

Ventilation: Stopping put up across leg  
heading off air to fire  
Roof and Sides left open through for same

ventilation of fire area  
If any other source of danger CH<sub>4</sub> level to be  
watched constantly

Action taken re gas, danger, and any other remarks } Make bucket  
up behind stoppings.

Time of Descent.	Barometer.	Thermometer.	Water Gauge.
<u>8-15 AM</u>	<u>30.37</u>	<u>26°</u>	<u>3"</u>

Signature of person receiving telephoned report.....

Time report received.....

Time of making report 11 AM - 3-25 PM

Signature of Deputy [Signature]

Initials of District Shoifirer } [Signature]

ORIGINAL TO GO TO MANAGER AND BE FILED IN OFFICE  
"THE COAL MINING ACTS, 1925 TO 1952."

No. 178263

Report of Inspection before commencing work at Pierson Colliery.  
Commenced Inspection at 6 AM o'clock on the 20th day of Sept 1957  
District Examined All starting places

I, the undersigned, being the certificated Deputy duly appointed for that purpose, have carefully inspected (as required by the above Act) with a locked flame safety lamp at and approved electric lamp, and report as follows:

Gas present: Nil later inspection  
(State whether noxious or inflammable, where found, and quantity.)  
with Snager 25 PP19 CO less than  
1% CO2 in return side for  
Ventilation: Fair all returns

Roof and Sides: Near roof face area 37th  
Flakey roof + low side throughout.  
If any other source of danger: None in roof area 47th.

Action taken re gas, danger, } Pre shift inspection.  
and any other remarks } Manager notified of smoke coming  
up main return 7-30 AM.

Time of Descent.	Barometer.	Thermometer.	Water Gauge.
<u>6 AM</u>	<u>30.36</u>	<u>18°C</u>	<u>3"</u>

Signature of person receiving telephoned report.....

Time report received.....

Time of making report 8 AM

Signature of Deputy [Signature]

Initials of District Shotfirer } EY - P.T.O.

ORIGINAL TO GO TO MANAGER AND BE FILED IN OFFICE  
"THE COAL MINING ACTS, 1925 TO 1952."

No 178262

Report of inspection before commencing work at Wonga Colliery  
Commenced inspection at 2:00 o'clock on the 19th day of Sept 1955  
District Examined No 39th North working place

I, the undersigned, being the certificated Deputy duly appointed for that purpose, have carefully inspected (as required by the above Act) with a locked flame safety lamp or ..... and approved electric lamp, and report as follows:—

Gas present: nil  
(State whether noxious or inflammable, where found, and quantity.)

Inspected South, and return appears  
Ventilation: Fair in good order

Roof and Sides: Broken in 3rd drift. Many rocks  
not flaking & sides loose through out.  
If any other source of danger

Action taken re gas, danger, } floating areas appear  
and any other remarks } under control

Shift inspections at about 5:00 PM 7:00 PM

Time of Descent.	Barometer.	Thermometer.	Water Gauge.
<u>2-30</u>	<u>30.32</u>	<u>28</u>	<u>3</u>

Signature of person receiving telephoned report .....

Time report received .....

Time of making report 5:15 P.M.

Signature of Deputy A. Butterfield

Initials of District Shotfirer }

M. 327

Govt. Printer, Brisbane

ORIGINAL TO GO TO MANAGER AND BE FILED IN OFFICE  
"THE COAL MINING ACTS, 1925 TO 1952."

No 150747

Report of Inspection before commencing work at Stangis Colliery.  
Commenced Inspection at 2 o'clock on the 19th day of Sept 1975  
District Examined Slyburnell - Delorick

I, the undersigned, being the certificated Deputy duly appointed for that purpose, have carefully inspected (as required by the above Act) with a locked flame safety lamp on \_\_\_\_\_ and approved electric lamp, and report as follows:—

Gas present: None  
(State whether noxious or inflammable, where found, and quantity.)

Ventilation: Free

Roof and Sides: Secure all working face doors  
roads throughout.

If any other source of danger \_\_\_\_\_

Action taken re gas, danger, } Resting areas appear to be  
and any other remarks } under control.

Time of Descent.	Barometer.	Thermometer.	Water Gauge.
<u>2.30 P.M.</u>	<u>30.32</u>	<u>28°</u>	<u>3"</u>

Signature of person receiving telephoned report \_\_\_\_\_

Time report received \_\_\_\_\_

Time of making report 6 P.M. - 11 P.M.

Signature of Deputy J. Brock

Initials of District Shotfirer } \_\_\_\_\_

M. 327

Govt. Printer, Brisbane.

ORIGINAL TO GO TO MANAGER AND BE FILED IN OFFICE  
"THE COAL MINING ACTS, 1925 TO 1952."

No 150746

Report of Inspection before commencing work at Kilgobbia Colliery.

Commenced Inspection at 6:30 AM clock, on the 19th day of Sept 1955

District Examined High Wall & 2 North

I, the undersigned, being the certificated Deputy duly appointed for that purpose, have carefully inspected (as required by the above Act) with a locked flame safety lamp or F.S. and approved electric lamp, and report as follows:—

Gas present: nil

(State whether noxious or inflammable, where found, and quantity.)

Ventilation: fair

Roof and Sides: Secure at working face some

props rest above break through Road

If any other source of danger rule flaking throughout

Stone dust warm in one spot at face area.

Action taken re gas, danger, W/S sealing area appears  
and any other remarks

Time of Descent.	Barometer.	Thermometer.	Water Gauge.
<u>6:45 AM</u>	<u>30.4</u>	<u>18°</u>	<u>3"</u>

Signature of person receiving telephoned report

Time report received

Time of making report 10:45 AM

Signature of Deputy E. Fletcher JB

Initials of District Shotfirer

ORIGINAL TO GO TO MANAGER AND BE FILED IN OFFICE  
"THE COAL MINING ACTS, 1925 TO 1952."

No 150748

Report of Inspection before commencing work at Keargo Colliery.  
Commenced Inspection at 2:15 PM o'clock on the 20th day of Sept 1975  
District Examined.....

I, the undersigned, being the certificated Deputy duly appointed for that purpose, have carefully inspected (as required by the above Act) with a locked flame safety lamp or.....and approved electric lamp, and report as follows:—

Gas present:.....  
(State whether noxious or inflammable, where found, and quantity.)

Ventilation:.....

Roof and Sides:.....

If any other source of danger.....

Action taken re gas, danger, }  
and any other remarks }

Time of Descent.	Barometer.	Thermometer.	Water Gauge.
	30.26	30'	

Signature of person receiving telephoned report.....

Time report received.....

Time of making report.....

Signature of Deputy E. Fletcher

Initials of District Shotfirer }

KIANGA MINE EXPLOSION 20/9/75

Analysis of atmosphere samples collected subsequent to explosion

Drill Hole No. 3 to 3 North Section

Date Collected 8/10/75 22/1/76

Point at which Collected

Tube No.	QMD8	QMD9	HQ 11
Hydrogen	.60	.64	-
Oxygen	1.73	2.46	0.16
Nitrogen	22.44	24.61	1.92
Carbon Monoxide	1.56	1.47	0.0018
Carbon Dioxide	1.76	1.61	0.64
Methane	71.9	69.20	97.3
Ethane	.01	.01	0.003
Ethylene	.0291	.0131	0.0006
Propane	.001	.007	0.0002
Propylene	.0026	.002	
Acetylene	-	-	
Butanes	-	-	0.0007
CO/O <sub>2</sub> Def. Ratio	37	36	0.5

Exhausting



KIANGA MINE EXPLOSION 20/9/75

Analysis of atmosphere samples collected subsequent to explosion

Sample Pipe at Man and Supply Portal

Date Collected 8/10/75

Point at which Collected

Tube No.	QMD4	QMD6
Hydrogen	0.46	0.48
Oxygen	6.19	3.35
Nitrogen	67.9	62.0
Carbon Monoxide	1.57	1.99
Carbon Dioxide	2.48	3.46
Methane	21.4	28.7
Ethane	0.01	0.01
Ethylene	0.009	0.011
Propane	0.001	0.0009
Propylene	0.0006	0.0007
Acetylene	-	-
Butanes	-	-
CO/O <sub>2</sub> Def. Ratio	13	15

KIANGA MINE EXPLOSION 20/9/75

Analysis of atmosphere samples collected  
subsequent to explosion

Drill Hole No. 4 (at 2 North Section)

Date Collected

22/1/76

Point at which  
collected

Tube No.

HQ 10

Hydrogen	-
Oxygen	0.36
Nitrogen	6.9
Carbon Monoxide	0.0017
Carbon Dioxide	1.69
Methane	91.00
Ethane	0.0038
Ethylene	0.0019
Propane	0.0004
Butane	0.0005
CO/02 Def. Ratio	0.1

KIANGA MINE EXPLOSION 20/9/75

Analysis of atmosphere samples collected subsequent to explosion

Drill Hole No.2

Date Collected 25/9/75 26/9/75 29/9/75 8/10/75 22/1/76

Point at which Collected

Tube No.	HQ10	QMD8	MB11A	HQ10	A	B	HQ 12
Hydrogen	<0.05	-	-	-	0.52	<0.05	-
Oxygen	2.28	8.4	7.57	5.78	4.11	3.16	0.61
Nitrogen	18.81	74.3	73.4	72.60	62.50	29.96	7.69
Carbon Monoxide	0.40	2.24	2.22	2.56	1.80	0.46	0.0016
Carbon Dioxide	3.02	4.82	3.68	4.35	3.15	3.17	1.69
Methane	75.48	10.19	13.11	14.69	27.9	67.2	90.0
Ethane	0.003	0.01	.01	.01	0.01	0.005	0.0041
Ethylene	0.0018	0.0125	.0095	.0103	0.0134	0.0035	0.0014
Propane	0.0003	0.002	.001	.001	0.001	0.0002	0.0004
Propylene	0.0001	0.0001	<	<	0.0006	0.0002	
Acetylene	<0.0001	<0.0001	<	<	-	-	
CO/O <sub>2</sub> Def. Ratio	15	20	19	19	14	13	0.1

Diluted with CH<sub>4</sub>

Exhausting

KIANGA MINE EXPLOSION 20/9/75

Analysis of atmosphere samples collected subsequent to explosion.

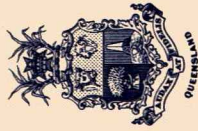
Drill Hole No.1

Date Collected      24/9/75      25/9/75      29/9/75      22/1/76

Point at which Collected

Tube No.      HQ14      A      HQ5      HQ3      HQ 7

Hydrogen	-	-	-	-	-
Oxygen	6.9	6.9	4.91	5.02	0.39
Nitrogen	52.6	63.2	66.29	65.72	4.12
Carbon Monoxide	0.91	1.81	2.32	2.18	0.0002
Carbon Dioxide	7.66	6.37	5.84	6.11	0.37
Methane	31.9	21.7	20.62	20.98	95.1
Ethane	0.005	0.009	.01	.01	0.0042
Ethylene	0.0008	0.0076	.0074	.0075	< 0.0001
Propane	0.0007	0.001	.001	.001	0.0002
Propylene	0.0001	<0.0001	<	<	
Acetylene	<0.0001	<0.0001	<	<	
CO/0 <sub>2</sub> Ratio Def.	14	18	18	18	0.03



Coal Age Nov 1964

Government Chemical Laboratory

William Street,

Brisbane, Q. 4000.

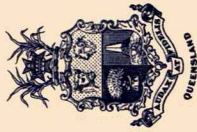
19.

The average incombustibles for the 8 samples taken by a Grubbe = 56.7%.

The average results so far obtained in the 4 samples submitted by Inspector J Roberts

give an ~~average~~ ash of 42.4% to be confirmed later  
an average limestone content of 16.3% by a slower method.  
a more accurate by a loss free basis  
an average volatile matter for Wanya coal on this loss free  
basis = 35.9%

The sample taken in the managers office shows a Floats  
at Specific Gravity of 1.2 of 4.9% and  
at " of 1.26 of 14.7%



Government Chemical Laboratory

William Street,

Brisbane, Q. 4000, ~~London~~  
The microscopic

19

These latter figures conform, that copy of some particles has taken place, ~~to~~

Pure coal has a specific gravity of 1.28  
of Kanya at 0.0 % ash is quoted at that  
figure therefore all that floats at 1.28 or  
below are coked particles.

All samples will be ~~float~~ tested for  
a sp Gr of 1.275.

P. 8 (5)

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~~Security~~

IR/jr

1-2-13

6th October, 1975

MEMORANDUM: Under Secretary for Mines

Claims by Mining Union Spokesmen

Following the recent mine disaster at Kianga certain claims were made via the news media by union spokesmen. Amongst these was a claim that the Mines Department had not answered letters of the Mining Unions.

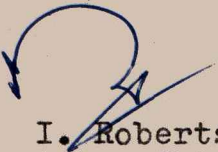
A search of records has shown that letters from the E.T.U. and the Q.C.E.U. have been dealt with and replies sent by the Chief Inspector of Coal Mines.

The following examples are attached

1. Letter from ETU 14/10/74 - reply sent 17/10/74
2. Letter from ETU 18/10/74 - reply sent 22/10/74
3. Letter from QCEU 26/3/75 - reply sent 8/4/75
4. Letter from ETU 23/4/75 - reply sent 13/5/75
5. Letter from ETU 26/6/75 - reply sent 10/7/75

In some cases it was necessary to refer the Union's letter to Rockhampton Inspectorate. In view of this it will be seen that the Union letters have received prompt attention.

Also attached is a copy of correspondence regarding a matter discussed with Mr. Dempsey at your office on 7/10/74 and to which a reply was unnecessary.

  
I. Roberts,  
Actg. Chief Inspector of Coal Mines.



1-2-13

30th September, 1975.

MEMORANDUM: Under Secretary for Mines

Kianga Mine Explosion - 20/9/75

Samples of dust which issued from the Kianga Mine as a result of the underground explosion were collected by Mr. A. Grulke and the undersigned on 23rd September, 1975 with a view to attempting to determine the nature of the explosion.

These samples were forwarded to the Government Chemical Laboratory and tests carried out there have provided some preliminary information. No conclusion is to be drawn from this early information as much more work has yet to be carried out and conclusive evidence may not be available until the underground workings become accessible.

Preliminary information:

1. The average incombustibles percentage on four samples submitted on 25/9/75 - 42.4%.
2. The average incombustibles percentage on eight samples submitted on 26/9/75 - 56.7%.
3. The average limestone content in these samples was estimated at 16.3%. This has to be confirmed later by a slower and more accurate method of determination.
4. The sample taken in the Manager's office shows "floats" as follows:  
  
at specific Gravity of 1.2 - 4.9%  
at specific Gravity of 1.26 - 14.7%


These "floats" percentages confirm the indications of microscopic examination that coking of some particles had taken place. Kianga coal is quoted as having a specific gravity of 1.28 on an ash-free basis. Therefore all "floats" at 1.28 or below can be considered to be coked particles.

At this stage it appears that some coal dust was involved in the Kianga explosion. Evidence by witnesses and a surface examination indicate that there was not an extensive coal dust explosion. The preliminary laboratory investigation supports that indication.

It has to be emphasised that an examination of underground workings will be necessary to draw a conclusion on the cause and nature of the explosion. Meanwhile the Government Laboratory is proceeding with the examination of all evidence available at the present time.

Mine Atmosphere

Analysis of mine atmosphere is proceeding. In order to obtain results more representative of the mine atmosphere the Mine Management has been advised to instal a sampling pipe so that samples may be drawn at seam level.



I. Roberts,  
Actg. Chief Inspector of Coal Mines.

1-2-13

14th January, 1976.

MEMORANDUM: Under Secretary for Mines

Kianga Disaster Inquiry Recommendations

Further to our discussion today I give below some information relating to the Laboratories of the N.S.W. Department of Mines -

- The Laboratories are directed by a Chief Analyst who is responsible to the Under Secretary.
- There are two Deputy Chief Analysts.
- There are 9 sections as follows

Safety in Mines  
Mine Gases  
Ceramics  
Water  
Coal Analysis  
Rock Analysis  
Heavy Metals  
Geo-Chemical Prospecting  
X-ray section.

Each of these sections is in the charge of a Senior Analyst and carries out research as well as routine Analytical work.

- The total number employed is approximately 40.
- There is a mobile laboratory which is used at any Coal Mine experiencing a problem with underground fire/heating. It is also used for testing diesel engine exhausts at coal mines.

Apart from the Laboratories there is a Testing Station at Londonderry on the outskirts of Sydney. This is divided into two sections - Mechanical and Electrical. The head of the Mechanical Section is responsible to the Under Secretary whilst the Head of the Electrical Section is directed by the Coalfields Branch of the Department. Work carried out at this testing station includes

- Wire rope destructive testing
- Testing of fire-resistant conveyor belting for the purpose of approval.
- Testing of FLP and Intrinsically Safe equipment for approval purposes.



Wm. Roach,  
Chief Inspector of Coal Mines.

Inspections as from 24-9-74

24-9-74

Gas tests           No.2 North 0.36%  
                      No.3 North 0.65%

Gas layer detected in North 4 panel arrangements made to clear this. Attention drawn to need to stone dust to the face line at the end of each day.

28-10-74

North 2 max reading 0.3% in extraction area.

6-11-74

Report by dust samplers almost completely dusted working faces well dusted to within 30 feet.

10-12-74

North 2 0.4% max  
North 3 0.5% max  
North 4 0.5% max  
bleeder entry in North 2 being driven.

21-1-75

North 2 0.5% in goaf return  
North 3 0.5% roof layer  
North 4 0.4% roof layer  
North 4 rib dusting to be caught up in immediate face area this day.

27-2-75

North 2 Nil  
North 3 0.6% unventilated end  
North 4 0.2% at face  
Production to cease in North 4 suspended until stone dusting caught up.

2-4-75

Main return 0.24%  
North 2 return 0.22%  
North 3 return 0.5% (at face max)  
North 3 face 0.7% (offside corner)  
North 4 face 0.7% (offside corner)  
North 4 face to be dusted before production next shift

19-5-75

North 2 - Nil  
North 3 - 0.24% max  
North 4 - 0.13% general air reading  
North 2 face dusting to be brought up to date  
Minor attention required in North 2 and 4.

29-7-75

North 2 - Nil  
North 3 - 0.35% general air.  
Methane noted to be issuing from blowers on the rib side as well as face area.  
North 4 - Nil.

25-8-75

North 4 - 0.1% max  
Samples from North 2 and North 4 returns analysed on Beckman analyser for CO content.  
Main Return (upcast) = 2.5 ppm  
North 2 return = 3.5 ppm  
North 4 return = 5.5 ppm  
Samples were drawn from goaf areas in (QMD10) North 2 and (QMD11)(North 4.

These will be subject to analysis to offer comparison with the results derived at the mine and recorded in the Manager's report. It is recommended that weekly sampling and Analysis be extended to cover the following points, 2 north, 3 north and 4 north returns and the main upcast.

Results of QMD10 and QMD11

CO 0.0008% 0.0012%

9-9-75

This was an inspection of the fire in the sump on north side of the roadway between the doors at the surface and above the air shaft on the No.5 dip.

Results roadway dust sampling. Kianga Underground R234.

5-9-75

Letter re installation of Beckman 865 for CO detection. Sampling on weekly basis. Areas are section returns and main mine return.

28-8-75

Letter re samples on 25-8-75

1-7-75 R

Roadway dust samples Kianga

6.75/G/1	38.3%
6.75/G/2	42.1%
6.75/G/3	35.0

6-5-75

Roadway dust samples

4.75/G/1	39.8
4.75/G/2	76.6
4.75/G/3	39.6
4.75/G/4	30.1
4.75/G/6	42.6

1-5-75

Letter re sample of stone dust - not conforming.

2-10-74

No.4 North K282 return	14.1
No.3 North K404 Belt road	37.0
No.3 North D67 belt road	58.6
K237 return belt road near boot end	24.3
No.3 North K237 belt road	29.3

3-10-74

No.2 Trunk conveyor 1 C/T below drive head	51.9
North return K46	70.0
Main Conveyor No.2 K99 50 yds <sup>K side side</sup> <del>inbye of station</del>	44.5
No.2 North belt road K25 50 yds <sup>K side side</sup> <del>outbye of stat.</del>	46.3 (inbye of station)
No.2 North return K243 50 yds outbye of station	42.5
No.2 North supply K249 25 yds inbye and outbye of station	32.8
No.2 North face return	54.5

KIANGA NO. 1 UNDERGROUND COAL MINELOCATION

The Kianga No. 1 Underground Mine is operated by Kianga Coal Company Pty. Ltd. which is a wholly owned subsidiary of Thiess Peabody Mitsui Coal Pty. Ltd.

The company operates both an underground and an opencut coal mine. The mines are some 12 miles south of a point halfway between Banana and Moura on the Dawson Highway. The Thiess Peabody Mitsui - Moura Mine installations are approximately 1½ miles south of the highway and on the same general north-south line.

HISTORY

The initial coal mining development in the area was initiated by Thiess Bros. (Qld) Pty. Ltd. at Kianga in 1958. At this site an opencut was developed in the C seam in the general area of existing opencut operations.

With the establishment of reserves of higher quality coal in the Moura area and the ability of these reserves to satisfy a contractual commitment to the Japanese steel industry operations were discontinued at Kianga in June 1962 in favour of development in the Moura area.

As the requirements of the Japanese steel industry expanded and specification for coal supplies was varied it was evident that Kianga coal could be mined and blended with that produced at Moura to provide an increased tonnage for market.

Underground operations were commenced in June 1971 and Opencut mining in the October following.

MANAGEMENT

Manager, June 1971 to August 1973	K. J. McMullen
August 1973 to -	D. Fowler
Superintendent Underground Mining appointed May 1974	I. A. Rasmussen

All the above have, amongst other qualifications, Queensland First Class Mine Managers Certificates. Such are necessary qualifications for managers of this mine.

GEOLOGY

The coal seams at Kianga are an extension of those being mined at Moura and are similarly identified, A, B, C, D etc. in descending order. In the opencut area seams C, D and E have been mined whilst in the underground mine C seam only is extracted.

The coal seams dip towards the west at a regional grade of 1 in 7 (i.e. 8 degrees below the horizontal). This further means that development to the north and south is along the level course or "strike" direction of the seam.

In the Kianga No. 1 mining area the C seam averages 14 feet in thickness and is accepted as being free of faults and other coal seam disturbances.

A typical cross section through the strata (Company Bore hole 4401) gives the following descending order relationship between the coal seams:- 71 feet shales, A Seams (9 feet thick), 232 feet banded shales, B Seam (13 feet), 132 feet banded shales, C Seam (14 feet), 139 feet shales and mud stone, D Seam (11 feet) - Depth to floor C Seam, 471 feet.

The nearest workings in any seam to Kianga No. 1 are those in the original Kianga C Seam opencut which are just over a mile away and could not be regarded as influencing in any way the operations in the underground mine.

### KIANGA NO. 1 LAYOUT

Because, in the opinion of management, underground mines at Moura had been successfully set away directly in the coal seams at opencuts (e.g. Moura Nos. 1 and 2) it was considered that Kianga entries should be designed in a similar manner. At the time however there was no abandoned opencut in the region of the proposed entries and accordingly the decision was made to open an excavation which would provide the necessary coal seam exposure to permit the placing of three entries to be used as (1) Belt conveyor entry (southern most) (2) Man and Supply entry (centre) and (3) Return airway (northern). The slot opened was 300 feet long in the north-south direction and 100 feet wide. Entry into the slot was gained by a 100 feet wide roadway 300 feet on the slope from the surface into the southern end, such incline was excavated in a westerly direction and thus added to the slot, making an excavation roughly in the form of an L. The inclined roadway provided the alignment for the belt conveyor system into the mine and the roadway for the trackless rubber tyred transport vehicles. The coal seam was exposed over the full 300 feet western face of the slot which is 60 feet from floor to ground level.

The belt conveyor entry was directed beneath the highwall in a direction at right angles to it, (i.e. to the west) the other two entries ~~were~~ diverged from this direction so as to increase the interval between each. When the desired distances had been attained (approx. 130 feet centre to centre) directions were altered to make all roads parallel with the belt conveyor. Two further roadways were developed at the set intervals parallel to, and south of the belt road.

From the time operations were commenced (June 71) until mid 1974, when they were temporarily stopped, the five main headings were extended down dip a total distance of 4240 feet and attained a depth of cover at the faces close to 600 feet. At the same time as heading development was taking place panels were turned off to the north. These panels were identified as 2 North, 3 North and 4 North in descending order.

### EQUIPMENT

Coal is mined at Kianga using 415 v Lee Morse continuous miners, these units discharge into either electric

or diesel engined shuttle cars which deliver the coal to the belt conveyor system for transport to the surface. Power to supply the machines is transmitted underground at 6,600V and is stepped down at a transformer in each working section.

Men and materials are transported in various types of rubber tyred, diesel powered units. Land Rovers with diesel motors are the regular man transport units. All diesel units are individually approved by the Department prior to use underground.

Beyond the equipment detailed, each unit is provided with an electrically operated roof bolting machine, an electric trickle duster and pumps as are required.

#### SPONTANEOUS COMBUSTION

Experience in the mines at Moura as well as the abandoned Kianga opencut established that the coals of the field will heat spontaneously and if left unattended, will fire.

At Moura No. 1 it has been demonstrated that once the air flow has been cut off a section that any fallen or crushed coal will heat within a 6 months period. If however the area is sealed or fully ventilated this problem does not occur.

At Kianga No. 1 heatings were experienced in the solid coal pillars separating the surface entries. The main problem was that associated with the pillar between the man and supply entry and the main return. Control was attained by sealing the pillar to stop air flow through it and the resiting of the main ventilating fan out of the slot area during Easter of this year.

Apart from the heating of the surface pillars the only other problem related to spontaneous heating was the development of an underground fire in the main return airway again in the surface pillar area on the 8th September last. This fire generated in loose material piled in a short entry driven into the side of a roadway. The location was in an area between two ventilation doors designed to prevent air flow. The situation was classically similar to an unventilated area and was found to have generated in the 6 month period.

#### PILLAR EXTRACTION

In January 1974, management indicated the intention to fully extract coal on the down dip side of 2 North panel. The method intended for use was an adaption of a design developed in N.S.W. and known as the Wongawilli system.

The Wongawilli system requires that a working place be driven by the continuous miner in such a way as to leave a section of coal about 20 feet wide between that being driven and the preceding drivage. When the required advance has been made, usually about 200 to 250 feet, the mining machine is turned almost at right angles and proceeds to progressively mine off the narrow pillar of coal with the intention of extracting the whole of it. Locally the drivage is known as the split, and the narrow pillar as the fender. As coal extraction proceeds, roof support is provided to protect the miners but at the same time it is recognised that the whole of the mined out area will collapse when sufficient area has been opened out.



In the various exchanges of correspondence and discussion between management and the inspectorate it was agreed that the following basies be followed:-

- (a) Extraction areas be designed for mining and withdrawal in less than six months.
- (b) Preliminary work be done on the establishment of sites for seals to the mined area.
- (c) Means be provided to analyse mine air for carbon monoxide as a means of detecting the development of spontaneous combustion.
- (d) The ventilation system for extraction areas be designed to have some partial flow over the mined out area in an attempt to sweep clear gas accumulations.

The first area to be extracted in 2 North was attended in accordance with all conditions excepting the carbon monoxide monitoring. The area was mined from October to March. Such timing was longer than was programmed but was occasioned by industrial problems which faced the mine through the year. The second area of extraction was commenced without any major delay.

Because of roof control problems extension of 4 North development was ceased and extraction commenced in this panel. The system used was similar to that adopted in 2 North with the exception of the direction of drivage of the roadways for extraction. In the case of 4 North these were down dip whilst in 2 North they were along the level course. Extraction was commenced in April and though designed for completion within six months this goal was nowhere near achieved, again because of the industrial situation.

Carbon monoxide monitoring was however commenced on the 1st August and was attended on a weekly basis.

VENTILATION

The mine ventilation is attended by dividing the main quantity by regulators to give the necessary volume in each panel.

Tests conducted in August showed that the main fan was drawing 257,310 cubic feet per minute. The quantities in each panel return were as follows:-

2 North	71 900
3 North	42 000
4 North	56 300

The difference between the total of the air returning from the three sections and that travelling in the upcast would be covered by the quantity circulating in the standing main headings and the total of all leakage along the main heading ventilation stoppings. As development of the mine progressed to depth it was evident that every attention would have to be given to ventilation as the seam gas was methane and was evolved at such rates that accumulations would occur if any sluggishness was permitted.

ROADWAY DUSTING

The average volatile content of Kianga coal for determination of incombustible matter is 29.70% requiring 68% incombustibles.

As required by Rule 7 (4) (a) Second Schedule Coal Mining Act samples of roadway dust have been collected and

analysed monthly. To attend analysis the mine has been divided into zones each one tenth of a mile in length. In all there are 74 current zones of which 71 were sampled in August. The three zones which were missed were 77, 78, 79 each of which is in the face area of 4 North.

An analysis of the various zones and their compliance over a period gives the following results. Complied August 35 zones, of those which did not comply, last compliance was as follows:- 9 - July, 5 - June, 4 - May, 8 - April, 5 - March, 2 - February, 1 - January. 2 zones 84 & 85 have never complied.

Considering the August results relative to percentage incombustibles the following details are revealed. 68% and over Incombustibles - 35 Zones, 62-67% Incombustibles - 14 Zones, 57-61% Incombustibles - 3 Zones, 50-55% Incombustibles - 1 Zone, 44-49% Incombustibles - 5 Zones, 38-43% Incombustibles - 3 Zones, 32-37% Incombustibles - 8 Zones, 26-31% Incombustibles - 1 Zone, 20-25% Incombustibles - 1 Zone.

With the recommencement of mining and the availability of labour on the 18th September stonedusting was done on each shift. It has been stated that approximately 6 tons per shift was applied.

Zones which were dusted were as follows: Zones 1 & 2 - complied August, Zones 83 - Complied May, Zone 84 - not previously complied, Zones 69 & 70 - complied August, Zone 60 - complied July, Zones 61 & 62 - complied August, Zone 40 - complied July, Zone 41 - complied April, Zone 33 - complied August, Zone 34 - complied June.

Following the appointment of Dust Samplers by the Department the mine was visited in October 74 when five samples were taken, none of which complied. In April 75 four samples were taken of which one complied. In July 75 three samples were taken of which none complied. In all cases the manager was notified of the results of non compliance and directed to bring the respective zones into compliance before production was resumed. Evidence of analysis indicating compliance exists in the mine records.

Besides equipment for roadway dusting management provided a trickle duster in each panel for adding limestone dust to the return air from the continuous miner. A notation in personal notes following an inspection on 2nd April indicates that on this occasion such dusters were running in each section. The running of such units has been the subject of regular examination, with detections of non running being corrected on-the-spot rather than by direction in the mine record book.

The equipment for stonedusting the mine was to be increased with the receipt of a bulk stonedust pod and a surface storage bin for stonedust. The bulk bin was received on the weekend of the 20th September.

During 1975 deliveries show that 343 tons of limestone have been used in the mine related to a production of 152909<sup>1/2</sup> as at 20.8.75 this averages 4.49 lbs/ton of coal produced. This figure does not however have any great meaning as the necessity for dusting is related to more than actual production.

#### LABOUR RELATIONS

Since the commencement of operations in 1975 the mine has been subject to industrial conflict. Such was occasioned by labours lack of satisfaction with the availability of housing and agitation for a variation of industrial award payments.

Initially restriction was placed on the employment of additional labour, later a ban was applied to all overtime and finally strikes by unions and stand-downs by management occurred.

The worst period for working was that from 1st August to 19th September when only 10 of a possible 25 days were worked.

Though production resumed on the 18th September the industrial climate was not fully calmed for there was a refusal to supply labour for stone dusting on Saturday 20th September unless all who wished were offered work. Management refused the offer being satisfied to provide for inspections by deputys only.



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 No. 1 UG PLAN

Sequence of EventsPrior to and BeyondKianga Mine Disaster 20 September 19751971

June

Mine Registered - K. J. McMullen appointed Manager.

1973

August

K. J. McMullen resigns - D. Fowler appointed Manager.

1974

May

I. A. Rasmussen appointed - Superintendent Underground Operations - includes Kianga.

July

Inspector advises no objection to pillar extraction 2 North.

October

Manager advises inspector - pillar extraction commenced 2 North.

1975

March

Manager advised extraction 2 North completed.

Manager requests approval for extraction 4 North. Inspector advises no objection.

Mine fan relocated from within slot onto fan shaft - no loss of performance.

August 1st

Manager commissions Beckman 865 Carbon Monoxide (CO) analyser.

Results: 2 North 8 parts per million (p.p.m.) CO  
4 North 9 parts per million

August 8th

Analysis results CO  
2 North 7.5 p.p.m., 4 North 9 p.p.m.

August 15th

2 North 7.5 p.p.m., 4 North 9 p.p.m.

August 22nd

2 North 6 p.p.m., 4 North 11.5 p.p.m.

August 25th

Inspector visits mine and takes samples from 2 North and 4 North for complete analysis. Requires that additional tests be taken in 2 North, 3 North and 4 North returns as well as main upcast.

Results of these sampling on that day and tested on Beckman, 2 North return 3.5 p.p.m., 4 North return 5.5 p.p.m., Main Upcast 2.5 p.p.m.

Analysis results of samples taken in 2 North and 4 North waste areas gave readings.

	2 North	4 North
Oxygen	20.5	20.5
Nitrogen	78.6	78.6
Carbon Monoxide	0.0008	0.0012
Carbon Dioxide	0.24	0.10
Methane	0.65	0.83
Ethane	0.0001	0.0001
Ethylene	<0.0001	<0.0001
CO/CO2 Deficiency	0.25	0.38

The above results indicate no evidence of heating and confirm the CO results obtained by the Manager.

August 29th

Managers tests:  
 2 North waste area 8.5 p.p.m., 4 North waste 13 p.p.m., 2 North return 3.5 p.p.m., 3 North return 2 p.p.m., 4 North return 5.5 p.p.m., Main return 2.5 p.p.m.

September 5th

Managers tests:  
 2 North waste 8.5 p.p.m., 0.65% Methane (CH<sub>4</sub>)  
 4 North waste 11 p.p.m., 0.8% CH<sub>4</sub>  
 4 North return 4.5 p.p.m., 0.35% CH<sub>4</sub>  
 3 North return 1 p.p.m., 0.3% CH<sub>4</sub>  
 2 North return 2.5 p.p.m., 0.15% CH<sub>4</sub>  
 Main return 3.5 p.p.m.

September 8th & 9th

Fire detected in return near main upcast fan shaft - Inspector advised.

Fire covered with stonedust and accepted as under control - area regularly checked for temperature thereafter.

September 12th

Managers tests:  
 4 North waste 11 p.p.m. & 1.0% CH<sub>4</sub>  
 2 North waste 8 p.p.m. & 0.7% CH<sub>4</sub>  
 Main return 2 p.p.m.

September 16th

Electrical Inspector A. E. McMaster and Mine Electrician - A. J. Henderson inspect all underground electrical equipment. Inspector satisfied with all aspects of equipment.

September 18th

Mine resumes production after a period of no mining as from 25th August.

September 19th

4 North produces on day shift but because of mechanical problems on continuous miner is not scheduled for mining on the second shift (3 p.m. - 11 p.m.)

3.45 p.m.

Underground Manager, Peter Pocock enters 4 North waste area to draw samples for analysis for Carbon Monoxide - He does not see any evidence of heating, smoke etc. in the area.

4.15 p.m.

Pocock arranges for Deputy J. Booth to take atmosphere sample from 2 North section for analysis.

9.00 p.m.

Pocock analyses samples on Beckman, Readings for each sample are equivalent to 1 p.p.m. which is so low that he concludes that

samples have been contaminated by air whilst standing. Pocock leaves message for Manager - Fowler to say results obtained not satisfactory.

11.25 p.m.

Mine clear of all workmen - Fan running - only persons remaining on mine site throughout night are Storeman Mervyn J. Strauss and Ian D. Renfrey.

September 20th

6.00 a.m.

William M. Allison - deputy arrives at mine and goes underground to inspect all working places.

6.45 a.m.

Donald Fowler - mine manager arrives at mine and reads report left by Pocock regarding CO analysis. He is later joined by Underground Mechanical Engineer Terrance R. Faber.

7.15 a.m.

Allison comes to the surface and advises Fowler that there could be smoke in the main return.

Fowler and Allison go underground immediately leaving Faber on the surface. They go into the main return and are not sure whether there is smoke or dust in the air - there is no smell.

They check other places in the return and eventually define a slight smell and smoke travelling in 4 North return. The return is travelled as far as the area between 6 and 7 cut through. A test is made and 1% of methane detected in the general air. Fowler telephones Faber and asks him to inform Ivor A. Rasmussen - Mine Superintendent of the possibility of a heating in 4 North, he and Allison then return to the surface.

7.40 a.m.

Faber informs Rasmussen as directed. Rasmussen is at his office at Moura Mine.

8.00 a.m.

Allison completes Deputy Report No. 178263.

8.15 a.m.

Allison and Faber go underground to collect air samples for analysis on CO analyser.

8.30 a.m.

Fowler telephones:- A. Pocock - Superintendent Mines Rescue Station, Blackwater to advise of suspected heating; G. Hardie - Inspector of Coal Mines with similar advice but no detail. Promises to telephone inspector when details to hand; W. Airey - union delegate for arrangement of labour and E. Jump - mine safety officer, to request that he contact tradesmen to come to the mine.

8.40 a.m.

Fowler analyses the three samples collected from 4 North waste area and determines an average reading of 25 p.p.m. CO.

8.45 a.m.

Fowler, Rasmussen and Allison go underground into 4 North waste to perform tests. General air tests in the area gives results: Methane 1.0%, Carbon Monoxide 25 p.p.m., Carbon Dioxide - less than 0.1%. A layer of methane

from 3% to 4% is determined at the junction of the roof and fallen ground in No. 7 cut through halfway down from the conveyor roadway to the man and supply roadway. Light smoke is noted to be issuing from an area of crushed coal on the conveyor roadway outside of 7 Cut through.

The Manager and Superintendent decided that all the evidences point towards an early stage heating and concluded that the area must be sealed. They make an inspection of sites for possible stoppings. While in the course of the inspection three workmen W. Pound, R. Kelly and R. Tsakovic arrive in the section and are put to work erecting brattice stoppings to control the flow of air to the heating zone.

- 9.30 a.m. Fowler and Rasmussen return to the surface leaving Allison in charge of the work underground.
- On arrival at the surface Rasmussen contacts Clive Machin a mines rescue brigade member to ask him to standby with other brigade members in case they were required for final sealing.
- 9.45 a.m. Eric Jump - the mine safety officer goes underground and meets Bill Allison. Together they examine 4 North waste. Jump sees Allison perform tests which gave results: 1% methane, 25 p.p.m. carbon monoxide.
- 10.30 a.m. Fowler goes underground to check on progress, he checks to be sure that the brattice stoppings have sufficient opening in both the intake and return to allow some air flow through the waste.
- 11.00 a.m. Allison returns to the surface and completes the first notations on inspection report 178264.
- 11.20 a.m. Mechanical Engineer Faber returns underground with Allison.
- 12.30 p.m. The manager, Fowler, and Faber travel to the surface.
- 12.45 p.m. Eric Jump returns to the surface.
- 12.55 p.m. The manager telephones Inspector and advises CO 25 p.p.m., methane 1% and no change at any time since first report. He considers the problem to be a heating in the corner of a pillar left on the conveyor road. Air flow to the area has been controlled but not cut off. Tests are being done regularly and advice will be called if the position changes.
- 2.00 p.m. Fowler, Rasmussen and Eric Fletcher (on-coming deputy) go underground. They have a discussion with Deputy Allison and Fowler conducts Fletcher on an inspection of 4 North waste.



- 3.00 p.m. Fowler, Rasmussen and Allison return to the surface.
- Rasmussen leaves the mine for his office at Moura.
- Kevin J. McMullen arrives at the mine.
- 3.25 p.m. Allison completes second notation to Report No. 178264 stating "80 p.p.m. CO, 1.1% <sup>-CH<sub>4</sub></sup> Smoke building up behind stoppings.
- 3.30 p.m. K. McMullen and ten men of the second shift go underground. Some of the men who are scheduled for the second shift are identified by McMullen. They are: Ron Linderberg, Merv Walker, Cliff Strudwick, Mick Carriage, George Widt and Murray Martin.
- The men who were underground are driven out in the machine which took the ten into the mine.
- While underground McMullen makes an inspection with Deputy Fletcher. On the outside of the brattice stopping across the return he reads 0.4% methane on the test instrument, there is no smoke or smell. Fletcher rearranges a brattice screen and following such can no longer detect any methane. McMullen then walks up to the brattice screen and can detect a slight heating smell only.
- 3.45 p.m. Neille W. Magarry, assistant mechanical engineer travels into the mine with four further men for the second shift.
- 4.00 p.m. Magarry and McMullen leave the section for return to the surface.
- 4.30 p.m. Graham W. Walker drives a transport vehicle out of the mine for further supplies.
- Superintendent Rasmussen returns to Kianga with an oxygen and carbon dioxide testing instrument (Pyrite).
- The superintendent has Fowler telephone deputy Fletcher and ask him to take a further series of tests.
- 5.00 p.m. Fletcher phones surface and advises tests gave following results 1% methane behind stopping in return, 1.2% between 6 & 7 cut through and 1% in 7 cut through. No noticeable increase in smoke or smell. No positive statement regarding carbon monoxide.
- 5.12 p.m. Rasmussen, Fowler and McMullen in office, Magarry in workshop, see lights blink, hear explosion. Those in office covered in cloud of black dust.
- 5.30 p.m. Rasmussen places calls to Mines Rescue Blackwater; C. Machin, Mines Rescue Moura; Moura Ambulance and Police; Mines Inspector, Rockhampton, General Manager Kianga Coal Co.;
- ...../6

Police to contact company representatives.

- 5.55 p.m. John B. Stafford - Electrical Engineer - Moura Underground Mines arrived at Kianga and arranged outside telephone communications from the Kianga workshop.
- 8.15 p.m. Inspector of Coal Mines Hardie arrives at Kianga.
- 8.45 p.m. Blackwater Mines Rescue Teams arrive Kianga.
- 9.00 p.m. Conference: Mine Manager, Mine Superintendent, Inspector and Mines Rescue Superintendent decide to arrange testing of atmosphere from the belt conveyor and man and supply portals which are exhausting smoke and fumes.
- 9.40 p.m. Rescue team member samples above the belt portal and determines +0.3% CO and 0.5% Carbon Dioxide (CO<sub>2</sub>)
- As a result of these readings, distances to 4 North and the possibility of a second explosion it is decided not to risk sending a team underground.
- 10.45 p.m. Further tests taken by G. Machin from above belt portal. Gas samples drawn into tubes for later analysis - Samples in Tubes QMD 7 and QMD 10.

September 21st

- 1.00 a.m. Thiess Peabody Mitsui - Managing Director R. A. Campbell arrives and suggests that a drill is available to open a hole from the surface into 4 North to sample the atmosphere directly.
- Also agree to open known drill hole which enters mine at the junction of the man and supply roadway and 2 North headings.
- 2.15 a.m. Messrs. C. Murphy (President), C. Peterson (Secretary) S. J. Morgan and R. J. Murphy (District Union Inspectors), Queensland Colliery Employees Union arrive at mine. Have nothing to contribute.
- 4.30 a.m. Further tests of atmosphere exhausting from belt portal. Samples pumped into Tubes QMD 11 and QMD 12.
- 4.50 a.m. Samples dispatched to Brisbane - Government Chemical Laboratory by aircraft.
- 10.50 a.m. Telephoned advice of results of analysis from Govt. Chemical Laboratory. Results support opinion that fires exist in mine.
- 11.30 a.m. Air reverses in mine - Belt heading and Man and Supply intake. Such attributed to change in air temperatures on surface.
- 3.50 p.m. Drill hole into 4 North holes through, on-the-spot tests 0.6% Carbon Monoxide, 1.2% Carbon Dioxide. Tubes QMD 8 & QMD 9 sampled.

- 4.50 p.m. Drill hole adjacent 2 North holes through, on-the-spot tests 1.0% Carbon Monoxide, 1.0% Carbon Dioxide - 2 unbranded tube samples taken.
- 5.15 p.m. Samples directed by air to Brisbane.
- 8.25 p.m. Laboratory advises that analysis results confirm on-the-spot tests and that all indications are that the mine is on fire.
- 8.45 p.m. Meeting of Police, Unions, Management, Mines Rescue Brigade and Inspectors agree that mine must be sealed to control fires.
- Unions ask that final decision be delayed until 8.00 a.m. Monday 22nd but agree to the covering of the fan shaft as of 6.00 a.m. Monday.

September 22nd

- 7.00 a.m. Fan shaft covered.
- 10.35 a.m. Work starts on the covering of the three remaining surface entries.
- 1.00 p.m. Upcast drift is covered.
- 9.00 p.m. All entries finally covered - further material pushed over for another 10 hours so as to improve seal efficiency.

September 23rd

- 8.00 a.m. Discussion with R. J. Murphy, Q.C.E.U. re statements from miners - Murphy agrees and organises persons.
- 9.30 a.m. S. J. Morgan, Q.C.E.U. advises that statements will not be given.

It should be recognised that times quoted particularly, from 7.00 a.m. Saturday 20th until 8.15 p.m., the same day are average times only and are not necessarily confirmed accurately by all witnesses.