

carries out a careful test on the fringe of CO₂ for CH₄, or perhaps you would rather not answer that? A. I do not think perhaps I had better answer it, but I can't consider it, sir, as you do. You see, there are quite a few other ways - well, one other way of testing for this gas, even with a safety lamp.

Q. I will be interested to hear from you after the adjournment as to the other way or ways of testing with a safety lamp? A. Yes.

(Short adjournment)

HIS HONOR: Q. Do you want to put something to me? A. Yes, I think we were going to show how I would test for the gas?

Q. Yes. A. If I may take hold of the lamp and show you?

Q. Yes, perhaps if you did it down there. A. The first thing you would do on going to any place would be to make sure the air you are breathing yourself is reasonably good so you carry out your tests at this level and then you bring your lamp up here for inflammable gas as high as you can and if necessary you climb up to do that and assure yourself there is no inflammable gas there. It has been my practise to do this over a number of years, having had some experience with it. If I suspect it might be bottom gas or even if I do not suspect it - -

MR. REYNOLDS: Q. Do you mean Illawarra bottom gas? A. Or bottom gas - gas on the bottom. I lower my light to about quarter flame and put my light in like that (demonstrates) bring it up till it is level with the fresh air.

HIS HONOR: Q. At that speed? A. About that speed to start with, in case there is a very strong concentration of CO₂. If I feel it on the feet I do take the precaution of filling my lungs with air. I make sure I can do that to get the maximum amount of oxygen in the lamp in the shortest time, to keep it alight, because this gas, once it enters the light, being some time before it gets down there - that is why I did it at that speed. It has now entered into the lamp. It is still going down towards the flame and by this it should have reached it.

Q. How long does it take? A. It depends on the size of your flame.

Q. But how long does it take for the gas or air to go down the lamp? A. Well, again, it depends on the size of your flame.

Q. It does? A. That is the circulation.

Q. I see. A. With a very low flame it may take 7 or 8 or even 10 seconds but with a half flame it would be fairly quick. You can - I don't know whether anyone would like to use the method to get their Illawarra bottom gas without getting down to all this business of lowering their light down slowly. In Illawarra bottom gas where you have a very low percentage of CH₄ you will find you get it this way where you have no chance by lowering it down.

Q. Is this what you say: the method of lowering it down would not show you a low concentration? A. Very low, no. You get down to 4 to 1 without any trouble in lowering it down this way but if you are going to get 1 per cent - say 90 per cent CO₂ mixture or aiming to try to find 1 per cent you would be really struggling. This way you just may happen to get the slightest trace of the gas on the flame.

MR. REYNOLDS: Q. I asked you a question relating to the incidence of Illawarra bottom gas in what you called the "Old days" and you have given His Honor an illustration of how you found it in the acclivity between two floor rocks? A. Yes.

Q. You indicated I think that up to about 1930 it was not uncommon to detect it in circumstances like that? A. Yes.

Q. You said, I think, this was when the works were nearer the escarpment on the eastern side of this seam? A. Yes, that is so.

Q. What has been the situation in more recent times? A. More recently you have had two things happen: one is that the character of the mines has changed, in other words, their output has gone up. The result is the area of the workings has increased

and they have progressed westward away from the area where the sill rocks are in particular, underneath the seam and in the seam.

Q. Would that indicate to you that theoretically this incidence would in fact be lower? A. That is so.

Q. What has been your knowledge as to the occasions when it has been detected in more recent years? A. Well, my experience is that it has only been small quantities, very small pockets and not very often.

Q. It is towards those matters that you have directed your observations in Paras. 62 to 74 of your report? A. That is so.

Q. The next matter you deal with is the question of pressure on the screen at the back of the shunt on A heading due to the gas in No. 8 Right and you say:

"(75) Gas having a specific gravity of 1.15 is being held behind the brattice screen."

Q. Where do you get that figure? A. I assumed for the purpose of this that that was the specific gravity as given, I think, by the Department of Mines analysis. I am not saying, in effect, it was exactly 1.15.

"(76). Pavement level at the screen is about 103 feet ASL. Pavement level - - "

Q. Not pavement level, surely? A. Pavement level at the top of the gas.

"of the gas in the goaf and near B heading is 107 feet ASL. The block screen therefore has a head of 4 feet against it or the gas under still conditions would be 4 feet off the floor behind the block screen."

Q. This is what your observation says, that we have a screen 7½ to 8 feet high and the level of this pondage at that point is 4 feet up the screen? A. Under still conditions.

"(77). Air at this position in the mine would have a weight varying with the temperature and the Barometric pressure but for all practical purposes it can be taken as being .07 lbs per cubic feet. The gas would have a weight of .08 lbs per cubic feet at 1.15 S.G.

(78). The pressure on the screen due to the gas would be .04 lbs at the bottom and nil from the point 4 feet from the floor to the roof."

MR. REYNOLDS: I don't quite follow that.

HIS HONOR: There is no gas there.

MR. REYNOLDS: It is as obvious as that.

Q. That is your reasoning. We will deal with the conclusion later on? A. Yes.

"Pressure to the normal flow of Air.

(79) The flows of air which would cause a drop in ventilating pressure which would in turn cause a depression in the shunt area:-

(a) As indicated by (31) the flow from the intersection of A and No. 2 cut through to the intake pipe in the shunt less the velocity pressure created by the velocity attained in relation to that pipe. This is not measurable.

(b) The resistance offered by No. 2 heading to the air in travelling from B heading to A heading. 909. G. Sellers, x.

Q. This is the air against the sides moving in that last area of the cut-through? A. Yes, that is right.

" This may be calculated. It has been indicated that the airway concerned was greatly enlarged by the action of the fire and subsequent cleaning-up. The resistance to the flow of air as a result has been reduced very considerably. The nearest estimate of its original condition would give it an area of 136 sq. ft. and a length of 82 feet and these figures together with the quantity flowing may be used to firmly indicate as to what the pressure drop would have been before the fire.

To calculate the pressure drop from B to A on No. 2 heading the Atkinson formula $PA^3 = KSQ^2$ may be used and this is recognised in every part of the world as being applicable to the flow of air in mines.

P equals the drop in pressure in lbs. per sq. ft.

A equals the area in sq. feet.

K equals the coefficient of friction which would be .01.

S equals rubbing surface in Sq. Feet.

Q equals the quantity in thousands of C ft per minute

$$P = \frac{.01 \times 52 \times 82 \times 27 \times 27}{1.6 \times 136 \times 136} = .0124 \text{ lbs.}$$
$$= \frac{.0124}{5.2} \text{ inches of W.G.} = .0025" \text{ WG. "}$$

Q. Applying that formula you got an answer of .0025" water gauge? A. Yes.

Q. And this is a pressure drop? A. From B to A.

Q. In No. 2 cut-through? A. Yes, in No. 2 cut-through, or heading, as I have called it.

"It is again emphasised that the pressure drops as would be found after the fire should be much less than this owing to the greater area and the much less coefficient of friction with the untimbered airway. "

Q. In "Pressure on the Block Screen Due to the Working Conditions" you are going to deal with a consideration by you of the effect of the shuttle car standing and moving in this general area? A. Yes.

"(80) A study of the normal shuttle car working cycle reveals that there is a very frequent obstruction to the flow of air along No. 2 cut through between B and A headings and that it will be frequent, intermittent, variable and sometimes comparatively heavy.

No. 67 car usually stood empty for about 4 minutes in No. 2 Heading between B and A in every cycle waiting for No. 40 car to come out and enter the shunt.

No. 40 car normally came up against the air flow to No. 67 car and then reversed into the shunt.

Both No. 40 and No. 67 cars when full went up the continuous miner heading against the air and returned empty with the air. "

Q. That is the flow of the air? A. Yes.

" No. 40 car turned full side on across the No. 2 cut through at the A intersection when turning into the shunt causing a momentary but severe blockage to the passage of air down No. 2 heading. "

Q. That is when it did its manoeuvre to move into the shunt? A. Yes.

MR. REYNOLDS: Can Your Honor visualise just how big this shuttle car is in relation to the roof and airway?

Q. It is quite a striking feature? A. Yes.

Q. There is a considerable obstruction to the air passage, you say - considerable, but short lived? A. Yes.

"(81) It would be possible (but difficult) to work out the pressure drop due to the shuttle car flow pattern so it was decided to find a similar spot in the mine, test the situation and then to convert the results to the conditions as could be reasonably assumed existed in No. 8 Right before the right.

(82). With the above objective in view a position in Red Panel was chosen and the work carried out on 27/1/66. The quantity of air flowing in the site of Red Panel was 13,000 cubic feet per minute as compared with the quantity of 27,600 flowing in No. 8 Right Panel. The other conditions while not the same were such as to give strong indications as to what the pressure drops would be under similar shuttle car travel conditions in No. 8.

The results gained with the 13,000 c.f.m. flow are as follows: -

The airway over 82 feet caused a drop of .001" WG."

Q. The 82 feet is related to the 80 feet you measured in No. 2 cut through? A. Yes.

"Allowing for this drop it was found that the following pressure drops were incurred: -

Empty car standing	.002"
Full car standing	.004"
Full car side on (in turning)	.0055"

It was not possible to measure the resistance created when a full car went up against the air current (owing to the wild fluctuations in the inclined manometer) but this may be calculated.

(83) When the pressure drops as above are converted for a flow of 27,600 they become approximately:-

Empty car standing in airway	.008" W.G.
Full car standing in airway	.016" W.G.
Full and empty car standing in airway	.024" W.G.
Full car turned side on	.022"

(84). When the full car is travelling against the air current the area is reduced and the flow rate is increased according to the volume of the car and its speed. The friction is increased. It was estimated that the car led to a situation which created an equivalent velocity of about 600 ft. per minute as compared with about 321 feet per minute when the car was standing. The pressure drop would therefore be :-

$$- \frac{(600)^2}{(321)} \times .016 \text{ inches of W.G.}$$

$$= .056" \text{ W.G.}$$

911 G. Sellers, x.

" (85) An approximate time study of the pressures on the block screen is shown on the chart below. "

Q. Would you explain this? A. I do appreciate this may be a little difficult. I have endeavoured to set out a table which will show what happens when shuttle cars take up the various positions in the cut-through, No. 2 cut-through, between B and A headings and the first column, and that is all the time, and it is labelled A on the top line, you find I have made allowance there for the gas pressure .0025 which I said could exist due to the height of the gas above the floor but of course that in this case would apply to the bottom of the screen only - I beg your pardon - "due to normal airflow", first. Secondly, I have provided for the pressure due to gas on the screen and that is there all the time of .0105 inches. That, of course, would vary according to the constituents of the gas behind the screen in some measure. That applies all the time so that appears in each of the cases concerned.

Q. You are seeking to get a total of pressure differential in each given set of circumstances? A. Yes.

Q. So you have the constant ones at the head of the column. A. Yes.

Q. And you add any other factors which are pertinent to the situation and put a total at the bottom? A. Yes.

HIS HONOR: Q. What does " 6 times x 4 mins. " mean? A. That means in this time actually that took place, the hour and 40 minutes on the morning concerned, this thing happened 6 times, each of 4 minutes duration.

Q. Six occasions? A. Estimated. One cannot be precise in these things. I am just putting this down as indicative of what can happen.

Q. When you move to the others - "8 times x 35 secs." - eight times every 35 seconds? A. Eight times each of 35 seconds. I have brought them down to the total time of variations from normal of 37½ minutes lower down, which is something in the order of what might be expected to happen.

S.Car action	All the 6 times	8 times	14 times	8 times	8 times	8 times	
	time	x	x	x	x	x	
	4 mins.	35 secs	12 secs.	7 secs.	35 secs.	5 secs.	
	B	C	D	E	F	G	
Due to normal airflow	.0025	.0025	.0025	.0025	.0025	.0025	.0025
Due to gas Bottom only	.008	.008	.008	.008	.008	.008	.008
Due to empty cars standing	.008						
Due to full car standing		.016					
Due to full car and empty car standing				.024			
Due to full car against air			.056				.056
Due to full car standing side on						.022	
TOTALS:	.0105	.0185	.0265	.0665	.025	.0345	.0745

"G" is for that time when the No. 40 car enters the No. 2 heading just above "A" intersection with the empty car also in that part waiting. "

"(86) The preceding chart shows the extent of the fluctuations in the period of 1-2/3 hours such as would be normal on the day of the ignition. In explaining the ignition all these fluctuations are important as the variations would have a far reaching effect. For 37½ minutes on the morning of the ignition the pressure drop would have been greater than that due to airway friction alone. Of these 37½ minutes the most important intervals of time would be those of one fifth of a minute when each full car was travelling between "A" and "B" headings and the eight times when the full car was using 35 seconds to shunt into "A" heading.

The Shuttle Car working Cycle on 9th November.

(87). At the beginning of the shift it has been indicated that No.40 car was in the straight and No.67 was still presumably where it had been repaired the night before in "B" heading towards the crib room.

(88) From the point as above the normal cycle would be:-

- (a) No.40 proceeds to the face
- (b) No.67 takes up the position of waiting between headings "B" and "A" (empty).
- (c) No.40 comes out of face to No.67 and then shunts (full)
- (d) No.67 proceeds to face (empty)
- (e) No.40 proceeds to unloading point (full)
- (f) No.40 empty proceeds to shunt and waits for No.67 (empty)
- (g) No.67 comes out of face and proceeds straight to the unloading point (full).
- (h) No.40 comes out of shunt and goes into face (empty)
- (i) No.67 comes from unloading point and waits for No.40 between "A" and "B"(empty)

Note: Seven complete cycles took place.

(89). It is possible to calculate the leakage through the brattice block screen providing a constant situation is there all the time. Owing to the heavy fluctuation of pressure the amount of gas available behind the screen for each pressure action would be highly variable and therefore any calculations that can be made would be an indication only of what would happen when the resistance of the screen allowed only a certain amount of gas to go through at a known pressure difference. In the case at point 56 cubic feet of CH₄ plus 81 cubic feet of Carbon Dioxide and an unknown amount of air (which in quantity could be the largest part of the leak) would be the leak if the pressures in between "B" and "A" headings remained constant. If there is fluctuating pressure then these leaks would be higher under the high pressure difference and then when the pressure difference falls a lower leak could be expected.

(90). Under normal pressure when the gas level at the block screen takes up the position of 107 ASL, it is 4 feet from the floor with air occupying the remaining space above it. Under surge conditions some of this air at least is exhausted thus giving a much greater area for gas to leak through by virtue of the rise in level of the gas.

(91) The following table shows the leakage which could be expected if the district was to stand for some time and then if each pressure was applied in turn under those conditions. The pressures are taken off the Chart (85) -

Basis (A) P.D."

Q. What is P.D.? A. P_ressure difference.

"105 W.G. leakage as found 56 cubic feet CH⁴ the make in the goaf."

Q. You deal with them and take the figures as given across the totals in your chart in para. 85 and you calculate how much CH⁴, on the analysis which you know, would leak through a minute?
A. That is so.

Q. You have a maximum figure in the situation "G" when No. 40 car enters the 2 heading just above A intersection, of 150 cubic feet per minute? A. Yes.

" 'B'	PD equals .0185"	leakage would be	76 cubic feet CH ⁴
'C'	equals .0265"		89 "
'D'	equals .0665"		141 "
'E'	equals .0325"		99 "
'F'	equals .0345"		98 "
'G'	equals .0745"		150 "

(92) On the basis of the above chart the least value is 56 and the maximum is 150 cubic feet per minute of CH⁴. It is clear that the lower leakage point would be very much less than above and it could be in fact in reverse at times and air could be leaking from the shunt into the space behind the brattice this could apply due to surge alone and it also could apply when the shuttle car is travelling empty with the air. In the tests this factor was not obtainable owing to the surge on the "U" tube of the Water Gauge. The high point would by the same token be greatly exceeded beyond the 150 cubic feet of CH⁴ indicated and it could easily be more than doubled. It is to be noted that by comparison with the pressures available for the ventilation of the District the variations in pressure due to the shuttle car movements are very small and they would not interfere in any measurable way with the quantity of air flowing in the District."

Q. Do you mean that would not have any effect on the mine system of ventilation? A. Very little.

Q. They were creating this intermittent pressure difference across that screen? A. These figures are purely comparative, but they are very small.

Q. You envisage what could have been the critical situation in this respect immediately prior to the ignition, and you say:

" The Critical Situation

(93) It appears that at about 9.20 a.m. on November 9th, the following conditions pertained in No. 8 Right District: -

- (a) No. 67 car had been filled with coal and it then proceeded to the unloading ramp where it was delayed for several minutes.
- (b) No. 40 car proceeded to the face and was filled with coal. It then came out of the place and proceeded towards "A" heading.
- (c) No. 67 car during this time had spent all its time in unloading and waiting near C heading and it did not take up the position between "B" and "A" headings where it usually stood for about 4 minutes waiting for No. 40 car to enter the shunt. No. 67 car in its last act before ignition time is between "C" and "B" headings in an empty state. "

HIS HONOR: Q. Where do you get these facts from? A. In the first place I did go into the District and I made an examination and I was not quite satisfied that you would get gas at the point where the ignition was said to have taken place.

MR. REYNOLDS: Q. I do not think that is what His Honor asked you? A. It is leading up to it, if I may. So then I decided there was some other reason why this ignition took place because the gas undoubtedly was there so it then became obvious to me there was something else interfering with the pressures to cause the leak to come at that particular time. So I then sought out for the reason and the reason I found in this case, by asking the people "what do you do?" - But first of all I analysed the thing myself and said "There is the shunt, the shuttle car obviously goes in there". That is quite obvious to everybody. But, the other car must wait somewhere. I decided it must wait as close as possible to the shunt because that is the logical place for it to wait. After all, these people do not wait, if they are efficient in their operations, they do not wait one hundred yards away, they get as close as they can to the point, to where they have to make their next move from and I then completely analysed the situation and I did find from the various parts of the transcript where these cars were. I did find that the 67 car was in fact being repaired the night before. I did also find in the transcript the 40 car was in the straight and I assumed that was below where the shunt was, towards the mine face, but I did not enquire about that. So, I did have confirmation about three statements and the whole thing fits into place.

Q. You mean you asked questions? A. As a matter of fact, on the night of my inspection I asked, "Where is the shuttle car normally standing?"

Q. You have here a fact "No. 67 car during this time had spent all its time in unloading and waiting near C heading and it did not take up the position between B and A headings where it usually stood for about 4 minutes waiting for No. 40 car to enter the shunt. No. 67 car in its last act before ignition time is between C and B headings in an empty state". Did that come from the transcript? A. I do believe so.

MR. REYNOLDS: It is in the plan, that is where it was found. Everybody says it was there. I am not sure whether an explanation for it not being in its normal position has been given. Obviously it has been given to this witness but I am not sure whether it is to be found in black and white in the transcript.

WITNESS: I believe it is in the transcript by the evidence of one of the shuttle car drivers.

HIS HONOR: I will endeavour to find this in the transcript.

MR. REYNOLDS: Q. You had this information. You believe it is in the transcript? A. I believe it is perfectly true.

"(d) The shunt and the airway between "A" and "B" has not been disturbed for a period estimated to be not less than 7 minutes."

Q. There has been nothing moving in there for 7 minutes? A. I assume this.

"The gas behind the stopping accumulates in the non-surge conditions."

MR. REYNOLDS: There is nothing to create a pressure difference in that 7 minutes.

" (e) No. 40 car travels over the intersection at "A" in a full state and then travels up against the air, stops after attaining sufficient length to turn, the driver changes from one seat to the other, moves his shuttle car to turn and in doing so gets his car side on across the air current, looks to see that the cable anchor point is right (statement of Mangles) and then makes his way into shunt. This action is estimated to have normally occupied some 35 seconds. On this occasion it could have taken longer because there was no need to do it quickly as the other car was not ready to come in. The driver also could have stopped when examining the anchor point. "

MR. REYNOLDS: You have dealt with it on the basis of 35 seconds.

" (f) Because of the comparatively high pressure difference created by No. 40 car in the 35 or more seconds period there has been a sharp increase in the quantity of CH₄ in the shunt and in addition to this it could have been that the quantity of CH₄ in the shunt was even greater than that due to the pressure change because just before that time the floor could have heaved in the goaf and released a large amount of CH₄. If there was such an emission then the pressure change would aggravate the position. "

Q. You say this study of yours indicates the actual manoeuvring of the shuttle car entering the shunt could at that moment create an increased emission of gas through the brattice into the shunt? A. Yes, almost certainly would.

" (g) Shuttle car No. 40 enters the shunt and an igniting agent comes into contact with a quantity of inflammable gas."

HIS HONOR: There was nothing unusual about this procedure of the shuttle car?

MR. REYNOLDS: No, it is not suggested this was a particular manoeuvre, but it would happen in more or less degree every time a shuttle car shunted in there.

HIS HONOR: Q. If the gas had been there the day before this would have been going on, the only difference was, no point of ignition? A. That would be quite right if that was the case.

MR. REYNOLDS: "Mining Practice in No. 8 Right District.

(94) In the Court proceedings it has been indicated that the mining practice has not been good and it has been inferred that this has been in a large measure the cause of the accident.

(95) It appears that the coloured plan as submitted to the Court in evidence is one such as would be prepared by the survey staff in the ordinary pursuance of their duties. It could be expected that the number of lifts would be much more numerous than as shown on the plan as the survey team would only show the position as they could be able to determine at the time of their visits to the section. "

Q. I think this morning you have already explained to the Court what you mean by that? A. Yes.

MR. REYNOLDS: "(96) The plan as attached shows that the extraction of that part of the area which is now goaf would involve the dealing with geological conditions which are not normal. These would be -

(a) Sill rock and cinder coal at the far or inbye end of the area.

(b) Strata heavily flexed by the formation of a major normal fault of some 300 feet throw which occurs just inbye of the panel boundary. This would cause considerable tension on the area.

(c) Heavy grades in the draw path of the fault.

(d) A cluster of volcanic dykes associated with a minor tension fault in the middle of the goafed area.

(97) The abnormal geological features would most certainly create bad roof conditions and would leave a floor that would break up and heave very readily.

(98) The lift system and the order in which they have been taken within the goaf area as indicated by the plan shows a pattern that would not be adopted willingly and it must be taken to show that the operations at least in part followed the need to maintain the safest roof conditions in keeping with the maximum amount of extraction.

(99) It would not be possible for any person who had not seen the working conditions in the area goafed in some detail to know whether or not the method was good or bad.

(100) In working the panel it was the intention to have a heading on the outbye side and parallel to the heading from which lifts were to be taken and for this heading to act as the drainage path for the ventilation that would travel by direction along the goaf edge. This is very good practice and the amount of gas that would be detected with this system in operation could be expected to be small.

(101) It appears that after the pillar marked (10) on the coloured plan was extracted the conditions relating to the pillar marked (11) were reaching a point where some collapse was envisaged and it was therefore decided to extract it without the delay that would be incurred by the driving of the heading as was proposed above. If pillar marked (11) was to be extracted then the two pillars marked (12) should also be extracted to preserve the goaf line. Again any person not having seen the situation could not say whether or not this was good practice.

(102) At the time the evidence available to the parties concerned in the decision to take out (11) before driving a place ahead to allow the air to circulate along the goaf edge was that the gas in the goaf was of a noxious nature and therefore non inflammable. It is not uncommon for mines to be worked with unventilated goafs and in mines where spontaneous combustion occurs ventilation of the goaf would be frowned upon and carried out when no alternative could be found. Under conditions where heatings are possible the presence of inert gases in the goaf is most desirable.

(103) With reference to that part of the district that is still available for operations the conditions would be perhaps little worse than average and I would expect a high extraction percentage and rate of output should it be worked.

(104) It is understood that it was the intention to hole the place (13) on plan and then to drive a split down the middle of the pillar parallel to Nos. 2 and 3 headings. It would have been better to have driven the split before the holing took place as it would have allowed a greater freedom in draining the goaf as a source of fresh air could have been brought right against the holing should it be found desirable. Such action would have readily allowed the holing to be made of larger size and the draining of the goaf could then be completed in short time. The split down the middle of the pillar would be a return to the original planning. "

HIS HONOR: Q. Would you say this split is a longitudinal split in the pillar you are talking about? A. Yes.

Q. And from which side - you would have obviously split the pillar on the goaf side? That is the only side you could have split it from? A. Yes.

MR. REYNOLDS: Q. But I gather you say you would have preferred to do it by splitting the pillar incompletely formed; that is before it holed into the goaf? A. That is right.

Q. Running a heading through from A heading to the miner place before you took the miner place into the goaf? A. That is so.

Q. That is the way you would have done it? A. Yes.

HIS HONOR: Q. You would have had this area for holing the goaf, that is another matter? A. You would have had a fresh air base right alongside.

Q. But it would not have taken it alongside the goaf, it would have been narrower? A. I did not precisely mean that, Your Honor. If you take the position you see on that plan on the Board now, before that place was actually holed I would drive the split and then hole.

MR. REYNOLDS: (Indicating on Exhibit A) He said if he found himself in this situation, he would have taken from there and then finished that off.

HIS HONOR: Q. You would not have a pillar if you had not driven? A. I would have driven the other place first, as is, but I wouldn't have split into what is now called the miner place.

MR. REYNOLDS: Q. I think your point is that if you had done this first and there was a connection here, you had a fresh air place available here? A. That is right.

HIS HONOR: Q. At what point, though, after you started to drive that extension would you have taken the split? A. Just before. I would not have holed the other place, just barely left it unholed.

Q. Left it unholed and then taken the split? A. That is right.

MR. REYNOLDS: Q. And you say this would be an important statement in this section of it :

"(105) The situation as indicated in (94) and (104) above had nothing to do with the ignition of gas."

Is that right? A. Yes, that is right. That is my opinion.

Q. Then you next deal with the matter of reversing the airway -

HIS HONOR: It is an important statement, Mr. Reynolds. Perhaps one of the most important statements the witness has made.

MR. REYNOLDS: It has been made from the Bar table before, but now it has the benefit of an oath.

HIS HONOR: Q. You mean not even as a remote course? A. Well, perhaps if I said that I was speaking comparatively in making that statement. You see, you can relate almost everything you do in life to something.

Q. An infinite chain of causation? A. Yes, that is so.

Q. But nevertheless, one does get the situation where for practical purposes one distinguishes between what is so remote as to be

ignored and what is not quite so remote; I suppose you would say here the immediate and proximal cause of the ignition is the fact that you have gas with a point of ignition?A. That is right.

Q. And spreading further away in the chain of causation, you have something which causes that gas to come out of the goaf and something which would heat up somewhere around the area of the brake drum, causing a point of ignition, and so you go wider? And basically, in this of course is the fact that the ventilation system was not sufficient to cope with the flow of gas or the amount of gas; that must be so otherwise the gas must have been diluted so that no ignition could have taken place. Would you agree with that?A. Well, I think that what I think is probably the same as what you think, sir, but I think I put it in a slightly different way.

Q. Tell me how?A. Well, the statement you made about the ventilation not being adequate to deal with the situation was not perhaps strictly correct.

Q. Can you show me where it is incorrect?A. For instance, I would say to you now that on the evening I first went into that mine I pulled down the brattice screen in the shunt and the ventilation was quite adequate to shift that gas in a very short time.

Q. Part of the ventilation system was the brattice screen across the shunt?A. I will allow that. Perhaps we then come back into agreement.

Q. What I said was the ventilation system as it existed was not sufficient, was not adequate, to deal with the gas that became present?A. Yes, well, I think we do mean the same thing.

Q. Assuming that to be so - this is going back to the more remote cause but one which may be foreseeable - one gets to the cause of the ventilation system not being adequate in that way?A. Yes, well, may I suggest that Your Honor limits that term "ventilation system not being adequate" to that little part of the district because quite clearly the ventilation system for the rest of the district was quite adequate. It would have been quite adequate had that brattice not been erected, and it is only one small part of the district. That is the point I make.

Q. It is true there was not sufficient ventilation in the immediate area where the ignition occurred?A. That is so. Nobody could deny that.

Q. And it appears from the evidence that the ventilation was not sufficient there in that set of circumstances because of the existence of the brattice?A. Yes.

Q. Without the brattice, as you say, the gas was dealt with by the flow of air?A. Yes.

Q. But you see, can you divorce the brattice from the remainder of the ventilation system in that way? For example, if there had been a further bleed tunnel - I do not say it was possible of course, but assume there had been a bleed tunnel formed before this one was driven, ventilating the goaf - the brattice itself would probably not have caused the gas to accumulate - A. Well, sir, if I may interrupt you, you may be right and you may be wrong in drawing that assumption. If I may explain --

Q. I may be right and I may be wrong; I will ask you to explain in a moment. Assuming for the moment without explanation that I am right. You see, we are talking about whether it is or is not too remote. If I am right, then does it not follow it is not just the brattice that causes the fire in more or less remote fashion, but it is the brattice in the circumstances that existed

that caused the fire and therefore the causing of those circumstances must be a significant cause of the fire. Is that right?
A. That is so.

Q. Now, tell me where I cannot be right? A. Well, there is no guarantee that if you hole that miner place into the goaf, you would get any flow at all. Now it is not uncommon that this happens, it is very common, along the line of the goaf you have two factors that are important to this particular case. One is how the floor behaves and the other one is how the roof behaves. Now then, as I say, it is very common in this sort of case where not exactly even on the edge of the goaf but some distance into the coal, it could be even six feet into the coal, you get the bottom starting to heave and it causes what we call a goaf drain. I think every practical miner here and every mining man would have quite often seen the floor up this high above the coal pavement due to this heaving. In addition to that, if you have a very fine grained roof and it breaks up into small particles they will fall very readily, and in the process of the bottom heaving you can get a very tight situation which would not allow anything to come through of any note. This is happening every day in certain parts of this district and you wouldn't get a flow through it. You would not drain the goaf in this particular method, but I suggest that possibly you would get a flow of air. I am not saying you would and I am not saying you wouldn't because we never got there. We don't know. I don't know, I couldn't say.

MR. REYNOLDS:

Ventilation.

(106). It has been said in evidence that the ventilation paths should have been reversed and that the intake should have gone down "A" heading with "C" heading the return. I completely fail to understand why this has been said. The position relating to No. 8 Right District with regard to good ventilation practice is:

(a) The gasses being met in the district were heavier than air and the direction of the air path should therefore travel from the high side to the low side. The ventilation in the district does go from the high side to the low side.

(b) The air should come from behind the retreating faces and then go over the worked out goaf. The air path in No. 8 right was coming from the part behind the retreat and then going over the goaf. The layout of the district as planned very clearly sets out to do this.

(107). The suggestion that the air should have travelled down "A" heading would mean that the air would be travelling up the goaf line right from the bottom, if the goaf was to be drained, and for the extraction of the coal above "A" heading it would allow for the air to travel through the extracted area before it reached the working places. With the comparatively low gas emission being experienced in No. 8 Right it would probably work but it could not be nearly as good as the method adopted. It is to be noted that any brattices erected would leak in a similar way to the brattice making the block screen of the shunt in "A" heading.

CONCLUSIONS:

(a) The drop in Barometer had virtually no bearing on the ignition.

(b) The suction fans did not create any zone of comparatively reduced pressure that would cause the brattice in "A" heading to leak.

(c) The method of working as proposed was sound, but, owing to the conditions to which the system was applied, variation was forced upon the management.

(d) There is every possibility that the gases being met with before the fire was extinctive and that at 8.30 a.m. on the 9/1/65 if inflammable gas was being given off at that time it could have been absent from the shunt areas.

(e) Gas was present at the time of ignition and its leakage rate through the brattice was aggravated at the time No. 40 shuttle car entered and the ignition occurred by the action of the shuttle car causing a comparatively high pressure drop in the shunt.

(f) The working of the shuttle car caused heavy variations in pressure in the vicinity of the working area.

(g) There was a sudden variation in the character of the gases given off from the goaf and miner place and this most probably happened suddenly on the morning of the 9/11/65.

(h) That a sudden heaving of the floor probably associated with the dyke and fault system within the extracted area was the cause of the sudden change in the character of the gases.

Finally I could not accept that every person who set out to detect gas in No. 8 Right would fail to find Illawarra Bottom Gas which was at the time of my visits so easy to find. "

(Luncheon adjournment)

HIS HONOR: Before the cross-examination proceeds further I think we ought to all be clear as to what exactly was done by the deputies on their evidence and in particular what was done by Mr. Stewart on the day or so preceding the fire and the day of the fire. There seems to be some confusion here and there certainly is confusion in my mind but as I see it, and I may be corrected here by Counsel, on each of the shifts where Mr. Walker and Mr. Cambourn were the deputies no gas was discovered by either of those deputies, noxious or inflammable, in the place at all, according to their evidence. Deputy Stewart reports that on his shift, on the shift before when the fire occurred, he found noxious gas. On the day of the fire, and his report was made 2 days later because of him being incapacitated by the fire he reported, and I will read it "Noxious gas found at goaf area of previous lift and A heading. Others clear". That is, as I say, the report as to the shift during which the fire occurred. His evidence as to what he found and what he did not find is as follows, and I will try to keep this down to the examination of the shunt area only:

"Then I came back up and into the shuttle car shunt again and I went in there and this time I got down on my hands and my knees and I got this sensation right down low on the ground. It is a small or a sensation or whatever anyone likes to call it. It is something like a sensation in your nose and mouth but it also burns your eyes and I gave this elephant tube a little bit of a wave around and then I could not smell anything else again and I tested all round that area with the lamp and could not find anything. Then I went back down and sat roughly at the back of the miner on the vent tubes for about another ten minutes and then I went back up to where everybody was collected on the timber bay and that is when the actualy fire took place."

We have been speaking here of Mr. Stewart having tested for gas some half hour before the fire and having found nothing. On that evidence obviously it is less than half an hour, one might say it is ten minutes plus.

MR. McNALLY: There is other evidence from another witness, Your Honor.

HIS HONOR: I am taking Mr. Stewart's own evidence at the moment.

"Q. That is when it happened? A. Yes."

He was then cross-examined by Mr. Lee as to the practice of getting down on his hands and knees. No where does he say he discovered that gas with the lamp or any other device, it was merely a smell, and he got rid of it, he said, by waving the elephant trunk around. He was asked this by Mr. Lee, on p. 109,

"Q. And what opinion did you form when you got this sensation or smell? A. When I got that smell I associated it with black damp.

Q. You never suspected bottom gas did you? A. Not suspected it, no, but I had been looking for it."

Apparently the effect of his evidence was he was looking for it without a safety lamp at that stage.

"Q. What you thought you were getting there was black damp? A. That is right."

Then, on the next page, he was asked:

"Q. What is the method you used then?"

I am sorry, the question before is important:

"Q. Did you test at the face and at the fans and in the shunt in the same manner each time? A. I would say Yes. Yes.

Q. What is the method you used then? A. First of all going into a place I tested the roof first. Now I lower my flame to that very small luminous blue colour and get it up to as high to the roof as possible and work across the face and if there is any inflammable gas it forms another blue or a lighter blue halo at the top of this flame and if there is no gas there, there is no alteration to your flame. From then I lower it - "

The witness appears to mean "I lower the lamp", as he then goes on to say :

"and I will raise my flame till it is just a little bit below normal height and the orange flame, then I will hold my hand underneath it and lower it in to the Bottom. If there is any inflammable gas in that area it will still flame on my light and if there is no inflammable gas there and what I call black damp is there it will tend to take your light out, to extinguish your light, and that is the usual way that I test. "

He says:

" While I am testing at the top I have the vents open from the top and my light has this, and while I am testing for the bottom you can screw the ring around and have the vents open. It is about four or five inches from the bottom of the lamp."

He was asked:

"Q. So the flame you used to detect the CO2 you say is one that will reveal methane to you also?A. Yes.

Q. Are you sure of that?A. I am positive of it.

Q. You would not agree that you need the small flame in order to be able to see the cap on this flame that ultimately forms there?A. No. The flame is reduced a little bit but it is nothing like the small flame.

Q. Then you do not agree that by leaving your flame at the same level to test for CO2 you are placing yourself in a position where you could very easily miss the cap? "

Mr. Reynolds said "That is a false premise. He did not say when he was testing for CO2 he left it at the same level".

" We do not want any doubt about it but what you said was having tested for methane with the small flame you then turned it up to give you the flame which you were ultimately going to use to test for CO2?A. Yes, that is right.

Q. You took that flame down to the floor?A. Yes.

Q. You claim on that flame if there were methane you would see it?
A. Yes.

Q. You would not accept a proposition that by using as a test for methane the same flame that you used to test for CO2 you were placing yourself in a position where you could very easily miss the methane if it was there?A. No, I would not. "

That is the evidence from Mr. Stewart.

Q. You will agree that is not how you would test for methane?
A. Not how I would do it but it could be done that way.

Q. It could be done?A. Yes.

Q. Mr. Sellers, the proposition that you have advanced, that there was a sudden rush of bottom gas, a sudden flow of bottom gas into the shunt after the test had been made involves this, does it not, on that evidence, if I accept it, that in the space between say ten minutes and quarter of an hour after the last test that gas came there?A. Yes, well, I think if you study what I have said a little closer you will find I said that, what you have just said, and I also indicated the possibility that you would have a fluctuation in the amount of gas coming in and out of the shunt. There are two things that could happen in what I said: after all, if you get, as I indicated, possibly say 300 cubic feet of CH₄ coming through just for a short time obviously the average must be less than what I quoted as 56 and it could have been very much less and I did indicate also there is some possibility the flow could have even been reversed.

Q. On your figures there was, up to the time of a sudden rush, a constant flow of gas - a make of some 57 cubic feet of methane in it. Is that the position, or am I wrong? A. I would have to look at it.

Q. Would you look at it? A. Yes, the November figures indicate 57 cubic feet.

Q. That would be a sort of average figure which one would expect to obtain on the days before the fire? A. Yes, on the figures, yes.

Q. Your understanding of it is that the bulk of this make was from the goaf, was it? A. No, my understanding of it would be some 20 cubic feet of that would be coming from the miner place and the rest from the goaf.

Q. So you still allow, on your understanding, some 37 cubic feet from the goaf? A. Yes, that is on those figures.

Q. All of that would find itself near the brattice, would it not? Haven't you said on your tests that the other airways were clear? A. Yes.

Q. But this was found near the brattice in the shunt? A. Yes.

Q. So we are to assume on the days before the fire there was a constant make of about 37 cubic feet in the goaf concentrating at the brattice? A. Yes.

Q. We have been told on the day of the fire and the day before the fire there was what the deputy took to be black damp there. Would you say that if that bottom gas, and the methane were contained in that Illawarra bottom gas, that that should have been detected on the deputy's lamp? A. May I just have a minute to work it out?

Q. Yes. A. Yes, it would be.

Q. It should be? A. It would be detectable but it is reaching the stage of getting difficult.

Q. If these propositions are true must it not also be true that one of these two propositions are true, either the deputy did not test for methane, or having tested for methane he did not find it because of a fault in his test? A. No, I would not exactly say that is right, but those are possibilities.

Q. They are strong possibilities? A. Yes, but supposing on this occasion, supposing this situation obtained on that morning and the gas was coming through at the rate you described and at the occasion, this was after great activity with the shuttle cars, there might not have been enough for him to find. You could still smell CO₂ in it, as you can.

Q. I want to read another piece of Mr. Stewart's evidence. Perhaps you may be able to give assistance on this. This is at p.112. He was asked some questions about whether he had ever smelt a mixture of bottom gas, that is on the bottom of p.111 and he said, "Yes, I have been shown bottom gas". It goes on:

"Q. Have you ever smelt the black damp in bottom gas?
A. I would say this smell or sensation I get was black damp.

Q. You could smell black damp in bottom gas? A. Yes, you can smell the black damp but whether you can find the bottom gas there or not is another thing.

Q. Did you think when you smelt black damp you in fact might be smelling a mixture which constituted bottom gas?

A. Yes, I took the precaution of testing them and when I found no inflammable cap on the light I thought it would be black damp. "

Obviously he was referring to what he did just before the fire. It is not what he had said originally about merely smelling it and using the bleeder tube to get rid of it.

"Q. Did you think where this bottom gas might be coming from if it were bottom gas? A. It could be coming from anywhere actually. It could be coming from the goaf area.

Q. From the goaf area? A. Yes.

Q. Looking back do you think that is the most probable area from which it would come? A. Yes, it would.

Q. Did it strike you at the time that it might be coming from the goaf area? A. No, I would not say it did strike me at that time. "

Q. You say you are familiar with deputies and their ability and so on. I want you to assume a deputy says "I can smell gas near a brattice", a brattice which is a stopping to a goaf. What is your opinion as to whether they would draw the conclusion or at least consider the possibility that the gas was emanating from the goaf? A. They would almost be certain it was coming from the goaf.

MR. McNALLY: Might I, arising from Your Honor's cross-examination, ask some questions at this stage?

HIS HONOR: Yes.

MR. McNALLY: I would have wished to have Mr. Stewart here had I known Your Honor was going to do this.

HIS HONOR: This arose from what happened this morning. If you want Mr. Stewart for any reason at all you may do so. If you want to postpone your cross-examination till Mr. Stewart is here you may do that.

MR. McNALLY: Q. I think this morning you demonstrated, or saw demonstrated yesterday in any event, by Mr. Cambourn, the manner of detecting black damp and the manner of detecting Illawarra bottom gas? A. Yes.

Q. Is it fair to say/ after testing at the roof for methane one reduces the light to about half flame and lowers the light until the gas is found on the floor - noxious gas? A. Yes, that would be quite in order, yes.

Q. Assuming that noxious gas was detectable upon the lamp and it was in fact noxious gas and not Illawarra bottom gas what percentage of carbon dioxide, what minimum percentage of carbon dioxide would be present? A. And the lamp did not go out?

Q. Assuming the lamp was affected, assuming there is noxious gas on the floor and the lamp shows it, is it fair to say that if the lamp shows it there must be carbon dioxide in excess of $1\frac{1}{2}$ per cent? A. Oh yes.

Q. So that if the gas was smelt and the lamp was put on the floor and was not affected, irrespective of what lamp you had on the light, you could assume there was less than $1\frac{1}{2}$ per cent carbon dioxide? A. No, I don't think that is what you asked me before, if you don't mind clearing it up.

Q. Assuming one could smell noxious gas or black damp on the floor of the shunt and assuming one sat the lamp on the floor of the shunt - do you follow? A. Yes.

Q. And the lamp was not affected - forgetting methane at the moment - and the lamp was not affected - could one assume there was less than $1\frac{1}{2}$ per cent carbon dioxide getting in to the lamp? A. Yes, I would.

Q. That in fact would be true, would it not? A. Yes.

Q. That may be either because the black damp that is in the shunt is in a less percentage - the carbon dioxide I am sorry - is in a less percentage than $1\frac{1}{2}$ per cent, or, alternatively, it was so close to the floor that the lamp could not pick it up? A. Yes.

Q. If you were told, firstly, these facts: that the air free mixture of Illawarra bottom gas was as described by Mr. Donnegan, that is roughly a little more carbon dioxide than methane, if you were told a deputy went into a shunt and stood his light on the floor of the shunt with his light half down and noticed no effect at all upon the light, what conclusion could be drawn? A. I would conclude it would not be a very big percentage of CH₄.

Q. It would in fact be less than $1\frac{1}{2}$ per cent where the lamp is picking it up? A. I would think it would be probably less than one per cent.

Q. On the basis there is more carbon dioxide than methane and there is less than 1 per cent carbon dioxide where the lamp would register I think it is fair to say a lot of deputies - I will withdraw that - it is fair to say one cannot be sure of testing an area closer than five inches from the floor? A. Well, it depends on the technique. After all, if you think there is gas there you will try and find a hole.

Q. If a light was set on the floor - ? A. It would have to come in the apertures for the gas provided for it to come in. I have never measured it but it would be about four inches.

Q. So in the area above four inches from the ground there would have to be, bearing in mind the percentage of oxygen present, greater than $1\frac{1}{2}$ per cent carbon dioxide for a registration to be shown and, if one was to use the non-luminous flame greater than approximately one per cent or $1\frac{1}{4}$ per cent methane? A. In that order, yes.

Q. Assuming we accept that deputy Stewart went into the shunt, smelt noxious gas, sat his lamp on the ground, and failed to detect it, failed to detect either carbon dioxide or methane, can we assume neither the methane nor carbon dioxide could be detected? A. I would assume so.

HIS HONOR: Is there evidence he sat his lamp on the floor?

MR. McNALLY: I thought there was.

HIS HONOR: His own evidence says nothing at all about that.

MR. LEE: He certainly did not say he put the lamp where he smelt, where he smelt black damp.

HIS HONOR: Q. Can you imagine a deputy, having smelt black damp near the floor, sitting his lamp in it? A. It would have to be very little for me to consider doing it.

Q. Assuming he did not know the extent of it, and that he smelt it, can you imagine him sitting his lamp in it with the

possibility of his flame going out should it be more than he guessed at? A. He would have to be very careful beforehand to make sure he did not have the percentage.

MR. McNALLY: At p.111 there is evidence, it is the fifth line, "Q. You took that flame down to the floor? A. Yes."

MR. LEE: That was general.

HIS HONOR: He is not talking about what he did on this particular day, that is talking about the method he used. That is prefaced by the fact that once he had been shown bottom gas and he is describing how he tested for bottom gas. It does not say it was on this day at all. He does not mention using the lamp, he said he smelt it by getting down on his hands and knees and waving the elephant trunk.

MR. McNALLY: A little lower down he is describing what he did on that day.

HIS HONOR: "As I said, I could not get a detection on the light. Q. You thought there was sufficient black damp down there to wave the elephant tube around? A. Yes. "

In the first place he said nothing about the light. He was asked very carefully to describe actually what he did in his evidence in-chief. This piece about the light is something quite new.

MR. McNALLY: What piece?

HIS HONOR: What you have just read, or, what I have read out. "As I said, I could not get a detection on the light." That was in answer to the question, "You say you got down on your hands and knees and smelt some gas. Did you make a report on that gas?" He said, "I could not get a detection on the light". He had made no mention of the light before that except in talking generally about testing for bottom gas in other places.

MR. McNALLY: He has said he tested the face at p.110: "Q. Did you test at the face and at the fans and in the shunt in the same manner each time? A. I would say Yes. Yes. " Then he describes the method of testing.

HIS HONOR: Then Mr. Lee subsequently asked him a number of questions as to why he got down on his hands and knees. He said he used the light, but after he waved the elephant trunk around. He then went round and tested in the shunt he had just cleared, with his lamp, but did not find any gas, but he does not say he used it before he waved the elephant trunk around.

MR. McNALLY: On p.108 a little lower than the middle this appears:

"Q. You tested for gas at the fan area? A. At that brattice stopping there or brattice surround. Then I went straight across from there, that is in A heading, in to the shuttle car shunt where the bleeder tube was and I tested on the right hand side first. "

HIS HONOR: But this is an earlier test, he then goes on to talk about testing just in by the cross sticks. The last test he did for gas on this occasion before the fire was in the shunt. He said he went down on his hands and knees, did this and waved the trunk around and tested then with the lamp and then went and sat down and the fire happened some ten minutes after. True it is on the first occasion he went round this place and tested with a lamp, on his evidence.

MR. McNALLY: It is correct that is the first inspection, Your Honor. He has said he got down on his hands and knees and tested the first time, he got down on his hands and knees and had a smell, but he has said he has tested. I am not clear if he tested before or not.

HIS HONOR: I thought Mr. Lee's cross-examination showed he did not test with the lamp before he smelt. This is the method he said he adopted from time to time, he got down on his hands and knees, smelt it and he smelt what he thought was black damp, waves the trunk and gets rid of it and tests with his lamp and finds none there. It is this fault - if you do it that way, if you do not use the lamp, you do not give yourself a chance of telling whether there is inflammable gas there or not. That is the fault. You get rid of it before you can tell.

MR. McNALLY: Perhaps if one realised if a lamp failed to detect black damp in this mixture it would not detect methane --

HIS HONOR: That may be true. I don't know about that. Is that what Mr. Sellers says? Is that the effect of his evidence?

Q. If the lamp would not detect black damp it would not detect methane? A. I did not say that.

MR. McNALLY: Q. In this air free mixture Mr. Donnegan found - ?
A. Yes.

Q. If a lamp failed to detect carbon dioxide due to the percentage of carbon dioxide present at the place where he tested it would not detect the methane because the carbon dioxide, being less than $1\frac{1}{2}$ per cent, the methane must necessarily be less than approximately one per cent? A. No, if you had a mixture like that you could faintly see the cap at one per cent. If your lamp was in a free mixture and not on the floor you could detect one per cent in that you could actually see the cap just very very slightly.

Q. If there is less than $1\frac{1}{2}$ per cent carbon dioxide present - this is the air free mixture? A. It is getting under one per cent.

Q. The odds are it would be less than one per cent methane? A. Yes.

HIS HONOR: Q. Does not that depend on the type of mixture? A. He did qualify it with the percentage and as I said - as you said - on the proportions as found by Mr. Donnegan - you will keep in mind that is what you asked - Mr. Donnegan's percentages -

HIS HONOR: Mr. McNally asked you. I didn't ask you.

MR. McNALLY: Your Honor appreciates the lamp won't detect carbon dioxide of less than $1\frac{1}{2}$ per cent and on this particular mixture, if you have got $1\frac{1}{2}$ per cent carbon dioxide I am suggesting to Mr. Sellers one per cent - you are going to have less than one per cent --

HIS HONOR: That may be, if you used the lamp.

MR. McNALLY: This must be cleared up. Mr. Stewart has a regular practice of finishing work at 4 o'clock --

HIS HONOR: I will hear Mr. Stewart tomorrow morning.

MR. McNALLY: May arrangements be made to have him here first thing in the morning?

HIS HONOR: Yes.

MR. LEE: Q. If you can smell black damp does that indicate a quantity of usually more than one per cent CO2?A. Yes.

Q. In fact it usually indicates a quantity of - - A. I would say three or four per cent.

Q. In other words, if you can smell it you should be able to get it on your lamp?A. You should find the flame will be reduced.

Q. Is it a usual thing to your knowledge for a deputy to go down on his hands and knees at a particular point and smell without any warning or knowledge or suspicion there is something at that point?A. Well it is, I can assure you, quite common for a deputy to get right down as far as he can to detect Illawarra bottom gas.

Q. Where have you seen that happen?A. All the "Swillies" - keep in mind these swillies are not very big sometimes and there may be a few inches of gas in there.

Q. You are referring to many years ago, the things you have seen?A. Yes.

Q. In what circumstance in this mine would you have thought the deputy would go down on his hands and knees and start sniffing around at the floor?A. All I can say is I have done it myself but I just could not put myself in the place of Mr. Stewart.

HIS HONOR: Q. I suppose you might think at some time the gas was emanating from a particular area, for instance, underneath the brattice?A. Yes.

Q. If you started off by saying, "I don't think the gas is coming from that area" you would hardly get down on your hands and knees?A. On the reverse side of the picture I have on many occasions climbed up in a cavity in the roof to smell what is there.

Q. You have had a cavity there. Can you picture a deputy looking at a place that has been already established for some days - the brattice in the shunt?A. The sense of smell is one of the things that is used in mining practice. I could not suggest in any way that deputy Stewart would not get down on his hands and knees.

Q. Would not you think he would do it because he thought there may be something coming down from under the brattice?A. I think he would go down for the purpose of finding out.

Q. If he says he does not even think it is coming from under the brattice one has to wonder why he did it?A. You must wonder always, yes.

MR. LEE: Q. Would you look at the certificate of analysis that is annexed to the report, the first one?A. This is the one with four items on?

Q. No, samples 1 to 6, headed "Certificate of Analysis. Confidential. Mine Air samples -15.11.65." Do you see that?A. I have seen it, yes.

Q. You have looked at it, I suppose?A. Yes.

Q. I will take you through some little aspects?A. Yes, certainly.

Q. You will observe the first sample, Sample No. 1, showed oxygen 21.3 per cent?A. Yes.

Q. You see that?A. Yes.

Q. I suppose that sta_rttles you a bit, does it?A. Oh well normally we take it as 20.9.

Q. But this analyst got 21.3 per cent. A. Yes.

Q. The maximum oxygen you can have in the ordinary atmosphere is 20.9?A. It doesn't startle me.

Q. It indicates, shall we say, an error on the part of the analyst?A. Well I think you will find in the type of apparatus you have there is an error always. You cannot get perfection and I think this chap has been most precise in recording the finding and I think is to be highly commended for it.

Q. Let's face it, to find 21.3 per cent as the oxygen content is quite impossible, isn't it?A. Under normal circumstances, yes.

Q. In these circumstances it was quite impossible to have found 21.3 per cent oxygen when the maximum would be 20.93 --

MR. REYNOLDS: Do you think it is quite fair to attack this witness?

MR. LEE: If he wants to be vague I will attack him.

MR. REYNOLDS: Do you think it is quite fair to attack this witness about somebody else's findings in this way? If you think it is fair, you do it.

MR. LEE: I will, certainly. This man has come forward and put forward a theory. I asked him if he read this and he agreed with me the figure was wrong and I thought he was trying to suggest there could be ways of justifying it. I am putting it to him quite bluntly there was an error and an obvious error on the part of the analyst.

Q. Isn't there an answer Yes or No to that?A. Well, as I said to you this gentleman has recorded his error. He has made a proper record of what he found.

Q. It is a record of an error?A. It is a record of an analysis that is not one hundred per cent correct.

Q. Does it simply record an error?A. Well, it is not exactly right.

Q. You are an expert on the matter of composition of gases?A. More or less, some gases.

Q. Have a look at Sample 2. It shows an oxygen content of 21.2 per cent, which cannot be right. Do you agree with that?
A. Yes, go on --

Q. That is so, isn't it?A. Well, I must agree that the percentage of oxygen is unduly high.

Q. Have a look at Sample 3 where the oxygen content is shown as 20.6 per cent?A. Yes.

Q. That sample, No. 3, showing 20.6 per cent should, with the other items shown, the CO₂ and the CH₄ with an air content, make 100 per cent?A. That is quite right, yes.

Q. It would be a simple matter for you to work out that 20.6 oxygen is the equivalent of 98.4 per cent air. You could do that?A. I believe I could do what you are suggesting, I believe so, yes.

Q. Let us assume - you may check it if you wish?A. I have no intention of doing so.

Q. That 20.6 of oxygen equals 98.4 per cent air. We have to add to that 1.5 per cent CO₂ and .9 per cent CH₄ and we have a figure which is over 100 per cent?A. Yes.

Q. That would indicate that that analyst was inaccurate in some way?A. It could.

Q. If it was accurate you would get a sum total which could only come to 100 per cent. Is that not correct?A. That is quite correct.

Q. If you take sample No. 4 - take Sample 5 - the oxygen content is 20.8 per cent. You could equally work out whether that oxygen content gave an air content of 99.4 per cent. You could check me on that, given the time?A. Yes.

Q. If it be 99.4 per cent then we have to add to it 1.4 per cent plus 0.78 per cent and we will get over 100 per cent again. That is a simple calculation?A. It appears to be right, what you say.

Q. So once again we would think in respect of Sample 5, there was an error somewhere. Would that be the conclusion?A. You could say that.

Q. With some confidence?A. Yes.

Q. With regard to Sample No. 6 the oxygen content is 20.9 per cent and you could quickly ascertain whether I am correct in saying that gives you 99.8 per cent air. You could check me on that?A. Yes.

Q. And if my figure is correct all that we have left to make up a composition of 100 per cent would be 0.2 per cent?A. It could be right.

Q. 99.8 to 100 per cent is .2 per cent, is it not? A. Well, it appears to be right, without working it out.

Q. What the analyst has done is not have something which totals .2 per cent but he has added 1.6 per cent and 0.67 per cent and once again we have over 100. Right?A. Could be right.

Q. It is right, isn't it?A. As I have said, I have not checked it.

Q. You just attached this to the report?A. No I don't.

Q. May I go to your next certificate of analysis. Do you agree that as far as the samples of the findings taken there are concerned they indicate the gas found was gas which was inflammable in air?A. This one, yes, quite right.

Q. I do not put this any further than this at this point: You agree that the gas you took a sample of was inflammable gas?
A. Yes.

Q. You heard Mr. Donnegan say his samples gave him the conclusion they were inflammable?A. Yes.

Q. Your samples were taken, and I think this is covered by the certificate of analysis, at the miner face?A. About 12½ yards back in the miner place.

Q. Not in the shunt?A. No.

Q. The samples covered by the certificate of analysis dated 20th January 1966 and signed by Mr. Jephcott were taken in the miner place?A. That is so.

Q. You would agree, from your knowledge, you can get a slight variation in the composition of bottom gas from place to place?
A. Yes, I would agree with that - slight.

Q. You appreciate that certificate there does indicate a slightly different composition of gas than that found by Mr. Donnegan?
A. No, I would agree that it shows a very marked difference.

Q. He got his from the goaf? A. Yes.

Q. You got yours from the miner place? A. Yes.

Q. Do you attach any significance to the marked difference? A. I do.

Q. What significance? A. If you know the gas from the goaf as found by Mr. Donnegan was comparatively richer in CH⁴ --

Q. It was more inflammable? A. That is so - it indicates there is some reason for that difference.

Q. I want to take you to your sketch plan, the section, marked 41a. A. I have it.

Q. This was your work, was it not? A. Yes, the original was mine.

HIS HONOR: I do not think you are looking at 41a?

WITNESS: I beg your pardon, the section?

MR. LEE: Yes.

Q. (Approaches large map on floor of Court) I want to make clear what you did here. What you did was to take a section as - (demonstrates) A. No.

Q. As if you were standing where? A. No, the section is drawn in a line down the middle heading.

Q. Down B? A. Yes.

Q. Looking from C heading? A. Yes, you could say looking from that way, yes.

Q. I want to be sure. A. Yes, that is right.

Q. I want to be sure that I have got a proper understanding of your plan. A. Yes.

Q. If you stood in C heading and looked forward you would take the section which you took? A. That is quite right.

Q. Your drawing shows a gas line coming - (demonstrates) A. That is so, 107 feet.

Q. You took the slope from B heading down? A. That is right.

Q. What your section does not show at all, of course, is the slope from A heading down to the extension to No. 2 cut-through and the area marked Goaf is quite a deal greater than the slope along B heading towards the goaf. Firstly, is that not a correct proposition? A. I would believe the grade is steeper.

Q. Do you want to check your contour plan? A. Yes, there would not be very much difference in level between the inby end of B heading and where the miner is.

Q. On your contour plan it shows a fall from B heading of something in the order of 110 down to 80 to where the miner was?
A. Would you say that again please?

Q. It shows a fall from something in the order of 110 down to about 80 at the miner?A. From A heading down to the miner.

Q. Away from B heading?A. Yes, it is a little more.

Q. If we follow the contour line across we can see the area which is shaded and which we know to be the goaf would also show a fall downwards from B heading towards the end of the goaf out in line with the end of the extension of two cut-through, of a similar order?A. About the same order.

Q. The only fall your gas line is concerned with on your sketch is the fall along B heading out towards the goaf?A. That is all my section shows.

Q. The effect of the topography of that area is if any gas was likely to be anywhere it was likely to be in the area down from B heading in the goaf out towards a line in line with the extension of 2 cut-through?A. In other words it would be on the left - that side of the district on the plan?

Q. Looking at it on the top side of the plan. A. I would say the greatest concentration of gases would be in the deepest parts. Would that describe it to you?

Q. That is satisfactory. A. Yes.

Q. Just to understand your section plan, you have shown a gas level at B heading?A. Yes.

Q. It could well be that that gas level is wrong?A. No.

Q. That it was considerably further back down the goaf?A. No, I would not agree. Perhaps we are talking at cross purposes but on what you have said I could not agree with you. Perhaps you might like to make it a little clearer?

Q. Did you find gas at B heading in the goaf? A. I found a very small amount of gas on the left hand side of the heading as far as I could get in at the goaf at that point, on the floor.

Q. If we go back into the goaf in the direction I have indicated towards a line in line with the end of No. 2 cut-through, the fact is that that is where we might expect bottom gas to be? That is the first proposition, isn't it? A. We would expect it to be below that level of 170 feet.

Q. Below that? A. Yes.

Q. Indeed, the position could be of course - I suggest you do not know - that the gas level may have only come up to A heading? A. Would you mind repeating that, Mr. Lee, because it doesn't sort of make sense?

Q. I withdraw it. There is no doubt in your mind that there was bottom gas in the goaf? A. Yes.

Q. You accept that? A. Yes.

Q. And we are going to find it on the bottom? A. Yes.

Q. And in the deepest places? A. That is so.

Q. It could well be then that the area of gas discovered in the goaf may only have extended up the incline to A heading? That is only a proposition I am putting to you as a possibility? A. In other words, there might not have been any gas in the goaf at all, is that what you are saying?

Q. No, not at all? A. Well, that is the way I read your question.

Q. Looking at the lay of the land and the contours of the goaf, to make it clear, do you say that it had to reach up, any gas level had to reach up to B heading? Is that what you are saying? A. Yes, to just below B heading, it would be 170 feet level.

Q. Just below B heading? A. Yes.

Q. How far below B heading and how close to A heading? A. Well, it could be ten feet, perhaps.

Q. Ten feet? A. Yes.

Q. It may not have reached up to B heading? A. It didn't reach up to B heading, at its junction with the goaf.

Q. But then that gas level means that we have gas from that point back down through the goaf passing the shunt in A heading? A. That is quite right.

Q. And the extreme likelihood is of course that the gas would be continually coming through the brattice in A heading? A. That is so.

Q. That is the extreme likelihood of any position we may care to take? A. Very likely.

Q. And is it not significant in your mind that when this area was first set up, before the brattice was put there, there was detected over a period of two days black damp, so the deputies say and thought, at the intersection of the cut-through and A heading; is that not a significant fact in your mind now? A. At the junction of A heading and the goaf?

Q. And the cut-through, in effect the shunt area? A. That is right, yes.

Q. You see, at the time before the brattice went up, gas was found in what we now know to be the shunt area at that point, on 2nd and 3rd November? A. Before the brattice went up?

Q. Before the brattice went up. A. Yes.

Q. And then the brattice goes up, is that right? A. Would you just tell me what type of gas?

Q. Well, the deputies say black damp, noxious gas? A. That is before the brattice screen went up?

Q. Yes. Now, before the brattice screen went up, would you agree that that would have the tendency to contain any gas in the shunt that was coming from the goaf? A. Yes.

Q. And so it would be a reasonable proposition, I think you would agree, that merely because of the fact, if it be the fact, that the shunt was clear from time to time after the brattice was put up would be no indication at all as to what might be behind the brattice? A. Very little, I would say.

Q. Now, the gas that was found there on 2nd and 3rd November and which was thought to be black damp, you would agree in all probability came out of the goaf? A. Yes.

Q. So that at that point of time on 2nd and 3rd November, some gas had come out of the goaf. In the light of all that you know, do you not think that it is almost certain that from 2nd November gas was continually coming from the goaf into the shunt area? A. What type of gas, would you be precise?

Q. Well, you put any type on it that may fit the proposition that it was almost a certainty that gas was coming into the shunt? A. Yes, any gas made in the goaf would tend to come out into the shunt.

Q. Just to come back to your section plan on one point, you have suggested to His Honor that if there was a fall in barometric pressure, the expansion would manifest itself equally at A, B and C headings? A. That is so.

Q. Now that is not quite right, is it? A. In a still condition, yes, that would be reasonably correct.

Q. In the first place, there was a brattice in C heading? A. Yes.

Q. Which you would agree would tend to stop - A. Yes, I understand it was not a very good one.

Q. It was not a very good one but it would tend to hold back? A. Yes, that is right.

Q. In B heading there was no brattice? A. That is right.

Q. In A heading there was a brattice? A. Yes.

Q. A heading is the last point between C and A? A. That is so,

Q. So that there is an excellent chance of the gas coming out in A heading, that is the first thing. There is a very good chance, if it is high enough, of the gas getting out into B heading? A. Not under the conditions as I see them.

Q. You rather suggested that air would come down B heading? A. Yes, almost exclusively.

Q.I will come to that in a moment. Just assume for the moment that it is not air but gas, you see, and it is going to get out at points C, B and A? A.Yes.

Q.You would agree A is an ideal place for it to come out? A.Yes.

Q.B is a better place for it to come out than C, more favourable?
A.It is closer to the body of gas,yes.

Q.And then if it comes in along B it then gets caught up in the airway along the current,along the cut-through? A. This is assumption of course?

Q.Yes, this is assumption. A.Yes.

Q.And then it could be taken out of the shunt or out of B? A.Yes, if it did come up B it would go into the general body of the air current.

Q.You of course have put forward a theory that it would be mostly air that would come out of B and C? A. Yes.

Q.I do not want to spend too much time on this because in my view it is not extremely germane, but it is merely to put an opposite viewpoint, and then leave it at that. You assumed from your own determination of what the goaf might look like and how the roof might fall and various other factors that it would be mostly air that would come out; is that so? A. That is so.

Q.If your assumption on those matters is not correct, then your conclusion that mostly air would come out is also not correct? A. I think that would be a fair statement.

Q.I do not propose to take it any further, Mr.Sellers, but to bring out it was assumption on which you made that? A. I beg your pardon, it was not assumption. I got up on the rock and tested it. I found there was no gas high up in the goaf but naturally I could not get up and -

Q.Look, you have drawn a picture there of fallen rock and so forth?
A.Yes.

Q.Which I am suggesting to you is to a large extent pure speculation. Is not that a fair proposition?A.I would not think so. I think it is reasonably correct.

Q. And how far did you go into the goaf? A.Not far. I went right along to No.4 cut through.

Q. I will leave it at that. Before I leave this question of the topography and the level of gas you yourself concluded that there could be a level of gas four feet up behind the brattice; that is so, is it not? A.That is so, yes.

Q.And that level of four feet was one which you arrived at by various calculations as to the quantity of gas that might be there?
A.No. I arrived at that by virtue of the level of gas in the goaf and I assumed that under the comparatively still conditions it would have that level right through.

Q.Of course it is fair to say that it might have been less? A.It might have been less.

Q.It might have been less? A.Yes.

Q.But the mere fact that it was less would not mean that it still could not get round the outside of the brattice into the shunt? A. That is so.

Q.Indeed I think the whole conclusion implicit in what you have said is that if there was any gas build-up behind that brattice, it would find its way into the shunt? A.That is right.

MR.REYNOLDS: Only if it was below 103 ASL, I think that is what he said.

MR.LEE: Yes, that is true.

Q.Coming back to your report, your said at p.21 of your statement, when you were talking about the reversing of the airways - do you remember? A. Yes.

Q.You said "The gases being met in the district were heavier than air." From where did you get that information? A. Well, by the proportions.

Q.By the which? A. Well, by the gases being met as analysed, as found on the analysis.

Q.What you are saying is that by looking back on it and being aware that bottom gas was there - is that correct? A.Yes, with the knowledg e.

Q.With the knowledge we have now? A.Yes.

Q.Then according to you the airway system was going to carry the heavier-than-air gas in the right direction? A.That is so.

Q.You did not mean to suggest that the management had only met gases that were heavier than air? You also said that you could not really tell whether the method was good or bad unless you yourself saw it? A.That is so.

Q.I note, however, that you did conclude that the management was forced to make a variation from the system of bleeder tunnels? A. That is my conclusion from what I -

Q.You have taken the view that the management, on the evidence you have heard, was forced to make this variation? A. And of account of that and the geological condition that I assumed would have appertained to the district.

Q.Leaving aside roof conditions, would you agree it would have been desirable for the bleed tunnel system to have been continued on in this area? A.Yes, if I may call it the drainage tunnel, the bleed tunnel.

HIS HONOR: Q.What tunnel do you call it? A.The drainage tunnel. Bleed is not a very good term and one I have never heard before used.

Q.Never before this Inquiry? A.Never before this Inquiry.

Q.You can take it it came from some witness? A.I think it is a very unfortunate term.

Q.Because we have a bleed tube and a bleed tunnel? A. Yes, I think it is most unfortunate.

Q.And an elephant's trunk?A.Yes.

MR.LEE: Q.I think you agree there can be no question that the bleed tunnel system - I will have to stick to it, we have had it now for 17 days - put in could give rise and achieve effective ventilation in this area? A.It could, yes.

Q.I mean, there has been a suggestion, you see, that certain problems

still arise with the bleed tunnel when you are taking out in this fashion, but you would agree with me, would you not, that provided you had your eye on ventilation you could overcome any of the problems of the goaf gases coming for a short space of time into the working area? A. Do you mean by virtue of the so-called bleed-tunnel?

.No, I have not put my question clearly. Assume you have a bleed tunnel. You will still have to keep an eye to ventilation to ensure that the ventilation that goes through the system still effectively dilutes any gases that come from the goaf? A. That is one of the things which you must do always. Constant vigilance.

Q.And there is nothing new about that proposition? A. No.

Q.And in this case here, I think you say that the departure from the bleed tunnel system had nothing to do with the ignition of gas? A.No, my opinion is that it didn't.

Q.I do not want to transgress on the matters His Honor has put to you but you will agree with me, will you not, that had the system as originally devised by the company been continued and no.11 not taken out before the bleed was put into it, by simply keeping an eye to ventilation you would have had no problems in driving that bleed? A. Well, that is not necessarily correct. That would be a normal expectancy, but it is not necessarily correct.

Q.Just leaving out a normal expectancy, providing you drive in your bleed two pillar lengths back from the goaf and you have got your other bleed from that goaf coming down and into your return, ventilation, adequate ventilation, can overcome any problems? A.That is true, but by the same token you could, using that, take the coal out safely.

Q.Using this system? A. You could, provided you did not have the brattice there.

Q.You may be quite right, Mr.Sellers - A. And if you knew inflammable gas was there you could still do it. The question is one of detection, Mr.Lee. It is not - it is the danger that you don't know is there that is the one you have got to fear.

Q.And the one you have to legislate against?A.Yes.

HIS HONOR: Q.What is that? A. The danger you don't know is there is the one you must fear.

MR.LEE: Q.It is the one that you arrange things - A.You try to eliminate it.

Q.With that danger very much in mind?A.Yes.

Q.This particular mine, the Bulli mine, is in fact known as a gassy mine, is it not? A. Well, in accordance with the terms of the Act, it is a gassy mine.

Q.But apart from in accordance with the terms of the Act, it is spoken about, I suggest generally, as a mine with gas in it, with a real significance in the expression "gas in it"? A.I would not have any reason to say that it would be gassier than any other mine that is working in the Bulli Seam.

Q.You know these things, I am sure - Bulli Seam stretches from where? Metropolitan down to Appin, is it? A. Well, from Metropolitan to Mount Kembla.

Q.To Mount Kembla? A.Yes.

Q. And I suggest to you the seam all the way through shows inflammable gas? A. Yes, that is so.

Q. And it is no secret? A. No, it is well known.

Q. And it would not be right that Bulli mine up here is called "the old gasometer", would it? Have you ever heard that expression? A. I have never heard it, Mr. Lee. It is the first time in my history, I can assure you.

Q. But it is common knowledge that the Bulli Seam throughout its length produces inflammable gas? A. That is so, yes.

Q. And you would agree that in any one mine, to assume that because in a particular district or panel you had not struck or detected - call it what you like - inflammable gas, it would be most unwise to assume that you would not get it there? A. It would be most unwise to assume you are not going to get inflammable gas in any mine regardless of where it is. I just would not put that to anyone. If you were getting Co₂ in a mine for all its history, you would still always want to be sure you are not getting inflammable gas.

Q. Coming back to this system which has been in operation here, this brattice and the set up in the shunt: Would you say in your opinion that that could reasonably be conceived as effective or safe with inflammable gas present in the mine? A. With inflammable gas present?

Q. Yes. A. Do you mean the district or the mine? The district, do you, with inflammable gas in the 8 Right district?

Q. Yes. A. No, I would not favour that at all.

Q. And of course, going back to the proposition I put to you a few moments ago, anybody working in Bulli mine, the person in charge concerned with gas, would be expected to assume that although inflammable gas might not have been found in a particular district or panel, nonetheless it could come there? A. I would think so.

Q. So that as far as the set up in this colliery on the 9th November is concerned, this ventilation system was one which could only be regarded as being safe against noxious gas? A. In my estimation, yes.

Q. In your estimation? A. Yes.

Q. And even then I think you would agree that it was running a risk that a quantity of noxious gas might come out which could not be handled by the ventilation system? A. A quantity of noxious gas - no, I would not think that.

Q. Well, just take the situation as known to all before the fire. It was known that there was noxious gas. Do you agree with that? A. Yes.

Q. It was thought that it would be coming from the goaf? A. Yes.

Q. It was not known what quantity of gas was in the goaf? A. That is so.

Q. And it was not known how much would come out of the goaf? A. No.

Q. In that situation, to rely upon this set up even as effective and safe in noxious gas conditions assumed, I suggest to you, that noxious gas in quantities that the ventilation system could

handle would be the only quantities that would come out; that assumption was made? A. I am afraid I will have to ask you to put that again, Mr. Lee. (Last question read by Court Reporter)

Q. Do you understand that? A. Well, to be perfectly honest, I am sorry, I don't, I am afraid.

Q. I will put it another way - A. It could mean such a lot of things.

Q. This system was which permitted noxious gas to escape into the shunt area; you have told us that? A. Yes.

Q. And the quantity that would come in of course was an indeterminate quantity? A. That is so, yes.

Q. And the system of locking off or storing up the gas was the feature, the essential feature which made it impossible for anybody to know what might come into the shunt in the way of quantity? A. Well, there would be a limit to what could come in the shunt.

HIS HONOR: Q. You would not know what the limit was, what might come at a particular time? A. Well, I think if you look at it closely on the figures I have quoted you will find you have a certain amount of CH₄ and a certain amount of CO₂ and the balance which was there, which could be about 50% - that in effect could be the leak of air on an average, the leak of air-gas mixture on an average. I would suggest to you that if this quantity became greater than that, the level of the gas would build up and it would come back up B heading.

MR. LEE: Q. Let me take some of your figures on this matter. I think you agreed in answer to His Honor that there was a possible make at the shunt of about 35 cubic feet per minute. That is allowing for your 20 feet at the face? A. Yes.

Q. On the gas returns? A. Yes.

Q. Of that 35 cubic feet per minute, that was methane? A. Near enough, yes.

Q. How much might we expect in the way of carbon dioxide? A. Well, it depends on the proportions. I would expect that early in the stages of this set up there would be more than the 58/40 ratio as indicated by the analysis taken.

Q. Let us take your analysis which was roughly two to one? A. Two or 2.2 to 1.

Q. So that would be round about 30 methane coming in and we might have 70 CO₂? A. Yes.

Q. And 70 coming in a minute would require effective ventilation to get rid of it? A. Yes.

Q. And if it was allowed to build up it could be highly dangerous? You nod your head; are you agreeing? A. If it was allowed to build up beyond a certain figure, yes - all gases are dangerous.

Q. Allowed to build up over an hour? A. In the shunt, without being removed?

Q. Yes. You get about 4,000 cubic feet per minute of carbon dioxide in there, would you not? A. Yes. If there is no way of taking it out it would build up.

Q. You made some reference to the fact that the presence of faults or dykes had some connection with bottom gas? Did you not say that? A. I think I made reference that it had some relationship to the emission of gas and possibly that would apply to bottom gas too.

Q. I see, there could be a direct connection between one aspect and the other, but I want to get clear in my mind: Is that what you did say, whether you have indicated that this particular area was one where you might have expected to get bottom gas because of its geological set up? A. Yes. I agree with that assumption, yes.

Q. Now will you agree with me that it is common knowledge amongst those in the mining community that near faults, the concentrations of methane can be richer than elsewhere? A. I think I would tend to agree with that, yes.

Q. And I suppose you know Mr. Hargreaves, the senior lecturer in Mining at the University of Sydney? A. I do know Mr. Hargreaves.

Q. I just put the proposition this way to make it quite clear: it is well known, is it not, that when you are near a fault you are likely to get the inflammable gas in greater quantities than when you are not in that particular area? A. That is generally a rule, yes - not always right, but generally.

Q. No, but it is something that you would have thought the management of a mine would be aware of? A. I think they are, yes.

Q. Now is it your view that when working in this particular area then, it was reasonable to assume that with the fault present and the other items which you have mentioned, the likelihood of rich concentrations of methane was very high? A. Well, in this particular case I think I have gone to a fair deal of trouble to point out the proximity of factors which would allow a greater percentage of CO₂ to be present.

Q. I am not worried about the greater percentage - A. And this would particularly apply to the Bulli Seam.

Q. You have gone to a great deal of trouble, but could you just stick to the thought I am putting to you, that the presence of the faults here was such that you would say it was likely you were going to get richer concentrations of methane here than elsewhere in the workings where the faults were not present? A. Do you mean in working the Bulli Seam itself?

Q. Working this area, this section? A. Would you like to qualify that by saying whether it is solids or pillars you are talking about?

Q. By working this section in the way it was worked, in the pillar extraction? A. Well, I think I have already indicated that there is a very strong possibility of getting a methane rich gas from Bulli.

Q. And when you create your goaf in a situation near a fault, does not the goaf have a tendency to be the place where the methane bleeds into? A. Gas bleeds into, yes.

Q. And you would agree, methane? A. All gases.

Q. You have been seeking to make some point about the concentration of CO₂ in the Bulli Seam. You would agree with me that the CO₂ is always present in the Bulli Seam gas in the whole seam, in other words? A. Taking it right over everywhere?

Q. Yes; perhaps in small portions here, but always present? A. Well, I do understand that there is 98- something per cent CH₄ in some samples and I would say under those circumstances there was virtually nothing else.

Q. You do not then agree with the proposition that the CO₂ is always

represented in Bulli seam gas? A. Well, it could be. In the case I am quoting, the 1.2 per cent or something like that which I think you will agree is comparatively insignificant.

Q. However, the point I wish to make is that in this particular colliery, anywhere it was first of all incumbent upon everybody to assume there would be CO₂ or could be CO₂ at any point of time? A. It is incumbent to assume there is any gas there, let alone CO₂.

Q. Then it is incumbent to assume there could be CO₂? A. Yes.

Q. It was equally incumbent upon those testing for gas that there could always be inflammable gas? A. Yes.

Q. Those are two propositions you would not deny, would you? A. That is quite right.

Q. Now do you agree that concerning CO₂ in Bulli Seam gas, the occurrence of Illawarra bottom gas has been one of the persistent features of mining the seam in many areas? A. Yes.

Q. Do you know the areas where it has been one of the persistent features? A. Pretty well, yes.

Q. And the fact of the matter is that this colliery, Bulli Colliery, has over a lengthy period been a colliery in which bottom gas from time to time has been found? A. Yes, I would say that would be right.

Q. It is not a case of bottom gas having been discovered in this colliery 50 years ago and never detected again, is it? A. Well, I am afraid I can't answer you that because I have no really close knowledge of it. All I can say is that I did see Illawarra bottom gas in Bulli about 1932 but apart from that I had not seen it until just a short time ago.

Q. You found it in 1932? A. I saw it.

Q. And have you had connections with the Bulli colliery since then? A. I have been in the mine, yes.

Q. You have been in the mine, but just casual visits? A. Yes, casual visits.

Q. You have not had to address your mind to safety in the mine? A. No, although I have had quite a few students from the mine and I would quite naturally ask them what gases they had come in contact with.

Q. What I want to put to you is this: The assumption, if it was made, that bottom gas was not present in this mine would be an assumption which would fly in the face of knowledge over half a century? A. I would think that might be fairly right.

Q. And indeed there is no reason - A. As I said, you assume that these gases are going to come and you look for them at all times.

Q. In other words, what you would tell His Honor is, that once you knew there was bottom gas in Bulli Colliery you would forever thereafter be on the alert for it? A. I would be on the alert for it anyway.

Q. But particularly if you found it there? A. I would not know that that would be the case. I do not know what the words "particularly if you found it there" would be right, anywhere.

MR.REYNOLDS: He puts the obligation any time, anywhere.

WITNESS: Anywhere.

MR.LEE: Q. I appreciate that. Tell us this, if you would: Where in the Bulli Seam is bottom gas to your knowledge most prevalent?
A. Well, I don't know that there is any place where it is most prevalent. I would say that the occurrence is generally all along what I may term, for want of use of a better term, all along the fringe which roughly follows the outcrop of the seam.

HIS HONOR: Mr. Lee, I take it there has been something written on this subject? I understand you and Mr. Reynolds were discussing some book?

MR.REYNOLDS: If you agree, whether the witness agrees in substance with this article, we could make it available to His Honor.

MR.LEE: I did read a passage about the occurrence of Illawarra bottom gas being one of the persistent features of mining in many areas. That is in the book, and Mr. Sellers was asked about it.

HIS HONOR: I was wondering about Bulli Colliery itself.

MR.LEE. This article does not specifically relate to Bulli Colliery to that extent, but it does give maps as to where the methane is found and the quantities in which it is found and that sort of thing, without actually concentrating on bottom gas. It is like a judgment of the Court from which one takes words and they could fit a proposition, but that is not what the Court had in mind when the words were quoted.

MR.REYNOLDS: If Your Honor wants it, I have a photostat of that portion of the article Mr. Lee has quoted which deals with seam gas composition. At any time if Your Honor wishes to read it, I think a certain amount of what the witness has said has been due to reading this, if not recently then some years ago. I do not know whether his knowledge is more direct, but Your Honor is welcome to it.

MR. LEE: Q. In your report at p.20, para. 102, you say:

"(102) At the time the evidence available to the parties concerned in the decision to take out (11) before driving a place ahead to allow the air to circulate along the goaf edge was that the gas in the goaf was of a noxious nature and therefore non inflammable."

Do you realise there are reports in from the deputies which indicate the finding of inflammable gas at the goaf edge at different times?
A. I have heard it.

Q. Then that paragraph is not quite right, is it? A. Well, not necessarily - what you say is perhaps not quite correct. I take this to be that somebody finds a trace of gas, they are in effect testing for it, and find a trace of inflammable gas in their lamp. I take that to be a very small proportion of CH₄ which goes to make a very carbon dioxide rich mixture of Illawarra bottom gas and one which I would say would be extinctive.

Q. Didn't you say a few moments ago, particularly if you know about the existence of inflammable gas you act upon the assumption that you may continue to meet it in future. You said that? A. That is quite true.

Q. You said that, in effect, was the reason why the brattice should not have been put up here, with inflammable gas behind, didn't you? A. Yes, but there is no indication the main mass of the gas was not noxious gas.

Q. What reason do you say anybody in this mine had, in the light of the reports of inflammable gas and noxious gas, to assume that there was not inflammable gas in the goaf? Why do you say that? A. Well I did not gather from what I saw that there was any quantity of inflammable gas.

Q. But isn't this the position: you can't assume because you found methane in a small quantity in the Bulli Seam at a particular time that there won't be methane in a large quantity somewhere else in the Seam? A. You never assume anything, as I said before.

Q. I am asking you to explain para. 102 --

HIS HONOR: Q. Before you do, have you in mind the evidence here that on the night of 5th October the deputy's report read: "Inflammable gas on edge of goaf area being diluted", and on the night of 6th October, again, "Inflammable gas on goaf edge in centre heading. Others clear." and on the night of 14th October, "Inflammable gas on the goaf edge being diluted. Others clear". We have the three nights. A. May I have a look at these reports?

Q. Yes. A. I have not seen them.

HIS HONOR: I think you will find them in succession.

Q. Does that affect your judgment one way or the other? A. I must confess having seen these reports --

Q. I thought it was obvious you had not. A. Yes.

MR. LEE: Q. Having seen them you yourself say, or have made it clear, you would not have put the brattice up in A heading if you thought there was inflammable gas present in the section? A. I would be very very careful if I ever did that.

Q. It appears from your statement that you had no difficulty at all on any occasion you tested for bottom gas in getting the methane cap on your flame? A. None at all.

Q. Even when you got one per cent you had no difficulty? A. No difficulty.

Q. It is inevitable, isn't it, the gas that was in the mine before this fire was the same gas you were testing a week or three weeks or five weeks after the fire. That is an inevitable conclusion? A. At the time of the fire?

Q. Yes. A. Well, it could have been even richer at the time of the fire.

Q. In other words it could have been easier for people to discover? A. At the time of the fire, yes, perhaps that would be the case.

Q. Do you know after the 3rd November no deputy discovered noxious gas in this panel until the morning of the fire? --

MR. McNALLY: That is not right. Six times, Your Honor, it was discovered.

MR. LEE: From 3rd November?

HIS HONOR: We will check it.

MR. REYNOLDS: I can give them to Your Honor quickly - including 3rd November?

MR. LEE: I excluded 3rd November.

MR. REYNOLDS: On the 3rd there are four reports, on the 4th there are two reports and, on the 8th, one.

HIS HONOR: Who are the deputies concerned in those reports? Are they in evidence?

MR. REYNOLDS: I do not think so, Your Honor.

MR. LEE: I could not read in the transcript any reference to gas other than the 2nd and 3rd.

HIS HONOR: On the 4th Mr. Gordon found it on the night shift, noxious gas.

MR. LEE: Your Honor is reading from a report?

HIS HONOR: Yes.

MR. LEE: I got my information from the transcript.

MR. REYNOLDS: On the 3rd there would be two reports on the one shift.

MR. SULLIVAN: Some of them are on the small sheets. I think I tendered the lot.

HIS HONOR: I have only one small sheet here.

MR. SULLIVAN: They are all there, I think, Your Honor.

HIS HONOR: Deputy Stewart reported it on the 8th. I have a recollection Mr. Cambourn never found it.

MR. McNALLY: Yes he did. I have them listed here. The gas was found on every day but the Friday.

HIS HONOR: That is, every day up to and including the 5th?

MR. McNALLY: And also on the 8th.

HIS HONOR: Can you tell me who found it on each of those occasions?

MR. McNALLY: The 2nd was Stewart and the afternoon shift, which would have been Cambourn. Also, the 3rd is afternoon shift and the night shift found it. The afternoon shift was Cambourn. On the 4th it was found on the night shift.

HIS HONOR: Was that Gordon?

MR. McNALLY: At that stage it would be still Gordon - I think it may have been Walker - none on the Friday --

HIS HONOR: Mr. Walker never found it?

MR. McNALLY: He was away on holidays, Your Honor.

MR. LEE: I am obliged to my friend for that information. Not having the reports I could not see it in the transcript.

Q. Your conclusion as to the barometric pressure drop having no significance depends essentially upon your belief that there were substantial quantities of air in the goaf? A. Yes.

Q. If that be not right and if the quantity of gas is greater than you believed it to be the effect of the barometric pressure drop becomes greater? A. If it should be, yes.

Q. You referred to the possibility of floor heave. Did you intend to convey that in this particular area we are concerned with floor heave was something that might reasonably have been expected? A. Yes.

Q. Would you say it was a situation where, if you were the manager of the mine, you would have been looking out for the likelihood of floor heave? A. Yes, that would be right.

MR. LEE: I notice it is nearly 4 p.m. Could I just have the indulgence of seeing the transcript before I say I have finished with the witness?

HIS HONOR: Yes. Mr. McNally has had some cross-examination already and I was wondering whether the cross-examination of this witness, in view of his answers, is likely to be lengthy. I understand there is some Departmental evidence which will not take long with regard to some equipment?

MR. LEE: Yes.

HIS HONOR: Is there any other evidence apart from that?

MR. SULLIVAN: Only this: I put a question to Mr. Stone about something he told Mr. Parkinson. I do not think it is of any materiality but still I am in the position where I have asked the witness a question and I may have to put Mr. Parkinson back.

HIS HONOR: What was it about?

MR. SULLIVAN: Splitting the pillar, as to whether Mr. Stone told him he was going to split the pillar this way or the other. I do not think it is of any importance but I do not want to be in the position of appearing to be counsel who asks the question without having instructions.

HIS HONOR: Having stated that, I am sure no comment will be made. I was wondering if the evidence would be concluded tomorrow. Mr. Parkinson, are you likely to be lengthy with this witness?

MR. PARKINSON: There are some questions but I do not think so.

HIS HONOR: I do not want to hurry you.

MR. MURRAY: I will only be a few minutes.

HIS HONOR: I would advise you to read the earlier part of this afternoon's transcript.

MR. MURRAY: I have every intention of doing so.

HIS HONOR: Are you likely to be lengthy?

MR. SULLIVAN: No, Your Honor, not if he behaves as he has, I don't think so.

HIS HONOR: Mr. McNally?

MR. McNALLY: I will not be long, Your Honor.

HIS HONOR: It seems there is every possibility of finishing the evidence tomorrow afternoon. If that is the case I would like the addresses to conclude within five days. I have in

mind that some matters are becoming crystal clear and the prospect of duplication by counsel of comments on issues where there is really no contest does not seem to me to be likely to be of assistance. I should think, without wishing to limit counsel, it would be very proper if the addresses could be completed within five days.

MR. REYNOLDS: Your Honor did suggest it would be appropriate for Mr. Lee to start first and outline some propositions he thinks should be raised in this investigation. I did think, and my learned junior and those instructing me have given it some thought, that it might be better if I addressed second because I am the one who can, by concession, clarify issues and perhaps save three or four people saying what they want to say about this company, when the company says that is the fact, or the situation. My address would be comparatively short and, I hope, almost entirely in typescript. I do not propose, as far as my client is concerned, to analyse in detail this evidence and make citations from it because it will be my submission on the issues that really matter that certain broad considerations emerge and unless Your Honor engages in considerable debate with me I should think I would finish well within the day.

HIS HONOR: I will do my utmost to refrain from debate. I understand there will be a series of headings handed to me by counsel and the addresses will be to those headings. I do not intend to ask counsel to do any more than that, and to expand certain propositions being put if I do not understand the basis. So, the addresses should be shorter than they usually are.

MR. REYNOLDS: On reconsideration I would think I would not need in excess of three hours.

HIS HONOR: In that case there should be no reason why counsel should not be able to deal with this within five days.

(Further hearing adjourned until 10 a.m. on
Thursday 10th February, 1966.)

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IN THE COURT OF
COAL MINES REGULATION
HOLDEN AT BULLI

)
) No. 1 of 1965.
)

BEFORE HIS HONOR JUDGE GORAN

ASSESSORS: MESSRS. MAHON and BUCK.

THURSDAY, 10th FEBRUARY, 1966.

- - - - -

IN THE MATTER OF AN INQUIRY IN PURSUANCE OF THE COAL MINES
REGULATION ACT INTO AN ACCIDENT WHICH OCCURRED AT THE BULLI
COLLIERY ON 9TH NOVEMBER 1965 AND ITS CAUSES AND
CIRCUMSTANCES.

- - - - - (PART HEARD)

HIS HONOR: Mr. McNally, do you want Mr. Stewart recalled now?

MR. McNALLY: Yes, it would be convenient.

CHARLES ROBERT STEWART
Resworn
Examined as under:

MR. McNALLY: Q. I think on the last occasion you described going
into the shunt in A heading on the second occasion? A. Yes.

Q. And you described a smell of gas that you got? A. Yes.

Q. After that, you left the shunt and you went back down near the
miner face? A. Yes.

Q. I wonder if you would just describe it - I think you said on
the prior occasion "Then I went back down and I sat roughly
at the back of the miner on the vent tubes for about another 10
minutes and then I went back up to where everybody was
collected on the timber bay and that is when the actual fire
took place." That is at p. 109 at the top. Now, just how long
approximately was it you were down near the miner place - for 10
minutes or thereabouts, is that correct? A. Yes, ten or 15
minutes.

Q. And you then went back up to the timber bay where everybody
was collected. What did you actually do when you got back to the
timber bay? A. We were just having a general discussion.

Q. And for how long did you have that general discussion, from
the time you got there up till the time of the fire? A. At least
a quarter of an hour, probably a little bit more.

Q. A little bit more? A. Yes.

Q. On p. 112, third question, you were asked "Q. Did you think when
you smelt blackdamp you in fact might be smelling a mixture which
constituted bottom gas? A. Yes, I took the precaution of testing
them and when I found no inflammable cap on the light I thought it
would be blackdamp." Before you waved the end of the bleed tube
around to move the gas had you tested before that or not? A. Yes.
Yes.

Q. Did you test after? Besides testing before did you test
after you waved the elephant trunk around? A. Yes, found nothing.

MR. LEE: No questions.

MR. PARKINSON: No questions.

946. C.R. Stewart, recalled.

MR. MURRAY: No questions.

MR. SULLIVAN: Q. You tested for methane, did you? You tested for methane? A. In that shunt, yes.

Q. So you suspected methane might be present? A. It could have been, yes.

Q. You suspected it was present? A. I was not sure. I tested for it.

Q. You also knew it was coming from behind the brattice? A. No, I wouldn't say I knew it was coming from behind the brattice.

Q. You knew that? A. No I didn't.

Q. Where did you think it was coming from? A. It could have been coming from behind but I didn't know it.

Q. Did you think it might be a good idea to find out where it was coming from? A. But I did not find any methane.

Q. But you had smelt black damp there? A. Yes.

Q. Which you admit might contain methane? A. It could have been, yes.

Q. You did not think it would be a good idea to find out where it was coming from? A. I got rid of the smell.

Q. But then you only got rid of the smell for a while, didn't you? A. I don't know.

Q. You did not know, did you? A. No.

Q. It could have then started to leak in again? A. It probably could have.

Q. The position was this: you weren't able to test back to the goaf edge because someone had sealed that heading up with the brattice. That is the position, isn't it? A. It was a tight screen, you could not get passed it.

HIS HONOR: Q. You said then, in your original evidence, as to where it might be coming from, you were asked this question at p.112: "Q. Did it strike you at the time that it might be coming from the goaf area? A. No, I would not say it did strike me at that time". A. Yes.

Q. Is that evidence true? A. I beg your pardon?

Q. Is that evidence true? A. Yes - not at that time, but after the occurrence.

Q. After the occurrence, yes. This was right close to the brattice, was it not? A. Yes, roughly round about six feet from the brattice.

Q. Tell me where you thought it might be coming from, would you? A. I can't answer that.

Q. You can't answer it. Do you remember when you originally gave your evidence in this matter as to how you made your tests? A. Yes.

Q. Do you remember saying this at p.108, near the bottom:

" Then I came back up and into the shuttle car shunt again and I went in there and this time I got down on my hands and

my knees and I got this sensation right down low on the ground. It is a smell or a sensation or whatever anyone likes to call it. It is something like a sensation in your nose and mouth but it also burns your eyes and I gave this elephant tube a little bit of a wave around and then I could not smell anything else again and I tested all round that area with the lamp and could not find anything. "

You then went on to say what happened after that. You were then cross-examined as to whether this was your usual practice, to get down on your knees and you said it was the usual practice by you? A. By myself.

Q. I am reading this: "By me to get down and have a good smell of the area." You were then asked "Q. You did not do that however on your first test? A. No, I made my tests on the first one." You had said nothing, had you, about using the lamp to test, you merely said you used the lamp once you had got rid of the smell? A. No, well, that would not be right, I don't think.

Q. Why did not you say you used the lamp, you were being asked to say what you did and you knew that? A. Oh well I meant to say - what I thought I said was that I made my test, I smelt on the ground low down on the ground and made a test and found nothing and then I used the tube to suck out the smell that I got and then I tested all around again and found nothing.

Q. Have you suggested to anyone or has anyone suggested to you that you placed your lamp down on the ground? A. I must have placed my lamp around there somewhere.

Q. Must you? A. Yes.

Q. That you left your lamp on the ground while you smelt around? Did you tell anybody that? A. Yes.

Q. To whom did you tell that? A. I told that to Mr. McNally yesterday.

Q. To whom have you spoken since you were told you were to come to Court to-day, apart from Mr. McNally? A. Mr. Cambourn, and I went to the pit yesterday afternoon to report I would not be at work this morning, when I saw Mr. Puddle. That would be the only - I think they would be about the only ones.

Q. Did you know when you came to Court to-day what you were being called for? A. No.

Q. Did not know at all? A. I did not know exactly what I was being called for.

Q. You just thought it might be about anything? A. No, roughly about the testing of the shunt.

Q. Who told you that? A. Mr. McNally.

Q. Has your attention been directed, before you came here to-day, to the time you spent after you made your test before the fire occurred? A. No.

Q. It has not been directed to that at all? A. No.

Q. Yet this was your evidence about the time, was it not - ? A. Yes.

Q. No. Listen to this. This is p.109 at the top. You said, after you tested with the lamp, when you got rid of the gas, "then I went back down and I sat roughly at the back of the miner on the
948. C.R. Stewart, recalled.

vent tubes for about another ten minutes and then I went back up to where everybody was collected on the timber bay and that is when the actual fire took place. " That is when it happened". Have you had it suggested to you at all that another 15 minutes elapsed? You see, today you told me it would be ten to fifteen minutes that you sat down and then 15 minutes after that elapsed, while you were talking in general discussion. Has it been suggested to you before you came here today that you might have spent some time talking to the men before the fire occurred?A. No it hasn't.

Q. That is something you have remembered today, is it?A. No sir. I would be nearly sure that I said on that day that I sat ten to 15 minutes behind the miner or in that area and then I went back up and spent roughly another ten or 15 minutes up there.

Q. I will read to you again what you said in case there is any doubt about it. A. I think Mr. Parkinson or somebody asked me about that, and I think I said the general discussion was general pit talk - I think.

Q. You do not want me to read to you again what I read to you before?A. Yes sir, I would like you to.

Q. Very well, I will read it again: "Then I went back down and I sat roughly at the back of the miner on the vent tubes for about another ten minutes and then I went back up to where everybody was collected on the timber bay and that is when the actual fire took place." A. Yes. Definitely I was up there ten to 15 minutes.

HIS HONOR: Do you want to ask any further questions, Mr. McNally?

MR. McNALLY: No, but I was just trying to find something - I would direct Your Honor's attention to some evidence.

MR. MURRAY: I have a strong recollection too, which I was trying to turn up - somebody else - of conversation as to general pit talk.

MR. McNALLY: May Mr. Stewart be excused?

MR. LEE: I did not ask any questions before, but may I now in view of Your Honor's questions?

HIS HONOR: Yes.

MR. LEE: Q. His Honor has read out portion of the transcript to you and I would like to take it a little further. You will remember on p.109 you conveyed to us that you supervised the workings at the face and you had made certain tests, then you came back up and into the shuttle car shunt. You said "and this time I got down on my hands and my knees." Prior to that you had said you had made various tests?A. Yes.

Q. I just want to read this to you from p.109, if I may:

"Q. You say you had made these tests at the face, near the fans, in the shunt, and then you went back to the face and then you came out again?A. Yes. "

A. Yes.

Q."Q. And you tested in the shunt?A. Yes, that is right.

Q. On this second occasion you apparently felt the necessity to get down on your hands and knees?A. Yes.

Q. Taking it step by step, before you got down on your knees, you had not had any indication of anything at all in that area?A. No.

Q. Then what was it that made you take this step of getting down on your knees? A. It is the usual practice.

Q. It is the usual practice by whom? A. By me to get down and have a good smell of the area.

Q. You did not do that however on your first test? A. No, I made my tests on the first one. "

You were making it perfectly clear, I suggest, Mr. Stewart, that your first round of tests was with the lamp and that your entry into the shuttle car shunt on the occasion we are speaking of was solely for the purpose of smelling on the floor? A. No.

Q. You appreciate that what you said was "No, I made my tests on the first one"? A. Yes.

Q. And you say that it would be wrong to take a view - A. Yes.

Q. - that you had said on the second occasion all you did was get down on your hands and knees and smell the floor? A. It would be wrong.

MR. McNALLY: Q. One matter does occur to me and it may be relevant for Your Honor: The time of the first test.

HIS HONOR: Yes.

MR. McNALLY: Q. I think you said you arrived in the panel at roughly ten to eight? A. Quarter or ten to eight.

Q. And you described that you did various tests down at the face, you inspected the vent tubes, and you went into the fan area across into the shunt and made certain tests? A. Yes.

Q. Are you able to remember approximately what time that was? Perhaps you might better be able to do it in relation to how long you had been in the section at that stage? A. Yes. It is pretty hard to put it down into time, but we went straight to the face, did the tests at the face, probably had them loading one shuttle car, then ventured back along to the vent tubes and up into the other area. Roughly about 20 minutes I would say.

Q. Approximately what time? You arrived in the crib room about five or ten past eight? A. Roughly five to ten past eight, yes.

HIS HONOR: Q. Were you talking to an overman on that morning? A. An overman - a new one.

Q. Who was he? A. Mr. Fears. He only started that morning, I think.

Q. Did you leave the section with him at all? A. No, I didn't.

Q. What time did he arrive? A. With us that morning.

Q. He came with you, did he? A. Yes.

Q. And what time did he leave? A. He left about five to nine with Mr. Wright.

Q. About five to nine? A. Yes.

Q. Did you show the overman the shunt section? A. Yes.

Q. The brattice erected? A. Yes.

Q. I take it Mr. Wright was with you at the time? A. No, he wasn't.
950. C.R. Stewart, recalled.

Q. Was anything said about the brattice and the possibility of gas being there?A. No.

Q. Nothing?A. No.

MR. McNALLY: I have information that that was the overman - he was not there very long that morning.

MR. MURRAY: Q. Did the overman, the new overman, have a light?
A. Yes, I think he did.

Q. And he had his light with you at the time you conducted him on a tour of your district or section?A. I didn't actually take him on a tour of the district. I just walked him in -

Q. When you walked round the areas you described, the overman had a light as well as you?A. Yes.

HIS HONOR: Q. And one of those areas was the shunt, you have told me?A. Yes sir.

MR. MURRAY: Q. Did he make any tests?A. No, this was his first day there.

MR. PARKINSON: Your Honor, something in connection with the plan of the working area and the crib room that we asked some questions of Mr. Cambourn about, particularly Your Honor. I was wondering if I would be permitted to ask Mr. Stewart?

HIS HONOR: Yes.

MR. PARKINSON: Q. Do you remember telling me when you were first in the witness box that the crib room was the place where the deputies in this particular area used to make their reports?
A. Yes.

Q. And that the reports were just about, lying around in the crib room?A. On the table or on the desk, yes.

Q. Was there a plan of the working area in the crib room?A. Yes.

Q. Have you any idea where that plan is now?A. No, I haven't any idea at all, but there was a lot of stuff brought out from that area later on. Whether that plan came out - I don't think it did. I'm not sure. I wouldn't know where it was.

Q. On the morning of the fire were the deputies' reports lying around in the crib room?A. Yes.

Q. Do you know if they were recovered?A. I think they were.

HIS HONOR: Mr. Stewart, you are excused, and the ordinary order for witness's expenses will be made in your case.

(Witness retired and excused)

GORDON SELLERS

On former oath

Cross-examination continued:

MR. LEE: Q. Just one matter, if I may. You advanced a certain viewpoint here about the presence of carbon dioxide in coal?A.Yes.

Q. Is this the position, that you have reflected on that viewpoint?
A. Well, I am always reflecting, Mr. Lee, on anything I do and say.

Q. If you can just go with me on this, because I am going to be very brief: Is it a fact that you have reflected on some of the matters you have put?A. Not unduly.

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Q. You still adhere to the views, or do you feel there is room for difference of opinion? A. Well, I think I take it you are referring to the presence of carbon dioxide, or something like that, are you?

Q. Yes. A. Well, a lot of people do lean to what I say there, but I will agree with you there could be a tremendous difference of opinion about that.

MR. LEE: I just wanted to make that clear, thank you. I do not think it is germane to this inquiry.

MR. PARKINSON: Q. Mr. Sellers, have you managed any colliery? A. Yes.

Q. Which colliery? A. South Clifton.

Q. You stated that you arrived at the colliery, Bulli Colliery, at about 10.50 a.m. on the day of the fire? A. Something of that order.

Q. With no particular invitation from anyone? A. No.

Q. You just heard the news of the tragedy and you proceeded to Bulli Colliery? A. That is quite so.

Q. And you were there for about 3 hours? A. Roughly that.

Q. You stated that most of that time you were in the Manager's office? A. That is so.

Q. Where did you spend the rest of the time? A. Well, most of the time was pretty well all the time.

Q. Then you stated that you returned home "on the understanding that I would be called if required"? A. Well, I left that message with Mr. Pearce that if he thought he needed me, to ring and I would come straight back.

Q. And of course, I take it that you felt you may be of some assistance at the scene of the tragedy? A. I could be, yes.

Q. Have you ever done any jobs of a consultative character for the B.H.P. or A.I. & S. in the past? A. Never at any time.

Q. Of course the A.I. & S. has a fairly efficient senior staff of mining engineers, has it not? A. I would say so.

Q. For instance, Mr. Wilkinson himself, the general superintendent, is a man with high qualifications? A. Yes.

Q. Mr. Martin? A. Yes.

Q. Mr. Pearce? A. Yes.

Q. Mr. Grierson? A. Yes.

Q. Mr. Reekes? A. Yes.

Q. All men to your knowledge of high mining technical qualifications? A. That is so.

Q. You stated that you attended the first sitting of the court which was held in Sydney and you were nominated for the position as assessor by the company? A. That is so.

Q. But you were not appointed. Do you remember the nominations that were submitted on that particular day at the court hearing, at the commencement? A. I would not say I remembered all of them.

Q. Well, you remember Mr. Mahon was nominated?A. Yes.

Q. And you know that Mr. Mahon is the General Secretary of the Miners' Federation?A. Yes, that is so.

Q. And that he was nominated on behalf of the miners?A. Yes.

Q. You know that Mr. Buck was nominated by the Minister for Mines?A. That is so.

Q. Do you know that Mr. Mills was the nomination of the Electrical Trades Union?A. I believe that is so.

Q. That Mr. Sawyer was a nomination on behalf of the Mine Management Association?A. I didn't know that.

Q. That Mr. Ward, who until just prior to Christmas was the Secretary of the Deputies' Association, was the nomination of the Deputies' Association?A. He could have been.

Q. Didn't you think it rather odd that you should be approached, in the light of what you tell me about the technical qualifications of senior members of the staff of the A.I. & S., that you were asked to accept nomination on behalf of the A.I. & S.?A. Mr. Parkinson, I didn't give that angle any thought whatsoever.

Q. Incidentally, this appointment - this proposition was put to you that you be an assessor. How was this appointment with Mr. Wilkinson arranged?A. Just a telephone conversation.

Q. With you and Mr. Wilkinson?A. I wouldn't be sure whether it was Mr. Wilkinson or somebody else.

Q. That Wednesday, 8th December, at the request of Mr. C. Martin - I take it the Mr. C. Martin referred to here is the Mr. Martin who I think is the Deputy Superintendent of A.I. & S. Collieries? They would be the same?A. That is quite so.

Q. And you saw Mr. Wilkinson?A. That is so.

Q. Mr. Wilkinson requested that you carry out investigations as an independent consultant?A. That is so.

Q. On any aspect of the incident or the subject matter which might be raised, and if you thought that any matter should be brought before the Inquiry, to do so?A. That is so.

Q. Then, according to your statement, Mr. Wilkinson stressed that it was to be done in a completely independent way?A. That is so.

Q. Now, you state "after some consideration" you agreed to do this?A. Yes.

Q. Would you care to tell the Court what was the reason for the consideration that you had to give to this particular offer, or did you have any reservation, first of all?A. None whatever, no.

Q. Was there any particular reason that you had to give it some consideration?A. Well, I do other things, and that was one of the matters which I would most certainly consider.

Q. At p.4 here on your statement you deal under the heading para. (23), at p.885 of the transcript, with "Visit to No. 8 Right Section 18/1/66. (23) The purpose of this visit was to collect a sample of the gas accumulation as observed on the previous visit. (24) At a point about halfway into the mass of gas in the Continuous Miner place two samples of gas were taken from the floor one from the middle and one from the roof. These were handed over for testing at Port Kembla." I take it, or am I right in assuming,

that these charges which are attached to your statement and signed by Mr. A. V. O'Halloran - he is the Chemist to whom you sent the gas samples? A. No.

Q. Well, first of all let me put it to you this way: To whom did you give these gas samples? A. I gave them to a young fellow named Riordan, who was sent to the Colliery for that purpose from the steelworks.

Q. And you stated that these were handed over for testing at Port Kembla? A. Yes.

Q. Whereabouts in Port Kembla? A. Well, I would not know. All I was interested in was getting some indication as to what the gases contained. Who did it and all about that, I would not have any knowledge.

Q. Well, what were the results of those samples? A. The results of the samples I collected are shown by a paper which is dated 20th January, 1966 on which are four results I have given.

Q. And you have not any knowledge who analysed the gas samples? A. Well, there is a signature on the bottom. I take it that this man would take the responsibility for them. I do not know whether he analysed them or not, but it seems to be Mr. Jephcott.

MR. REYNOLDS: There are other initials on the left of the paper too, which seem to indicate authentication.

MR. PARKINSON: Q. Well, is it not reasonable for me to assume that the analyses of these gas samples were taken by chemists in the employ of A. I. & S. ? A. I think that would be a perfectly logical assumption.

Q. In the light of what Mr. Wilkinson said to you - that he stressed the necessity for an independent consultation or an independent investigation - don't you think it would have been desirable that you send the gas samples to someone other than the A. I. & S. chemists? A. I can assure you that the thought never occurred to me.

Q. Then, of course, Mr. Lee's cross-examination yesterday found some errors in these analyses? (No answer).

MR. REYNOLDS: Not in these. He did not take these samples and he did not send these.

HIS HONOR: Mr. Lee suggested some errors.

MR. PARKINSON: Q. Well, Mr. Lee suggested some errors -

MR. REYNOLDS: Before this cross-examination proceeds, I think it is only fair to point out that the subject matter upon which Mr. Lee cross-examined this witness was a document, dated 17th November, 1965 which was long before this witness undertook any investigations. If we turn to the paragraph, I think it is p. 11 of his statement, paragraph 63, which is at p. 900 of the transcript, this is the only reference. It is taken from the final sentence in paragraph 63: "The earlier analysis taken by the Department of Mines was confirmed by samples taken at or about the same time by A. I. & S." This witness has never placed any reliance on that at all. - merely to indicate that nothing that was found by the A. I. & S. investigation earlier was in conflict in substance with what the Mines Department found. That is the only reference and only for that reason it was rather a concession to the Department of Mines that it was annexed to this report. He does not rely on it anywhere. I think it is only fair to point that out. I have

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already had an opportunity to point it out to Mr. Lee this morning, before this gets out of proportion or out of hand. He did not have it done but he looked at it and saw that in substance it agreed with the certificate which Mr. Lee had tendered in evidence earlier in the case. That is the only point.

MR. PARKINSON: Q. However, Mr. Sellers, you state that it did not occur to you it might have been desirable to have sent the gas samples to, shall we say, an independent person? A. No, it did not occur to me at any time.

Q. On the same page, at para. (29) you say "The gas in No. 2 North was coming up through the floor by medium of floor heave cracks which were up to one inch in width and up to eight feet in length. Some of the cracks extended into the coal ribs and gas was also coming up these." A. That is right.

Q. Then you go on to describe the type of gas, the percentage that was detectable, and then you state that in one crack the gas was confined "and I placed my face well down into the crack." Now you might be able to clear this up for me. I find it very difficult, if the crack is eight feet long and an inch in width, to see how you would be able to get your face well down into the crack. Is that what you did? A. Yes, in effect. I gave a general description of the crack and you will appreciate, as you are a man of wide experience in mining, you have a crack in the floor, then there are places where it is quite ragged and in effect you have something in the nature of a hole formed, and the crack is a part of it. It was in such a situation that I did what I described.

Q. But on my experience of floor heave in an inch in width, bearing in mind this is what you say, doesn't floor heave tend to come up this way? That is, more in a triangular shape?

A. It depends on the currents and it quite often happens in a heading where you find the middle tends to come up more than the sides and you do get a situation where the middle comes up as you have described. If the heaving part is say about that big (demonstrating) as it very often is, you find the bottom locks and the top opens. That is very common.

Q. You were able to get your face well down? A. I was able to pull away a bit of the floor and be far enough down to be where I thought the gas would be.

Q. (Shows witness document) Would you read to His Honor what this document purports to be? A. This document is entitled "By the Mines Department, New South Wales, Coalfields Branch, Report Number 5, Occurrence of Methane, Western Intake Section, by M.J. Muir Inspector of Collieries". The price is two shillings.

HIS HONOR: Q. What is the date? A. I could not give you that.

MR. PARKINSON: Q. I think you will find the date on the last page. A. There are two dates here, one is 13th November 1962 and the other is 24th October so I gather the material would have been gathered at that time. I beg your pardon, it has "Government Printer" in small print, "1963".

MR. PARKINSON: Q. That is a Mines Department document? A. Yes.

Q. And it is a report on a methane gas ignition at the Bulli Colliery in 1962? A. I would say that would be right.

Q. The report is made by Mr. J. Muir? A. Yes.

Q. Who you know now to be a Government Mines Inspector? A. That is so.

Q. On the first page would you read where I have marked the paragraph? -

MR. REYNOLDS: I must object, Your Honor. Do you mean read it to himself or aloud? I have no objection if he reads it to himself.

HIS HONOR: Read it to yourself first.

MR. PARKINSON: Yes.

WITNESS: The paragraph you have marked?

MR. PARKINSON: Yes.

WITNESS: I think I have read it. I may want to refer back to it perhaps if you are going to ask a question.

MR. PARKINSON: Q. That very clearly and specifically defines the fact that there was a fairly substantial gas problem, CH₄ problem, in this particular section in 1962? -

MR. REYNOLDS: Is there any point in me objecting? I would, if we were dealing with the matter on a realistic basis.

HIS HONOR: I want to know where it is going. What are you suggesting Mr. Parkinson? It may be of some value but I would like to know what you are going to ask.

MR. PARKINSON: Q. Is Mr. Muir's finding on this particular occasion that there was no - or did not appear to be any gas coming from the floor or from the roof? A. Well I think that is probably what it does indicate, without reading the whole of the text.

MR. REYNOLDS: Your Honor has authority to inform Your Honor's mind in whatever way Your Honor sees fit. That is why I ask if there is any point in objecting. It is a matter really entirely for Your Honor.

YOUR HONOR: Yes, it is.

MR. PARKINSON: Q. On p. 11, paragraph 66 you said it has been your experience in a neighbouring colliery to find gas as close to a cinder and sill rock zone where the amount of CH₄ if any could not be detected with a safety lamp. Which colliery was that? Was that Old Bulli or Bulli or what? A. Which paragraph again? 66? That is right.

Q. Yes. A. I have seen this particular happening in both Excelsior colliery and South Bulli colliery that is one to the north and one to the south.

Q. You said "in cases of lack of ventilation where the areas were sealed off I have seen roadways fill up with such gas". That would not be an unusual occurrence? A. It would not be.

Q. No. A. Not when you seal them off.

Q. In paragraph 67 you said "I have noted one case where the Bulli Seam has been formed into pillars for at least ten years when a shaft was extended down some 21 feet to the No. 2 seam below a large volume of gas was released from this lower seam". Is there any shaft, to your knowledge, driven in No. 8 Right? A. No.

Q. This seam was tapped by a shaft, wasn't it? A. Yes.

Q. That you are referring to? A. Yes.

Q. There is no similarity to 8 Right? A. I would not suggest there was.

Q. In your statement yesterday, page 903 of the transcript I think it is, and I am pretty sure His Honor was asking you some questions at this period, the question was:

"Q. That is Illawarra bottom gas, but you see we have evidence that there is quite an amount of what the miners call black damp, CO₂, existing on its own? A. Yes, well, that is formed in a somewhat different way.

Q. How is that formed? A. Well, this gas usually forms in goaves and you could take it this way: the air goes into the goaf which is virtually a still place when it is sealed off and in that goaf almost invariably you will find timber, and in the olden days of course horse dung, and this material combines with the oxygen in the air and throws out carbon dioxide, and finally it will almost completely absorb all the oxygen.

Q. Strictly speaking it is not coming from the coal at all? A. Very rarely. It is not a natural gas in the coal seam. It has some other source. "

Do you remember the CO₂ outburst at the Metropolitan Colliery in 1954? A. Yes.

Q. Do you remember the CO₂ outburst at Collinsville in 1954? A. Yes.

Q. Did you have the opportunity to read the findings of the experts who gave evidence in the Collinsville Royal Commission or Inquiry? A. I believe I did.

Q. Do you recall where the experts indicated that CO₂ was impregnated in the very coal itself? A. Yes.

Q. Does not that suggest that CO₂ is in the coal and is not something apart from the coal? A. I think perhaps you might have misunderstood what I was saying. I did not say there was no CO₂ came off the coal, I particularly referred to a gas, what was known as black damp, and this term black damp has its origin right back in history when the mines were shallow and where these goaves were present and very little ventilation and we found we had black damp mainly due to its generation in the goaves due to the rotting of the timber and due to the combination of oxygen with the coal itself and the term black damp is one which is used in a very general sense now, very often people call a gas black damp because it has CO₂ in it. I would perhaps think that in the course of time the term black damp might mean something a little different to what I might describe it as in a general sense.

Q. On p.14, para. (80) of your statement under the heading, "Pressure on block screen due to working conditions", you said:

"A study of the normal shuttle car working cycle reveals that there is a very frequent obstruction to the flow of air along No. 2 at-through between B and A headings and that it will be frequent, intermittent, variable and sometimes comparatively heavy.

No. 67 car usually stood empty for about four minutes in No. 2 heading between B and A in every cycle waiting for No. 40 car to come out and enter the shunt. "

Then you go on to describe what No. 40 car did. How did you get this information? A. In the first place, I simply applied logic to it and I determined what I would do if I was a shuttle car

driver and I worked out then that No.67 car in doing its job efficiently would get as close as it could to the shunt where 40 was to shunt and, if I may say "so on and so on". That is, each operation, I treat in the same way and at that stage I did ask somebody was I right. I asked Mr. Fred Wright who was there with me on the occasion of one of my visits "Is this the situation which applied normally?" He said "Yes, that would be pretty right".

Q. Then you go to p.18 of your statement and at paragraph 93 (e) you say:

"No.40 car travelled over the intersection at "A" in a full state and then travelled up against the air." You continue on :

"This action is estimated to have normally occupied some 35 seconds. On this occasion it could have taken longer because there was no need to do it quickly as the other car was not ready to come in."

Was that a logical assumption you arrived at? A. On this occasion, and I believe this appears in the transcript, the shuttle car driver went up to the unloading ramp and for some reason I am not too clear on he was delayed there in his unloading cycle and as a result did not get back to what I would call his normal position.

Q. When you he did not get back to what you would call his normal position, would you say he was 15 or 20 yards - that would be a significant part of your statement, that he did not get back to his normal position? A. One of the key notes would be in effect that he should, in his normal position, be between B and A on No.2 cut through.

Q. I quote from p.15 of the transcript, Mr. Hope's evidence. Mr. Lee is asking the question :

"What did you do when you saw the flash? A. I stopped the shuttle car I was driving."

That indicates Mr. Hope was on his way in? A. Yes, I think that would be right.

Q. Then, in confirmation of that, p.37(a) of the transcript, or I think it is Mr. Reynolds at p.25, about the four or fifth question from the bottom, Mr. Reynolds was cross-examining Mr. Hope and the question was:

"As I understand it, at the actual time you saw some flash or flame you were close to B heading in No.2 cut-through? A. Yes.

Q. You would not quite have reached B heading? A. No."

What was the distance from B heading to A heading? A. I measured from rib to rib, 82 feet.

Q. So in effect Mr. Hope, according to evidence, was only a matter of some yards away? A. I would say that would be right.

Q. Then you go on to say, in "conclusions" at p.21 of your statement:

"Gas was present at the time of ignition and its leakage rate through the brattice was aggravated at the time No.40 shuttle car entered and the ignition occurred by the action of the shuttle car causing a comparatively high pressure drop in the shunt."

WITNESS: Yes.

MR. PARKINSON:

Q. Do you see that? A. Yes.

Q. Did not you say in your statement also that one of the reasons you gave was due to this period of time before No. 40 shuttle car was able to come down B heading - No. 2 cut-through - ?
A. Yes, I did advance that as a possible reason.

Q. - and as a result of this period of time of the other shuttle car going into the shunt that allowed, made provision for the fact, that there was no upsurge? A. That is right.

Q. You are not suggesting that there was some dependence upon shuttle cars ventilating this shunt? A. No, that was not the intention at all.

Q. Did you in your investigations come to the conclusion that the shuttle car shunt had been adequately ventilated? A. At what point of time?

Q. At any point of time, particularly prior to the ignition? A. All I could depend on there is the fact that people have tested in the shunt and found it to be in a certain state, and I cannot go beyond that point.

Q. What conclusion did you arrive at? After all is said and done, you are supposed to have made an independent investigation here and I take it by what Mr. Reynolds said prior to you going into the witness box and what Mr. Wilkinson said to you that anything you could bring to this Inquiry that could assist His Honor, you were to do so? A. Are you suggesting something I have not in fact got in here? For instance, I have said already I would expect under the conditions of comparatively great pressure difference you would, if gas was behind the screen, you would get a much greater flow of gas through the brattice at that time.

Q. What I am saying is this: As a result of your investigation what conclusion did you arrive at - that the shunt was adequately ventilated or, in your opinion, the shunt was not adequately ventilated? A. At the time of the ignition I would say quite clearly there was gas in the shunt and therefore it was not adequately ventilated.

Q. Do you state that in your statement? A. I think that has been said.

Q. After all said and done, you are making a statement to His Honor? A. No, it does not state that in plain words but - - -

Q. But you were given certain, shall I use the word, instructions by Mr. Wilkinson to make an independent investigation, were you not? A. Yes, as far as I was able to.

Q. Would not you think, as a mining engineer, this shunt being inadequately ventilated was a very important and significant thing? A. At that time, yes.

Q. Would you say the brattice screen that had been erected across A heading was a contributing factor to the inadequacy of the ventilation in the shunt? -

HIS HONOR: I think the witness has already made that perfectly clear.

MR. PARKINSON: Q. You said, on p. 19, paragraph 95:

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"(95) It appears that the coloured plan as submitted to the Court in evidence is one such as would be prepared by the survey staff in the ordinary pursuance of their duties. It could be expected that the number of lifts would be much more numerous than as shown on the plan as the survey team would show the position as they could be able to determine at the time of their visits to the section."

But the plan, as we have it there, clearly indicates that here was a tremendous amount of coal being left in the pillars, doesn't it? A. If you take that as the indication, yes.

Q. Would you suggest any other way we could take it, as a mining man? A. I suggest to you if the lifts were put on by some person as they were driven, these are daily occurrences and if produced on the plan you would have much more detail than you had on that one.

Q. (Indicates on plan on floor of Court) Would I be right in saying that where we have the colour Yellow extraction has taken place? A. I would assume that to be right.

Q. Where it is plain that is coal that has been left? A. That could apply to that particular part.

Q. That is what you would expect? A. In that particular part I would think that would be reasonably correct.

Q. And this pillar there? A. You mean those pillars were left in like that?

Q. Yes. A. I would be very surprised if that was the case.

Q. You would be very surprised if that was coal left? A. Yes.

Q. Could we say these spaces outside, the endings of the spaces, that that was coal that was left? A. I think the extremities would be fairly accurate. The other part may be subject to some variation.

Q. Could we accept the fact, or would you accept the fact that it is marked like that and was complete extraction? A. No.

Q. You have been here while evidence has been submitted? A. Mostly.

Q. You heard Mr. Puddle, did you not, indicate that there were substantial quantities of coal being left? A. Yes.

Q. So what you are telling us now is that that plan is not a true picture of the situation, in your opinion? A. I can only express my opinion on this, whether I am right or not would depend on some other feature. I could not tell you exactly. I would expect there would be more than that.

HIS HONOR: Q. You say, however, it would surprise you if that represented the true amount of extraction? A. Yes.

MR. PARKINSON: Q. In paragraph 97 you say :

"The abnormal geological features would most certainly create bad roof conditions and would leave a floor that would break up and heave very readily".

Q. Yes.

Q. You stated you went into some where round about a portion of where No. 4 cut-through would have originally been? A. Yes.

Q. Did you look for floor breaks? A. Yes.

Q. Did you find any? A. I found the floor was up a little. I did not estimate how much.

Q. You say you found evidence of floor break? A. I found the floor was up a little, yes.

Q. What do you mean when you say that? A. The full height of the seam was not present. By judgment I would assume the floor was up.

Q. Did you find any evidence of floor heave round about the close proximity of the present goaf area? A. Would you like to say particularly where?

Q. Say from C heading down along the goaf edge, down past B heading, down towards A heading. A. Not such a great deal.

Q. I don't see anywhere in your statement where you did say you saw floor heave. Can you point out to me anywhere in your evidence where you say you had found floor heave in that goaf? A. No, I can't.

Q. At p. 324 of the transcript Mr. R. A. Menzies was in the witness box and I was asking him some questions:

"Q. Now, this seam at present being worked at the Old Bulli Colliery: What is its number? A. No. 1.

Q. Is it a common occurrence in pillar extraction to experience what is known as floor heave? A. In many cases you do have floor heave associated with pillar extraction.

Q. Would you like to explain now this question of floor heave to His Honor? A. Floor heave is caused in the working areas of the pillar extraction district because of the weight of the super-incumbent strata acting upon the pillars and that weight being transferred to the floor which, being more plastic than the coal, tends to flow and in flowing it flows into the roadway itself and we have the phenomenon known as floor heave.

Q. Is it only pillar pressure that can create floor heave? A. In instances overseas I have known where floor heave was caused by the pressure of gases from seams below. That phenomenon, however, is rather rare in my experience.

Q. But it is still a possibility? A. Yes.

Q. To your knowledge was there any evidence of floor heave in the preceding goaf area or the area that is the subject of this particular inquiry? A. I didn't see any.

HIS HONOR: Q. You did not go through the goaf area? A. No. I am referring to the edge of the goaf, the working area.

Q. Mr. Parkinson, did you intend your question to refer to any part of the goaf or only the edge?

MR. PARKINSON: Any part of the goaf at all, from the commencement of pillar extraction and particularly in the workings where they were working at the time of the disaster.

HIS HONOR: Q. Would you have to go into the goaf to see whether there was any evidence of that? A. No.

Q. You would have seen it, would you? A. Yes.

Q. But you saw no evidence of it at all? A. No evidence. "

The manager of the Colliery made a statement and gave evidence. He indicated he had from time to time visited this particular area. There was no evidence from the manager of floor heave. You heard the manager's evidence? A. I believe I did.

Q. You heard the evidence of Mr. Puddle? A. I heard some of Mr. Puddle's evidence, I did not hear it all.

Q. Did Mr. Puddle at any time - have you discussed this with Mr. Puddle at any time? A. No.

Q. Mr. Puddle at no time indicated there had been any floor heave. Isn't it a fact that the only reference that Mr. Puddle or the manager has made is in relation to roof conditions and no signs of floor heave? A. Well, I don't think perhaps you are quite right there. I think you might find where somebody has indicated they had to brush the floor at the intersection of A on No. 2 cut-through. That is the only reference I can think of that would have been made.

Q. You heard that reference made? A. I believe I did.

Q. Was that as a result of floor heave? A. Oh, I would say so.

Q. That was not in the goaf area? A. No but it is allied to the goaf area. It is quite common for the solid place to have floor heave adjacent to the goaf. In fact, I have seen a seam of four or five feet thickness have the floor come right up to the roof by a process of heaving adjacent to the goaf.

Q. In your investigation on this occasion did you have a look at that intersection? A. Yes.

Q. You told me it probably was floor heave. Was there any further signs of floor heave? A. No, there were cracks in the floor but they were very very fine cracks, they were not open cracks.

Q. Hairline cracks? A. Well, in that nature. I did not see anything very much wider than that.

Q. You don't doubt the qualifications of Mr. Menzies? A. No, not at all.

Q. Would you agree in substance with what Mr. Menzies has stated? A. I would agree there is not a great sign of floor heave just in the immediate vicinity of the goaf edge.

Q. Nowhere in your statement do you indicate there was any sign of floor heave? A. I never set out to particularly do so.

Q. All you stated in your statement is that it could have been? A. That is quite right.

Q. If you had seen floor heave you would have said in your statement it was floor heave? A. Well, the type of floor heave I would have in mind is just not quite allied to the one you are talking about. The one I am talking about is more of a broad portion of floor heave, which is a most common feature in a goaf.

Q. Would not it be a form of detonation if there was any emission from the floor? A. No, not necessarily.

Q. No bump? A. There could be a bump.

Q. You said at paragraph 99 that it would not be possible for any person who had not seen the working conditions in the area goafed

in some detail to know whether or not the method was good or bad. Which method were you referring to? A. I was really referring to the procedure of taking out pillars - the order - what was left and what was not left.

Q. You were just referring to pillar extraction generally? A. Yes.

Q. Nothing to do with ventilation conditions? A. That is correct.

Q. So you did not approve of this particular plan of extraction?
A. I think I said very clearly it would be impossible for anybody not seeing it to know whether it was good or bad.

Q. So you are not prepared to say whether it was good or bad? A. I could not. I could not possibly say it.

Q. The only reason you won't do it is because you had not seen the details? A. That is right. Had I been in it I would say .

Q. In paragraph 100 you say :

"In working the panel it was the intention to have a heading on the outby side and parallel to the heading from which lifts were to be taken and for this heading to act as the drainage path for the ventilation that would travel by direction along the goaf edge. " A. That is right.

Q. "This is a very good practice and the amount of gas that would be detected with this system in operation could be expected to be small." A. Yes.

Q. That was the original ventilating system that included and made provision for the bleeder heading? A. That is as I understand it.

Q. You thought that was sound? A. Yes.

HIS HONOR: I have spoken to Counsel in my chambers. It is anticipated the evidence will finish to-day. I had indicated earlier that I would expect Counsel to commence their addresses immediately without any interruption to the hearing. However, I have reconsidered that view. It seems to me there are several considerations to be taken into account, one of which - and this is an important one - is that it is very difficult for everybody, including Counsel of course to keep up with the reading of the transcript, and it is necessary for Counsel to be up to date in that reading before preparing their addresses. Therefore I have decided we shall not sit to-morrow. The hearing will recommence at 10 o'clock on Monday morning and continue until it is completed without interruption. I would expect it to be completed some time next week.

MR. PARKINSON: Q. At the adjournment we finished on the point of paragraph 100 at p.20 of your statement, page 917 of the transcript, where you agreed that the original method of ventilation was a sound method? A. Yes.

Q. Then paragraph 101 (p.917) you state "it appears that after the pillar marked (10) on the coloured plan was extracted the conditions relating to the pillar marked (11) were reaching a point where some collapse was envisaged." What were the circumstances that brought you to reach that conclusion? A. Well, I did hear Mr. Puddle and one or two of the others talk about this situation and I do say "it appears" - that is exactly what appeared to me. I don't know for sure myself, as I have said quite clearly in other parts.

Q. You do not know for sure? A. No.

Q. But you are inferring? A. I believe that that was the case.

Q. And don't you think that this being the actual situation, Mr. Puddle would have made some reference to this while he was in the box? A. I would not know. I just can't -

Q. But he made some reference to you about it? A. No, I think what I heard came from the transcript somewhere, or from what I heard.

Q. That there were imminent prospects of collapse in this particular area? A. Well, I understand - and I am afraid I can't tell you from what source, simply because I just don't remember it. - but I have no doubt it could be refreshed and brought to light if it was necessary.

Q. But then of course you had stated that you would have to have personal knowledge of the details of this particular goaf area before you could arrive at any conclusion? A. That is right, that is quite so.

Q. You state at paragraph 102, page 917, "At the time the evidence available to the parties concerned in the decision to take out (11) before driving a place ahead to allow the air to circulate along the goaf edge was that the gas in the goaf was of a noxious nature and therefore non-inflammable." You say "available to the parties." What parties? What were the people who comprised the parties you had in mind? A. I gathered, rightly or wrongly, that people had found, in the main, noxious gases. In other words, there were extinctive gases in the area, the area of the goaf.

Q. But you did hear Mr. Puddle make a statement in the box that he accepted full responsibility - he and he alone accepted full responsibility in the change in the ventilation? A. I am not sure that I did, Mr. Parkinson. What you say could be quite right.

Q. Then you go on to say "It is not uncommon for mines to be worked with unventilated goafs and in mines where spontaneous combustion occurs ventilation of the goaf would be frowned upon and carried out when no alternative could be found. Under conditions where heatings are possible the presence of inert gases in the goaf is most desirable." Was there ever any semblance of heating in this particular area to your knowledge? A. I have never known of one case of heating in the Bulli seam.

Q. Then why was that included in your statement? A. Well I included that to show that in some cases it was the practice to have an unventilated goaf, particularly one with inert gas in it, and it could be done.

Q. But in different circumstances altogether from those which existed in 8 Right? A. Well, that could be so, yes, but it doesn't mean - I think that shows it could be done should it be desirable to do so.

Q. And this was an unventilated goaf in 8 Right, was it not, after the change in the ventilation? A. There were areas which were fairly stagnant.

Q. And would you say that the inference here was to point out "Well now, it is not uncommon practice to have unventilated goaves"? A. Quite right.

Q. And would you say there was some effort to relate it to 8 Right? A. On my part?

Q. Yes? A. I think that would be correct.

Q. But this was dealing with spontaneous combustion, the latter part of your statement, wasn't it? A. Clearly a reference to spontaneous combustion, yes.

Q. And that is a situation that is almost unknown in this district? A. As I said, I don't know of any one case in the Bulli Coal Seam.

Q. You said, again at p.20 of your statement, at para. (104), p.917, "It is understood that it was the intention to hole the place (13) on plan and then to drive a split down the middle of the pillar parallel to Nos. 2 and 3 headings. It would have been better to have driven the split before the holing took place." (Approaching Exhibit "A"). What you are saying here now is that you would not have holed from there but you would have driven this pillar before you holed? A. That is how I would do it.

Q. Now how would you ventilate that split on the present set up? A. I would put - firstly you would have to put brattice down in the present machine place.

Q. You would remove the vent tubes? A. Yes - put the brattice in.

Q. And you would put brattice in? A. Yes. I would take the brattice down that has been so much in question. I would go to the spot that caused the ventilation to run round the goaf from both C and B headings and to come out A.

Q. Around the goaf edge? A. And keep that place clean, yes. To do that I would possibly re-erect a brattice between A and B on No. 2 cut-through and perhaps also a similar one between C and B. And of course, to complete the picture, you would want another one somewhere near the crib room just to make sure your air did go right down the goaf. That could be a possible variation.

Q. And that would be your method of ventilating? A. That is right.

Q. And then you would proceed down the pillar and then you would hole into the goaf? A. That is right, yes.

Q. During the course of proceeding down that pillar, how many dead-ends would you have? A. Dead-ends - would you just clarify what you mean by a dead-end? Do you mean a standing place which hasn't holed?

Q. Well, you have a dead-end now in No. 2 cut-through, have you not? A. That is right.

Q. It has not holed through into the goaf? A. You mean the miner place?

Q. Yes. A. That is a dead-end, yes.

Q. And would not splitting the pillar be another dead-end? A. Yes, it would, till it holed.

Q. But it would be another dead-end? A. Yes.

Q. You know the manager has already indicated in evidence that he has given instructions that there are to be no more dead-ends? A. Yes.

Q. You know that? A. Well, I would expect that to be quite a good instruction.

Q. A good instruction, but this method of splitting the pillar as the set up is at the moment, you would be creating another dead-end, would you not, until such time as you holed? A. That could be so, but there would be nothing wrong with that. In

doing these things you must consider the advantages that you gain and take them overall in considering what is to be done.

Q.Would you not think then it would be better mining practice to come to about there (indicating), about one third of the way down the pillar, and immediately hole into the goaf? A.No. I am not very keen on splitting a pillar in that way.

Q.Do you agree that it is accepted mining engineering theory now that it is most desirable to extract pillars without splitting?

A.It has been the practice in this field as long as I know of to make the biggest possible pillars and take them out on a lift principle.

MR.LEE: Q.You do not split them? A.No, not if you can avoid it.

HIS HONOR: Q.In other words you lift bit by bit without splitting through?A.Yes. Under certain circumstances - I mean, this is a very broad statement, Your Honor, and I would like you to keep in mind a lot could flow from this if the question Mr.Parkinson probably wants is to be answered fully. I mean, this is an answer to nothing at this stage.

Q.I thought it was an answer to Mr.Parkinson's question? A.Yes, well, I am anticipating it goes a little bit further. I beg your Honor's pardon and Mr.Parkinson's pardon also.

MR.PARKINSON: I did not intend to pursue that any further,Your Honor. Probably Mr.Reynolds may have something to say in a few minutes time.

Q.However, the fact remains that the way you would have operated there by introducing that split, you would have been creating two dead ends, would you not? A. I would have had two places open at the one time not being holed - right.

Q.You would have had to have another conference with the Manager, wouldn't you, because that would be in defiance of his instructions? Now, at paragraph 105, page 918, I am a bit confused on this and I myself want some clarification. "The situation as indicated in (94) and (104) above had nothing to do with the ignition of gas." Well, you correct me if I am wrong, but are you not of the understanding that the actual ignition of gas was created, on the only evidence we have before us at the present moment, of a piece of wood becoming lodged in the disc brakes or the brake discs, rather, and charring, coking, heading up to the point of ignition? A.I have heard the evidence,yes.

Q.Paragraph (94), page 916, "In the Court proceedings it has been indicated that the mining practice has not been good and it has been inferred that this has been in a large measure the cause of the accident." A. Your Honor, if I may, I think that word "and" should have been expunged, indicating "(94) to (104)." Would Your Honor allow me to read it right through just to make sure?

HIS HONOR: Yes.

WITNESS: I think it would be a fair statement to say that that applied to all those statements in general without specifically applying to one.

HIS HONOR: Q.What you are saying is that the word "and" should read "to"? A.Yes,that is right.

Q.That is "(94) to (104)"? A.Yes. It is indicated in them all. I apologise for that, Sir.

Q. You are crossing out the word "and" in "94 and 104" and substituting the word "to"?A. Yes.

HIS HONOR: In para. (105), p.918, it will now read "The situation as indicated in (94) to (104) above had nothing to do with the ignition of gas".

MR. PARKINSON: Those are all the questions I desire to ask.

MR. MURRAY: Q. We have heard a lot in this Inquiry, and from what you have said I take it that you also have heard it or read it, concerning an occasion following the accident when the conditions existing at the time of the ignition were sought to be reconstructed. Do you understand me?A. Yes, I believe I do.

Q. And you were present in the mine on that occasion?A. Some time after the actual inspections took place.

Q. On the occasion you were present in the mine, were the conditions as they had been reconstructed?A. I understood so.

Q. What do you say about the reconstructed conditions? Are you able to offer any comment as to whether they were really reconstructed, whether the brattice was the same?A. Well, I think they were reasonably so, but you will appreciate that after an event such as happened it would be most difficult to get things back exactly as they were.

HIS HONOR: Q. You did not know the conditions as they were at the time?A. No, I didn't. That is a general statement. I did not know - I had never been in there before.

Q. I do not know how you make a comment as to whether something was a proper reconstruction unless you knew what was being reconstructed. A. Well, the only comment I could make was that the fall must certainly would change the resistance of the air flow in some of the airways. I don't think anything else would change.

MR. MURRAY: Q. I will put it this way: for the conditions to have a chance of being accurately simulated, the brattice in the shunt would have to be a tight brattice, would it not?A. I am sorry, again I would not know. I never saw the brattice and I don't think anybody could give any reliable information on this point.

Q. You have had experience in the industry over a number of years and, from what you have said, some experience of the particular workings in this mine?A. I have been in the mine on quite a number of occasions.

Q. The deputy on the shift on which the accident took place, the maintenance shift, would in the ordinary course of things have carried out a number of tests in the place during that maintenance shift, would he not?A. I would very much have expected it.

Q. For the purpose of fighting a mine fire it is essential that those carrying out the operations have accurate information concerning the layout of the workings, including the existence of any screens or stoppings?A. Yes, I think that would be quite right.

Q. Indeed, it would be most essential for the efficient conducting of such operations that the officer or officers in charge have a plan which showed the latest details of what existed?A. Yes, right up to date.

MR. SULLIVAN: Q. You are chairman of directors at Huntley now, are you? A. Yes.

Q. It is a fact, is it not, that miners have now been issued with this survival kit? A. Yes.

Q. And they are wearing them on their belts? A. I think they are doing it very consistently now.

Q. They are doing it very consistently - that has happened since the fire, hasn't it? A. Well, I think there were some cases where they were a little bit neglectful, but I understand the attitude has changed.

Q. Everybody has got them now and they are supplied by the Colliery? A. Yes.

Q. I understand you have got a foam machine to be kept at the pit top, have you not? A. That is so.

Q. And apparently your directorate considers that is very desirable, in the event of fire? A. That is so.

Q. And it can be got into the mine if necessary, to any part, by loco? A. Yes, well, we hope that that will be attained at a very early date.

Q. You hope you do not have to use it? A. That is so.

Q. I want to ask you about the testing and I will not be very long. (A approaching Exhibit "A") Incidentally, is a contour map available to the manager and under-manager such as you have been good enough to provide us with? A. I would believe so.

Q. As I understand the position, between the intersection of No. 2 cut-through and A heading there is a drop of something like 30 feet? A. Between the intersection of - I did not get exactly the point you mentioned.

Q. I will see whether I can point you out the position. I am sorry, between here and where it was intended to hole into the goaf, there is a drop of some 30 feet, is there, if you would not mind having a look? A. It is in that order, yes.

Q. It is in that order; I do not want to bind you down to a few feet. And at the time you examined the area the pool, if I may call it, of gas had extended as far as the end of A heading? A. No. In my earliest inspection it was a little this way towards B heading.

Q. Towards which way? A. Towards the centre heading, B heading.

Q. It had completely got over A heading, had it? A. Yes.

Q. At that stage it was 4 feet deep at A heading, was it? A. Well, I must confess that I did not make any measure at the junction of A heading and the goaf of what the height might be.

Q. It would have been a good 4 feet, would it not, on the contours? A. Well, according to this, on what I have said it would be 7 feet.

Q. 7 feet? That high, would it? A. Yes.

Q. It was rich in methane, apparently, was it? I think that is the expression you used yourself? A. Yes.

Q. It was rich in methane - well, I suppose if you tested that with an oil flame safety lamp there would have been no doubt that

you would have found - practically any tester would have found the methane?A. Well, I want to be strictly correct - you could not test in that position. You will forgive me - you couldn't test in those circumstances. You could not get in there.

Q. We will take the brattice out, you see. A. Would you ask me the question again please sir? I misunderstood you.

Q. You have a pool there?A. Yes.

Q. That is at the late stage when you looked at it, it was 7 feet deep?A. Yes.

Q. Assuming you could put a lamp in it, you see; you would have undoubtedly found the methane?A. No, it would have put the lamp out.

HIS HONOR: Q. The methane would have put the lamp out?A. Even if it was only methane.

Q. Not enough oxygen?A. Yes.

MR. SULLIVAN: Q. So that would have alerted you of conditions dangerous straight away?A. When your light goes out that is a sure sign there is something there - there is some reason.

Q. You are sure there is something very dangerous there?A. Yes.

Q. Now, putting up that brattice also could prevent that pool from being tested, could it not?A. Yes, except, if I may say, you could test it on B heading. It is the same pool of gas.

Q. But if it had not reached the level at B heading you could not have, unless you went in between B and A ?A. You must go round between B and A. You could test it anywhere you had air.

MR. McNALLY: Q. Just one question about testing. If one were to use the safety lamp and lower into Illawarra bottom gas and have the lamp not at its lowest level, the non-luminous flame, but below the highest flame, a little bit less than the highest flame - if one lowered it into Illawarra bottom gas and got to the layer where it could be tested, would one notice an increase in the flame itself? To put it another way: What effect would it have upon the safety lamp?A. Well, perhaps I will have to answer this in a little bit of a round about way. When you put a safety lamp with a fairly full flame into a CH₄ mixture, unless you have reached a critical point in it the immediate reaction is to enlarge your flame somewhat.

Q. That is the methane causing it?A. Yes. Supposing you were testing near the roof and you found it with the flame, that is what would happen. If you go down into Illawarra bottom gas and you have a fairly high CH₄ content in it - well, that would be your reaction because when you are getting near to the extinctive stage that does not happen.

Q. What do you call a fairly high CH₄ content?A. Well, I would describe the gas that I saw in there as a fairly high methane content.

Q. That is the gas that was there on the day?A. Yes.

MR. SULLIVAN: "Rich in methane" was the expression, I think.

WITNESS: Yes.

MR. McNALLY: Q. Just briefly, in talking about the simulated conditions you referred to the roof fall. Was there to your

knowledge a considerable amount of fall in the intersection of A heading, No. 2 heading? A. A heading?

Q. And No. 2 cut-through? A. It was not a great fall.

Q. It was not sufficient to affect - A. A couple of feet.

Q. It was not sufficient to affect the attempt to simulate the conditions that existed at the time of the fire? A. Well, it would pertain particularly to the flow of air between No. 2 cut-through, between B and A. If anything it would tend to show a reduction in pressure after the fire as compared with before the fire.

Q. Would you agree with this broad proposition, and then we can perhaps go to the details: That in dealing with findings made under simulated conditions, one must have a great deal of reservation, and I direct that particularly to the finding of gas, the detection of gas? A. Well, only in this respect, but I think I have pointed out here what happens when the shuttle cars go backwards and forwards and I think that would be a vital difference. I don't know what was done during the tests that were carried out, I wasn't there and I did not enquire.

Q. You do not know, and I do not think we do, whether a shuttle car was in the shunt at all at the time the tests were made? A. No. It was not there when I was there.

Q. Or, whether shuttle cars had been wheeled in and out of the shunt shortly before? A. I would doubt whether that would have happened but -

Q. And such things as the positioning of the bleed tube and the tightness of the brattice at the back of the shunt itself would be material in determining just how good the attempt was? A. Well, I would say, without seeing the first one, that the second one could be somewhat different from the first one with the result that the gas could come out in a somewhat different way.

HIS HONOR: Q. But you would expect the gas to come out? A. It would still come out.

Q. And in the first place you would accept that gas was coming out at the time of the fire? A. That is right.

MR. McNALLY: Q. I do not mean to suggest that this attempt to simulate the conditions was worthless. I mean, we can rely to some extent upon the findings made under the simulated conditions? A. Yes.

Q. But one must treat those findings with a great deal of reservation? A. Well, in the respect that there is no shuttle car as I have been demonstrating, and I believe fairly well that there was a difference.

Q. And the gas may well have been coming into the shunt in a different way from what it had been while the other brattice was there? A. Well, you could have been getting a jet effect through a particular hole which perhaps did not appear in the second brattice.

Q. And I think you said earlier, that due to the loss of velocity as you get away from the entrance to the bleed tube, it would be important just where the bleed tube was placed under the simulated conditions? A. It would be, yes.

RE-EXAMINATION:

MR. REYNOLDS: Q. There is one matter I believe you would like to clear up. At para. (100), p.917, you dealt with the drainage path, as you call it, in pillar extraction and your concluding sentence was this: "This is very good practice and the amount of gas that would be detected with this system in operation could be expected to be small." Now, do you say that there is any certainty or that the provision of such a drainage tube would eliminate such a situation as arose in this case? A. It is my opinion that in general that would be the case, but like all mining there could be exceptions to this. For instance, I have indicated already that that particular place there could possibly hole and meet a barrier which would not allow any great amount of gas to go through. Now you could have that situation develop, say, during the time that one of the lifts was coming off and you would get almost a complete stoppage going through with that particular drainage tube. And in effect, you could have a very similar condition develop to what you had during the time of the ignition.

Q. Do you say, for example, if you had put a bleeder in and you found a situation arose, which could arise, that it was blocked off as an effective drainage path, you would then have to go and drive another one or clear it in some way and make temporary provision for ventilation, or withdraw the work? You had this sort of alternatives? A. Well, you would have to have something like that. Of course you could have a situation where, say, even before the fire, where the people concerned perhaps again think they have noxious gas and perhaps they would not worry too much about it. Perhaps you could have that place taking some gas that could rest on the bottom due to the stagnant atmosphere. It could be fenced off, you could have a shuttle car parked in the entrance which is just against A heading. You could be taking out cars up the split that was proposed off A and you could then have the goaf lower down building up with gas. It is quite a logical situation that it could happen and you could also then have a fall, even a roof fall, which could cause the opening to become effective again and you could then get quite a high flow of gas over where the shuttle car was. I mean, there is no certainty in mining, Mr. Reynolds. You have always got to be vigilant.

Q. I think we have all come to understand that. A. Yes.

(Witness retired and excused)

HIS HONOR: I make any usual order as to witness's expenses.

Have you your next witness, Mr. Lee?

MR. LEE: Yes.

HIS HONOR: Before that witness is called, I want to draw the attention of Mr. McNally and other counsel to the question that was raised this morning as to the time that elapsed after Mr. Stewart had made such tests as he did make in the shunt and the time of the fire. I have only found two references. There may be others, and I draw the attention of counsel to these so that they may be able to assist me as to the finding of others. The first is in the evidence of Mr. Mangles at the bottom of p.45, the second last question, "Q. I want to ask you about what you said.....that is why you said that? A. Yes."

The other reference is from the evidence of Mr. Jones at p.60. He was describing who was there at the timber bay and said, "At the timber bay there was Deputy Stewart.....I am not too sure of that." At the fourth question at the top of the next page, "Q. How long had Charlie Stewart been talking to you.....new chap."

MR. McNALLY: I have always assumed and still do that that part is evidence that Mr. Stewart was there with the other men for a quarter of an hour before the fire, after he tested. On Your Honor's reading of it, if you take it that Mr. Stewart had been there in the section for half an hour when the other men came in, everyone said they arrived there at ten to eight - that still places it at half past eight. I realise the significance of it. Perhaps then it was not significant but it certainly is now. So that there is no confusion, I understand Deputy Stewart went down to sit on the back of the miner, further down for ten minutes, then he went back up to where the others were.

HIS HONOR: It will have to be cleared up, but it does not have to be cleared up by evidence. As I understand it, the only evidence that could be given on it is by Mr. Jones. Do you want Mr. Jones recalled?

MR. McNALLY: Yes, or somebody.

HIS HONOR: Mr. Jones is the man who gave the evidence. He can explain what he himself said. When can he be called?

MR. SULLIVAN: Apparently he is A.E.U. We could get him about 3 o'clock or perhaps before. I am now informed he can be here by 2 o'clock.

HIS HONOR: He should be brought as soon as possible. The only reference to this half an hour is evidence of Mr. Jones' and there seems to be some confusion or some ambiguity, apparently, existing in the evidence. Mr. Jones is the man to clear up what he meant, so he will be recalled.

MR. LEE: Mr. Muir who has given evidence here prepared a paper, not for this Inquiry but in connection with another matter but it is very pertinent here and it may save a lot of time. It deals with "1. Present detection methods in common use and new seam gas detection equipment. 2. Present requirements of the law." There is nothing controversial in it. It indicates the Department's knowledge of what equipment there is to deal with detection.

HIS HONOR: This does not touch any question on which counsel is interested from the point of view of his client, unless Mr. Reynolds, perhaps; but this is a question of suggestions which will weigh in my mind when making any observations I may think fit?

MR. LEE: That is so. Firstly I was going to suggest that Mr. Herron could read this statement and then I might produce on the Bar table here, in order to save the calling of witnesses, certain pieces of equipment which are mentioned in this. We could then all look at them. If it is necessary, Mr. Menzies could come forward and demonstrate them if Your Honor requires further information, but most of the information that is necessary is in here. In this way we could all be informed and it will obviate the necessity to call a witness and will therefore be much quicker.

HIS HONOR: I take it any questions that may be asked will not be by way of cross-examination but by way of explanation?

MR. LEE: I would think so.

HIS HONOR: Is there any objection to that course? (No response)

MR. SULLIVAN: Before the evidence closes, the big mine plan which Your Honor may wish to look at has not yet been formally tendered. It is on subpoena from me and it is here in Court.

Mr. Stone says it is all right for it to be retained.

(No objection to tender)

(Large plan of mine admitted and marked
Exhibit "LL")

(Statement of M.J. Muir dated 7th February 1966
read by Mr. Herron, as follows:

" GAS CONCENTRATION MEASUREMENTS AND THE LAW

By M. J. MUIR

1. Present detection methods in common use
and
New seam gas detection equipment.
2. Present requirements of the law.

7th February, 1966.

Inspector of Collieries, Special Duties.

- - - -

There are a number of instruments in common use in coal mines for the detection of Methane, Carbon Dioxide and Hydrogen Sulphide.

These instruments have certain advantages and disadvantages.

These instruments are displayed.

Instruments for continuous detection, recording and monitoring of Methane are available. There are possibilities in their future application to underground equipment.

The Coal Mines Regulation Act has a number of requirements with regard to the detection of mine gases and action to be taken.

- - - - -

Present common detection methods - METHANE:

Oil Flame Safety Lamp

The oil flame safety lamp has been the main detecting means for methane in the coal mines of this State. The lamp commonly used is a bifold burner type, using kerosene fuel and may or may not be fitted with a shut-off ring for top feed.

However, it has been established that top feed lamps are incapable of detecting thin methane layers due to convection effects, and a recent development has been an oil lamp fitted with a probe attachment which can draw a sample of the suspected atmosphere into the lamp from adjacent to the roof or from near the floor.

A further refinement is the use of a lamp burning spirit and fitted with a relighter arrangement. This spirit lamp with probe will undoubtedly find an increasing use in mines in this State.

Electrical Means of Detection

The most common type of electrically-operated detector is powered by an inbuilt battery supply and works on the Wheatstone bridge principle whereby the current flow in one element of the bridge varies with increased heat, due to the combustion of methane on the element. This is reflected on a galvanometer or milliampmeter suitably graduated in percentage methane.

The unit most commonly used at the present time is the M.S.A. G.P. Methanometer. This unit is available with a probe if desired, for the detection of methane layers and is normally scaled 0-5% CH₄.

The presence of up to 10% of carbon dioxide has no appreciable effect on the accuracy of the instrument. There are numerous other instruments of this type; however, they are not in common use here.

Interferometer type of detection:

This type of detector depends on the different refractive indices of air and air-and-methane mixtures. The fringe pattern caused by diffusion of a light source is caused to alter on a suitable scale depending upon difference in refractive index caused by the percentage of methane in the sample as compared to a reference sample of air.

This type of instrument is usually scaled 0-10% methane, and a Vernier arrangement allows of the reading being determined to 0.1% methane.

The instruments in use here are the Riken and Toka, and in common use in Europe is the Zeiss.

The presence of other gases, primarily carbon dioxide, can alter the reading, and carbon dioxide and moisture absorbents are located in the suction line to the instrument. Regular changing of these absorbents is essential.

Recent Developments in Methane Detection.

Continuous Detection:

English Electric Automatic Firedamp Detector and Alarm:

This type of detector is designed for eight to nine hours continuous operation between battery charges and operates on a modification of the Wheatstone bridge principle whereby thermocouples detect the variation in temperature between an exposed element burning methane, and an unexposed element, this difference being amplified onto a scale reading 0 to 3% methane.

A visual alarm system is incorporated whereby a red signal shows on the instrument at any pre-determined figure between 1½% and 3% of methane.

This type of instrument can be adapted to provide a form of methane monitoring or to shut down electrical equipment at a pre-determined methane percentage.

M.S.A. Methane Alarm:

This equipment is an adaption of the Wheatstone bridge type. The equipment is designed to be attached to a machine and to provide both a visual alarm and a shutdown of equipment if desired.

A detection head is located where desired, and a continuous sample of the atmosphere is drawn into the detector. If the methane content almost reaches a pre-set level, a red light will start to flash, and when the methane percentage reaches the pre-set level, the red light glows continuously, and the electrical equipment is shut down if so desired. Current for the instrument is provided from an adapted cap lamp battery.

Sigma Recording Flame Methanometer:

This unit is an adaption of the oil flame safety lamp principle where a continuous uniform supply of butane is burnt in the lamp. This heat output is sensed by a number of thermo-couples in series and activates a galvanometer type recorder. Percentages of methane increase the flame height and the heat output with a resultant increase in output of the thermo-couples. This is reflected onto the meter in terms of percentage methane between 0-3% and is also recorded on a time chart.

The lamp and recorder provide for eight days continuous operation, and is suited to the continuous recording of methane in such situations as return airways.

The instruments can be modified to provide both distance monitoring and shut-down of equipment.

Infra-Red Detection:

Instruments such as the Irga can be modified to provide continuous monitoring, and recording of methane. A beam of infra-red radiation passes through a tube containing the samples. Methane absorbs some of the infra-red radiation, and the loss of radiation is proportional to the percentage of methane.

Of note is portion of the recommendation of the Chief Inspector of Mines, Great Britain, following the recent inquiry into the Rhondda Colliery Explosion of May 17th, 1965, which recommended, among other things, the making of firedamp determinations at the end of face return airways, and the development of instruments and systems for the continuous monitoring of firedamp.

It is apparent that refined methane detection and monitoring equipment will come into more common use in this State, and when properly used will provide a continuous reliable warning system.

Some available instruments can be located at strategic places in the working area to provide continuous warning of methane, and others can be located so as to provide knowledge of fluctuations in general methane levels in the return airways. These instruments can be adapted to shut down equipment as required.

Carbon Dioxide: - Oil Flame Safety Lamp:

This is the most common means in use for the detection of carbon dioxide, and in fact, the detection procedure is only by means of lack of oxygen on an oil lamp flame and such detection includes other extinctive gases such as nitrogen.

Chemical detection:

The most common chemical detection means is by use of the Drager detector using carbon dioxide tubes in the required range. An immediate indication is given of the percentage carbon dioxide present.

Interferometer detection:

The existing detectors such as the Rikon and Toka can be adapted to determine carbon dioxide.

For this purpose a total deflection is obtained of the sampled atmosphere with only a water filter in the instrument suction line.

A carbon dioxide absorbent is then introduced in the suction line, and another deflection reading obtained. The
976. M.J. Muir's statement read.

difference can be calculated or determined by supplied graph as percentage carbon dioxide.

Hydrogen Sulphide:

The most common detection means for hydrogen sulphide is the Drager detector using the appropriate tube.

Hydrogen sulphide tubes are in the range of 1 to 600 parts per million, the accepted maximum allowable concentration of H₂S in air being 20 parts per million.

Other means such as cadmium sulphate and lead acetate give an indication of the presence of Hydrogen Sulphide but, without further analysis, provide only an estimate as to quantity of gas present.

Present requirements of Law:

These are primarily embodied in the provisions of the Coal Mines Regulation Act and are as follows:-

General Rule 1, Section 54 (Part e):

A Place is not in a fit state of working or passing if the air contains either less than 19% of oxygen or more than $1\frac{1}{4}$ % of carbon dioxide.

An intake airway shall not be deemed to be normally kept free from inflammable gas if the average percentage of inflammable gas found is not less than two samples of air or more than six samples of air taken by an inspector in the air current in that airway at intervals of not less than a fortnight exceeds one quarter of one per cent.

General Rule 7:

A place is deemed to be dangerous for men working if the percentage of inflammable gas in the general body of the air in that place is found to be $2\frac{1}{2}$ or upwards.

Reg. 27, Seventh Schedule:

Machines shall not enter, or if in a working place, shall be stopped, if any inflammable gas is found on an oil flame safety lamp in the place where the machine is working or is to work.

Inspections for inflammable gas shall be made at intervals of half an hour while the power is switched on to the machine, upon the completion of operations by a machine in any such place, and immediately before the recommencement of operations after any interruption exceeding one half hour duration.

Reg. 69, Seventh Schedule:

Power promptly disconnected from any cables or apparatus in any part of the mine where the percentage of inflammable gas in the general body of the air in such part is one and a quarter percent or upwards, or is such that its presence is capable of being detected on the lowered flame of an oil safety lamp.

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HIS HONOR: I will hear Mr. Jones now.

MR. MURRAY: Before Mr. Jones is called I feel I should inform Your Honor, not because I regard this factual issue as crucial, not because I think anything of great moment necessarily rests on it, but Mr. Kent is here and is willing to give evidence, he is back on light duties and is prepared to give evidence which will answer questions on this matter.

HIS HONOR: You say you do not think it is crucial: As I see it, and this is the only reason for this exercise, the crucial matter is one which affects Mr. Stewart. It may be somebody will urge me to say something about Mr. Stewart, about whether he tested or didn't test and so on and if so I may have to come to some decision on the matter. If my decision is one which, in one sense, makes some comments which are unfavourable to Mr. Stewart, I should be most reluctant to do it unless I were entirely satisfied in my mind as to the facts upon which I rely. That is the reason why I think this should be done. As to the actual time lag it may not in the long run be vital. The question is whether Mr. Stewart made the test some 15 minutes before the fire or 25 or 30 minutes before the fire. At the moment I can't see how it is vital. It merely shows, I suppose, how quickly the gas appeared in the shunt after the test was made.

DALE JONES

Resworn:

HIS HONOR: Q. Your name is Dale Jones? A. Yes.

Q. You have given evidence in this matter before? A. Yes.

Q. There are some matters on which I want your evidence: You were being asked about what men were with you at the timber bay before the fire broke out? A. Yes.

Q. You said Fred Hunt was there, Mr. Barry Kent was there, Harry Smith, Jack Murray and Charlie Stewart, Charlie Stewart being the deputy. You were then asked this question, "How long had Charlie Stewart been talking to you"? A. Yes.

Q. You understood, of course, that was in relation to how long Charlie Stewart had been talking to you before the fire occurred. You had been describing the fire? A. Yes.

Q. This was your answer:

"Minutes. I would not like to say. I would not say quarter of an hour. No, it wasn't that long at all but more or less it was talk just going on while waiting for the other car to proceed in the normal morning's work." A. Yes.

Q. That was your evidence? A. Yes.

Q. Do you recall that? A. Yes, but wasn't there a part there about Bobbie Stewart somewhere in by or something? That might have been before.

Q. There was something else about Bobbie Stewart. A. Just when the six were at the timber bay, I thought I said Bobbie Stewart was there?

Q. I am certain at some stage you said that later on. You said, "Well, this was more or less a point where there were bars, props and vents - air vents. Now, as was customary, or what we used to do anyway, while waiting, Bobbie Stewart would be in the habit of dropping the back end or sending out for a bar where these chaps

were already on the job would take the bar in, or if he said 'We will need a vent' a vent was got out and in the case of a bar going down, props were made ready so that when they came back with the measurements it was just like ready to go on". So, that puts Bobbie Stewart there too? A. Yes, that is right.

Q. Soon after that you were giving evidence and you were asked this question, "Was it just a coincidence that they were all there at this particular time? A. I don't quite know that. I mean, I think what had happened there previously was there was a new overman came into the section and he was introduced around and then he went out with Fred Wright, I think. I am not too sure of that. Q. With whom? A. Fred Wright. I am not too sure, and I think Charlie Stewart who had been with these two other chaps, he more or less came up with them and then he - Q. Who was Wright - you mentioned Fred Wright? A. Assistant Under-Manager. Q. So whilst you were there Mr. Wright, the new overman, and Mr. Deputy Stewart came into the bord, is that right? A. Came into the what? Q. Came into the working place? A. No, I am not sure whether Charlie was with them or not."

And then you were asked:

"Q. Well, he was there when the fire broke out, wasn't he?
A. Oh yes, certainly.

Q. You had suggested that they had come in just a few minutes before? A. Well, they were there early - I am not sure whether this Mr., the new overman, I am not quite sure of his name - Fairs, that is right. Well, I am not quite sure how he came in. He was with us there first thing in the morning. He came in with the transport I think.

Q. Did he come into this particular working place? A. Mr. Fairs, yes.

Q. With Mr. Deputy Stewart? A. I think he may have and then Fred Wright came in, as was usual, later on.

Q. How long had Deputy Stewart been in there? A. He had been there a fair while.

Q. By 'a fair while' you mean half an hour or quarter of an hour or something like that? A. Yes.

Q. Half an hour? A. Half an hour - it may not have been as long as that.

Q. More than a quarter of an hour, at any rate? A. Yes, by the time he was introduced around and had a bit of a talk with the new chap.

Q. Mr. Fairs had gone and Mr. Wright had gone at that stage?
A. They had gone, yes.

Q. And Mr. Stewart was still staying, chatting with you?
A. That is right. "

Do you recall the part I read to you earlier where you said Mr. Stewart had been talking to you for minutes and you would not like to say, you would not say quarter of an hour - "No, it was not that long at all but more or less it was talk just going on while waiting for the other car to proceed in the normal morning's work." You see, that is what you said? A. Yes.

Q. You were being asked how long was Mr. Stewart talking to you in the timber bay before the fire started? A. Yes.

Q. You said less than quarter of an hour - minutes. Later on you had spoken, as I have indicated to you about Mr. Stewart having been there a fair while. We are not quite certain what you mean?
A. I see.

Q. Can you explain? Tell us what the situation was?
A. Charlie Stewart as far as I can remember and I think - he was down at the face with Mr. Wright and Mr. Fears and we were - I was at that particular time working on the shuttle car, like, filling it up with oil and carrying out normal duty.

Q. You are not talking about No. 40 shuttle car?
A. No, this was Fred Hope's, No. 67 shuttle car. The oil tank is on the same side as the vent tube and they were on that side.

Q. You have got Mr. Wright and Charlie Stewart - ?
A. And Mr. Fears.

Q. At the face?
A. At the position at the back of the mine and also on the ~~face~~ tube.
vent

Q. You are working on the shuttle car?
A. Yes.

Q. What happened then?
A. A while after that I was filling oil drums up to put, from the 12 gallon drum, into the shuttle car. I went back outby to get more. Now, I'm not sure whether I went back into the face and put more oil into the car or whether I was up there when I went out - I'm not sure about that.

Q. When who went out?
A. Fred Wright and Mr. Fears.

Q. What happened then?
A. As I say, I'm not quite sure whether I went back and put more oil into the car as the cars were coming in instead of going out to the ramp and catching them out there, I was catching them in at the face to carry out repairs - not repairs, but maintenance on them. Really the next thing I can remember was that we were at the timber bay, like, the six chaps but I don't know where Charlie Stewart was, whether he went out with Mr. Wright or Mr. Fears or where he was, but anyway the next thing I can remember was that we were at that particular loading point - that is wrong - at the timber bay.

Q. You say you are not sure whether Mr. Stewart was with you at this stage or whether he had gone out?
A. He may have still been in the place, for all I know.

Q. But he wasn't at the timber bay at that stage?
A. I'm not too sure of that because, like, just imagine, we were not all collected, just all went there together, there might have been three there and then another one come, you know how I mean?

Q. Yes. Do you know where the vents were?
A. The spare vents or the vent line?

Q. Well, I don't know?
A. The spare vents were over the vent line, just over the vent line on the straight down place.

Q. Do you recall seeing Mr. Stewart sitting on the vents?
A. Earlier, yes, when they were talking down at the shuttle car.

Q. That is with Mr. Fears and Mr. Wright?
A. Yes.

Q. Do you recall seeing him sitting there at any time later?
A. He may have been there with Jack Murry - no, I would not say for sure.

Q. At any rate, he was somewhere else whilst you were at the timber bay; is that the position?
A. For a while he may have been
980. D. Jones, rec. x.

but then he did join us. He may have been even in the place and come up to where we were sitting or he may have been outby and come to where we were sitting, I am not sure of that.

Q. At some stage you had a talk at the timber bay? A. We were all talking, yes.

Q. Do you remember how long it was after he started talking to you at the timber bay before the fire started? A. I could only guess between a certain time because I could not say exactly ten minutes, quarter of an hour, or any particular time like that but I know we were talking there for a fair while on subjects that were usually spoken about during a day's work, also we had a bit of a friendly messing around, as we had at times in there, but it would be more than, I would say, quarter of an hour.

Q. You would say - ? A. More than a quarter of an hour.

Q. Would it be much more? A. I think - yes.

Q. You do? A. Yes.

Q. When you first gave evidence you were asked how long had Charlie Stewart been talking to you and you said "Minutes. I would not like to say. I would not say quarter of an hour. No, it was not that long at all," A. Charlie Stewart, see, as I think I said before, Jack Murray was the closest chap to me. Now, Jack was sitting on the vent line and I was on the timber, a matter of a couple of yards between us, and Charlie was more or less on my right. I think Harry Smith may have been sitting beside me. I would say at any rate, Charlie was over a bit. He may have been talking to me for just a few minutes and then I know I was talking to Jack Murray for quite a while then.

HIS HONOR: Does any counsel wish to ask any questions?
(No response)

Q. How long was it after Mr. Fears and Mr. Wright left that the fire broke out? A. No, I couldn't even - I wouldn't even like to try and guess on that.

Q. Can you tell me if it was a very long time, or was it a short time? A. No, that would be only complete guesswork.

HIS HONOR: Any questions? (No response)

(Witness retired)

MR. MURRAY: Shall I call Mr. Kent?

HIS HONOR: Yes.

BARRY KENT
Re-Sworn:

MR. MURRAY: Q. Is your full name Barry Kent? A. Yes.

Q. Do you live at 7 Cochrane Road, Thirroul? A. Yes.

Q. You recall the events leading to the noticing of the fire in the place where you were working on the morning in question?
A. Yes.

Q. I would like you to recount, as best you can, the events which led up to you noticing the flame - -

HIS HONOR: Not from the very start.

MR.MURRAY: Q.Do you recall an occasion when you walked outby up the extension of No. 2 cut-through towards the loading ramp?
A.Yes.

Q.Was there someone in the place walking in the same direction as you then? A. At that time I was walking up to the loading point and I was going to check the numbers on the cables and I noticed Charlie Stewart coming down from the loading point.

Q.Where did he go? A. He headed in towards the shunt but more or less he just passed and he just went in and I just kept going up the loading point, I suppose I was there 20 minutes before I went down the place to rejoin the others at the timber bay.

Q. You then rejoined the group of men who were talking? A. Yes, we were talking down there. If I remember, Charlie just came across from the back of the miner, if I remember rightly, he was over there with Bobbie and just came across then. He had been talking to Bobbie and both of us more or less came to the timber bay at the same time.

HIS HONOR: Q .He came to the timber bay from the back of the miner?
A.Yes.

Q.Where are the vents? A.On the opposite side.

Q.They would not be in the timber bay - there is a vent tube?
A.Yes, they passed the timber bay. The rest of them are at the timber bay where all the spare vents were, where they carry them forward, just outby of the timber bay.

Q.How far from the timber bay are they? A. Practically right on the bay.

Q.Listen to this and see if you can tell me what vents these would be.

"Then I went back down and I sat roughly at the back of the miner on the vent tubes for about another ten minutes....."
A. That would be the line, the ventilating line going down to the face. It would not be the spare vent.

Q.It would not be near the timber bay?A.No, more or less roughly half way from the face back to the timber bay, or a bit closer.

HIS HONOR: That is what Mr.Stewart himself said he did.

MR.MURRAY: Q.I think you have said you were walking inby and Mr.Stewart, walking outby, arrived at the timber bay together?A.Yes.

Q.You were talking to your workmates, a little bit of horseplay was going on and about how long were you all there together, that is yourself, the others, and deputy Stewart until you noticed the flame? A.About quarter of an hour or 15 minutes. I would say that would be about the period of time.

HIS HONOR: Q.Deputy Stewart was there all that time? A.Yes, I would say.

Q.Where did he come from? A.I thought he was coming more or less just straight from Bobbie, he was at the back of the miner.

Q.You thought he had come from the back of the miner? A.Yes, I thought he was talking to Bobbie Stewart.

Q.He came to the timber bay and was there about quarter of an hour? A. Yes.

982. B.Kent, recalled.

MR.MURRAY: Q.And then the events you recounted in your statement took place? A.Yes.

HIS HONOR: Q. Did you notice Mr.Fears and Mr.Wright there? A.Yes.

Q.Did you see them go? A. Yes - I did not actually see them go - I did not see them go out of the panel,no.

Q.Did you see Mr.Stewart go with them somewhere and then come back alone? A. When I seen him coming back in the panel he was alone and I just naturally took that he went out of the panel with the other two.

Q.How long after you saw him coming back alone was it the fire started? A. Roughly about 35 minutes.

HIS HONOR: Does any other counsel wish to ask any questions?
(No response)

MR.MURRAY: Might he be excused?

HIS HONOR: Yes, both witnesses. I make the ordinary order for expenses.

(Witness retired)

MR.LEE: We have some of the equipment which was referred to in Mr.Muir's paper and the first piece of equipment we have is this English Electric automatic firedamp detector and alarm. Actually the word "alarm" should be deleted from the reference. This is the machine. It is calibrated and when it reaches a certain percentage of methane this red section shows, the red light, and then this blue section comes on with the blue light.It is run by a battery which can be charged. The duration of the battery is 8 or 9 hours. You have to have the instrument checked for calibration from time to time. I am informed that is not a task beyond the technicians ordinarily found in mines.

HIS HONOR: Will it still operate while the battery is being charged?

MR.LEE: I am informed it has to go to the surface to be charged.

MR.LEE: The next piece of equipment is the large equipment set up here showing again a calibrating which is attached to the continuous miner and can be set so that when the intake of methane into the machine reaches a certain level, which can be pre-determined, the light will glow red. It can be set so that when a higher level, pre-determined, is reached, it automatically cuts the machine off so that if the warning is not observed and the men go on working they will only do so till the machine takes in the quantity of gas which will register at the red light position.

HIS HONOR: What I will be interested in is the question of failure of these things. You may have a device like this in operation and then a subsequent inquiry may be told the device failed for some reason.

MR.LEE: This piece of equipment I am told costs about £260. It also is run off a battery.

The final piece of equipment I wish to display is the recently developed safety lamp designed to take the probe. This is the probe I have here, designed to detect right at roof level and floor level and also designed with a relighting system should the lamp be lost.

983. B.Kent, retired.

HIS HONOR: That is the one with the flint.

MR.LEE: May I suggest that Mr.Menzies now come forward and be asked any questions Your Honor desires?

HIS HONOR: One matter to which I think reference should be made is the reliability of the piece of equipment itself. I do not mean when it is functioning properly and doing what it is desired to do, but are they subject to failure?

(Mr.R.A.Menzies, who previously gave evidence in this Inquiry, came forward to demonstrate the equipment already mentioned and was asked certain questions by His Honor).

MR.MENZIES: Like all equipment they are subject to failure but they require maintenance and regular routine maintenance should reduce the failure to an absolute minimum. Of course, we have had no experience with them in this country but they have been tested overseas and found to be efficient. The maintenance problem has not been acute there and I can see no reason why the same position should not obtain here.

HIS HONOR: Q.Would you say devices of this kind could replace the deputy or the tester? A.No.

Q.In other words they would have to be used in conjunction with the ordinary tests carried out in mines? A.Yes.

Q.I suppose you would say the ordinary tests would have to be made more certain than they are at the moment - I use the word "certain" to avoid any criticism of those making the tests? A.Yes.

Q.In other words, perhaps the methanometer either in conjunction with or in substitution for the safety lamp - probably in conjunction with? A. In conjunction with, Your Honor.

Q. What about the cost of the equipment? Mr.Lee said one costs about £200, I think? A.Yes.

Q.What about the other - for instance, the blue and red gadget? A.£76.

Q.Would you need these placed all round the section? A.No.

Q.Where would you locate them? A. In the working place where gas is most likely to be found and where it is most likely to be in any accumulation which is likely to be dangerous and where gas can be ignited.

Q.These all test for methane? A.Yes.

Q.Assume you had the device you do not put near the miner the English Electric, assume you have that on this occasion in the shunt. Where would have located it? A. Near the roof.

Q.What would happen if you had bottom gas up to a height of four feet behind the brattice? A. You would not have got it.

Q. Is there any device - any automatic device? A. On the understanding that you had Illawarra bottom gas containing methane then, quite obviously, it would be rested on the floor, if you knew you were getting Illawarra Bottom gas.

Q.If that had been known, that it was inflammable gas, I suppose something would have been done but you have to know you are going to get this gas? A. Yes.

Q. I suppose nobody in this case would have put that on the floor?
A. Apparently not.

Q. Is there anything you can use to cover that sort of situation?
A. One on the roof and one on the floor.

Q. I have a duty here, as I feel in this case the consequences of this fire were so grave, and of course one might say we are lucky they were not graver, but I feel it is my duty to recommend something which would be of real value in preventing a similar situation such as this recurring. One can pass all the criticisms one likes on what has happened but that is valueless for the future and valueless to the miners and management in future and that is why I have become interested in devices such as this which might serve that purpose. Is there anything apart from these devices?
A. Research into methods of detection have been done on firedamp which is a roof gas in the mine. Recordings of bottom gas, or Illawarra bottom gas, containing methane being held on the floor are not very common and all the work has been done on pure methane.

Q. That means you expect it to come up high?
A. Yes, we are left with the flame safety lamp, obviously useless near the floor. You cannot put anything which has a flame near the floor because you would lose the flame because of lack of oxygen so you must have an electrical device. If the presence of bottom gas is known the English Electric would, I think, do the job satisfactorily, of detecting the methane.

Q. In other words you would place it where you suspected the gas might be?
A. Yes.

Q. At the same time you would have a very careful check, certainly the statutory check, and perhaps even a more careful check on those people charged with the duty of detecting it?
A. Yes, these alarms are only intended to give a warning where the normal detection system falls down or where the eruption of the gas is sudden.

Q. Turning now to the probe do you think it likely that there might be some objection by the management or the deputies to carrying an instrument like that around with them in the mine?
A. There always will be objection. There always will be.

Q. I suppose you could imagine comments from the men.
A. I have an instrument which is not a probe but it has a telescopic probe. I can put it together to about 15 inches long.

Q. Does it have the pole effect too?
A. I do not need to pump it.

MR. LEE: I am reminded it is designed as a walking stick.

WITNESS: I am afraid not. You could not use it as a walking stick. This is where the gas come out. If you used it as a walking stick you could not get any gas coming out.

HIS HONOR: My attention has been directed to this matter and you may know something about it, or there may be another Inspector in the Court who may be able to give me some information. I make it perfectly clear it is not a suggestion connected with the colliery with which I am dealing. There is no suggestion of this happening at Bulli but it may be one may need to say something about it; I do not know yet.

Q. I am told that in some collieries it is quite a common practice for officials other than deputies - under-managers and such like -

to go underground without carrying their safety lamp? A. That is a fact.

Q. I suppose you regard that as almost amounting to mal-practice? A. Deplorable.

Q. Is there anything in the actual regulations to cover that? A. Nothing that requires them to carry it.

Q. I will ask your opinion as an expert. Do you think it might be of assistance to the Department or the industry if I made some observation about that? A. I think so, yes, Your Honor. If I may add something of my own, I think it is a reflection upon the management, the senior management, that they go underground without a safety lamp. It is my opinion that any manager or under manager or senior official should never go underground without a flame safety lamp.

HIS HONOR: I make it again perfectly clear that I make no suggestion that that situation applies to Bulli Colliery. Are there any questions anybody would like to ask?

MR. REYNOLDS: Q. Where is the intake point for this equipment. Is this it here? A. This is the detecting head which is fastened, clipped on to the machine, near the ripping head of the machine. This leads back to the detector here.

Q. It is designed specifically to go on to the machine? A. Yes. This is the operating battery. This all has to be changed daily. This can be fixed to the chain and the battery changed every shift.

Q. And how far would it be away in the ordinary case of a continuous miner, from the coal face that is being ripped? A. It could be very very close to it, probably a foot at the most.

Q. Do you think that would give a reliable indication for general purposes or only show that there was methane in the coal at that point? A. It would show that the methane was coming off the coal and it would also show if the accumulation was building up. In other words, if it was being released or not being contained by that ventilation, it would accumulate there and the detector would pick it up.

Q. You say experience in the United States is that this works satisfactorily? A. Yes.

MR. MURRAY: Q. I got the impression - correct me if I am wrong - that this is put forward as something very new, this equipment. Is that right? A. Very new. The M.S.A, the big one here, is a recent development, I think in this past 2 years.

Q. So that thing which could go on to the continuous miner has been known to you in the Department at any rate for 2 years? A. I would say its development has been known for 2 years but it is probably about 6 months it has been put into production. It has been under test for some time. These things are tested very thoroughly before being put into production.

Q. So to your knowledge it has been in production for 6 months? A. Yes.

Q. What about the English Electric alarm? A. I am not too sure but I think it is somewhere about the past 18 months as well.

Q. You will remember I asked you some questions about the Department and new equipment which would assist in the problem that was being discussed; that it was known to you and the other inspectors of the limitations of the flame safety lamp. Do you recall those questions? A. Yes.

Q. When did you, for instance, first see the article which has got the red and blue things on it, like an expensive poker machine? A. Yesterday morning.

Q. Do you know this - you may not - when did the Department first know of its existence? A. Probably the middle of last year when the Chief Inspector was overseas. As soon as he came back he obtained the necessary powers to get one.

Q. I think it was ordered after the Bulli fire, or before? A. I would say before. I have been told now that it was before.

Q. What about the probe, which I cannot help thinking looks like a photograph I showed you some time ago? A. It is very much different from it.

Q. What about the probe; when was that first - A. In the middle of last year. That lamp was only being developed by the Safety Mines Research Establishment in Britain and that is probably one of the earliest production models that was produced.

Q. That is the lamp, but what about the probe? A. This type of lamp, without the probe, that lamp has been in use.

Q. You say the probe was not developed until the lamp was developed? A. No, not till this part here was developed. I think I used this lamp way back in the early 1940's, this type of lamp.

Q. I was asking you about the probe. There is nothing new about that - that type of apparatus? A. The probe has been tried before and was never found very successful. That is why it has taken some years for this lamp to be developed by the Safety Mines Research Establishment in Britain.

Q. What about the other device, the square aluminium looking box. A. This is only a testing device.

Q. So there are really three articles produced. One goes on the miner or other machinery? A. Yes. We have another one which is at the colliery, a continuously recording methanometer. That is being installed in the colliery today. I may say all these were ordered before the Bulli incident.

MR. REYNOLDS: Q. Do you know the nature of this detector head? A. No, I am afraid I do not. I think it is simply a device, I would say, with a gate of gauze in it through which the air is drawn. This is a gauze here through which the atmosphere is drawn. This is to keep out all foreign matter. It is known as a detector head.

Q. You believe it is only a device for getting it through to registering? A. Yes. When it gets in there it must be free from dust, and where this is to be placed is a dusty area so it filters the dust out.

MR. MURRAY: Q. How long has the methanometer been in use or known to you - ten years? A. Many years.

Q. Ten years? A. Oh yes.

MR. PARKINSON: Q. I think His Honor asked you a question about the shunt area and I understood you to say in answer as to where the English Electric would be that it would be hanging up towards the rib? A. I said that, but I don't apply it particularly to the shunt now, I apply it particularly to a place where I was going to use it to detect fire damp, and I would have it near the roof. I didn't mean particularly in that shunt, knowing that bottom gas was there.

Q. My understanding of this particular methanometer, one can readily see it is constructed along the same lines as an oil lamp, and I think in view of what we have discussed over these last few weeks this would become the property of the deputy, to test for methane where blackdamp was not only suspected but blackdamp had been found. I would think that this would be the objective. Is that the general idea? A. No, I can't agree with that, regarding the deputy. This device, the English Electric was produced in England and it is produced for one purpose, a warning methanometer for use by the workman on the long wall coal face, and the British Regulations have a certain number of men on a long wall coal face and there must be a certain number of these detectors which are carried by the workmen in addition to their normal lamp and they are hung on props, secure positions along a long wall coal face. This English device is not for the use of deputies, it is for the use of workmen who carry it.

Q. That might be all right in the United Kingdom. It sometimes irks me about the conditions in the United Kingdom which have no similarity in Australia. Did you ever know of Illawarra bottom gas in the United Kingdom? A. I heard of it, not under the name of Illawarra bottom gas, but I have heard of the term "bottom gas" in the United Kingdom.

Q. Is not this the situation, that had that lamp there been hung up, say for instance, in the shunt, there is every possibility it would not have registered? A. There is a possibility.

Q. Don't we want something that would have registered under the conditions we have been discussing? A. You put it on the floor.

Q. And you leave it on the floor at any given set of circumstances? A. Yes.

Q. I want to ask you in connection with the appliance that goes on the continuous miner. Do you say it gives off an alarm other than that red light? A. If it can be connected to the power supply and when a certain percentage of methane is read, the power supply to the machine can be cut off.

HIS HONOR: Assume that you put that English Electric device on the floor and that you had a layer of bottom gas which did not reach as high as the vents at the top. Is there any other way it could register? A. I can see no reason why you should not turn that one upside down.

Q. You could turn it upside down it would work? A. I have not really gone into it but I can see no reason why it should not. I can see no reason why you couldn't also lie it on its side although I have not really gone into it. Knowing the type of machine it is I see no reason why you cannot do that.

Q. This lamp is a self-lighting lamp, a re-lighting lamp.

Q. One which does not have to be taken back to a lamp station should the flame go out? How many of those are in mines to-day? A. None.

Q. I understand you have now made obsolete the aluminium type of lamp because of the danger from aluminium itself, is that so? A. Yes.

Q. Of what are they now made? Are they brass? A. Brass and steel.

Q. But there are no re-lighting lamps? A. None in use in the State

Q. That means at the present time if the deputy loses his light he has to go to a lamp station, wherever it may be, to relight his lamp, or get another lamp, or of course he may borrow one temporary from someone who has one, for example, the miner driver? A. Yes

Q. But at times it is quite a substantial period before he gets another lamp?A. Yes.

Q. And sometimes the lamp station is above ground, is it?A. Yes, that is right.

Q. A considerable distance from where he is working?A. That is correct.

Q. That means of course there is a tendency amongst deputies to preserve their light, if I may put it that way?A. Yes.

Q. And would you not agree that that could lead to a certain carelessness in the tester?A. I prefer to call it ultra-caution, to prevent them losing their light, rather than carelessness.

Q. I suppose ultimately it comes to the same thing. They do not make a thorough test for fear of losing their light?A. Yes.

Q. They could easily miss methane in bottom gas, could they not?A. Yes.

Q. If they knew they could re-light their lamp as easily as this one, without going anywhere but staying in the same place, I suppose that fear would largely be removed from the mind of the deputy?A. That is right.

Q. Is there any great difference in cost between this lamp and the one that is used at present?A. Not very much.

MR. REYNOLDS: I think a couple of pounds at the most.

HIS HONOR: Q. Are you able to tell me how many lamps a colliery like the Bulli Colliery, which is a large colliery, would have in stock to use?A. 40 to 50 oil flame safety lamps. I am informed double that number - about 100.

Q. The price of these lamps here is something between £10 and £15?A. Yes, somewhere in that vicinity.

Q. It may not be a matter of replacing the full complement of lamps, but it may be a question of supplying the deputies who are on duty with a lamp of this kind?A. I do feel that nobody below deputy will be issued with a re-lighting type lamp.

Q. Why is that?A. When you are using these you just can't use them and think you can re-light them in any old place. When you lose your light with these things you must examine your lamp to make sure nothing has gone wrong with it. You must remove yourself from the place where you lost your light.

Q. You still cannot light it?A. No, you must move out into the main body of the air current.

Q. Is there some risk?A. Yes.

Q. What is the risk - the flame itself and therefore the spark that lit the flame is completely sealed off?A. It is completely sealed off. I will talk about a methane mixture. If you go into a methane mixture such as to lose your light, getting a mixture where the lamp shows 2.5 per cent methane and you have lost your light there and you just try to re-light your lamp, you can quite easily have an explosive mixture within the lamp.

Q. You would get an explosion within the lamp?A. Yes, and if you do that two or three times you get a red hot gauze and your lamp ceases to be effective so you must remove yourself from the place where you lost your light and go to a place where you know is clear of gas and there re-light your lamp.

Q. There are no regulations at the moment to cover this? A. No.

Q. So I suppose before they could even be used the regulations would have to be amended? A. I am not quite sure about that.

Q. It all depends whether the oil lamp described in the regulations covers this type or not, but if you are going to restrict it to be used by deputies only it would need some amendment? A. Yes. I am not quite certain, but the lamp has to be approved by the Chief Inspector and should the lamp be approved by the Chief Inspector then conditions could be set down under which it should be used.

Q. In other words those existing would cover the position? A. I am not quite sure.

MR. LEE: I think that is so. The definition of safety lamp is - (read) .

HIS HONOR: Q. I suppose then it would not need any new legislation but a recommendation might well persuade the collieries concerned to use this lamp voluntarily? A. Yes. There are mines in the State where for quite a long number of years gas has been no problem, gas has never been detected. It might be placing an unnecessary hardship on certain people if we withdrew all the lamps for these.

Q. If I were to say that I think these ought to be used, in mines where gas could be a problem, by all officials from deputy up in place of the others - in other words, self-lighting lamps in future - what would you do about it? Would you consult the Minister concerning this? It is not a change of legislation at all, it is leaving you a discretion, is it not? A. Yes.

Q. First of all would you discuss it with the Minister or what would happen? A. I feel it would have to be discussed with the Minister, yes.

Q. Assuming you did that and the Minister said "All right, carry out the recommendations," how would you carry it out? A. As far as the legal sense becoming law, you mean?

Q. How would you enforce a recommendation such as that? What would your attitude be? A. If somebody said this lamp had to be used, this lamp would have to be then approved and the Chief Inspector must approve of it. In his approval he would put down his conditions which I visualise would include the persons who can use and carry this type of lamp.

MR. MURRAY: If any reliance is being placed on this by Your Honor, he is now telling us hypothetically what the Chief Inspector might do in relation to the article put forward. The Chief Inspector is sitting in Court.

HIS HONOR: Q. Do you feel you are able to answer that question? A. Yes, I feel quite competent.

MR. MURRAY: I submit any conclusions apart from the interest it may be, coming from a man of experience, would be of little value to Your Honor.

HIS HONOR: I am prepared to rely upon Mr. Menzies as a senior Inspector of the Department.

WITNESS: The Chief Inspector would approve the type of lamp and in that approval he would nominate the persons who could carry that lamp. He would nominate the conditions under which the relighter could be used and state when the light was lost to carefully examine and to remove to a place where the air was clear and pure before it

was relit. I have already given consideration to the conditions and have a few ideas on it, but I have not got them on paper here and I find it difficult to bring them back to mind. But there would be conditions which would not in any impede the working of the mine or endanger the lamp operator or the mine in any way.

HIS HONOR: The collieries may say "We are not going to apply for approval to use these, we will use the old ones."

MR. REYNOLDS: The approval could be withdrawn.

MR. PARKINSON: I feel perhaps Your Honor and Mr. Menzies have overlooked this, that no matter what recommendations Your Honor found fit to make, particularly when it is going to cost £260 for that particular application, the concurrence would have to be received from the Prime Minister of this country.

HIS HONOR: I am fully aware of the position with any legislation in this Act, that it is one which must be done in consultation with the Commonwealth Government. I understand it is a matter the Joint Coal Board discusses before making any recommendations.

WITNESS: The approval or disapproval of this lamp rests only in the hands of the Chief Inspector. It does not even require to be approved or disapproved by the Minister. It is entirely in the hands of the Chief Inspector.

HIS HONOR: Q. Does that mean you could then go on to disapprove of the other lamps being used? A. If I said that, it would be rather a drastic step.

Q. Do you think it would be drastic legislation though? A. To prohibit completely the use of any other type of lamp?

Q. For example, for persons below deputy? A. Unless it is a matter only of supply I feel it will take some time to get the supply of all this type of lamp we would require in this country. It is a completely new model and as it has been developed in Britain, it will be ordering a lot of a company of limited resources in manufacturing and it may take some time. I cannot say how long. Regarding the use or non-use of these in mines, inspectors have quite a lot of powers of persuasion to have things done which they require to be done.

MR. REYNOLDS: I am instructed that that is so. I would have thought that the power to approve of the safety lamp would include the power to withdraw approval from time to time and that this would not be a matter of legislation.

HIS HONOR: If in any of these recommendations they are not matters of law but matters of persuasion, I hope the Inspectors will act with authority.

Q. Mr. Menzies, would you read that through and have a look at the back and see whether it alters the view you expressed about being able to turn this one upside down? A. It does alter my opinion.

Q. When you turn this upside down there is a switch inside which enables you to test it and it always shows you have plenty of methane when you turn it upside down? A. That is so. It couldn't be used in the upside down position or lying flat.

MR. McNALLY: Q. The intake air - where is it on this, without the probe? A. We have two. The bottom intake, here is the shutter. If we want any in there we put it in there. It is the same as the old one. If we want to use the probe I would suggest we

close the bottom one and put it in there. The probe hole is open all the time.

(Mr. Menzies' demonstration concluded)

HIS HONOR: Is there any other evidence anybody wants to call?

MR. LEE: I draw Your Honor's attention to the top of page 604. Mr. Griffiths gave evidence and he had a calculation worked out as to the quantity of air coming into the vent tube in the shunt. He calculated 1600 and 2000 cubic feet and a little further down I said to him, "Q. The bleed tube that was in the shunt at the time of this fire I think we have been told was about 10 inches in diameter. Do you need time to calculate the difference?

perhaps in a few minutes if I ask you to stand down. Could you do it? A. Yes." The matter was left there. There are a number of factors coming into it and I think it is sufficient to inform Your Honor that Mr. Griffiths if recalled would say the quantity of air would be somewhat less. In other words we can take it that 1600 to 2000 cubic feet would be the maximum possible coming into the tube and if it was a 10 inch tube it would be less than that.

Does Your Honor wish to be referred to an article by Mr. Hargraves, Senior Lecturer, Department of Mining Engineering, University of Sydney, in "The Australasian Institute of Mining and Metallurgy Proceedings," No. 208, December 1963, p. 251, entitled "Some Variations in the Bulli Seam"? I think Mr. Reynolds has read this. It would not be an article from which Your Honor could be influenced in any way in any matter regarding these proceedings, but it is somewhat helpful in a general way in the understanding of seam gas and things of an allied nature.

(Mr. Reynolds not objecting, above article admitted and marked MM).

HIS HONOR: There being no further evidence I propose to adjourn, but I want to say that should some fact be re-discovered at some stage - I hope this will not happen and I am not inviting it - but should something of consequence be discovered which necessitates my hearing further evidence between now and the time I finally make my report, then I am prepared to listen to such evidence. Therefore I will not say that the evidence is concluded but I will say it appears almost certain the evidence has already concluded in this matter.

I am told that the local Magistrate has to call a list in this Court on Monday morning next so I will commence on Monday at 10.30. I will then hear Mr. Lee, followed by Mr. Reynolds.

(For list of witnesses see page 993).

(For list of exhibits see pages 994/5).

(Further hearing adjourned to Monday 14th February, 1966 at 10.30 a.m.)

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BULLI COLLIERY ACCIDENT INQUIRY

LIST OF EXHIBITS

- "A" Plan - Part Bulli Colliery. Workings in 8 Right panel as at 13.11.65.
Scale 40" to one inch. (Tendered by the Minister by Mines)
- "B" 1. Large photograph of Shuttle Car No. 40.) Tendered by
2. Small photograph of shuttle car) Minister for
Mines
- "C" Photograph of disc brake of Shuttle Car.
(Tendered by Minister for Mines)
- "D" Sketch of Shuttle Cars. (Tendered by Electrical Trades Union).
- "E" Statement of Barry KENT. (Tendered by Minister for Mines)
- "F" Records in accordance with Regulations 22, 25, 27, 42, 7th Schedule. Night Shift 8 Right on 8/11/65, 9/11/65. 5th, 6th, 14th and 27th October 1965.
(Produced by A.I. & S. on subpoena)
- "G" Report of inspection under General Rule 4 - 8 Right on 9.11.65. Made on 11.11.65 by C. Stewart. (Produced by A.I. & S. on subpoena)
- "H" 1. Four photographs of area of fire.
2. Enlargement of area of roof in vicinity of the fall.
- "J" Graph of barometric pressures 9.11.65.
- "K" Charred timber extracted from between drive and disc brake of Shuttle Car No. 40.
- "L" Charred brattice from area adjacent to Shuttle Car No. 40.
- "M" Plan showing whole ventilation system of mine.
- "N" 1. Sketch showing ventilation system on 9.11.65.
2. Sketch showing ventilation system on 12.11.65.
3. Sketch showing ventilation system on 15.11.65.
- "O" Copy of messages found in sections of flexible tubing in workings in No. 2 cut-through.
- "P" Safety Lamp.
- "Q" Photograph of cables in Bulli Colliery.
- "R" Piece of molten metal from electrical box.
- "S" 1. Photograph of Junction box.
2. Photograph of Junction box.
3. Photograph of Junction box.
4. Photograph of Junction box.
- "T" Sample of Miner cable.
- "U" Pamphlet on fire damp.
- "V" Copy of requirements in regard to fans.
- "W" Self Rescuer.
- "X" Report of Mr. Donnegan.
- "Y" Chart on mine gases.
- "Z" Reports of Mines Inspector J. Muir.

BULLI COLLIERY ACCIDENT INQUIRY

List of Exhibits - (Continued)

- "AA" Piece of Standard Mine Brattice.
- "BB" Samples of Shuttle Car maintenance sheets.
- "CC" Deputies' reports for 3/11/65 - (3); 4/11/65 - (3);
5/11/65 - (3); 8/11/65 - (3); 9/11/65 - (1).
- "DD" Victor Parkinson's Notebook.
- "EE" Returns to Western Section (Rule 4)
- "FF" Report of V. Parkinson - District Check Inspector.
- "GG" Statement to Press released by A.I. & S.
- "HH" Check Inspector's Report. Sec. 54, R.39.
- "JJ" Plan of work in 8 Right (Coloured in order of work)
- "KK" Plan of Fans in ' Right furnished by Mr. Reynolds.
- "LL" Main Mine plan.
- "MM" Australasian Institute of Mining & Metallurgy
proceedings .

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IN THE COURT OF
COAL MINES REGULATION
HOLDEN AT BULLI

)
) No. 1 of 1965.
)

BEFORE HIS HONOR JUDGE GORAN
ASSESSORS: Messrs. MAHON and
BUCK

MONDAY: 14th February, 1966.

IN THE MATTER OF AN INQUIRY IN PURSUANCE OF THE COAL MINES
REGULATION ACT INTO AN ACCIDENT WHICH OCCURRED AT THE BULLI
COLLIERY ON 9th NOVEMBER 1965 AND ITS CAUSES AND CIRCUMSTANCES

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(PART HEARD)

NOTES ON ADDRESSES

MR. LEE: When the Minister for mines came to Bulli after the fire on November 9th 1965 he promised a full public Inquiry into the disaster. This Inquiry before Your Honor has fulfilled that promise in every respect. The proceedings have been lengthy and a considerable number of witnesses have been called but from the great volume of evidence before the Court it is now possible to deduce with precision and certainty the causes and circumstances of the fire. Only good can come from this Inquiry. Firstly will Your Honor make specific recommendations in respect of matters and things designed to promote safety in the mines in regard to gas and these recommendations we can be confident will be implemented as expeditiously as possible. Secondly, the Inquiry has made a real contribution to the safety of men working the Bulli Seam - and probably elsewhere - in revealing that Illawarra bottom gas an inflammable and deadly gas may be found anywhere in the Seam and that deputies and managers must be on guard for it at all times. Prior to this Inquiry it was known that Illawarra bottom gas was present in this colliery and elsewhere but it had been so little encountered that its presence or likely presence was dismissed from consideration, it seems, by those whose duty it was to ensure that dangers from gas were properly dealt with. This would probably have been the case anywhere on the Seam. This grave error led to this tragedy. There is no precise knowledge of where Illawarra bottom gas may be found in the Illawarra district and this Inquiry has sounded the warning that it must be expected to occur anywhere in any mine until the contrary is absolutely proved. Thirdly, the evidence has shown that safety in the mine as far as gases are concerned can only be achieved if those whose duty it is to ensure safety are ever alert to the possibility of danger, for the mistaken belief by the deputies and management that inflammable gas, namely Illawarra bottom gas, was not present in this section was due basically to an attitude of laxity to the dangers which gas of any kind presents in a mine. This attitude manifested itself in the failure by the deputies to make the tests for gas which ought to have been made and which proper safety considerations demand shall always be made no matter how unlikely it may be that a particular gas being tested for will be found. It manifested itself in the failure by the management to be ever alert to the necessity for proper testing to be carried out at all times and its failure to take conscious and positive action to ensure that this would be so. It has no right to rely exclusively upon the deputies, it must be conscious of the dangers and ensure that proper tests are made.

This attitude of laxity further manifested itself in the creation by the management in this section of a ventilation scheme which, whether Illawarra bottom gas was present or not, contravened proper principles of ventilation and disregarded elementary but fundamental safety considerations. In the result the deputies having failed to make themselves aware of the presence of Illawarra bottom gas and there being a ventilation system in operation which was inadequate even to deal with noxious gas in quantity, the men were in fact for an appreciable period of time in this particular area, and in all probability in an earlier part of the workings a month or so before exposed to conditions of extreme danger. The fire which did occur could have occurred at any point of time in this period and an explosion also was possible. Had the ventilation at this point been arranged in accordance with accepted principles there is every possibility that notwithstanding the deputies' failure the tragedy would not have occurred.

I propose to deal at length with the failure of the deputies and of the management to deal with gas as it should have been dealt with, not merely for the sake of criticising them but for the purpose of stressing that a perfunctory approach to the problem of gas in a mine can only lead to situations of danger. No deputy who gave evidence here, nor the manager or under manager can possibly be accused of showing a willful disregard for the safety of the men. Never at any time did they expose the men to any danger which in their minds was a danger worth considering. But the errors made by them were errors of magnitude and whilst one must always remember that no man is infallible and that many years' freedom from any problem of bottom gas or any gas could well condition their minds to an attitude unappreciative of the possible presence of gas in really dangerous quantities nonetheless the errors would not have been made if they had shown the degree of alertness to danger necessary for safety in any mine.

The management seems to have treated ventilation as secondary to speedy extraction of coal.

The Inquiry has established the following facts:

- (1) On 9th November at 9.15 a.m. there was an ignition of gas in the shuttle car shunt in section 8 Right which caused the loss of four mens' lives.
- (2) The gas was Illawarra bottom gas of a proportion approximately (p.406) 40 per cent CH₄, 58 per cent CO₂, 2 per cent N₂, which was inflammable and explosive in air (p.418).
- (3) The bottom gas came from the goaf outby of the brattice erected in A heading to form the shunt. The gas was large in quantity as shown by the fire which was of considerable magnitude.
- (4) The ignition was set off by heat generated in the disc brake section of the shuttle car No. 40 where a piece of wood was jammed causing the wood to ignite (p.414). It is possible that the heat caused inflammable hydraulic oil to ignite (p.435) and/or caused coal dust near the bottom of the disc to coke (p.451) and give the spark necessary to ignite the gas. It seems on the evidence of Mr. Donnegan that it is more likely the ignition of the wood caused the spark - it would have been at a somewhat lower temperature than the hydraulic oil or the coke and was in charcoal form and could have been at much lower temperature (pp.435-6). But

whether it be the wood, oil or coke dust or all three it is clear that the ignition commenced in the disc brake mechanism, there is no other possibility.

- (5) The presence of Illawarra bottom gas in the goaf was unknown to the deputies or to the management.
- (6) The presence of bottom gas in the goaf was not suspected by the deputies or the management. (Mr. Puddle's evidence, p.739)
- (7) The deputy had tested in the shunt at regular intervals from 2nd November to 9th November and their tests revealed no inflammable gas in the shunt. These tests were made with an oil safety lamp.
- (8) The brattice was put up in A heading with the knowledge of the management and for the avowed purpose of containing the gas in the goaf. (See Mr. Puddle's evidence pp.732-733).
- (9) The management would not have erected the brattice in A heading or designed the ventilation system as it was if it had known that bottom gas was present.
- (10) When conditions pertaining in 8 Right section as at 9th November, 9.15 a.m. were simulated after the fire bottom gas was found in the shunt at the goaf edge.
- (11) After the fire bottom gas was found in the shunt and at the goaf edge and in the goaf.
- (12) Bulli Colliery is a colliery in which bottom gas has previously been found since as long ago as 1928 although of recent years in small quantities only. Mr. Puddle tested for it at No. 3 and did not find it. (P.739)
- (13) The bottom gas found after the fire was readily detected by an oil safety lamp.
- (14) In the development of the workings in 8 Right the management had until about one month before the fire followed a system which ensured that gas from the goaf could pass into a bleed tunnel and be adequately and safely diluted.
- (15) This system is accepted by the management, the Department and Mr. Sellers to be a sound system to be used in pillar extraction.
- (16) This system was discarded because the management believed that roof difficulties likely to be encountered required speedy withdrawal of the coal and speedy withdrawal could not be achieved if the bleed tunnel were driven.
- (17) This system had been devised by the Mines Department and the colliery in conjunction in 1960 and had been used successfully in numerous other developments in the mine as well as 8 Right.

With the source of the ignition and the nature of the fire already established the Inquiry inevitably leads on to ascertain why gas in such quantity and inflammable gas at that should have been present in the shunt on November 9th. This has

led to a close investigation of the conduct of those entrusted with the safety of the men in the mine, namely the deputies and the management and we have had extensive evidence on the testing methods employed by the deputies; the tests for gas which they in fact made, the tests made by the management, and the ventilation system designed by the management.

The findings of inflammable gas, namely Illawarra bottom gas, after the fire established with certainty the nature of the gas which was in the goaf before the fire and it follows inevitably that the gas found in the shunt prior to the fire, and it was found as early as November 2nd and November 3rd, was inflammable gas. The deputies reported finding noxious gas, that is CO₂, at various times before the fire and the only conclusion open is that these were in fact findings of Illawarra bottom gas. It is clear and indisputable that inflammable gas was present in section 8 Right in the workings from the time the extension to No. 2 cut-through was commenced to be driven on 2nd November. It is equally clear that at an earlier date, about one month before, when the extension to No. 2 cut-through was driven, inflammable gas was present in the workings there. It has been shown positively that over an appreciable period there was extreme danger of fire or explosion or both in this section and that neither the deputies nor the management were aware of it.

As neither the deputies nor the management had any knowledge of the presence of Illawarra bottom gas in the section. It followed as of course that their conduct would be based on this state of their knowledge and we are thus furnished with an explanation of conduct which otherwise would be inexplicable. We are thus shown that what now appears to have been conduct unreasonable in the extreme was at the time conduct which was at least consistent with the state of affairs as then known. It is to a large extent irrelevant in this Inquiry to criticise such conduct solely for the purpose of exposing the weaknesses, failings and errors of those concerned - the purpose and the only proper purpose of criticism of the persons concerned is to ensure that the mistakes made shall not occur again and that the nature of the mistake shall be fully appreciated by those who work in mines in any capacity involving the duty to take proper safety precautions.

There is not the slightest evidence that any person entrusted with the safety of the men in this mine was guilty of any wilful disregard for their safety. The fact is, however, that the failure to discover the presence of bottom gas in the mine before the fire was the real cause of this disaster, for as I have said everything was done from the point of view of safety on the assumption that it was not present. Why then was it not discovered?

All the deputies (Pp.87, 92, 93, 111, 112, 117, 547/8) and Mr. Stone (Pp.647, 648/50) and Mr. Puddle (P.739) confessed to a knowledge that bottom gas had been found in the mine. All the deputies claim they tested for it and Mr. Puddle says he tested for it in No. 3. (P.739)

Three clear possible answers to the question as to why it was not discovered and why it was in such quantity in the shunt at the time of the fire appear:

- (1) It came in quantity from the goaf by reason of the expansion of the gases in the goaf caused by a fall of barometric pressure from midnight on the 8th until the fire at 9.15 on the 9th and continuing thereafter.

- (2) It came in quantity suddenly by reason of a fall in the goaf and/or floor heave which released large quantities of gas into the shunt.
- (3) It was at all times present in some quantity in the shunt and the deputies failed to detect it on the safety lamp. The failure could have been due to the fact that although the tests were made for bottom gas, the deputies, because of lack of experience or because the quantities of gas present did not show on the lamp, could not get a positive result. It could as an alternative be due to the fact that the deputies did not test for bottom gas.

It is our submission that failure by the deputies, for one of the reasons set out above, is the most likely explanation of the presence of the gas in such a large quantity before the fire.

Let me explain why:

As to (1) the barometric pressure drop, it will be remembered that this was put forward by the Department as a possible explanation of the accumulation in the shunt. The Department went in and made certain findings and the only information it had was that there had been noxious gas present beforehand according to the deputies' reports. (Menzie's: p.345) Some explanation then had to be found for the presence of inflammable gas which had not - if the deputies were to be accepted - been present before. You had so to speak to assume that the goaf was locked up before the fire and something made the Illawarra bottom gas come out. The theory as put forward by Mr. Donegan accounts for at least some quantity of gas coming into the shunt. Mr. Donegan's theory depends on certain calculations based on assumptions as to the nature of the goaf, absence of air and the like. Mr. Sellers' calculations based similarly on various assumptions lead to a conclusion that the amount of gas emitted as a result of the barometric pressure drop was negligible. In the light of the reason behind the advancing of this theory and taking into account the evidence revealed in this Inquiry as to testing by the deputies, the absence of any suspicion on their part of the presence of bottom gas and various other features, it would be necessary to be very certain that this theory provided a decisive answer before accepting it. It clearly does not and rather falls into the background against the obvious conclusion that the gas was at all times present but not detected. It is our submission that the pressure drop may well have added to the conflagration by causing the gas to come out more readily but to what extent we do not know, as Mr. Donegan said at p.466 the continued pressure drop would feed the gas into the existing fire.

As to (2) - goaf fall and floor heave - this as Mr. Sellers fairly indicated is largely speculation but it is a possibility. It depends on assumptions and of course like the barometric pressure drop theory is necessary only if it is established that bottom gas was not present in the shunt for an appreciable time before the fire. Mr. Menzie's never saw any floor heave. (P.325)

As to (3) this situation is the most likely, namely that the deputies not suspecting its presence did not either test or test properly for it.

As I said earlier it is abundantly clear that the goaf gas was inflammable gas - Illawarra bottom gas - and that what

was detected by the deputies on 2nd and 3rd was this gas. Whatever came from the goaf was Illawarra bottom gas and there could be no doubt that that is where gas found in the shunt would come from. It is common ground that on the 2nd and 3rd when the shunt was created for the extension to No. 2 cut-through the men and the deputies were conscious, indeed acutely conscious, of gas. The brattice erected in A heading must, as we know, keep the goaf gases back. The brattice did not keep the gases sealed behind it and accordingly there was not only the likelihood but a near certainty that Illawarra bottom gas from the goaf would come in. No doubt the original erection of the side brattice and the introduction of the bleed tube cleared the shunt for some little time of the gas, (McGarrity p.125-126; Ackerman, p.133), but as we know the side brattice was taken down on 3rd November when the shunting began. (Mangles, p.476; Cambourn, pp.566, 584). There is other evidence that over the week before the fire some of the men were at different times conscious of the presence of gas which they thought was black damp. Mr. Hope was aware of black damp in section 8 Right (p.18). Mr. Mangles said he noticed a strong odour in the shunt over a period but did not know it was gas (p.31). There had been complaints of gas in this area (pp.43-44) and he himself had made complaints.

Mr. McGarrity and Mr. Ackerman testified as to what was obviously serious gas accumulation in the shunt area. Mr. Ackerman says he told Mr. Cambourn that gas was "still seeping through", (p.133) and that Mr. Cambourn suggested the bleed tube. He said he had been in 8 Right section about six weeks and smelt gas most nights (p.136) and on a previous occasion in an earlier heading he had become nauseated on two occasions (p.137). Clement Robinson gave similar evidence (p.227-228) and said he could still get a bit of a taste after the bleed tube was put on. Mrs. Esme Murray, the widow of John Hilton Murray gave evidence that in the week before her husband had told her he could not taste his food for the taste of gas and that the Sunday before the fire he seemed tired and unable to work and disinterested in his usual food. (p.424-425) At p.428 Mr. Donegan says that an inhalation of CO₂ can cause increased respiration with consequent tiredness.

In very similar circumstances in No. 3 cut-through Clifford James Lake, a bricklayer, said that when the brattice was being put up for the shunt he could hardly breathe "It was terrific" (p.455) and even Mr. Stewart said, "It's pretty crook". Lake said he felt the sensation he described both when standing up and bending and this clearly indicates an accumulation of dangerous proportions. In No. 3 the brattice was put up to keep the gas back.

Mr. Cambourn himself said there was always a distinct odour or taste in 8 Right section which he could not identify or get on his light (p.561) but he never suspected it was bottom gas.

Deputy Charles Walker found no gas in the area before the fire but had found inflammable gas at the goaf edge elsewhere (pp.78-79-80). He never suspected bottom gas (p.97) but tested for it at all places (p.87).

Deputy Stewart said that on the morning of the fire he found a patch of black damp after 8.30 when he went on his hands and knees and smelt it (p.109). He too said he never suspected bottom gas but was looking for it.

All the deputies had found inflammable gas at some time or other in 8 Right.

In the light of our certain knowledge now that the goaf gas was bottom gas and in view of the fact that the practice in A heading must cause a build-up of gas which however could leak into the shunt the above evidence shows positively and without the necessity for any process of inference that bottom gas was coming up into the working areas in large quantities for some time before the fire. Yet the deputies claim they tested for it. There are two possibilities in our submission: they did test and tested ineffectually, or they did not test.

It must not be forgotten that the bottom gas in question here was gas which everyone who tested for it got readily on a safety lamp. Mr. Sellers makes the point very strongly. The suggestion that in small quantities of methane it is difficult to test seems quite out of accord with Mr. Sellers' statement that he got one per cent quite readily. But in any event it has been shown that when conditions were simulated significant and not merely minor quantities of methane were shown. (Longworth, pp.158, 159 - 5% to 2½%; Sellers, p.882 - 3% to 4%).

Your Honor will remember that all the inspectors maintained that a competent deputy could find bottom gas if the methane were significant. Mr. Menzies says (p.283) the lamp will always show an inflammable mixture. These observations are established by Mr. Sellers' tests. They did somewhat reluctantly admit that in some situations it might be difficult but even then maintained that competence alone was required to enable it to be detected. The subsequent tests under the simulated conditions show that it was readily detectable. It will be suggested of course that the simulated conditions were not precisely the same but we have it from Mr. Cambourn (pp.596-597) that it was "a fair test" and conditions were nearly identical.

There is cogent evidence that if proper testing was done it would have revealed the gas and that what have been described as deficiencies in the oil safety lamp have nothing to do with the failure to detect the gas.

There is additional evidence to support the conclusion that tests were not made. Mr. Stewart, at p.110, described a test for bottom gas which is in reality a test for carbon dioxide only - he used the same flame for carbon dioxide as for methane. As Mr. Longworth pointed out at p.153 this test relies upon seeing the alteration in luminosity to detect methane. In addition Mr. Stewart detected what he thought was black damp by smell at 8.30 and labelled it black damp without any evidence from his light to justify this conclusion. No deputy who had tested for bottom gas, who couldn't get it on his lamp, or black damp on his lamp, would dismiss it as black damp unless he was totally regardless of his own safety and Stewart was not. The contemptuous way he treated it is strong evidence of his attitude to bottom gas.

In Deputy Charles Walker's evidence he admitted to a test behind the shuttle car which could not possibly have been a proper test. He says, at p.81 that he had to stretch out and obviously he could not test behind the shuttle car. This could not have been a test for bottom gas at all which would have required the lamp to be lowered in the manner we have had demonstrated. He too describes a test which is very similar to Mr. Stewart's. At p.93 he says he lowers the flame a little. Mr. Longworth and the others say you miss it with a small flame, or can easily miss it. (p.153)

Mr. Cambourn's evidence of the test is at p.877 and is after the inspector's evidence whereas Stewart's and Walker's were before. The true inference from all the evidence is that the deputies never suspected bottom gas and basically for that reason never tested for it. If however you accept that they consciously did test for it - and Stewart's assumption from smell that the gas was black damp and not inflammable gas is very significant against this being held - then the test was a test which would in all probability not reveal it anyway.

One may take a middle view and say that the deputies tested for inflammable gas at the floor with the sort of test you would expect them to make when they assumed that all they would get on the lamp would be a carbon dioxide indication.

There are other features in the deputies' evidence which might be referred to to indicate the extent to which their belief that only carbon dioxide was present governed all their actions and how deep was that belief. There are descriptions by McGarrity and Ackerman of how the side brattice and bleed tube were installed after their complaints of gas. There was Cambourn's direction to the dogwatch deputy to erect ordinary brattice (pp.554, 578, 557) notwithstanding that there was cement washed brattice in No. 3 and he thought No. 3 was being duplicated. It is irrelevant as to whether what went up was ordinary or cement washed - I refer to it to show a complete lack of appreciation of any danger at all explicable only on the basis that carbon dioxide alone was the gas likely to be found. We saw the same lack of appreciation of anything but carbon dioxide at No. 3 where the miner had gone in 100 feet according to Mr. Lake at p.459 before anything was done to ventilate what had obviously become a very serious state of affairs and this state of affairs, before the brattice was put up in the heading, must have been getting at least some ventilation. In other words it got really bad before any one worried. This is only explicable on the footing that no one ever thought of carbon dioxide.

It would be unfair to single out the three witnesses, Stewart, Walker and Cambourn who gave evidence here and treat them as if they were responsible for the deaths of the men here. The true position is that no one in a position of responsibility, whether deputy or staff, ever entertained the notion that there might be danger from Illawarra bottom gas and the assumption that it was not there dictated the conduct, no doubt, of all deputies and all on the staff, although we have heard from some only. There was an attitude of mind which existed here and no doubt elsewhere - human weakness not wilful disregard for safety was the predominant fact.

In our submission the proper inference from all the evidence is that the deputies did not test for Illawarra bottom gas and that if they had they would have known that inflammable gas was present and neither they nor the management would have allowed the section to be worked as it was.

The lesson to be learned is that no deputy - indeed no person in a position of responsibility - on any part of the Bulli coal seam should assume that he will not encounter inflammable gas at floor level or near floor level. There is no precise knowledge as to where Illawarra bottom gas will be found and this fire shows that tragedy can occur by assuming that because a gas has not been detected in the past for a long period it will not be present in the future. It would be greatly in the interests of safety if deputies and management on the Bulli Seam could be informed of the peril that may exist and that all deputies and management satisfy themselves

that they can at this moment use the oil safety lamp in the fashion proper to detect bottom gas. It is clear, as I have said, that the lamp will detect dangerous quantities except in some limited circumstances. I will later on refer to specific recommendations the Department suggests might be made in regard to the introduction of automatic devices.

Let me now, Your Honor, consider the position of the management. It is abundantly clear that if Your Honor finds along the lines I have indicated, namely that the gas was at all material times present in the area and that it was not detected because it was not tested for by the deputies, then the management can quite rightly say that it has been let down badly by its deputies. It is very much to the credit of the manager and under manager who gave evidence here that no such suggestion has been made or even hinted at. Rather the company has adopted the procedure of explaining what it did and why it did it and admitting quite openly and without reservation that it, like its deputies, never for one moment suspected that inflammable Illawarra bottom gas was present and that it arranged the ventilation system and conducted itself about other matters concerned with the area on this assumption. As I have indicated earlier it would be idle and foolish in the light of all the evidence to suggest that the company wilfully exposed the men to the dangers of Illawarra bottom gas. It is abundantly clear that the ventilation system contributed substantially to the fire. Its inadequacy even against normal situations will be demonstrated and it had no hope of coping with inflammable bottom gas in the quantities which were present. The company concedes this and it is hardly relevant therefore to labour its inadequacy in this respect. But, as in the case of the deputies, one must, if this Inquiry is to do what I conceive it ought to do, namely promote safety, criticise the management for allowing itself to be lulled into the false position in which it found itself and one does this, Your Honor, for one purpose only and that is so that a tragedy of the nature we are dealing with here directly attributed to bottom gas cannot occur in this colliery or any other colliery again.

The evidence shows not only that the management believed that Illawarra bottom gas was not present but that it took no worthwhile steps to ensure that the testing by the deputies was accurate or that they were put on guard as to the possibility of it being there. It was known to the management as occurring in this mine and this knowledge was all that should have been required to bring about a real consciousness of possible danger. This consciousness was singularly lacking. The management, as I have said, was let down by the deputies but it no doubt contributed substantially to this by its own undoubted attitude that the gas was not there. The only evidence we have of any step taken by the management to ensure that bottom gas was not present was a test made by Mr. Puddle at No. 3. (P.739)

The management never tested in this area where the fire occurred nor put the deputies on guard in any way to be alert to the possibility of bottom gas.

Mr. Puddle has made it clear that he never suspected bottom gas, that he thought he was dealing with noxious gas and of course he relied upon his deputies' reports to a very large extent. However he did test for it at No. 3 (p.739) and could not find it. He has tested before on occasions but as he said "it is a rarity, not a common occurrence in our colliery". He indicated in the clearest possible way at p.739 that he thought it was noxious gas he was dealing with in putting the shunt in A heading and he thought it was reasonable to put it there.

Whilst we know and can understand how the ventilation system came to be set up in 8 Right section at the relevant time and the assumptions which were made as to the nature of the gases present, nonetheless the creation of the ventilation system which was in fact created of itself shows a very substantial disregard for proper practices. Even on the assumption that the goaf gases were carbon dioxide as Mr. Puddle believed, and Mr. Stone also, the erection of a brattice stopping for the purpose of containing the gas in the goaf was fundamentally bad practice. (Menzies p.358-368; Muir, p.375-390; Parkinson, p.507; Longworth, p.195). But in any event he had no right to assume this as inflammable gas had been found frequently at the goaf edge. It not only showed gas but showed at a point where you could never know how much gas would be likely to come out. You had the goaf at the back emitting the gas and yet what you did was to knowingly create a situation where you must get gas building up behind the brattice and yet until it got through in around the brattice you would have no idea of what quantity was there. It was clear back at No. 2 and No. 3 that the gas was there in quantity and to adopt the expedient of storing it showed a very poor appreciation of the principles of ventilation. It was right at the back of the shunt place. In addition the brattice prevented any inspection of the goaf edge at the point where gas would most likely come from if it was noxious gas. This was because of the topography of that area. It also prevented examination of the goaf edge for inflammable gas. The company was well aware of the presence of free methane and in fact it had been found, usually at the goaf edge.

The company put the brattice in A heading because that is where it wanted the shunt, that is, it disregarded proper ventilation theory for the sake of ease of work.

There were other systems available which while not the optimum would at least have shown, if implemented, that the company had some appreciation of proper ventilation principles. It could have removed the brattice from A and put it across the cut-through and ventilated the edge of the goaf. It could have used a side brattice at the edge of the goaf as was done (p.158) (see p.152 for brattice across No. 2 cut-through at B. heading: see sketches) Mr. Parkinson at p.494 outlined another easily arranged setting as shown on sketch 3, except that the brattice in the cut-through would be one allowing the shuttle car to go through. (P.495) It could have re-located the fans in the cut-through as shown on No. 3.

There was nothing to stop the company using these systems but they were not as convenient. The company without doubt showed a very keen awareness to matters concerned with production - it should have shown the same keen approach to ventilation.

It could have put the shunt in B heading (Menzies p.303) but it would not be as convenient. (Stone 657-8). It could have put the shunt on the other side (p.321) and reversed actions by the cars.

Any of these systems would at least have shown that the company had some genuine awareness of the difficulties and dangers inherent in the goaf being nearby.

It could have reversed the airways. This of course was a large task.

So bad was the system it in fact devised that one inspector Mr. Muir said he would have stopped all workings in that area. (P.384).

Secondly, its method of ventilating the shunt by the bleed tube was indefensible on any view. The witness Wasson said he had never seen this before (p.753) and it was contrary to engineering practice and not good. As Mr. Griffiths showed, there was very little air entering the shunt from the main stream (p.605) and all this tube would do would circulate 1500 to 2000 cubic feet in a very limited area of influence. It could not, as was shown by Mr. Stewart, dissipate what appears to have been a small pocket of gas.

The company seems to have used this method without regard at all to its obvious limitations. Accepting, as we do, that Mr. Puddle thought he was dealing only with noxious gas, it is clear that this method of ventilation could expose the shuttle car driver to danger at any time. It also shows a lack of alertness on the part of the management as to the importance of ventilation. It did something here which it had no right to assume would be effective. It had no specialised knowledge of the effect of the fan as a ventilating agency and yet it placed the entire shunt area under the dependence of this one agency. As Mr. Wasson said the function of the fan was to ventilate the face and he would not have imagined a dual ventilation at the face and the shunt (p.794). It seems totally irrelevant that the system worked in No. 3, as Mr. Puddle claims. It was bad and indefensible as it was in No. 2. It was improvisation, as Mr. Longworth put it, at p.176.

So the ventilation system, apart from the assumption by the management that it was dealing only with noxious gas, was gravely deficient. It is difficult to understand why these deficiencies were not apparent to Mr. Stone or Mr. Puddle. They could both see that they had created a situation where gas was stored behind a brattice which if it came through into the comparatively confined space of the shunt was immediately harmful unless the vent tube disposed of it. There was no basis for thinking it would. Mr. Puddle, at p.730, said he told the deputies to "keep an eye on the area" because of the likelihood of noxious gas coming in but no special precautions were taken. It was sheer blind faith and hope that all would be well. If it had this situation and insisted on it it might have shown some awareness of what it was doing or how defective the system was if it had put a bleed from behind the brattice over the intersection to behind the brattice near the fans. (Mr. Menzies, p.300).

It is worth while pointing out some evidence here given by Mr. Lake. He said he was called in a hurry and when he got there he described conditions as very serious. The miner was 100 feet in. The brattice in A heading had not been erected. One can only speculate as to why this serious situation was permitted to exist while the miner went 100 feet. Mr. Puddle, as I have said, relies upon the fact that the **system** worked at No. 3, but in the light of what we know now he must indeed be puzzled as to why it did work for the short position is that it had no right to work. Gas which he thought was noxious had, on the evidence, come out in serious quantities in No. 3 and yet he decided to contain it - and so it would not again come out in serious quantity. The non sequitur is obvious. (Mr. Parkinson, p.585)

Not only did the company provide a poor and inefficient system of ventilation but it departed from a system of long standing which had worked well. In 1960 Mr. Muir had made it clear that in pillar extraction you had to have a bleed tunnel. It did this in Green, Violet and Purple panels, in this section and elsewhere (p.637). It was too late in the day, we submit, for the management to make any assumptions on how a goaf might be dealt with other than with a bleed tunnel. It had been tried over 5 years without incident, on its own admission. It is

perfectly true that in this type of development you may with the bleed tunnel get some goaf gases entering the intake airway before getting to the return but this in no way detracts from the system, as Mr. Muir said at p.393. You have the great advantage of being able to direct the ventilation around the goaf and dilute any gases. You also have the advantage that you can get at the points where you expect gas and test for it continually. You are two pillar lengths back. (See Mr. Muir's file) With this knowledge the company created almost a mirror image of what had been forbidden in 1960. Mr. Stone did not know of these requirements but knew of the bleed tunnel system. Mr. Puddle did and knew that inflammable gas had been found under the forbidden system of 1960. The company had the benefit of the Departments injunction and its own experience. Its justification for this departure was the roof conditions. (P.721).

It is clear from Mr. Puddle's statement that he was aware that he was departing from an effective system - the whole statement is framed that way. He refers to ventilation making a concession to roof difficulties. (P.722) All that he says as to roof conditions may be correct but if he was going to depart from a well established system it was incumbent upon him to devise an effective system in its place. The one he did devise was, as has been shown, lamentably inadequate even to deal with noxious gas. His admission that the bleed tunnel system is accepted as the desirable one in dealing with a goaf makes it unnecessary to refer to the evidence of the inspectors that this is their optimum. We can accept it.

Both Mr. Stone and Mr. Puddle in their statements assert that they believe any other systems put in would have failed to deal with the gas on November 9th. The short answer to all this is that if the bleed tunnel system had been in operation you could by adequate testing and proper testing have seen any danger arising and dealt with it. Of course if they are to be taken to mean that with their knowledge and the deputies' knowledge that only noxious gas was present the fire would still have taken place with a bleed tunnel we can only say that it was much less likely that it would have happened because the gases would have been diluted by the air currents over some distance. Mr. Sellers said you might have got a bad hole. Well, obviously you would go on till you got a good one. In any event no one suggests that had ever happened in this colliery. Whilst in one sense the absence of the bleed tunnel is *causa sine qua non* and not *causa causans* the departure by the company from a proved principle of ventilation of a goaf is something which should not happen unless the system substituted can be relied upon to work. If a departure is to take place the management makes the departure at its peril.

The department, having lent its services in the developing of a proper method to ventilate a goaf is entitled - and so are the men in the mine - to expect that if that system is to be departed from it will be notified beforehand.

There are other features in the evidence which add to the submission that the company showed an offhand approach to the question of ventilation of gas in the mine - an attitude of course stemming essentially from its belief that only noxious gas was present, but nonetheless quite unjustifiable. It had the gas returns. Now, it would be nothing short of hindsight to suggest that the company could have got the clue to the gas in the goaf from these but it would have been comforting to hear some witnesses say "Well, I did study them. I saw the increase and I thought it might be due to this or that." Instead we have evidence the effect of which is "You don't worry about an increase until you get a dangerous quantity of gas".

No longer must this attitude persist. The gas returns here speak eloquently.

Likewise with the barometer. Once again the effect of the evidence is to reject its significance. Perhaps it is of no significance. But it would again be comforting to have had someone say "well, we do look at it in relation to possible expansion of gas in the goaf and we tell the deputies 'it's falling' ".

Then again, Your Honor, there was the mistake made in holing the goaf which prevented holing for some days. Here again the company showed no evidence of an appreciation of the importance of the bleed tunnel. No urgency was felt nor any concern shown for the fact that the men would be working in conditions of some danger - great danger as we now know - but of course no special danger as the management then thought. Obviously the bleed tunnel should be driven as expeditiously as possible and the goaf then ceased to be a source of danger of any real consequence if, of course, the ventilation system is defective. Proper ventilation took second place to the desirability of full production shifts.

There is evidence from which an inference could be drawn that the company did not intend to split this pillar at all as it claims and that its claim that it did so is an afterthought. Mr. Puddle's statement suggested it had not been done in No. 11. (See also Mr. Cambourn's evidence) where the pillar had been split sideways. I do not pass upon this controversy because it is unnecessary to do so. The significance of not accepting the claim of the management that it intended to split the pillar lengthwise is that it would show that the company had abandoned the bleed tunnel system both in No. 11 and here completely and that the danger to the men was extreme in both cases in the light of the information we now have.

I have endeavoured in this address to avoid attributing to the company the knowledge we have now and I have attempted to point out only the obvious difficulties in the company's planning and supervision of section 8 Right from the point of view of ventilation and gas. It is useless to criticise the system on the basis that bottom gas was found. It was not designed for bottom gas. But even so it was deficient for noxious gas and free methane. The conclusion which emerges is that the company's failure to be aware of bottom gas in this section was due firstly to an almost complete reliance upon the testing of the deputies and secondly to a failure to show the alertness which must be ever present in the management - an alertness which would have discovered the gas which has been so readily discoverable since. It was known to the management before the fire but the management never gave any special direction that deputies be on the watch for it, or checked with the deputies to ensure that their testing methods were proper or that its own were correct. Its failure to detect the gas justifies the same criticism against it as the criticism against the deputies. It never used the methanometer which it had in the colliery. One can say it knew of bottom gas but did not pay any regard to it. This was its error. It is to be hoped that this error will never be made again here or elsewhere.

The standard of safety is indeed high and it requires constant alertness.

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May I now go to some matters upon which the Department would seek or ask Your Honor to make recommendations. I put it in general form at this stage because no doubt others at the Bar table will wish to say something about them and it may be later on when we are either all in agreement or we can see points of agreement and disagreement, reduced to some subsequent form.

Firstly as to the shuttle car evidence has been given that the Fox Manufacturing Company is at the moment experimenting with the possibility of a totally enclosed brake system. No doubt the improvement of the shuttle car is something which could only come from the manufacturers but until that improvement takes place the Department suggests the following as being easy to implement and presenting no problem: that there should be a regular inspection for the presence of coal dust, wood and other foreign matter behind the guard of the brake. You can take the cover plate off and with a torch look down and with a broom or similar instrument you can push it out of the road. I said "regular". Somebody might suggest before the shift started or at the end but, at any rate, a regular inspection.

HIS HONOR: I suppose you have to put the machine out of running. I would have thought if it was a simple job to inspect, as the evidence shows, one could expect perhaps an hourly inspection. I may be able to be assisted on that.

MR. LEE: I am putting it in general form because no doubt the other gentlemen at the Bar table will have some worthwhile observations to make on that aspect.

The second observation is that somebody, I don't know who, would make regular inspections of the wheeling road for the presence of obvious pieces of wood.

Mr. Muir referred to the possible use of non-inflammable hydraulic oil. I may say it is the Department's view and I do not put it dogmatically because we would like to hear from the other gentlemen on the matter but it is the Department's view that there is no reason why such oil should not be used. The Department's knowledge is that it is available.

HIS HONOR: I understand there is a cost factor involved in that.

MR. LEE: That may well be so. There is an emulsion which takes the place of the existing hydraulic oil. In fact there are certain emulsions in use overseas replacing hydraulic oil. So much for the shuttle car.

As far as the safety lamp is concerned we have seen the new edition of the lamp with the probe and such lamps are available and it is the Departmental view that they should be introduced, that is the lamp with the probe and re-lighter attachment.

The Department also takes the view there is no reason why methanometers approved of by the Department should not be introduced for use by the deputies and others in conjunction with the oil safety lamp.

HIS HONOR: Not in substitution?

MR. LEE: Not in substitution.

HIS HONOR: Are you able to tell me what methanometers have been approved by the Department?

MR. LEE: Yes, Your Honor. The M.S.A. is a popular one and is quite effective.

HIS HONOR: The rules require any device used for this purpose must be an approved device.

MR. LEE: The M.S.A. methanometer is a methanometer which is approved under the Regulations as they stand at the moment but if you were going to introduce a regulation that the deputies had to test with a methanometer of course you would have to get approval.

MR. MURRAY: Am I to understand the M.S.A. has been approved by the Department?

MR. LEE: The M.S.A. methanometer has been approved by the Chief Inspector but let us understand as a matter of law that his approval does not go to it because it has to be written into the Act.

MR. MURRAY: When was it approved? My friend is pointing to what appears to be a document.

MR. LEE: We have the fact that the Department considers that the methanometer may be used. There will have to be, at a point of time, approval given to a particular methanometer if this recommendation Your Honor undoubtedly will make becomes law. The Department is quite open on the matter of which ones have to be used.

HIS HONOR: If one looks one sees Rule 4, p.86, of the Act. One would have thought that I did not have to recommend legislation, that I merely had to recommend that the device be brought to the attention of the Chief Inspector.

MR. LEE: Is that so? You have the "or" in the paragraph.

HIS HONOR: I suppose I would have to recommend that legislature be introduced to make it compulsory. That is perfectly true. What happens in the case of me saying in my report that there is an M.S.A. methanometer and I recommend the use of it should be made compulsory and I then find the Chief Inspector has not approved of the particular device?

MR. LEE: I cannot see any difficulty, I am afraid. The Act says the Chief Inspector shall approve - unless Your Honor is going to suggest that that be amended?

HIS HONOR: I am not, Mr. Lee.

MR. LEE: The Chief Inspector says he will be delighted if Your Honor recommends and he indicates that the M.S.A. is a popular and suitable type to be introduced.

HIS HONOR: Is the M.S.A. methanometer a device approved of by the Chief Inspector under the General Rules?

MR. LEE: Yes, it is.

MR. MURRAY: So I can follow my friend's suggested recommendation could I repeat my question: When was it approved and in what document might the approval be found?

MR. LEE: I cannot answer that at the moment.

MR. REYNOLDS: You cannot detect CO2 with it. Whether it has to be one device I don't know.

HIS HONOR: The question is whether it is a device approved for the purpose of testing under the General Rules. Mr. Mahon points out I can disregard the question whether it is approved under the General Rule. If you turn to p.217 you see 20F. There is the General Rule. I think Mr. Murray is entitled to be informed as to when and where such approval may be discovered. I do not mean he is entitled to be told at this moment.

MR. LEE: We will tell him. I cannot conceive a situation which has come about now in which we are going to recommend the use of the methanometer in conjunction with the oil safety lamp where you could ever find anywhere in the Act or anything done by the Chief Inspector an approval in relation to that. It is a new situation and the inspector may approve the M.S.A. and has, I am told, under F for the use with oxygen acetylene torches and so forth but he will have to specifically give an approval which will be gazetted under s.79A for this purpose. I am sure that must follow. So when Mr. Murray asks when the approval was given we could not show him an approval for the use of the methanometer for the purposes of the Act in the state of affairs that then existed.

HIS HONOR: What about the Toka. Could you make an enquiry about that as to the attitude of the Department? I do not mean now.

MR. LEE: The Department takes the view that the large M.S.A. monitoring device we saw which is attached to the miner could be introduced but once again this is put forward to Your Honor at this stage so that the views of others may be given on it. These are not being put dogmatically.

Likewise the monitoring device which can be hung up is also a device the Department considers suitable for use in Mines but once again it wants to hear the views of all concerned on the matter and it does occur to me to say at this stage that Your Honor might well consider, after hearing everybody's views, that Your Honor's recommendations on the introduction of these matters might be left in quite a general form.

HIS HONOR: I agree with you at this moment, subject to hearing other counsel. I think it would be wrong for me to say at this stage that this device should be used. It may be something will become known to people concerned in the Department, or the people concerned in this Inquiry, which will be much more effective.

MR. LEE: We have it in evidence that since the fire in England in 1965 the English people are more conscious of this problem and there has been liaison between the Department here and the English authorities and, of course, we in this country do not make any devices at all so that we have to rely upon such developments as are made overseas but the matter is very much present in the Department's mind.

So far as the self-rescue unit is concerned the Department would recommend that they be made compulsory. I think that would bring the state of affairs into line with the practical state of affairs where they are in fact being used by the men at this very instant. I think somebody said that.

MR. MURRAY: At Bulli?

HIS HONOR: I don't know. Perhaps somebody can tell us.

MR. PARKINSON: Mr. Sellers gave evidence that they were being used at Huntley Colliery.

HIS HONOR: Mr. Murray has specifically asked are they being used at the moment at Bulli Colliery.

MR. LEE: So much for the introduction of safety devices. The next subject matter of recommendation has to do with the standard of the deputies. One thing the Department feels could be done, and done easily, it may need a little co-operation from the collieries but would not cost anybody anything, is to ensure that every deputy before he is given a certificate of competency is taken on a field day, if you like, into a colliery and tests for gas in the actual conditions in which he may be expected to find it and to pass a practical test in that regard. Now that we know what we do know we would submit that that omission from the deputies' training is a serious one and can readily be overcome.

The Department would seek a recommendation from Your Honor in regard to deputies along a slightly different line. I refer to p.20 of the Act, sub-section 2 of s.6. (Read) Your Honor will see that the Department itself does not figure very prominently in the Board. It has an inspector.

HIS HONOR: One inspector only.

MR. LEE: That is not to be taken as any criticism of this Board.

HIS HONOR: On the other hand it could be represented under section B.

MR. LEE: It might be. Putting it generally the Department would ask Your Honor to make a recommendation to the Minister that he would inform the Coal Mines Qualification Board of the necessity for the deputies to have this practical experience I have spoken about and, further, that the Board ensure at all times that the qualifications of the deputies are in keeping with the prevailing high standards of education in this community. We will need deputies for many many years to come and there would appear to be no reason why those setting examinations should not take very strongly into account that people can be educated nowadays up to 4th year and various qualifications are set. The Board should be very conscious in our submission of the availability of high standards of education and the insistence on those high standards which is fitting in our community. That is one way, if Your Honor makes some such recommendation to the Minister - I do not think you could recommend to the Board - of bringing about in that area, namely in the Board itself, a real consciousness of the necessity for men to be as highly trained as possible because notwithstanding our automatic devices which may be introduced there can be no doubt the oil safety lamp will still be relied upon very heavily and very properly so. The Board may upon such a recommendation ensure that the pass standard was a very much higher pass standard and not, so to speak, a pass standard that did not really test at all. It is not to be thought this is the case but the Department does consider a recommendation coming from the Minister along the lines I have indicated could serve a very useful purpose.

HIS HONOR: What about the question of deputies already ticketed and working in the mines and on whom the men rely?

MR. LEE: It is a serious problem that has exercised the mind of the Department and the only way to deal with it is by amendment to the Act to ensure, for instance, that at the end of a particular period a deputy should re-submit himself for a certificate of competency.

HIS HONOR: Or, a refresher course of short duration upon which they may be examined and if they fail to pass, their deputy's

ticket suspended till they have passed. In other words you are checking up on the deputies to see they are up to date with what the Department requires, or what the examiner requires. I do not mean to make them go back to school and get a higher standard of education but the practical test seems to me to be almost essential. I would think it might not be a bad idea to take this practical example of what has taken place at Bulli and push it down the deputies throats for all time to come and that is without passing any strictures on the deputies connected with this case - I am not doing that - it might well save any other deputy from taking what might be called a cavalier attitude towards the danger.

MR. LEE: It is clearly a matter which is in the forefront of Your Honor's mind, the question of what might be done to keep the standard of the existing deputies up to a standard which ought to be maintained.

The next recommendation is in regard to pillar extraction: the manager of the colliery would advise the Department of the ventilation system it proposed to adopt showing (1) any existing goaf areas or old workings in the vicinity, (2) the intake and return airways, (3) the position and type of all stoppings and (4) the proposed location of auxiliary fans and the number thereof and receive approval of the Department before commencing, no variation to take place after pillar extraction commenced without the written approval of the inspector.

May I add something about a matter which has, in our submission, nothing really to do with this fire. It may be of advantage to some of the other gentlemen who may wish to say something about it. It is on the question of stone dusting. The Department at the present time is considering making substantial recommendations to the Minister in regard to stone dusting, quite unrelated to this fire and I thought Your Honor should be aware of that.

There is another matter I would wish to draw to Your Honor's attention because it could well be Your Honor might consider it without going into any detail at all, that it would be quite appropriate to make some general recommendation that this Act be looked at and brought into accord with modern conditions. There are areas in the Act which seem to be strangely remote from the present day reality. Let me point to s.51(b)(1) as an illustration of what I mean about the Act not having kept pace at all points with modern technology. It is on p.68. It is rather pertinent to this disaster because if this section had been complied with this would not have happened but it did not have to be complied with because the required number of men were not there. You need ten men for it and what has happened is that since the introduction of mechanisation you get much smaller groups of men. I merely draw that to Your Honor's attention.

There are other parts of the Act and Your Honor might think it appropriate without referring specifically to it to make some general observation that the Act be looked at to make sure it is in accord in all respects with modern technology and practice in the hope that somebody will take the trouble of going through the Act.

Those are the general recommendations we put before Your Honor and those are the submissions I make at this point of time.

HIS HONOR: May I say I am most grateful for what you have put and also you have put it most accurately.

MR. REYNOLDS: It has been most helpful to those appearing for the company to have had the benefit of hearing what counsel for the Minister has had to say because it has clarified many issues. If I may make one small criticism: counsel's enthusiasm leads to the introduction of adjectives which are inconsistent with his basic thesis but I suppose that is a failing which is not uncommon.

May I say something about the approach of my client company to this investigation. I hope it has been apparent to Your Honor that the company has come to this Inquiry sincere in the idea that it should treat it as an investigation and not as it being on trial and that it should seek to put before Your Honor the truth rather than try to defend itself in respect of any position in which it finds itself.

HIS HONOR: I think I ought to say that has been my impression of the company's attitude from the start.

MR. REYNOLDS: I submit Your Honor could have deduced the attitude from the evidence of the Mine Manager and the under-manager and from the fact that we put before you the evidence of Mr. Wasson. We put him in the box to establish, we hope, one thing, that the existence of the fans and their siting did not contribute to the fire and I think it might be generally taken to be established now. At any rate I did not hear Mr. Lee submit to the contrary. Similarly we put before Your Honor a gentleman who is obviously an authority on South Coast mines, not because he would give evidence which would extract us from difficulties which were too plain and obvious but to offer Your Honor some assistance in the elucidation of the problems.

May I say generally that we are dealing in this investigation with human beings in an industrial climate. You could not run mines if you did not have people who held a deputy's ticket without the prospect of becoming a manager and you could not run mines unless the under manager was a man of long experience and possibly would never be qualified to be the General Superintendent of the B.H.P/A.I.S. Collieries. These are human beings and we are dealing with an industry which is not a highly scientific one in the sense that everything can be done by precision means. It, I would suggest, is an industry in which experience and knowledge of the practical problems of mining counts tremendously and with great respect I would issue a warning to Your Honor, if I may put it that way with respect, that we lawyers should be careful in using what we believe to be the powers of logic that we do not overlook the practical realities of the situation. I could not help feeling, with due respect to Mr. Lee, that at times he was able to offer Your Honor solutions to problems with a great deal more confidence than his mine inspectors and this is not, I suppose, unnatural as we are trained to look at the things we put forward and forget the other practical difficulties. I agree that in dealing with an industry where, always, men are working below ground, always are working in a measure of danger, it is imperative that high standards for the safety of those men be set but we must also be careful not to seek to set impossible standards because after all, and I make no excuse for saying this, coal has to be won and if coal is not being won these men won't have a job and we won't have any business. This is the reality of it and whilst conceding the highest standards possible must be set, they must not be impossible standards.

This is, I suppose, the most highly regulated by statute and regulation of all industry. I know of no other which is as highly regulated as this is. It is, I suppose, the only industry in which one's foreman has statutory duties and

statutory responsibilities, where he is tested for his appointment by an outside board of examiners. One real difficulty, I suppose is that this tends to make the minimum standard set by an Act become the maximum and I know it is indefensible to say because the Act says a deputy shall test so many times and in so many places, that those in the industry unconsciously being to think that that is what the Act requires them to do and that is enough. That cannot be defended as a proposition because we all know at this Bar table an employer owes a duty to exercise reasonable care for the safety of his employees. I mention this because it is an attitude of mind which is apparent to us and has come into this industry by the very fact that it is, I suggest, with due respect to the legislature, over-regulated and maybe there are good historical reasons for that, but one wonders whether the degree of regulation is ultimately in the best interests of the industry.

HIS HONOR: You mean, I suppose, higher standards of safety might be observed if there were no standards laid down by the statute?

MR. REYNOLDS: That may be so. I only offer this to Your Honor to illustrate that by saying "We will fill this gap or that gap" Your Honor may be only adding to that difficulty. I do not want to take it any further except to put that to Your Honor for your consideration.

HIS HONOR: It is quite obvious legislation is no substitute for realities.

MR. REYNOLDS: I wonder if in this day and age there is a need to say anything about ventilation because the law itself would impose upon the employer the obligation of providing reasonable and proper ventilation in every circumstance. That is what the law would say.

HIS HONOR: It is a matter of teaching the people concerned what is adequate ventilation.

MR. REYNOLDS: The history of this industry is too long and too complicated for me to have assimilated in the space of a few short months. Obviously it has its roots in the centuries and in very bitter industrial struggles and this is not the time and place to discuss that.

I have committed to writing the basic propositions for which we contend. We do not contend for them in any sense of litigation inter-parties: Your Honor will see that very large concessions are made. They are put forward in the spirit that they may assist Your Honor in coming to your ultimate conclusions of fact in this investigation but I do at the outset wish to repudiate any suggestion that the management, my client company, has in any way been lax or off-handed as is suggested by learned counsel for the Minister. Whatever defects may be evinced from the evidence I suggest ~~it~~ cannot properly be said Mr. Puddle and Mr. Stone, as the management, and I rather gather those are the persons referred to as the management in Mr. Lee's address, were in any way off-handed in their approach to the problem of ventilation or any other problem concerning the safety of their men. It must never be forgotten that they are men of many years' experience who hold first and second class certificates of competency respectively and it cannot be suggested they are not imbued with the necessity for maintaining safe working procedure for their employees and there is no evidence here, I submit, which indicates any general lack of awareness of their responsibility in that regard and the failure, if failure there be in this case, and I must concede there was

some was due to an error of judgment in respect of a ventilating problem.

Having said that may I hand to Your Honor and to those at the Bar table notes of what we put. Very much of what is said here is what Mr. Lee has said in a perhaps terser form because I am not propounding, I am defending, in a sense. It comes to this, I suggest, that we suggest the cause of this fire, the real effective cause was a failure to identify bottom gas coupled with a shunt which was inadequately ventilated in the circumstances. Mr. Lee did put at one point this morning that the real effective cause of this fire was a failure to discover bottom gas. Well, with great respect an analysis of this, undertaken by us, agrees with that, with this possible exception, that we have treated it rather more as a failure adequately to ventilate the shunt. So I think it is fair to say our analysis would be that it is a combination of those two factors and once we go beyond that we are getting into the realms of causes which are too remote for Your Honor's purposes.

1. The operative cause of the fire was an ignition of inflammable gas.

2. The occurrence of gas is an inescapable feature of coal mining. Since gas cannot be avoided, it is necessary to be aware of it and to take suitable measures to detect, control and deal with it. This is the problem of ventilation.

The evidence on the matter is found in Mr. Longworth's evidence at p.232.

3. The problem of ventilation cannot be considered in isolation. There are other problems of equal importance notably in this case roof control.

Mr. Longworth deals with that at pp.247-8, Mr. Menzies at p.363.

4. The actions of the management must be designed to secure maximum roof safety consistently with good ventilation and vice versa and it is inescapable that situations arise from time to time in which the solution of the problems involved must be a compromise, if such solution is consistent with reasonably safe working conditions.

If there is no such solution there is no alternative but to cease work.

HIS HONOR: What is meant by "reasonably safe"?

MR. REYNOLDS: It is the standard above which no employer can operate.

HIS HONOR: You are saying, in other words, there is a condition in which any danger which exists must be known or should be known by the management with the skill it has.

MR. REYNOLDS: It is not an exposure to unnecessary danger as the common law puts it but no one would ever work underground where there are known to be or likely to be noxious or inflammable gases because there is an exposure to danger. The employer has no other obligation, I would submit, under the Act or anywhere else, other than to take reasonable steps in the circumstances to protect his employee from injury.

HIS HONOR: What is reasonable in the circumstances may be different from employer to employer.

MR. REYNOLDS: It depends on the knowledge of the danger. With the knowledge up goes the standard of reasonableness. It is a flexible concept.

5. This solution must be reached in the context that the Mines Department requires extraction of the maximum amount of coal consistently with safety.

This is something about which little, if anything, has been said. Mr. Menzies dealt with it at p.328. Apparently in the past some greedy colliery owners have sought to take out all the easy coal which is cheap to extract and left behind that which is difficult and expensive to extract and that natural resource is lost to the State and it is for this reason, as I understand it, s.53B of the Coal Mines Regulation Act gives the Minister power to serve a notice and say, "You must get that coal out".

HIS HONOR: This came about after a report of Davidson, J., did it not? There seems to be an emphasis in the reports of proceedings.

MR. REYNOLDS: Much coal was being lost to the nation by this method.

HIS HONOR: Was it something concerned with O.M.H.? I think it stands for "Output per manhour".

MR. PARKINSON: O.M.S. - Output per man shift.

HIS HONOR: It is in relation to output or production. You do not have to convince me: from what I have seen of the atmosphere in which these operations are conducted it is an atmosphere on the part of the Department and the manager of the mine and, may I say, in Bulli mine, on the part of the men themselves, to win as much coal as they can in the shortest possible time.

MR. REYNOLDS: At p.327 Mr. Menzies said "There are two sides of the fence for me in this regard.....conservation of coal and safety matters". It is that sort of material which is the basis of this submission that its solution must be reached in the context that the Mines Department requires extraction of the maximum amount of coal consistently with safety.

6. The first workings were by means of three headings, known as A, B and C. The location of these headings was determined by reference to the slope expected to be encountered in the coal seam the proximity of the panel to a geological fault and the existence of goaf to the right. The terminal point of the headings was dictated by the fault.

I would add "The direction of airflow was determined by the slope". We picked that airflow because it was coming in the high side and going out the low side.

7. There has been no criticism of the first workings.

8. In the second workings it was decided to extract coal from the area to the left of the headings. This was done by driving bleeders from the goaf successively so that extraction took place one pillar inbye of the point where the bleeder entered the return airway. This is an accepted method of work and it has not been criticised by the Mines Department.

9. Serious roof difficulties were encountered both in the workings to the left and in the extraction of pillars in the main headings.

I indicate some evidence by Mr. Menzies which confirms the assertion made by the Mine manager, to be found at pp.328-9: "Q. Had they done this previous to that in this particular section.....it was due to inherently bad roof". So if confirmation be required of the sworn evidence of Mr. Puddle Your Honor has it there.

10. No excessive occurrence of gas was reported and no difficulty was experienced in dealing with the quantities encountered.

That is up to the point. I am coming to the departure.

11. In these circumstances a danger could be apprehended to the safety of the workers in the roof conditions but not in the ventilation system.

12. The necessary measures to reduce the danger from the roof involved a compromise with ventilation.

I would say here that this involved the exercise of an on-the-spot judgment by a man under the ground charged with this responsibility and it is a judgment which in my submission is peculiarly one for the man on the spot. That is what Mr. Sellers said. He said, in effect, "I would not presume whether this was good mining practice or bad mining practice unless I had been there." Mr. Puddle was there and exercised his judgment in this way - it may have been right, it may have been wrong, but there was a situation existing which called for the exercise of judgment by a man who was the under manager from 1957 to 1965, at that time, and he took the decision and stood by it here, if I may say so, manfully.

13. This involved a temporary departure from the bleeder system by extracting the pillars numbered 11 and 12 in Exhibit JJ before driving another bleed tunnel.

13A. It cannot be said that this departure was without justification.

I merely would make this suggestion: it cannot be said this departure was without justification, whether it was sufficient or not may be, in this investigation, a little beside the point, a little on the fringe of things, but he made a decision and he has sworn here there were circumstances which called for this decision and that was the exercise of his considered judgment.

14. After the place numbered 13 had holed, the bleeder system could have been restored by splitting the pillar so created.

It could have been restored by driving the split which Mr. Puddle claims was his intention.

15. The evidence indicates that the ventilation problems were adequately dealt with up to the point where the bleeder system was temporarily departed from.

I refer to Mr. Menzies' evidence at p.288 where he is being taken through his report by Mr. Lee: "Prior to the incident of the 9th.....ventilation of the district?A. Yes". This is his interpretation on the information he had including the deputies' reports. There was no major ventilation problem disclosed before the departure and up to the time of the departure.

16. There is evidence that the ignition was caused by the
1021. Mr. Reynolds' address.

impaction of a piece of wood near the brake drum on the shuttle car generating sufficient heat to provide a source of ignition.

17. Whilst ideally every new work situation in a mine may call for a detailed appreciation and solution of the ventilation problem involved, in the nature of things those engaged in practical mining draw on their practical experience and tend to deal with the matter in a pragmatic way.

Perhaps it would be better to say in an empirical way. What I mean is we have here, over the course of some six weeks, looked at plans. We have had the benefit of hindsight and the best brains of the Department of Mines prodded by brains from the Bar devising alternatives and possibilities that might have been better or preferable. Everybody at the Bar table can come up with one and say "Why didn't you put a brattice here?" No doubt some of the solutions may be better solutions than that which Mr. Puddle came up with - some may have been worse. The simple fact is people, as I say, charged with this responsibility underground draw on their experience, a lifetime of experience, in some cases. He does not work out calculations as to how much air precisely, in cubic feet per minute, will be drawn through a tube or he does not work out how much comes through a screen, he knows in an instinctive sort of way this will work or won't work and arrives at a solution. This may not be ideally right but if every time one went back to the drawing office or sent to the central office and had engineers look at it and called in Mr. Wasson and experts you would never get any coal. These decisions have to be taken in a day to day situation by human beings with qualifications and of considerable experience and it is upon this experience he draws. You cannot have, generally speaking, highly qualified graduate engineers employed as under managers. If you do, they do not last long as under managers. You have to get a man of practical experience and common sense and he has got to come up with these solutions. He cannot go ringing up the manager all the time or leaving it till tomorrow to work it out from figures and plans overnight. I submit that is the reality of the situation and it is very easy for mining engineering brains to come here after a tragedy like this and say, "You might have done this or that" or "it would have been better to do this". They were not there.

HIS HONOR: You say you cannot pass judgment on anything these men did until you put yourself in the situation they were in?

MR. REYNOLDS: Yes. I am not going to say some of these solutions may not have been preferable but that is not the end of it, to say, "You did not get the right answer". I will deal with that perhaps a little later.

18. In this case whilst it may be conceded that servants of the Company had notice of the occurrence of extinctive gas in the shunt at no time was the presence of inflammable gas reported in the shunt area. The management did not have any reason to believe that the Deputies were not doing their job properly.

Those facts are not an answer to the whole problem and I do not put them forward as such but they are factual. There was never any inflammable gas reported in the shunt area and it was never brought to the notice of Mr. Puddle or the manager that the deputies were not doing their job, if that be the fact. I think it is proper in this case, the deputies being separately represented, that I should not pass, or trespass, on that field but leave Mr. McNally to deal with it, although they are servants and agents of the company and we are civilly and morally responsible for what they do but I think it is best

for Mr. McNally to deal with them because he has been the one who has been conferring with them and who has been living with the problem.

19. No inflammable gas had been reported on the goaf edge when the line of goaf was along No. 3 cut through and no report of inflammable gas on the goaf edge had been made for nearly a month and this was at a time when the line of goaf was along No. 4 cut through.

This is significant in that statements are made here about numerous reportings of inflammable gas. There is no report of inflammable gas along the goaf edge at the time when this operation of driving No. 2 cut-through was being made - none at all. No report of inflammable gas on the goaf edge had been made for nearly a month, I think from the 14th to the 9th and this was at the time when the line of the goaf was along No. 4 cut-through. True it is still the same goaf and it is only extended further but it explains, whether you call it compacency, but it explains why the management was not alerted to a possible danger. Mr. Menzies' interpretation of the evidence he had was this: that there was no direct evidence the goaf contained noxious or inflammable gas just prior to the time of the incident. That is a striking statement to be found at p.287 of the transcript: "Q. Your report goes on.....inflammable gas." That was his interpretation of the available evidence. That is the only importance of that.

(Further hearing adjourned till 10 a.m.
on Tuesday 15th February, 1966.)

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IN THE COURT OF
COAL MINES REGULATION
HOLDEN AT BULLI

)
) No. 1 of 1965.
)

BEFORE HIS HONOR JUDGE GORAN
ASSESSORS: Messrs. MAHON and BUCK
TUESDAY: 15th February, 1966.

IN THE MATTER OF AN INQUIRY IN PURSUANCE OF THE COAL MINES
REGULATION ACT INTO AN ACCIDENT WHICH OCCURRED AT THE BULLI
COLLIERY ON 9th NOVEMBER 1965 AND ITS CAUSES AND CIRCUMSTANCES.

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(PART HEARD)

MR. REYNOLDS: I had dealt with the first nineteen submissions
in the written document and I come now to the 20th.

20. The working arrangement, the provision of a shunt and the
ventilation thereof were in substance a repetition of what had
been carried out one pillar inbye of No. 3 cut-through.

No circumstances arose or were disclosed in that position
which the management was bound to interpret as creating a
situation of danger.

It is of course open to Your Honor to find, and I
would not contest this finding, that there were indications
there which were taken to be CO2 and I need not go to that
evidence. There is abundant evidence that CO2 was detected
and identified, perhaps wrongly, but identified as such at
that point.

I have had reconstructed the coloured plan to
indicate what the situation was according to the evidence when
the extension to No. 3 cut-through was being driven. I do
not know whether Your Honor or anybody else had the same problem
as we had but it is difficult to eliminate from the plan and
reconstruct the situation as it might have been a month or two
before so I thought it may be of assistance if I had this done.
I have copies for anybody at the Bar table interested.

As we read the evidence the position, when the place
9 was being driven, was that the goaf line ran along No. 4
cut-through and the area between 3 and 1 which is 10 on Exhibit
"JJ" had not yet been extracted. We know that because we
know 10 and 11 were extracted together. So it is fair to say,
I think, that the evidence indicates the goaf line ran along
cut-through 4 and the extension thereof. There was an existing
bleeder situated there and marked 3, 4 and 5 and there was being
driven, in accordance with the practice dealt with in the
correspondence between the Mines Department and the mine
management 9 which could constitute the bleeder when 10 was
extracted. If there was a conscious departure without any
rhyme or reason 10 would have been taken out at this time before
9 was driven so Your Honor sees there is an adherence to the
system at this point.

As we read the evidence the expedient adopted so far
as ventilation was concerned at this point was not to take the
main current of air along A and B up as far as 4 and back along
A heading, that would be a method whereby the goaf edge was
ventilated and the return airway along C would be taking off any
gases which tend to come out of the goaf along its edge at 4.
It seems to us from Mr. Puddle's evidence and the situation
generally that that was not done but a device was adopted which

was substantially similar to the method which was adopted later at cut-through No. 2. In other words it seems the intake air was coming in A and B and was being directed along cut-through No. 3 and thence into the return airway, heading A.

HIS HONOR: You mean by that it went along 3, up 4 and 5, into 1 and then back along into 4?

MR. REYNOLDS: No, Your Honor. I mean the main current of air did not go beyond cut-through 3, it came along B and C, was then made to come along 3 past the working place and then go down the return airway. In other words it was not taken right up to 4 and then taken down that way.

HIS HONOR: It only went up to 3?

MR. REYNOLDS: That is as I understand the evidence. That means, for good or bad, the goaf edge was not being ventilated at that point of time but the air was being short-circuited and not allowed to go right up to the goaf and that situation is substantially identical with the situation which subsequently developed at the place with which we are vitally concerned.

HIS HONOR: Where was the air cut off so that it did not reach 4?

MR. REYNOLDS: It does not appear from the evidence but undoubtedly there would have been stoppings in C heading in by of 3 cut-through. There would have to be some such device otherwise it would go down. We do not have on the evidence any clear indication of this although when one reads Mr. Puddle's evidence he indicates the main current of air was going along 3.

It was in those circumstances that we have the situation that it was believed CO₂ was coming along A heading in the vicinity of the No. 3 cut-through extension which was being driven.

HIS HONOR: Does that mean the bleeder which had been driven from 3, 4 and 5 was not doing anything?

MR. REYNOLDS: That it was not completely effective, Your Honor, will be part of my submission.

HIS HONOR: It could cause a leak but there was no flow of air up there to push the goaf gases back down.

MR. REYNOLDS: That may be so but it is indicative of the situation I will be putting to Your Honor subsequently that a bleed tunnel or a drainage tunnel although it assists the problem does not completely solve it. I think that is a fair statement of what most of the people who have given evidence on an expert basis in this investigation have said. It is a great assistance but it is not the final ultimate solution, many other things have to be watched. Mr. Sellers points out one eventuality which may make the drainage tunnel ineffectual and, with respect, I do not think Your Honor appreciated yesterday that it could become ineffectual without you knowing it and there could be a closing-off by a fall or heave.

HIS HONOR: I appreciated that.

MR. REYNOLDS: So, you would be relying on the situation where you had this tunnel but unbeknowns to you it had in fact ceased to be effective, or, fully effective.

HIS HONOR: I would have thought testing would have shown it.

MR. REYNOLDS: Yes. This is where testing is so important, as I am going to put to Your Honor in a general way later. Testing is the important thing. We come back to the situation, and I hope this will help Your Honor to appreciate what the situation was: we have the picture that CO₂ is being detected in this area inby of the extension to No. 3 cut-through and it is said, and there seems to be no reason why I should submit to the contrary, it is at this point of time it is decided to put the brattice up inby of No. 3 cut-through and A heading and to use the device of an auxiliary vent tube into it to ventilate it. That seems to be the situation at that point of time, so far as one can reconstruct it. In that context I have said "No circumstances arose or were disclosed in that position which the management was bound to interpret as creating a situation of danger."

I am urging upon Your Honor that the finding of CO₂ in quantities which can be dealt with and readily dispersed is not to a mine man a situation of danger, it is an everyday occurrence. It may be now in the context that it could be, if not properly identified, bottom gas, and that is a very different problem, but I am making the assumption that it is believed to be CO₂ and it is in quantities which can be dealt with and dispersed. That, on my submission of a fair view of the evidence, and in reality, is not considered by a mine man to constitute a situation of danger. In contra-distinction to that, it gives you notice, of course, that you might want to improve your ventilation if it is hanging about, that the ventilation to that extent is not fully adequate. When I say "adequate" a mine man would always know you are likely to get pockets in the ceiling or floor or in little recesses and it is impossible as a matter of practice to so ventilate your mine as to avoid all the possibilities of that situation developing.

HIS HONOR: Perhaps I should indicate this to you so that you may deal with it: while I agree with the proposition you put generally, that if you have CO₂ in such quantities only that you can deal with it by dilution or getting it out in some other way, there is no immediate problem of danger, nevertheless does not that miss the next step and that is to ask, if this CO₂ is coming in and has to be continually diluted, to ask where it is coming from? Assume there is just a pocket somewhere and it is discovered that it is only a pocket and it can be dealt with then, of course, we have no problem but assume you are getting it from the goaf, aren't you then put upon notice so that you will enquire whether this can come out in excessive quantities, that is leaving aside the question of testing as to whether it is bottom gas or anything else, but assuming it is CO₂, and you believe it is CO₂ and know it is coming from the goaf, what is your next step? Do you say "I just ventilate and disperse it and if in fact it goes that is enough"?

MR. REYNOLDS: It gives the clearest notice you have carbon dioxide in the goaf and I believe a mining person would like to know his goaf is filled, if possible, with CO₂, an extinctive gas and this, I submit, would not give him any cause for alarm. He would, of course, if he adopted the type of reasoning we are dealing with here, say, "Well, this is coming from the goaf". If he thinks about it, and no doubt he would, he would say, "There is therefore CO₂ in the goaf." At this point of time the bleeder was inby where they were working so it could be coming around the bleeder, it could be coming direct from the goaf along A heading.

HIS HONOR: Would he just simply get rid of it or would he find out where it was coming from?

MR. REYNOLDS: I cannot deny the proposition that reason would say he is getting CO2 from the goaf but I cannot concede that this puts him on inquiry as to any other type of gas.

HIS HONOR: I am not suggesting this.

MR. McNALLY: Mr. Puddle in fact tested himself on this day when he put the screen up.

HIS HONOR: I think it must be conceded.

MR. REYNOLDS: This could not be taken to be some small emanation from a crack, it is obviously goaf gas and anybody applying their mind to it would be forced to that conclusion.

HIS HONOR: Assuming it is CO2 and assuming you are getting rid of it at the time, unless you get notice of something further that is all you need to do in the immediate situation? That is your proposition?

MR. REYNOLDS: Yes. I have not put this proposition very highly. I have said "No circumstances arose or were disclosed in that position which the management was bound to interpret as creating a situation of danger." It is easy for all of us afterwards to say "Let us reason this and that." "But we are getting CO2 in there", someone replies. "Are you getting rid of it?" "Yes, it is being cleaned out now". It does not alert people to danger if it is CO2.

I have spent time on this only because it appears from the evidence it was the fact that this was done at No.3 cut-through and operated apparently successfully which induced the deputy to assume the same system, when similar circumstances arose in the next cut-through, could be adopted with safety. It goes on:

21. It is necessary to consider also what part if any was played by the fact that the pillars in areas 11 and 12 in Ex JJ were extracted before another bleeder had been driven.

22. It was at the point that the decision to extract these pillars was taken that the departure occurred - -

At this point there was no departure, the system was being adhered to and the only criticism that could be levelled at that point of time was there may have been a better and different way to ventilate the goaf edge and the expedient of putting the brattice and the bleed tube in was not the best.

MR. LEE: Is this an Exhibit?

MR. REYNOLDS: It may be made an Exhibit.

(Document marked Exhibit "00")

It is when this bleeder No. 9 is complete that for reasons which appear in the evidence and with which I have already dealt Mr. Puddle made the decision, and I put it yesterday that it was his judgment on the spot, that in the interests of the safety of his men and having regard to the necessity to extract the maximum coal if it could be done consistently with safety, that he decided before driving another bleed he should take the coal out in 10, 11 and 12 - in 12 because it is good practice, everybody agrees, to keep the goaf line aligned and not to have it stepped.

The first point I make is somewhat legalistic, I concede, but whilst that departure was going on nothing happened which caused any injury to any person or any great problem, as

disclosed by the evidence. No evidence is given as to any undue exposure to gas or anything during the period of the extraction in 10, 11, and 12. Not a word is said and one can assume that that operation was carried out without any problem and that is what I say in plain words in the last part of 22. "and no problem is disclosed to have occurred during this operation".

23. The Company officers claim that the course referred to in para. 14 was intended.

That is, to restore the bleeder system by splitting the panel. It goes on "this claim is disputed."

My learned friend Mr. Lee put to Your Honor yesterday that there was evidence which could, if Your Honor saw fit, lead to a finding that Mr. Puddle had no such intention and he referred primarily to an alteration in Mr. Puddle's statement. With respect to my learned friend it seems to us that he has misconstrued this situation and I want to take Your Honor to Mr. Puddle's statement which appears at p.722 of the transcript. This is what Mr. Puddle said: "It is our practice after splitting a pillar to extract the coal in lifts along the goaf edge and my intention was that, on the next shift after holing, the miner would be moved to an appropriate position in A heading and the pillar split if roof conditions allowed." Your Honor will remember long cross-examination by Mr. Parkinson of Mr. Puddle about that phrase, "if roof conditions allowed". So, he has said in his statement quite unequivocally that it was his intention to hole. The alteration that was made in the statement was that he said in the original statement "I therefore formed the conclusion that for a short time only the bleeder from the goaf could be replaced by the bleed tube". The words "replaced by a bleed tube" were deleted and the word "omitted" added. It has nothing to do with his intention to hole the goaf, nothing at all - except it confirms it. My learned friend apparently had a wrong impression of that situation. He stated very clearly it was his intention. I would not be so blind as to ignore the fact that there may be some indications to the contrary but it would be a very serious step in the face of mere indications of that kind to reject the oath of Mr. Puddle on this matter particularly when, if one looks at it, one finds he had split the pillar in the same way previously. The other point made by Mr. Lee was that 10 and 11 had been split through the middle elsewhere but if we look at it the pillar created by 3 and 4 cut-through had already been split and likewise there is a complete split between 4 and 6 as they are numbered on this.

HIS HONOR: You are saying this is a double pillar?

MR. REYNOLDS: That is right, and it is difficult to say, in the light of Mr. Puddle's assertion, that he was going to depart further, when he had obviously complied up to this point and had given a reason for departing temporarily. I can put to Your Honor that there is not sufficient material to justify the rejection of Mr. Puddle's oath on this matter. If Your Honor was a jury I might talk at greater length on it but I do not think I need to say to Your Honor anything more than that.

24. The complete effectiveness of such a bleeder system has not been demonstrated although it is conceded that it has some value in assisting ventilation in pillar extraction and that its provision is desirable.

I say that because even Mr. Menzies has no practical experience of this and relies on theory only in the belief that this is a great aid to the ventilation of the goaf, to have this

drainage tunnel rejoining the return airway outby of where the men are working. The next paragraph, 24A, brings us right to what I suggest is the crux of this problem.

24A. It was at the point when the extraction of the pillars in 11 and 12 was complete that a new problem of ventilation arose. A number of alternative solutions have been offered. They may have avoided this accident but each may have created difficulties and dangers of another kind.

Your Honor sees the factual position: a departure has been made from the system of having a bleeder tunnel in reserve, if I may put it that way, and the operation is now complete and the coal has been extracted so that there is now a situation where it is a straight line of goaf, the three headings, A, B and C, and the next step is to be taken. It is then that the person on the spot has to make up his mind what is to be done next and how he is to ventilate to the best advantage. The next step was to drive 13. Mr. Donnegan, I think it was, devised means of doing it and has shown you could have done it this way or that way. Mr. Menzies has made his suggestion. In fairness to Mr. Menzies, he said, in effect, "Well I am not saying this is the perfect solution, I am not saying really it is terribly much better but it would have got over this and that". He concedes that it may have brought about difficulties, any solution may have brought other and different difficulties in its train. Just to take one example of that, Mr. Menzies said he would have supplemented the bleed tube into the shunt with another tube going from behind the brattice, making an overcast, and going into the return airway unassisted by the fans. My engineers say you would need a 22 inch one. How are you going to get your shuttle car through? I do not know if Mr. Menzies applied his mind to that. I only say that to illustrate that these theoretical solutions have their own "in-built bugs" if I may put it that way and you would need the master-mind of an international chess player to be able to work out how this thing will fit in with the problem of safety in all respects and winning coal. The point is that there is no absolute solution and one should not be too ready to condemn out of hand a solution which, in the events that happened, due to an extraordinary coincidence of ignition and build-up and failure to detect caused this unfortunate fatality. That is my only point: one should not be too ready to say "This was wrong and it was badly wrong". We concede in the events that have happened it was certainly not a good solution.

25. Even if the departure from the system had not been made (as it had not when 9 was being driven) the position at 13 so far as a bleeder is concerned would be little different.

The only difference would be that the brattice stopping erected in A heading would be one pillar's length further from the goaf in the case of 9 as against 13.

HIS HONOR: Would you expand that?

MR. REYNOLDS: (Indicates) Here is 9 and the system was being adhered to. The brattice screen was put up at this point, the goaf was then here, along 4 cut-through so the difference is instead of the goaf being about 3 it is about half a pillar further back. The tunnel to the goaf is longer and it is longer, in these circumstances, by about half a pillar. That is what we say, "the only difference would bein the case of 9 as against 13." I put this proposition to two of the inspectors, Mr. Muir and Mr. Longworth and Mr. Longworth sought to point out differences and I think it is worth while that we have a look at that at p.247. It seems Mr. Longworth was, in seeking to point out differences, dealing with matters

which were not quite relevant to the problem. I refer to the fourth question from the foot of the page, "Q. And until you hole it it cannot act as a bleeder?.....the disadvantage that I referred to earlier." What he is saying is no doubt factually right but it is not relevant to the question so far as the men in the shunt are concerned, the only difference is it is that distance away.

HIS HONOR: He does not include the shunt in the working place.

MR. REYNOLDS: I do not quite follow what he means at all. We are driving the bleeder at 9 and the gases from the goaf have to come up past that work place somehow - there is no escape from it, whether they come down the bleeder or directly down that way. I put the same question to Mr. Muir and he sought to indicate a difference and I think I should take Your Honor to that because it was plain that on one aspect of it he only saw it when it was first put to him by me. I only say that to indicate how much thinking out there has to be about any particular solution. I put this to him at p.392: "Q. The question is this: At the time the place 13.....in the area marked 10." (Page 393) I never got any more differences and he was, I think, invited quite fully to give them. He was saying he would consider using the circumstance to perhaps ventilate the goaf edge by separating portion of the air and taking it along the further cut-through - but no certainty about it. I only cite that to show that when these answers were given as to the substantial differences, they could not in any convincing way show a real and appreciable difference. The only point of that is to come to my submission that this departure from the system laid down in the correspondence has little, if any, relevance to the problem Your Honor has here. The problem, we submit, is slightly different.

26. The obvious fact that when driving a bleeder tunnel there is then no existing bleed from the goaf into the return airway outbye makes the departure of doubtful relevance as to the cause of this fire.

It is a circumstance but it is too remote to constitute a causative factor.

27. The fact that the working arrangement had operated satisfactorily in No. 3 cut-through, where also there was no bleed tunnel, assisted the assumption that the use of A heading as a shunt and its method of ventilation without a bleeder tunnel was safe and proper.

28. What made the shunt dangerous and unsafe was not the seepage of CO₂ through the brattice stopping but the seepage of inflammable gas mixed with CO₂.

29. There could be little doubt that if this fact was known or suspected as a reasonable possibility the use of A heading as a shunt would have been abandoned.

Mr. Lee, I think, enunciated the same proposition to Your Honor, that this management, if they had the slightest inkling there was inflammable gas in that shunt into which a work machine was being sent periodically, that its abandonment would be instantaneous.

HIS HONOR: I agree with the proposition, the real issue is should they have had an inkling.

MR. REYNOLDS: Mr. Menzies dealt with this at pp.320 and 321. He was asked a question in such a way by Your Honor that he interpreted "gas" as meaning "inflammable gas". Whereas Your