

WARDEN'S COURT

MR F W WINDRIDGE, Warden and Coroner
MR R J PARKIN, General Manager, Capricorn Coal Pty Ltd
MR P J NEILSON, District Secretary, United Mine Workers' Union
MR C ELLICOTT, Training and Development Officer, Department of
Mineral Resources, New South Wales
PROF F F ROXBOROUGH, Professor of Mining Engineering, School
of Mines, University of New South Wales

IN THE MATTER OF A CORONIAL INQUIRY IN CONJUNCTION WITH
AN INQUIRY (PURSUANT TO SECTION 74 OF THE COAL MINING
ACT 1925) INTO THE NATURE AND CAUSE OF AN ACCIDENT AT
MOURA UNDERGROUND MINE NO 2 ON SUNDAY-MONDAY, 7-8 AUGUST
1994

GLADSTONE

..DATE 28/03/95

..DAY 51

THE COURT RESUMED AT 9.04 A.M.

MR CLAIR: I call Robert Van Dolah, Your Worship.

MR MORRISON: Just before Mr Van Dolah is called, can I deal with the matter you raised yesterday in so far as we need to and were any views to be forthcoming, the seminar for Friday, 31. All we wish to say about it, which is really very little which will no doubt come as a surprise to many people, as we understand it - we have had some discussions with Mr Lyne in relation to the content and he has assured us, and as we understand it to be so, aspects of No 2 or re-entry into No 2 won't be dealt with in the seminar. It will be completely removed topics and on that basis we really have nothing to say about either the event or participation in it, although as we understand, I think, it's only Mr Ellicott that may be attending. So on that basis we really have little to say about it.

WARDEN: Thank you, Mr Morrison.

ROBERT WAYNE VAN DOLAH, SWORN AND EXAMINED:

MR CLAIR: Your full name?-- Robert Wayne Van Dolah.

You have prepared, for the purposes of this matter, a report dated January 1995; is that so?-- Yes.

Your Worship, in accordance with the practice indicated earlier I will allow Mr Morrison to take Dr Van Dolah through his evidence-in-chief.

WARDEN: Yes.

EXAMINATION:

MR MORRISON: Dr Van Dolah, can I ask you to have a look at this document? Is that a copy of your curriculum vitae?-- Yes, it is.

Does it show, apart from personal details, your education BA (magna cum laude) in Chemistry at Whitman College, 1940?-- Yes.

And PhD in Organic Chemistry?-- Yes, in 1943.

Since 1978 to the present time and ongoing have you been retained and employed as consultant on fires, explosions, explosive and spontaneous combustion?-- Yes, I have.

XN: MR MORRISON

WIT: VAN DOLAH R W

And has that required you to provide advice in relation to events in various parts of the world including South Africa, United States and now in Australia?-- Yes, that's correct.

Not only in relation to coal mines, but the hazards of spontaneous combustion of transportation of coal by rail and sea?-- Yes.

For 34 odd years before 1978 were you employed in the Bureau of Mines in the Department of the Interior in the United States?-- 24.

What position did you hold there?-- Well, I - working for the Federal Government you undergo name changes all the time. We call it name calling, and I had six separate titles. When I went there I was chief of a division of physical sciences and explosives. When I left I was Research Director of Pittsburgh Safety and Mining Research Centre.

In that latter role did you occupy that position for seven years leading up to 1978?-- Yes, I believe that title came about 1970, yes.

In that position were you effectively the Director of Research and Safety for the Department?-- Yes, for the Pittsburgh station which was a major station dealing with coal mine health and safety of the Bureau of Mines.

You set out there some details of the staffing and the budget that was involved at the centre, and also refer in the second part of the major paragraph on the first page of your CV to some of the matters that Mr Mitchell referred to, that is to say, in the early 70s a research program on spon com which you were involved in?-- Yes. I should explain that the Bureau of Mines was interested in spon com throughout the years, but it was critical only at certain times. There were publications back in 1920, there were publications in 1940. We looked upon spon com in my early days with the Bureau of Mines as having secondary importance to the larger problems of coal mine gas and dust explosions and the use of explosives underground, and so that occupied the bulk of our attention until 1970, and with the passage of the Coal Mine Health and Safety Act of 1969 there carried with that an authorisation of increasing funds for research and development in the field of coal mine health and safety. So we were able to expand our activities very significantly beginning in 1970, and one of the topics that came to our attention very early on was spon com. It had been noted through the years, but as I say, it was given a lower priority. With the development of the western mines, increasingly we anticipated that the problem would continue to increase in importance and we initiated both our in-house program and an extramural research contract program with outside contractors beginning in the early 70s and that program expanded and is being carried on today.

Prior to '71, which is about the time that you were effectively the Director of the Pittsburgh Mining and Safety Research Centre you mention in the CV that you directed a

research group in relation to other areas including explosions and combustion?-- Yes.

On page 2 you refer to your service as a consultant to the Department of Defence and the AEC; what's the AEC?-- That was the Atomic Energy Commission, a forerunner of the Nuclear Regulatory Commission which is in charge of all the nuclear research in the country, in the United States.

You are the member of the Apollo 204 Review Board; was that in relation to the fire aspects of the disaster that engulfed the Apollo space capsule?-- Yes. It was a fire inside the command module sitting on the pad, and it was a preliminary exercise that they were going through. Launch was scheduled in the relatively near future and this was one of the later exercises that was to terminate in an egress exercise. A fire occurred. I was asked to come first as a consultant and then I became a member of the Board, and I was assigned the responsibility for Panel 5 which dealt with the origin and spread of the fire inside the command module. That effort was a very intense one for 10 weeks.

Then later in your CV you deal with various times going right back through to 1946 where you were employed by or acting in different positions in different areas?-- That's correct.

Right through to 1940 taking you back to Ohio State University?-- Correct.

On the third page you mention a number of awards you've received and memberships that you hold and committees that you are on?-- Yes.

To publications, without setting them in long detail, 118 odd publications and several patents?-- Yes, sir.

So you are three times more successful than Mr Mitchell in getting some patents, it seems?-- Yes, perhaps. As a Government employee you are readily in a position to get patents.

I tender the CV.

WARDEN: Exhibit 252.

ADMITTED AND MARKED "EXHIBIT 252"

MR MORRISON: Can I inquire whether the panel have copies of the report?

WARDEN: Yes, I think it's been distributed.

MR MORRISON: Perhaps I should provide one and formally tender it and then speak to it. The other parties have all been circulated with copies prior to this time.

XN: MR MORRISON

WIT: VAN DOLAH R W

WARDEN: I will mark the report Exhibit 253.

ADMITTED AND MARKED "EXHIBIT 253"

MR MORRISON: You were asked to provide a report in relation to this matter which you've done and you have a copy with you. You list on the front page of that report at that point some of the material to which you had had reference including the SIMTARS draft report, the report by the registered manager and a number of statement interviews?-- Yes, sir.

Since that compilation was made and prior to the compilation of the final report you have had access to other material, haven't you?-- Yes, I was separately supplied with a binder such as this filled with computer print-outs, graphs, various records dealing with the mine, and besides that there were some additional statements that were separate and there were some large scale mine maps, 1 to 5,000 full mine maps.

You've had the opportunity to review the reports of Mr Mitchell and Mr Highton as well as the final SIMTARS report?-- Yes, I have.

And you've mentioned the computer print-outs, that's the Maihak data?-- Yes.

And also parts of the transcript of evidence by various witnesses?-- Yes, bits and pieces, yes, sir.

It's the fact you've been in Court for a fair bit of the last five weeks?-- Yes, most of it.

In addition to that have you had regard to a number of texts and various articles and so forth?-- Yes.

You mention on the first page there that you reached the conclusion in general agreement with the SIMTARS report that the explosion was most probably originated in 512 and the result of a spontaneous combustion event?-- Yes, I did.

And you there mention also that there was some circumstantial evidence prompting a close look at 5 South, but no substantiating hard evidence found?-- That's correct.

Where does that leave 5 South in terms of your assessment of its involvement?-- At a very low probability, very low compared to 512.

You mention in relation to the No 2 Mine there on the first page a number of the physical features of the mine, its tube bundle system, the length of time of methane drainage in 512 and so forth. Now, in relation to 512 itself, at the bottom of that page and the top of the second you refer to the mining method itself consisting of the robbing of alternate rows of

pillars, ramping into the floor coal, and you then go on to mention a statement from one of the statements tendered at the Inquiry about the nature of the mining. Now, in relation to that aspect of mining, do you see some of the features as being significant to how we assess this event?-- We really should begin back on the first page with the statement about the drainage, methane drainage, which has a significant impact in that - two things. It impacts the ability of the coal to react with oxygen or vice versa of the oxygen in the air to react with the coal and it may impact the question of adsorption of moisture.

Could you explain those two aspects for me, please?-- Yes. The coal surface when first exposed is going to react with oxygen of the air by adsorption of the air. People want to call this oxidation; I don't believe that's the the really appropriate term. I was trained as an organic chemist once upon a time and it basically isn't a reaction. We don't really know what the end products are when the oxygen first reacts at low temperature with the coal molecule. The early writers used the term "adsorption". I think that's a very good term really if you think of it as being chemisorption rather than being strictly physical absorption. In any case, the first surface is to see the oxygen react quickly, but then the oxygen seeps into the coal through coal pores as well as the fracture planes, the fracture - cleat system that we call it, and the individual basic fractures that are in the coal structure, but the coal pores provide access to the bulk of the coal for reaction or adsorption of the oxygen. Now, if the coal is loaded with methane the methane is streaming out of the pores as it becomes broken, and that inhibits or prevents or slows down the movement of oxygen into those pores and this has been demonstrated even in the case of storing coal under - that has been degassed, storing it under argon and letting argon over a long period of time get into the coal pores, and then the oxygen reaction or adsorption is slowed down by virtue of having to compete with the argon coming out and the oxygen trying to get into the pores.

The second part is that the impact of moisture, if it

condenses - and that's a physical term really rather than thinking in terms of sweat on the coal surface - but if it passes from the gas phase into being adsorbed on the surface, there is involved a heat of wetting which is the heat of condensation which is a very significant heat property and has a very significant effect on the early stages of heating the coal. Now, depending upon the equilibrium moisture situation with the coal, and I have no way of knowing what it was, it - on exposure to high humidity air can adsorb more moisture and that is a contribution to the heating process. So, if it heats, the temperature goes up, reactions with air go up - with oxygen goes up, and so it has that secondary effect.

These are two aspects, I think, you deal with on page 2, or mention perhaps in the more abbreviated form on page 2 in the first complete paragraph?-- Yes.

So, with methane drainage then - with less CH₄ in the coal, is it the case then that we could expect less heating and adsorption of O₂?-- Yes, the oxygen can penetrate into the coal more readily in the absence of a large amount of methane trying to escape.

And is the corollary then in that situation with pre-drained coal, higher production of CO?-- It can be.

If one took a prosaic example then, the longer it might be pre-drained of methane, the higher the chance of - the greater the chance of higher CO?-- It would tend to increase.

And the methane drainage has an impact on the water which you mention in that paragraph, namely, the reduction of bed moisture?-- Yes, typically it does.

And what does that lead to in relation to the susceptibility of coal to, first, oxidise and, secondly, in that process produce more or less CO than it would otherwise?-- Well, again, it's - as I say, it involves the heat of wetting which is the heat of condensation and it - there is a further effect that has been noted in some experiment work that the Bureau of Mines has done and that is there appears to be a synergistic effect between the adsorption of - or at least the presence - the reaction in the presence of moist air compared to the two effects, one of adsorption of moisture and the second of absorbing - of reacting with dry oxygen. It was found, for example, that the rate of reaction was twice the combined rates of the effect of moisture using moist - moist nitrogen, which only had then the heating effect from the moisture, and dry air which had - did not have the effect of moisture. So, if you had - you have got the two rates of production of gases: the one, the moisture effect with moist nitrogen, with the other one, the oxidising or reacting with oxygen effect with dry air. The sum of those two rates was half of what the moist air rate was.

So, the water has a very significant impact then?-- Yes, I think so.

And that translates directly into production of CO?-- Yes.

Now, turning away from the methane drainage but more in relation to the method of mining in the panel, we have heard a number of witnesses give evidence that there was a ramping system here which produced more loose coal in this panel than in others; that those ramps produced stubs at the end of the ramp; that bottoms were taken in this panel as opposed to other panels, and at the bottom of the panel on the inbye end there was what was described as a sugary band of relatively soft coal which tended to break or crush under the miner when they were mining there. Now, in relation to those four aspects, that is, loose coal particularly in ramps, stubs, bottoms and the sugary band, are you able to make some comment about the impact of that - those features of the mining method in relation to production of CO?-- Well, the CO is going to be produced by reaction with coal surfaces. The more broken coal that is available for reaction, the more CO is going to be produced. The location of the coal can have an impact, so that it isn't just coal surfaces - coal surfaces or not coal surfaces. If you have a spread out pile in the bottom of a ramp, it will not react as rapidly as a pile of equivalently broken coal that's stacked up alongside a rib merely because of the access of the ventilation currents to it, the renewal of fresh air, if you like, to the coal, the ease of developing chimney effects, many things, but typically one says that the more loose coal that you have, the more CO that's going to be produced as a first generalisation, and it - the first general rule if you have got a problem of spontaneous combustion in a mine is clean up the loose coal.

In relation to each of those aspects, that is, the increased loose coal, stubs themselves have an exposed face, bottoms which predicate a higher exposed face on the ribs at least, and the sugary band crushing out, would you expect each of those four features to result in higher production of CO?-- They all make a contribution.

So, if we compared, as you heard me doing the other day with one witness, the two side by side mythical panels, one with these features and one without, in which one would you expect the higher production of CO?-- The panel with the loose coal - the larger amount of loose coal.

And does that have some translation then into what one might see in relation to CO make in such a panel?-- Well, of course. CO make is nothing more than the concentration of carbon monoxide measured at some point and multiplied by the volume of air that's transporting it, and given the same volume of air, the more carbon monoxide, the more carbon monoxide make.

If one had those two mythical panels at the start of extraction and one knew that one would have these features we have been discussing and the other wouldn't, is it reasonable then to anticipate a higher CO make in the one with these features than the one without?-- Of course, yes.

Now, I will come back to CO make shortly, if I may. I just

want to touch on another area. We have heard some evidence in this case also that the rate of production in this panel was greater than in other panels in the mine?-- Yes, sir.

Does that, in your view, have some impact then upon CO production and translating that through to CO make?-- Yes, of course.

Could you just explain how?-- Well, the rate of production determines the amount of fresh coal that's exposed and, depending upon the mining method, the quantity of loose coal that may be left, and so the higher - the greater the rate which one chews up coal and transports the bulk of it outside but leaves some part of it inside the panel, the greater the carbon monoxide make.

And would you expect to see some relationship between production - a production graph, for instance, and a CO make graph for such a panel?-- When I first looked at one of the documents that were supplied to me which was a graph comparing a number of sections that you will get to later, I am sure, a number of panels, I was struck by the difference of 512 from the others. I looked through the bundle of documents that had been found - that had been supplied to me and I found some production figures and I discovered that at least within the limits of the documents that I had that this - the production rate of this panel was greater than any of the others for which I had data, and that immediately said to me that, you know, this panel is different, the rate of production is greater, and this was before I really had all the details about exactly how it was extracted, the details of the extraction process. I immediately came to the conclusion that this was at least a part of the answer for the change of - for the increased rate of production of carbon monoxide in 512 over the other panels that were shown as a comparison.

You have had - since forming that preliminary view you have had access then to the information about the details of the mining method and the features that I have mentioned and others?-- Yes, sir.

Does that extra information serve to confirm or disturb the view that you had formed?-- No, it confirms and gives additional reasons for the very substantial increase of carbon monoxide make over the other panels because while the production is greater, that alone didn't seem to provide the complete answer to the difference in the rates that were shown between the several panels - among the several panels.

The rate of production by itself wasn't enough but combined with these other features -----?-- It did appear to me as I studied it at first -----

But combined with the other features about the detail of the method -----?-- Yes, it was more when I began to learn about the actual extraction method which I - in the beginning I wasn't aware of the details of the ramping process, for example. I saw first an outline of just the slabbing of the pillars which is a pretty standard retreat - extraction

recovery of the panel - of pillars on retreat and that - I was still looking for other answers to give me an idea of why 512 produced as much CO as it did.

And now knowing those features, do you find it surprising that 512 produced that level of CO?-- Well, "surprising" is a poor word for me, but -----

Well -----?-- It helped explain the reason for the extraordinarily high production of CO.

Now, can I ask you to have a look at Exhibit 219, and as well 245 if you wouldn't mind? Doctor, I think you have seen each of these documents but I am going to ask you some questions about them. 219 is the CO make graph for 512 during its extraction life?-- Yes, sir.

With some points taken out because of the original plotting on an inaccurate - or non-representative is probably more accurate - non-representative horizontal axis?-- Yes, I have seen that data before.

Now, can you make some comments about how one would assess or read that graph?-- Well, I see a continuing increase in the carbon monoxide make as the extraction process went on. I was - my first impression was that a straight line might fit the bulk of the points. A better fit might be one that was slightly concave downward, flattening out a bit towards the later stages of the extraction, towards the end of the panel.

If one was looking for a line of best fit, you referred to the flattening out, about which point on the graph do we see that, in your assessment?-- Well, the change in slope appears to start back on 1 July perhaps or so. It's a very gradual thing. It depends on how you do it. A straight line linear regression isn't that bad a fit.

And how do you assess or read the spike at 11 June and then the drop down to about 18 June?-- Well, I had problems with the spike at 11 June but - and I had problems until I saw some recent data that's given in the other exhibit with a drop, but the drop, I think, is easily explained in terms of the very reduced production during that week, which I have heard was a short week by virtue of holidays and a maintenance day.

Well, it might be convenient to turn to 245, the other exhibit that you have been given?-- Yes, I have it here.

Which is the production graph for the same period?-- Yes.

And -----?-- That week of -----

Sorry, you were mentioning the drop then around 12 June?-- Yes.

Which is revealed on that graph?-- Yes.

And reflected in the data attached to that graph?-- Correct.

Shows over that week only three production days and a halving of the tonnages?-- Yes.

Can you offer some comment in relation to that as an explanation for what we see on the CO make graph?-- Well, it provides a rationale for the decrease in make during that period of time. The rate of exposure of broken coal was down when the production was down.

And do you see some correlation between Exhibit 245 and 219; that is, the production graph and the CO make graph?-- A rough correlation, yes.

Could the witness see Exhibit 220, please? Now, we have also heard evidence from various miners that towards the end of the panel more loose coal was being cleaned up towards the end?-- I have heard that.

Than it was in the early part of the panel?-- I have heard that.

Do you see that as having some impact upon these graphs also?-- It could provide an explanation or some basis for the decrease in the rate, which is a function of time - the flattening out that I alluded to earlier.

Is that simply because with the removal of more loose coal than before, or indeed all loose coal, there are less faces to oxidise?-- That would have an effect. There may be other effects with the ageing of the panel. It is a very complicated thing. I don't think it is fair to try to ascribe any one factor here to explain all of these changes, but it would have an effect.

In relation to the oxidation of coal and its ageing effect over the life of the panel, can you offer some assistance to the Inquiry about how one might see the background CO levels and CO make over time?-- Well, yes, the reaction of fresh coal surfaces with air is immediate, but obviously the surface is very limited and so a very limited amount of reaction would take place just on that surface. The reaction then begins to soak in and obviously the finer the coal - the more that is broken up, the more surfaces and the more points of access, if you like - surfaces of access that the air has to get to react with the coal. The rate will fall off. The function of falling off is - that rate - the function is a complex one because it depends on the coal - the nature of the coal itself. Some coals are relatively porous. See, the old coals - old geologically, that is - are very tight comparatively to the very young coals, and we have already talked about the question of competing gases, a competing flow of gases - the whole thing is very complicated, but coals continue to react for very long periods of time. It becomes an asymptotic decrease to zero, but zero is probably out here at infinity, or near it, and the rates do fall off, and it is a function of how the coal is broken and the coal itself, but as you continue to mine, you continue to expose new fresh coal and so you are starting the process on a continuing basis, and even though each little bit of coal that was first exposed - its

rate of adsorption or reaction with oxygen falls off, the next coal that's exposed is beginning to react and the next reacts and the next reacts, and you can finally end up with a panel that has an overall reaction that is greater than the first bit that you were exposing - the very first fresh coal. Even though it is all aged, the reaction is no greater.

Do we see an incremental increase, as it were?
Notwithstanding early rates of dropping off, later rates are decreasing?-- All rates are decreasing with time, but you are continuing to add new material to the reaction system.

Is there a way to show this fairly simplistically, albeit on a graph?-- No.

Schematically, perhaps?-- Schematically, perhaps, but it involves one's guess at what the rate is and the rate of fall-off, and if we have - I have no data on that sort of thing, so - it only decreases.

Right. Apart from having no empirical data for a particular area, is there a way to represent it schematically, though, so we can understand the general effect of it?-- Could be.

Are you able to do that for us?-- I could try.

All right?-- If one thinks in terms of a rate of - let's say it is Delta oxygen, or a rate of production of CO; at the beginning there is a very steep rate that has some sort of decay. A little bit later - this is time. A little bit later one exposes new coal - this comes down here - the beginning, of course - at another time, one has a curve like so, another time one can have a similar curve that goes like so - that should have been a little higher, because these are additive effects, of course - another one like so. My point is that one reaches a time - this should again be higher - when even this rate out here is - exceeds the rate of production at the beginning, because these things are additive - I mean, they are continuing - this stuff is continuing to react here - this is reacting more, and so on and so on and so on. All the rates are falling off as the coal is reactive, but it continues to react and it continues to add to the new stuff that's beginning to react.

So, leaving aside the empirical data for particular events and so forth, certainly the theory is - or the expectation is that we will end up with a level which exceeds that earlier production level?-- It could be.

So that you could expect to see a rise in a continually extracting panel over time?-- Yes. In fact, you always see it.

Sorry, you ought to see it?-- You always see it, at least in the data that I have seen. The rise might be very slow. It depends on the panel. It depends on the coal.

No doubt we will print that off in due course before we wipe it. Do you want to do that now? We will do it in the break.

I have had placed before you Exhibit 220, I think?-- Yes.

Now, I've been asking you to pass some comments on 219, which is the-----?-- Yes.

-----make graph re-corrected. 220 is a similar make graph, this time taking Drager tubes as the CO data?-- Yes.

And you will see that - I think you will agree - that in the early parts of the life of the panel, certainly up until, say, 23 July - or 9 July - in that period, 220 pretty much mirrors 219?-- Pretty much.

And then after that period, from 23 July on, or in that period, we have a very much increased number of data points?-- Yes.

And apparently wildly fluctuating?-- Yes.

There is one missing off that graph - which you might like to not write on the graph, but at least have in your mind - from the last point represented there, the one that is missing is Mr Tuffs' reading, which is down at around 16.6?-- Yeah, I recall that reading.

Now, if you were assessing this graph - and, in particular, I want to direct your attention to the end period where the multiple data points were available - does it show anything different or substantially different from what you assess on 219?-- Not very much. The bulk of the points that are taken show the same sort of flattening out that I had remarked on earlier with the earlier graph. The fliers, if I may use that term - the ones that are very much higher, or one that's very much lower - I feel are perhaps artifacts of the techniques of arriving at those numbers - the data for those numbers. The Drager tubes have a certain inaccuracy - fairly substantial potential for inaccuracy.

Do you mean like a standard that's a product of the tube itself?-- Many factors enter into it. One is the tube itself and its variations from the chemical point of view and filling point of view, and from an ageing point of view and how it has been kept and in what temperature, and so forth, is influencing the ageing, and then in just the technique of - well, we have heard reference whether you make the right numbers of pumps to get the right number of - that is appropriate, and these things are - can be misread somewhat, or it is a judgment call as to where the end of the - the stain length in tubes, and it is a judgment call as to what really constitutes the end of the stain. So, there is that, and then there is multiplied to this, of course, in order to get the make, is the volume of air that is moving - carrying the carbon monoxide, and this determination is made by velocity measurements. Velocity measurements have a certain potential error in make, so one has the possibility of two inaccurate measurements multiplying to each other and they may cancel, they may exaggerate.

In assessing a graph such as 220, what view do you take of the

way in which to have regard to those fliers, as you call them - the very highs and the very lows? Do you sort of eliminate them, rule them out, or do you look for the mean line of where most data lies?-- Well, I tend to view them with great suspicion as to their accuracy and thus how much you can trust them.

In terms of - that's your own view. In terms of the way one should approach this, were one to be viewing this sort of graph in the future, should you treat wildly disparate points again like that with a degree of suspicion and look for a truer line of data?-- I think we have even had one example on which a morning reading was repeated in the afternoon because the morning reading wasn't believed by anyone. So, it was even eliminated from at least one of the graphs that I have seen in the past. I think these are judgment calls. You have to know who is making the measurements and their reputation of doing a careful job. Velocity measurements can be written down without making any measurements or velocity measurements can be made in a hurry without doing the full traverse that is required. One can do a single traverse and not do an average of several, and, you know, there are - I just look at the data with suspicion. I think that's the best way I can put it.

Your view is that, properly assessed, 220 in that latter part shows nothing substantially different from 219?-- If one discounts the fliers.

In looking at, say, that graph of 220, or even 219, or any such graph of CO make, is there some - or any relevance in the absolute figures that the graph reveals at any particular point as opposed to the trend? In other words, does one look at and pay attention to the absolute figures, or does one look at and pay attention to the trend?-- I have argued from the beginning - and in my report - that I do not believe that absolute figures have any relevance - any universal meaning - universal relevance. They may provide useful benchmarks to a certain mining operation or series of operations, but they are not translatable from an advancing long wall to a bord and pillar operation by fiat, in my estimation.

So, in assessing such graphs, one should really pay attention to trends, not figures?-- Yes, trends.

Can I just turn to another point, if I may? You can probably put those three exhibits to one side, for a moment. That is perhaps a related point. You mentioned the fact that you can't translate empirical figures from one place to the other and therefore you should look at trends?-- Yes.

Does the same sort of thing apply to the utility of some of the standard ratios such as the Graham's Ratio?-- I believe it does.

Can you just explain why that is so?-- Well, it basically comes down to the reactivity of the coal, and I don't believe there is a standard reaction. This is not oxygen reacting with graphite; this is oxygen from the air reacting with an exceedingly complex molecule. We have shown, and I allude to

this very briefly in my report, that the oxygen that first reacts - and Graham himself uses the term "adsorb in the coal" - is not the oxygen that appears immediately in carbon monoxide and carbon dioxide. We did use isotopic oxygen. We used oxygen 18 mixed with nitrogen to make a synthetic air. We allowed it to react with coal, and we analysed with a mass spectrometer the products of carbon monoxide and carbon dioxide that came out and they were carbon dioxide with oxygen 16, not oxygen 18 that we had used in the synthetic air. It was still in the coal. It was still in the coal, and the carbon monoxide and the carbon dioxide came out as oxygen that entered the coal molecule a few million years before.

It comes out as a reaction that is probably some complex organic thing that we call decarboxylation and decarbonylation and this means the breaking up of labile groups in the coal molecule and the role of the adsorbed oxygen is very unclear at the moment. People talk about organic peroxides and so on, but no-one really has elucidated these reactions. These are earlier reactions. Again I am talking about the very low temperatures where the coal is first reacting.

And this reaction will vary from place to place according to the type of coal or the constituents of the coal?-- That's a very complex question that you ask. Place to place, country to country, seam to seam, yes, it will. It varies a great deal with the age of the coal.

So we have heard a couple of people express the view here before that coals are coals with a shrug of the shoulders, coals are coals?-- Not so.

You don't adhere to that view?-- I do not, not as far as spontaneous combustion is concerned, not as far as the marketing people are concerned.

Certainly the latter, but more significantly for my purposes, the former. You can get variances country to country and seam to seam and can you get variances within an individual seam?-- Yes.

Indeed down to quite small areas within a seam?-- I have seen differences as reflected in R70 values, that have been used extensively to look at Australian coals, with parts of a borehole sample, a borehole core.

Within the borehole itself?-- Within the core.

Within the core itself, sorry?-- Yes.

Variances that would affect the utility of the application and absolute values -----?-- Well, variations in the susceptibility to spontaneous combustion as measured by a laboratory method, R70, values that one gets in an adiabatic oven test and there are several of these around the world. They all have their use in ranking the reactivities of coal. Individual results may differ, but - and even rankings can differ somewhat, but in general it's the same technique that is used.

Now, you mentioned before that certainly coals are not coals when one is considering spontaneous combustion or CO production; does that lead one to the view that absolute values for CO production or the significance of CO production or make at one place are not necessarily applicable to any other place?-- It argues against that general applicability. The one-to-one relationship between an R70 value or a Bureau of Mines adiabatic furnace spontaneous ignition temperature determination is not immediately translatable into the data that one gets again in a laboratory for determining carbon monoxide emission from heated coal or carbon dioxide, or ultimately the other materials that come out at higher

temperatures.

The indicators, if we can turn to page 2 of your report, you pick up points that you've been making in the second half of that page, particularly the second last paragraph. You mention in particular the Graham's Ratio being affected by the need to have knowledge of the behaviour of specific coals?-- Yes.

And this, I think, is the point that you've been making a little more fully in the last few minutes?-- Yes, and I can even go back to Graham's article in which he ascribes a value of less than five-tenths, 0.5, to some coals and greater than two for other coals as being the normal production of carbon monoxide from those seams or portions of seams.

This is in the article by Graham publishing the results in the first place?-- This is the article in which he describes the use or the development and the application of the oxygen - of the carbon monoxide to oxygen deficiency ratio, and also in the same article he gives carbon dioxide to oxygen deficiency ratio. It's in that article.

You are saying that in that article he indicated a range - or at least two figures from .5 to up to over two to be normal?-- Yes, he makes those statements.

In relation to the Graham's then does the same thing apply for it as applies to your comments in relation to CO make? That is to say, one doesn't look at absolute figures at all, but one looks for trends?-- One needs trends and one needs the history of a particular seam and even in detail the nature of the - because the seams can vary. Again if I may, the Bureau of Mines has this adiabatic test in which they determine a temperature at which spontaneous heating under the conditions - very artificial in the laboratory - will progress, and these numbers run from in the order of 35 degrees Celsius up to 130 or 35 degrees Celsius as being the minimum temperature that you must start - where the reaction becomes enough for it then to continue on. This has been applied to a mine in Colorado - actually more than one, and they have actually plotted on the basis of borehole samples and in-mine samples an isotherm line, a series of isotherm lines, if you like, in which they find using a relationship derived from these adiabatic furnace tests on a variety of coals, using that mathematical relationship, and estimated self-heating temperatures that ranges from 35 degrees Celsius to 75 degrees Celsius within one mine property.

That would require quite a number of boreholes no doubt to establish a meaningful isothermic plan?-- They drew a lot of lines. I don't know how many boreholes they used.

That would be one way certainly of determining for a particular mine, or indeed for a particular part of a seam, a more clear picture of susceptibility of the coal to spontaneous combustion?-- I don't know that it's a perfect relationship, but it at least gives you an idea of what to look for and the idea - the possibility that you will

encounter much more sensitive coals, much more coals having a higher proclivity, higher reactivity, higher proclivity to spontaneous combustion within a seam, within a mine.

And the isothermic results in that case in Colorado indicated quite a disparity of self-heating temperatures within the one mine?-- Yes, yes.

In relation to that aspect of it, that is to say the prediction of temperatures, is there some utility in the absolute indicators that result from laboratory tests to predicting temperatures in the real life situation?-- Well, I always think that any information can be useful, but I don't think that you can hang your hat on any one bit of information. You need to look at it all. I'm not sure that I understood your question completely.

I'm wondering whether there is any utility in taking, for instance, indicators that are derived from a laboratory test of 100 grams of coal and simply extrapolating that into your assessment of what went on in this panel. Is that scientifically sound to do that or is it potentially flawed?-- Well, it's a difficult extrapolation, but it does give you an indication of what might be possible.

No more than an indication?-- I think it's a great mistake to try to go directly from a laboratory result to an in-mine consequence. No matter how you try to think you are reproducing something that might occur in the mine, I think it's probably impossible.

And given what happened in Colorado with the isothermic results, potentially misleading unless one had the reactivities for the particular coal you were working with?-- I think we need to explore that one. Could you -----

Well, in SIMTARS report some extrapolation is done from laboratory tests to assess temperatures in 512?-- Yes.

In a very - apparently specific way, but as we have heard from Mr Humphreys, not specific way. Unless one had the tests done, unless laboratories tests were done on this coal, for instance, this seam or even this part of the seam, might there not be the potential to mislead people?-- There is a potential there, yes. I think I made the statement that I find it difficult to translate the laboratory data directly into a mine situation.

In relation to oxidation of coal that we were discussing before when we were talking about the coals aren't coals theory - coals are coals theory, you mentioned that oxidation continues and to some infinite point?-- Some very long time. Infinity is an exceedingly long time.

Is there some support from Graham's article also in relation to that point that oxidation does keep on going?-- He makes general remarks, yes, that it does.

This is not a new phenomena then by any means?-- No, I think

the first publication was in 1600 and something or other on spontaneous combustion. It's been known for a long time and people are still trying to understand what happens.

Turning back to page 2 of the report, in particular that section dealing with the Graham's Ratio, are there various gases in the seam that can affect the utility of that ratio?-- Yes, any gas that - well, particularly nitrogen in the seam gas would cause lots of trouble with most ratios, any ratio that looks at air or oxygen as a part of the air. CO/CO2 ratio is - has a great problem if there is carbon dioxide in the seam gas. Methane doesn't impact these ratios.

Now, are you saying methane doesn't impact on those ratios?-- Not - no. It depends - well, I was thinking of the Graham's Ratio and the Morris' Ratio and the carbon monoxide/carbon dioxide ratio.

I mean to keep you thinking really about the Graham's Ratio for the moment because we saw some calculations yesterday which suggested that the introduction of, I think 10 per cent methane would adversely or - not adversely, that's the wrong term - would change the Graham's Ratio. Do you recall seeing those figures being done?-- Yes, I recall.

Do you have a comment in relation to those?-- I don't think - I think the mathematics has some flaws.

Is that largely because the methane affects all gases and not just one?-- That's correct. It dilutes everything.

Sorry?-- It dilutes everything. It doesn't change the ratios.

Introduction of the methane doesn't just impact on the oxygen, it impacts on all gases?-- On the nitrogen as well and, of course, the carbon monoxide.

And as revealed in those calculations, did it seem to you that the methane was being impacted only on the oxygen?-- It seemed that way. I found it difficult - I found that to me there wasn't enough information on the diagrams, at least as I saw them, to allow me to really follow the reasoning, but Graham's Ratio is not sensitive to dilution by gases that are not involved in the calculation or by air which has the same ratio of nitrogen to oxygen as the air that was reacted.

Can I ask you to go back to the two graphs, 220 and 219 for a moment? Can I also ask that you be given Exhibit 21? I'm giving you Exhibit 21 open at a graph done after the event, but essentially as plotted at the mine site. You will see that Exhibit 21 opened to where I've opened it takes you up to 6 August as its last point. Do you see that?-- Yes.

As promulgated at the mine, what we know is that that graph wasn't available, that was done after the event, but one was promulgated on the 5th which is the Friday. It's essentially the same graph with the last data point taken out?-- I see that.

I will ask you to have Exhibit 123 and take back 21 so you've got the actual graph. I think you will note that 123 is just what I've been referring to?-- Yes.

Now, if one looks at those three graphs, particularly 123, you form the view in your report that it may not be realistic to make - may be unrealistic to draw conclusions on the basis of the CO make data when you look at these three graphs. Do you still hold that opinion that it may be unrealistic to draw conclusions on the basis of such data?-- Can I go back and find out conclusions of what?

You can have a look at page 3 of the report, and the last two complete paragraphs where you were there discussing the CO make data. You referred to the points that we have discussed in a little less detail this morning - a little more detail, the levelling off?-- Yes.

And then the fact that the CO2 values didn't change, you deal with that point as well?-- Yes.

And say in the next paragraph, "It may be unrealistic to attempt to draw conclusions on the basis of such data."?-- Yes.

And that's a comment which applies to the graphs that I've shown you, 219, 220 and 123 as well as other things?-- Yes.

In assessing the graph such as 123, is what you were saying before that the way one uses such a graph might be a judgment call as to whether it's dropping off and so forth?-- Yes, it's - it might suggest that, but it might - it also might be as a result of combined inaccuracies of measurement.

In assessing such a graph, particularly 123, it's a matter on which views might legitimately differ as to what the meaning is?-- Yes, especially at the end.

You can hand that back. Now, even though you have handed those back, to some extent you reflect those graphs in figures 2 and 3 attached to your report?-- I do.

And figure 2 is a data point assessment of the CO make over the life of the panel?-- Yes, over the life of the extraction, yes.

And figure 3 is the recalculation for the last seven weeks of the CO make?-- Yes.

Now, I will come back to those shortly, but those two figures, figures 2 and 3, replicate what we see in those exhibits that I have just been showing you?-- Yes.

Can I turn to a slightly different point for a moment?-- If I may.

Yes?-- You say they replicate.

Well, I'm sorry, yes, replicate is the wrong term, isn't it?-- Not quite.

Yes, I was incorrect in the use of that term. They're another version of those graphs?-- Yes, slightly different but close.

Now, can I ask you to go back to page 2 of the report that you gave and direct your attention again to the bottom of the page where you were discussing Graham's Ratio and you were mentioning that your view is that there is no universal application of absolute values because of the nature of the coal. You mentioned the same thing in relation to CO production or CO make because of the very same features, the nature of the coal and its reactivities?-- Yes.

Now, we have heard mention - and you deal with this at the bottom of page 3 and the top of page 4 of your report - of the suggested levels of 10 and 20 in relation to CO make?-- Yes.

And you make the point there also that in your own views expressed as early as this report that there is no universal application of those values either?-- That's correct.

And is that for the same reasons, because of the different reactivities of the coal?-- And the different mining methods.

In terms of that assessment of your own, is the mining method the most significant feature or just one of?-- It's one of. The German longwall experience is just quite different in terms of the exposure of the coal, the nature of the goaf, the way these things progress as the - as a panel progresses. There are - all of these factors are quite different from a bord and pillar operation. I think one would approach with

some caution applying them to a retreating longwall in Australia or the United States, but in those cases the nature of the goaf and how the goaf develops and how it is mostly covered as the roof comes down as the phase retreats leading to a more nearly steady state of coal exposed to the ventilation air as this whole process progresses down the panel, these things are different and so you have to factor in this mining method very, very much in order to think about what carbon monoxide make is. You cannot translate from one method to another method as a firm benchmark.

Mr Kock in his article, which you had an opportunity to read, draws a distinction between - not so much a distinction, but draws attention to the fact that certain levels of CO make could be equally the production of general oxidation as opposed to a small intense site?-- Yes.

And that if we see production tracking - CO make tracking production, that may be a way of discerning a difference between the two alternatives. In other words, he was - his article was more directed to seeing whether CO make continued to rise on down days and weekends?-- That's correct.

Is that a view with which you agree?-- Yes. The production of carbon monoxide by this reaction with oxygen in the air is - it has been gone through extensively before - very much a factor of the coal that's available for reaction, and he uses two terms that others have used since and I think are very worthwhile adopting and that is one of extensive reaction and one of intensive reaction, and the extensive reaction is a very low temperature, a few degrees above ambient, the intensive is the heating that is in some form, and it's an interesting philosophical question as to when is a heating a heating, how hot does it have to be to be a heating versus this extensive reaction which is warming the air that passes through it by virtue - and the coal, of course - but the distinction between the extensive reaction, with all this great mass of coal surfaces available, and an intensive reaction that may lead to a heating may - which then leads to a fire is an important distinction to make. The question is whether or not - and this is a difficult one - whether or not the intensive reaction, with its higher rate of production of carbon monoxide and carbon dioxide, can be distinguished from the background of the extensive reaction.

And that's a very difficult question?-- He makes a point of that, yes, and it continues to plague us in our attempts to discern that something special is happening.

And do you agree with the view that it's a very difficult determination to make?-- Yes.

In relation to heating of coal then, if heating sends the CO make up, would you expect to see it reflected in the CO parts per million as well?-- If there is enough of it to exceed the background - to be distinguishable from the background.

We have heard the view expressed before here that if you assumed constant ventilation, then - if you make that

assumption - then you should expect to see CO parts effectively tracking CO make?-- Yes, assuming the same efficiency of that ventilation.

You have mentioned before that with the CO make there are two areas of potential error?-- Yes.

Which might have a very significant impact upon either the figures that are obtained or the way in which one assesses it?-- You have two measurements to make and both of them are subject to error and the product can reflect those errors - does reflect those errors.

Can I turn to a slightly different point for a moment, if I may, and take you to a time which is post sealing in your report, page 5? I think it's the first complete paragraph on that page. You are there dealing with - or you have been dealing with in the paragraphs leading up to that some comments about the SIMTARS report where they purport to do a CO make calculation after sealing. You will see that at the bottom of page 4, to put it in context?-- Yes.

And you have some reservations about that approach, which I think you express there, because of the assumptions required for it to be a valid approach?-- Yes, it's always tempting to look at the data provided by point 5 inside the sealed 512 and see a near linear increase in concentration as reflected by the samples by the Unor system, the Maihak system - it's tempting to say that that represents the atmosphere in the panel which, I think, is quite far from the truth. It represents a small sniff of that atmosphere. Their estimate is 189,300 cubic metres of void space inside the seals in 512. The sniff is a few millilitres and it cannot reflect the total atmosphere in this 200-odd by something like 400 metre panel.

The same would be the case, would it not, if one placed a sample point, for instance, at the intersection of 1 cross-cut - No 1 heading, 13 cross-cut, the most inbye point of the top return?-- I would expect different results, still not representative of the total atmosphere within the panel.

And the same could really be said of any sample point placed anywhere within the panel, it won't be representative of the panel?-- It will not represent the entire atmosphere of the panel.

So, what's the answer then for the future? If that's so, sample points really aren't going to be representative?-- Multiple points will give you a better estimate. No estimate will be perfect because there is such poor mixing within the panel. It's only natural convection that's really doing any significant mixing and this is a slow process. This is not a fan turning things around and whipping that air from top to bottom of the panel.

And so in fact even if we put 10 points in here, we may get a better picture but we won't necessarily get a true picture?-- Well, it's a much better picture, especially if you sample at different elevations at any one point.

In terms of - you mention that it's tempting to view the data as being representative. For someone without the sort of training that you have or some of the experts here have, it would certainly be a view that could be held that the sample point does represent the panel atmosphere?-- Yes, of course.

And in fact you include in your notes at the back, or your documents at the back - I think it's figure 4 - the graphic representation of what the gases were doing after sealing taken from the Maihak system itself?-- Yes, this is merely a reproduction of a print-out from the Maihak computer and it shows this nice linear appearing progression of - it should read CH₄ for methane and CO for the middle graph and oxygen, O₂, for the bottom graph. My copy at least has part of those -----

Cut off?-- Cut off.

I think that might be common to all. So that someone without the sort of training that we have been discussing may well view this sort of graph as being representative of the panel, perhaps more particularly a very ordinary sort of graph?-- Well, it's the only intelligence that you have.

All right. Can I go back to the question of sampling post sealing and I had you - directed your attention to page 5 of your report, the first complete paragraph. You mentioned that you can't assume an even mix in the panel, that is something that might affect part of the SIMTARS report. I'm not saying you mention it here in the report, I am trying to draw together what you have said this morning - and that there are some convection currents in the panel after sealing?-- Yes.

Now, do you have some conclusions which you have reached about the source of the methane post sealing?-- Yes. My report reflects my earlier thinking in that the - I make the statement that methane is coming out of all surfaces, coal surfaces. I did not have at that time the information that I subsequently was given about the level of degasification of the seam, the fact that the methane content was reduced to something in the order of a cubic metre per tonne, I think the figure is, by the methane drainage. This suggests to me that the methane that comes out readily from the coal is pretty well out of the coal. There is still residual methane in the coal but it's back in tight pores and may be chemisorbed. It's the sort of thing that you really have to work at. If you take a sample and want to know what the methane content of a core sample is - if you want the whole methane you really have to work at it to get the last bit out of the coal, and so I now feel that only part of the methane that comes out of the broken coal in the sealed panel is coming from the coal, and it may be a small part, and so you look for where else is it coming from? You look at the roof. There is a C seam above it and there is surely some - after the roof is relaxing with the extraction process, that there is some channels for the methane to come into the - where the D seam - into the D seam area. There is a possibility of floor heave that might provide access of methane from the E seam that I know nothing

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about, but I understand it's there, and I think these represent a much better source of particularly the roof and the C seam above for the methane rather than the degassed coal that remains in the D seam after extraction because the build-up of methane is quite rapid.

XN: MR MORRISON

WIT: VAN DOLAH R W

We have heard some evidence to the effect that floor heave in the panel was minimal?-- I have heard that.

Does that have some impact on how you weigh the floor or the roof as being the source?-- It makes me want to emphasise the roof as a source.

And if it is from the roof, does that have some impact on the mixing potential?-- Sure. It comes out at the roof and it wants to stay at the roof because of its - because of its low density. The density is a ratio of molecular weight, and methane is 16 and air is about 29, so the ratio of densities is nearly 2 to 1. It is .55, I think - something like that.

The mixing process in the panel - the sealed panel, as you have mentioned - is quite a complex one. Does that apply also to the way in which methane might mix as it enters?-- Well, if methane is coming with the roof, as I say, it is wanting to stay at the roof. Diffusion is very slow. It is a slow process. I mean, you are talking big distances, and so it is - if the bulk of it comes with the roof, it tends to want to layer at the roof. The coal that's reacting is all over the place. It is on the floor, and if it reacts and makes warm CO and warm air, that rises. If it is a fractured, crushed fender or pillar, it is where it is crushed, but it is probably up closer to the roof. If it is loose coal that's - that has come from sloughing of pillars and fenders, whatever, it is stacked up alongside of the pillars and it's an intermediate height, but it is making warm CO containing carbon monoxide, containing air, which is wanting to rise. Now, the whole panel is on a dip that rises from 5 to 1 entry, and it rises from 13 to 1 or 0 cross-cut. The rise - the increase - the change in elevation is quite significant, so the gases that are in a buoyant form that are up near the roof are wanting to work their way up dip, and they are going to displace air that is up there, and it is going to flow down, but this is not a rapid process, but it does occur, of course, and there is mixing by virtue of things being added while this gas is en route, and it is all a very complex kind of a process, but I feel very strongly that there is a gradient of concentration between the roof and the floor no matter where you might measure it. It is not perfectly mixed. There is no good mixing process that exists inside the panel.

So, we are not going to get a uniform methane mix at plus 5 per cent, for instance, across the panel. Because we see plus 5 per cent or 5 per cent at sampling point 5, we are not having the uniform mix across-----?-- Whatever you see there, I don't believe it is uniform within the panel, no.

So, to the extent that the SIMTARS report might suggest that the whole panel was full of methane at that percentage, you disagree with that proposition?-- Well, yes, and for other reasons as well. There is - they make a calculation that suggests there might be, I think, 8.1 per cent in the panel from looking at methane make and working out the arithmetic to - for the volume of the void space. If that were pre-mixed - a nice mixture - anywhere from 6 or 7 per cent on up to 8 or 9 or 10 per cent you would have had an explosion in there that

was completely different in character than the one that occurred - the first explosion that occurred. That quantity of pre-mixed methane air would have been a very violent explosion inside the sealed - starting inside the sealed panel.

So, in terms of your view, then, do you adhere more to the view that was expressed by Mr Stephan that it may have been a relatively small quantity of methane that ignited?-- Oh, no. I don't know how much methane ignited, but I know how much methane-----

Didn't ignite?-- It is a question of how much methane burned, which is different to - ignition is the beginning of the process. The explosion that occurs is a function of a lot of stuff burning, and so it is, I think, quite wrong to talk about the amount that ignited. It is the amount that burned that's important, but also the mixture ratio of what burned.

Well, apropos that, you have had reference to - and others have as well - the sample that received analysis on the surface at 23.49?-- Yes.

In your view, what does that show in terms of explosion or fire or anything else?-- I have looked at that several times daily, I feel, in trying to sort out exactly what it is trying to say, and my best guess - my best estimate of what it is is a good whiff of a very hot bit of burning coal. It doesn't look like it is flaming yet to me, because the CO₂ - the carbon dioxide is low for flaming coal and from what I would expect, so I think that it is exceedingly hot and I don't want to put a temperature on it, but very hot.

But not yet flaming?-- It doesn't appear to me to be flaming yet, but obviously there was flame very few minutes later.

There is only a short period from then to when the explosion actually happened?-- It doesn't look like explosion gas. It doesn't look like flaming coal to me.

Now, can I remain with that post-sealing period for a moment?-- Before you leave page 5, if you were going to-----

Yes. Is there a matter you wish to raise about that?-- Yes, I have an error in there that says the Graham index is - the quotation in the middle of the second last paragraph, "...reflecting the build-up of carbon monoxide and methane...". The Graham index increase does not reflect the methane. That should be taken out.

So, the words "and CH₄" should come out?-- Yeah.

Just on - if I might pause there, because I think there are a couple of these - and is there a correction on page 6 as well?-- On another page, yes-----

In the second last complete paragraph?-- Page 6?

In the brackets after "Morris' ratio"?-- Oh, yes. It isn't a

ratio of oxygen. That's wishful thinking. All you have to do is multiply the number by .265 and you get oxygen and, philosophically, it is much better for me to think in terms of a ratio of oxygen producing oxygenated products - carbon monoxide and carbon dioxide - rather than nitrogen, which is just along for the ride.

Doctor, I am going to have to hand you the note to slow down in a minute?-- Sorry, yes.

So, the words "oxygen consumed" should be replaced by "nitrogen"?-- No, it should be a ratio of - just of nitrogen to carbon monoxide.

All right. Literally true, but-----?-- You know, it differs only by this factor of .265, but it is incorrect as stated.

And also to make the last correction, page 3 is there a correction that you wish to make there as well, the second last sentence?-- Yes, I was - somehow the last line - the last sentence - the last line, dealing with - it says, "N Tuffs" - Neil Tuffs - "took an anemometer reading at 21.34 hours." Where that number came from, I don't know. The computer did it. But the best figure that I have was 8.30 in the evening, or 20.30.

All right. Now, can I go back, then, to page 5 of your report, the bottom of the page, where you refer to the data in Table 1 which appears on the previous page showing, "...a large increase in CO make the last day before sealing but the suggested acceleration of CO production is not reflected in the data recorded for Point 5, inside the seal, for the first half day or so."?-- Yes.

Can I deal with that topic for a moment - that is the CO rise after the sealing? If one had a higher - let's go back to our two mythical panels for a moment, if I may, and we have one that has a much higher CO production or make, whichever you will, than the other, and then they are sealed; would you expect a higher rise of CO parts in the one that had the higher CO production in the first place?-- Yes.

And is that something that's due to those various mining method factors that we have discussed earlier?-- Well, it is due to the presence of reacting coal in differing quantities.

Now, the data that you have included for post-sealing is in Figure 5 in your report?-- Yes.

And you say in relation to that that the, "...acceleration of CO production is not reflected in the data...for the first half day or so." In relation to figure 5, is it the case that we don't see an increased rate of accumulation until the very last period?-- That's correct.

And is that last period then reflected in Figure 6?-- Yes, it expands the last few hours of - six hours - before the explosion, and this is a point by point plot. One sees the slight wavering around which probably the change in slope -

the small changes in slope that you see - the first five or four hours or so - probably is not apparatus/analyser caused. This is probably by virtue of the currents that are in there that are wandering through the panel, bringing more or less CO in the air that is sniffed at that particular time. We have to remember that it is sampling continuously, but it is analysed every 14 minutes roughly, and so it is that bit that 40 minutes earlier was put into the - taken into the tube and later analysed, and these things are - the analyser isn't perfect, but it doesn't change very much, and these may reflect analyser drift, you know, for whatever reason, and it may reflect real concentration changes. It isn't until the end where there is a significant increase which seems to come up-----

About the last half hour or so - 40 minutes?-- Yeah, one can argue whether there is a real difference between 6.0 and 6.8 parts per million as a long-term average, but clearly at the end it is going up. I think it is interesting to note that there were short-term rates of increase that were - or that much - followed by a slowing down. So, if you took a longer view of the increase in carbon monoxide, you wouldn't - and the rate of increase - you would tend to wipe out these small variations point to point and look at the larger picture, but in the end, of course, it becomes sort of impressive and there are several points that are at a higher rate.

Along-the-way increases, and then decreases are consistent with what you are saying about the movement of gases?-- It may be that, it may be analyser problems. You know, these things - we are talking very small differences, and it can come as a result of different things.

Around certainly the major rise, if one - you said one could argue that there isn't any significant difference between 6 and 6.8, but the change to 10 is certainly only in the last 40 minutes or so?-- Yes.

Now, another point that may be - you may agree with is that what's certainly reflected in Figures 5 and 6 was not available at the mine - this is your workings from the data?-- The numbers were at the mine.

Yeah, but not the graphic representation?-- No, this particular graph was one that I developed.

And the fluctuations you see in Figures 5 and 6 don't seem readily apparent at all from figure 4, for instance, which is the-----?-- That's correct.

-----graphic representation off the Maihak?-- That's correct.

In that sense, the Maihak gives you, would you agree, quite a different picture from what is apparent from Figures 5 and 6?-- Well, the small changes are lost and - in the scale of the graph.

And even the change at the end - the last 40 minutes seems to be lost as well?-- Yeah, I don't see it in this graph, but

again, it is a relatively small change.

In looking at those two graphs, if one looked at them, you could take an absolute figure of 6 ppm per hour it seems, or thereabouts?-- For most of the period, yes.

Is there in your view any particular significance in that figure?-- I'm not sure what you mean by "significance". I think it is a good valid number, but-----

Yeah, apart from perhaps its veracity, if one was just given 6 ppm and told after sealing one was getting 6 ppm per hour and asked you a question, "What do you say about that?", what's to be said about it beyond the fact that it is 6 ppm per hour?-- It doesn't surprise me. I did a sort of back-of-the-envelope calculation taking the carbon monoxide concentrations that were seen by point 16 the day or so before sealing and translating this amount of carbon monoxide make, if you like, into the volume of 189,300 cubic metres, and it comes out in the same ballpark figure, depending on what you take as a reasonable methane concentration - carbon monoxide concentration. I took 6 and 7 ppm - two numbers - and they come out reasonably close, especially the 7 ppm comes out reasonably close to giving us 6 ppm - again if you assume - which I insist is wrong - the mixing in the whole atmosphere.

So, if one's view before sealing was that the background CO parts in the panel was around 7?-- Yes.

Then a rate of 6 per hour afterwards is not untoward as against that?-- It doesn't surprise me.

All right. Is that a convenient time, Your Worship?

WARDEN: Yes. Thank you, Mr Morrison. We will take the morning break. We've been going for two hours.

THE COURT ADJOURNED AT 11 A.M.

THE COURT RESUMED AT 11.18 A.M.

ROBERT WAYNE VAN DOLAH, CONTINUING:

MR MORRISON: Can we just complete our discussion, if we may, about those figures for the post sample - post sealing CO production? I was asking you some questions about the significance or otherwise of knowing that it was 6 ppm, and I think you answered that point, and you also mentioned the calculations albeit brief that you had done which demonstrate that that is, as it were, a ballpark predictable result for a seven parts panel?-- Well, it's a big ballpark, but, yes.

Now, does the same comment apply when one views Figure 5 upon which we can see the increase to 8.6 parts at the very end of that figure, even at eight parts would you still regard that as being within the range?-- I see an increase that I think is significant, but it's awfully hard to divorce its significance from the fact of what comes after that bit of graph where I've drawn a straight line up.

Of itself, that is to say if one looked at this data by itself, the six parts per hour, of itself does that indicate to you a heating?-- No, six parts per hour says that if a heating exists, and it probably does, it's hidden in the background.

And the same applies with - I've used the six parts per hour as an overall figure for this graph, but does the same apply to those figures across the graphs?-- Well, the increase towards the end suggests that it's getting above the background.

But only at the end?-- That's what I see in these data.

When I say "the end", we are talking about what appears to be the last 30, 40 minutes?-- Or perhaps even an hour or so before that.

Can I move to a slightly different point, please, and that is to a point that you deal with albeit in a slightly different way at page 3 of your report in the second complete paragraph, the major paragraph on the page. You refer in that paragraph to changes in ventilation with reductions in air in the bottom return, and it's allied to that area that I want to ask you some questions. We have heard evidence at the Inquiry about a phenomenon that occurred a couple of times of reversal of air in the No 2 roadway?-- Yes.

And perhaps some methane layering. Now, in relation to that aspect, that phenomenon, can you make some comment about how that phenomenon in No 2 heading occurs and what its characteristics are? That is to say, what is it one is seeing?-- Well, you made the - if I understood your question correctly you referred to a methane layer. I think what I

understood - I understand from what was reported, is a layer of warm air containing methane at a substantial concentration. When I say "substantial", above the whole body air -----

As opposed to a layer of methane itself?-- As opposed to a layer of methane that might in the classical sense that the British investigators studied of coming out of the roof and coming along at very high concentrations of methane.

So a classic description of methane layering would have a rich layer of methane moving along the roof?-- Yes.

And how does one get mixing of such a rich layer in the normal course of events?-- Well, through a turbulent flow, but the methane resists mixing in this turbulent flow by virtue of its buoyancy.

As you understood the evidence of reporting what had happened, was that what occurred in No 2 heading or not?-- Well, my understanding of what was observed was a - some reasonably thick layer, warmer than normal, warmer than the intake air that was backing up dip up against the ventilation of the normal - the normal ventilation flow in No 2 heading, and to me this is enriched in methane goaf air that's coming up rather than - I don't know, perhaps I'm just being picky about the term "methane layer", but to me it was a very dilute layer in terms of the methane content.

And might be similar in nature to general air in the goaf anyway?-- Close to it except perhaps containing more methane, and I think the significance is that it is less buoyant than a higher concentration of methane would be and so less resistant to mixing, and because of its lower buoyancy, more readily pushed back down where it belongs and out the return.

Well, in relation to that phenomenon having such a body of air move out of the goaf, what might produce that?-- Inadequate ventilation in that heading.

Would temperatures have something to do with it as well?--

Well, temperatures create buoyancy, but whether it backs up or not or whether it flows out the return is a function of the ventilation.

If we can deal with the two parts first, though. If there was a temperature differential between the air moving in and the air moving out, that might commence the process?-- Well, it is the basis for the process, for the warm layer to be a lower density than - lighter than the intake air.

And would the normal temperature differential between intake air and goaf air, which is warmer through oxidation - would that be enough to start it off?-- Well, these things are - there's a spectrum of temperatures and any warmth is going to - any warm air is going to be more buoyant than the cooler air, and the difference is the difference in temperature.

In your view, is that phenomenon - that is the reversal out - is that indicative of a heating?-- Not in itself.

Is it simply indicative of low air velocity in the No 2 heading?-- Yes, it's indicative of inadequate ventilation flowing down No 2 heading.

If such an event might have been caused - if such an event was the cause of a heating inside the goaf pushing this layer out, would you expect to see other signs as well?-- Well, it would all depend on the extent - temperature of the heating and so forth and in relationship again to the extensive warming up of the air by virtue of reaction in the goaf.

Now, in relation to one other feature, can I turn to a matter that's been mentioned from time to time in this Inquiry and that is to say an indicator of spon com being referred to as haze. Are you familiar with that phenomenon?-- Well -----

Familiar with the -----?-- I am familiar with the term "haze" and its use sometimes as an indicator of a heating.

In terms of the position of such a haze - and I draw the distinction here between the returns in a panel and either intake air or non-return air - if a haze was truly generated by spon com, where would you expect to see it?-- Well, it's easiest - most easily seen in the vicinity of the spon com and it depends on - we have heard haze described as being moisture in the air. I think in terms of haze as a - what really results from a diffraction.

We are talking about the haze generated by -----?-- By anything.

By anything, all right?-- I'm talking about haze as a general term; that it's something that one sees as a result of diffraction of light, and diffraction of light takes place when there is a - there is particulates in the air, and so it could be moisture that is condensing to a light fog, it can be particulates, it can be condensed other liquid things more typical of - well, it's a mixture of things that comes out of

diesel engines, for example, it's the smog of the cities. These are particulates that one sees as haze in what I believe is - what I like to think of as being definitive of haze as something that causes diffraction of a light beam. In contrast warm gases that are lighter change in density, causes a refraction of light and it's - this is a source of shimmies and so forth that people talk about. This is a refraction process and not a diffraction process.

Well, the haze that has been identified on 6 August - it was mentioned a haze was seen more in the general body, I think it's to correct to say - on that day we know that there was between 39 and 35 cubic metres per second of ventilation into the panel. Can you make some comment about the likelihood of a spontaneous combustion haze existing in such ventilation?-- It would be very hard to see it very far into the goaf if one is looking down into the goaf with a cap lamp as the only illumination.

I should be corrected. That 39/35, in that range, that was the volume coming out of the top return?-- I understand.

But does the same comment apply?-- Well, it was going into the goaf as well, wasn't it?

Now, if one got a spon com haze as opposed to some diesels or whatever else haze - if one got a true spon com haze and it was in the return, would you expect to see other signs consistent with a heating?-- I would expect to find some odour, some smells.

That's in the return itself?-- If there is enough to be able to create a haze that one can see in the return with the velocity of air that's in that return, I would think there is a fairly good heating going on. I would look for other things that might be interpreted as a haze in the return.

Such as dust?-- Such as dust, very fine dust. It's a particulate that causes a diffraction, and the light really doesn't care much. It's sensitive only to particle size.

And knowing the velocities that were available on that day through the return, do you think it's likely that there could have been a haze due to spon com in the return?-- I think it's unlikely.

Now, can I move to a somewhat related topic for a moment, and that is another of the indicators that has been mentioned in these proceedings from time to time, that of smell. Mention has been made, and no doubt will be again, of evidence at least - I don't put it in the category of reports - evidence at least of people getting a smell in June - in one case Mr McCamley said he got a smell in June, in another case Mr Robertson reported in his report a smell - and we have had the view expressed that smell can be an indicator of a heating. Do you agree with that proposition?-- Well, it's a popular belief and I think a reasonable one.

Could it be something else, though, that produces such

smells?-- Smells are pretty subjective, but it's hard to say what some person smells. It could be.

In assessing the impact of a smell, is the non-repetition of it a factor that you would take into account?-- Well, non-repetition is the sort of thing that's frequently reported. The absence of someone else smelling it doesn't really say that it didn't exist for the first person and was a reasonable smell for another person. It's - we are dealing with a huge area with ventilation that does not move, as it were, down four, five, or whatever number, six sometimes entries and sweep everything out ahead of it, so that small changes in the ventilation patterns, things that disrupt the normal, nice, easy, smooth pipe flow through the panel, roof falls and so forth, headings, and all of these things can make it conceivable that somebody would get a whiff of something and then somebody couldn't get another whiff of it a short time or an hour later, a day later.

Would it also depend upon whether people were in the same general vicinity?-- Perhaps, perhaps not.

Apart from non-repetition, was non-confirmation - in the sense of someone going to check it out and finding no such thing - is that also a factor?-- Well, it's a factor but it's - you have to accept the fact that the first guy might be right.

It's a judgment call?-- It's a judgment call.

And upon which judgments might differ?-- Yes.

Now, we have heard suggestions also - and you may have been here for some of them - of the postulation of a heating in by 9 cross-cut and very early in the life of the panel. Now, do you have a view as to the likelihood of that occurring?-- I have problems with a significant heating developing there early in the extraction of the panel because of the number of people that are working in there, the changes of all sorts of things, people making changes in the ventilation, maybe minor, maybe major, but they clearly are making some small changes in the sense of keeping a good air flow over the miner, and I just find it difficult that a heating of - that might have occurred there early on in the extraction wouldn't have manifested itself to people in the early days afterwards.

You make the point in your report at page 3 that it's interesting - or perhaps you might put another adjective on it - that some slight smells were detected on one occasion but nothing in July?-- Yes.

Even though the air in July was reduced?-- Yes.

You find that odd?-- Well, I found it remarkable and so I remarked on it.

Can I turn to a slightly different point, please, and that is in relation to the - excuse me, I will just have to find my note - the CO/CO2 ratio about which we have heard some evidence in the last few days and before. Now, CO2 is given

off by coal as well as CO; is that right?-- Yes.

And, generally speaking, is there some temperature differential between them, one comes at lower temperature than the other?-- The first gases to come out at low temperature have generally been found to be carbon dioxide that comes out ahead of the carbon monoxide. As the temperature increases, the carbon monoxide starts picking up and comes out in greater quantities. The problem with the early emission of carbon dioxide in a mine environment in contrast to the laboratory environment is the inability to detect small amounts of carbon dioxide against the background. Normal air has 300 per cent of carbon dioxide - I think we have heard that before - but the infra-red analysers used for carbon dioxide are struggling to find - to see differences in the hundredths of a per cent range of carbon dioxide and they do not see this early development of carbon dioxide as lost in the noise.

Is that why you subscribe to the view, as others do, that CO is the best indicator of the early stages?-- Yes, it comes out at an early stage and is the sort of gas that can be readily detected at very low concentrations, and this was the whole basis for the Graham development - his refinement of a chemical means of analysing for very small concentrations of carbon monoxide - and so one needs to remember that one measures carbon monoxide in parts per million, when one is struggling to measure carbon dioxide in hundredths of a per cent, whereas starting at hundreds of parts per million - hundredths of a per cent. So, we are talking two different scales here of gas concentrations to seek to analyse, and in the mine it is quite different than in the laboratory where flows can be adjusted, such as to give high enough concentrations to make the discrimination possible.

And that's another example of the difficulty of trying to translate or impose laboratory tests or standards on a real life situation?-- Well, there are other probably more significant problems.

And in relation to the CO/CO2 ratio, is it another ratio which suffers from a lack of knowledge of the specific coal that one is dealing with?-- Only to a certain extent. In the data that I have seen and in the work that the Bureau has done, I'm sure there is a difference in the behaviour of coals. I think that that ratio might be perhaps less sensitive than some of the others to variations, but I expect variations coal to coal, especially if one goes to the extremes of the coal spectrum.

And do you hold the view that there is no absolute value with that ratio, as with others, that represents at some point a heating and at other points not?-- No, at best I think it can indicate the progress of a heating, and there within very, very small limits of temperature.

Now, you have had the opportunity, I think, to examine the CO/CO2 graph in Mr Mitchell's report?-- Yes.

And that shows a number of peaks and troughs?-- Yes.

Do you have some view that - as to what might cause that?-- Yes. In looking at the data there are some strange things happening in terms of the calibration of carbon dioxide - the calibration of all of the analytical system - and some of these changes are reflected there, particularly the one I think you may be referring to is the peculiar changes in June that were, I believe, associated, in part at least, with changes in calibration. There were significant changes in the background in the sort of steady state of levels of carbon dioxide before and after that period.

Do you understand, do you, that there was a re-calibration at about the time of that jump?-- That's what I was referring to, yes.

And that's a calibration that affected the way in which the analysers read carbon dioxide?-- Yes.

Could the witness see 251, please? Could the witness also see 228, please? If you turn over in 228?-- Yes.

You will see the carbon dioxide for Point 14?-- Yes.

Does that show, once we have reference to the Maihak data that shows the re-calibration-----?-- Yes, that's what I was referring to - to the sort of steady state situation that existed before running between six hundreds and eight hundreds, and afterwards more or less centring around 200 per cent after the significant change that occurred there in June - the latter part of June.

So, if we look at that Exhibit 228, what we can see there is the large change in the way in which the analysers were reading carbon dioxide?-- Yes.

And this, for Point 14, which was sampling simply air-----?-- Yes, I have found that looking at Point 14 was very useful because it was in every case analysing about one minute ahead of Point 16, and any changes in whatever barometric pressure, calibration, drift, voltage spikes, whatever one can make for some wandering of the data. One would expect to be minimised within this minute the difference between the analysis recorded for Point 14 - reported for Point 14 and the immediately following one reported for Point 16.

Now, in terms of the approach to analysis - scientific approach to analysis, is it important that one has a control that one can apply against which you can test data?-- Yes, this is rather comparable to what analytical chemists used to have to do all the time - running a blank before they ran an analysis for the record on an unknown - and this provides a - if you like, a blank against which to look at the results of the analysis immediately following.

You are there referring to not just the CO₂, but all of the gases for Point 14?-- For all of the gases Point 14 reports the same analyses - well, analyses for the same gases, as does Point 16. So, Point 14 provides this blank, if you like - this control against which to judge the - or the real value of what's being reported for Point 16.

And we can see from Exhibit 228 that there are, in fact, fluctuations from the normal on all the gases at Point 14?-- Yes, yes, and this is - there are all sorts of things that I say that I don't really know all of the factors that can enter into the variation of these, but if one just scans down the analyses for any one gas or all of the gases, one sees these things bouncing around a little bit - sometimes there are big excursions that you have to throw out, but there are small changes, and the way to correct to the best extent that you can - the best way is to look at it against a blank.

Now, if we stay with the effect of the calibration change on CO₂ for Point 14, what we can see there is roughly the CO₂ drops to a quarter of what it was before?-- Of that order.

Now, if one was looking for the impact of that change on a CO/CO2 ratio, would you expect to see the CO/CO2 ratio to jump by a factor of about 4?-- It would jump significantly by the virtue of the smaller denominator, yes.

Is that what we, in fact, see when we look at the graph that Mr Mitchell produced for the CO/CO2 ratio?-- Oh, a change that is significant. I hesitate to say that it is-----

I'll just give you a copy?-- Well, I see a jump here from something - perhaps .4 - perhaps to something like 1.5 or 1.6.

So, it is of that-----?-- Of that order of change, yes, that we see in the change for Point 14.

All right. Now, can you put those two to one side for a moment? If we look at the ratio just in its bare form, if CO2 does not increase, then the increase in the CO/CO2 ratio must be driven by increases in CO?-- That's the only other variable.

And if that is the situation - that CO2 doesn't increase, and it is only CO increasing - then is it any different to looking at parts per million or make in terms of its impact?-- No, it is the same number, really; it is just put on different coordinates.

Now, if you turn to Exhibit 251, which I think you still have there - it might have been put aside with the others?-- 251 I have.

This graph demonstrates the correction necessary for Point 16 by reference to what we saw on Point 14?-- Yes, this corrects for oxygen in the normal atmosphere for all of the variations in the electronics and the analysis and so on, and tracks from Point 16 the reference Point 14 to give the red line - the bottom line at the left-hand side, anyway.

So that the red line is where Point 16 should truly have been reading CO2?-- It is reading the best estimate possible of the CO2.

Sorry, it is reading it-----?-- But it is coming out of panel 512.

Sorry, I should have put it more correctly. It is reading the level of CO2 as it should for the corrections made from Point 14?-- Yes.

And when we look at that graph, we can see, as I think Mr Mitchell agreed with me, that the CO2 doesn't change. It is flat?-- It is quite flat.

Now, can you put that to one side for a moment? I'm sorry, I will ask you to just have it back for a moment. I'm sorry?-- It's still here.

There is one point I want to make. We see the fall on about 20 June in the CO2 - during the period of calibration?-- Yes.

Now, is it right to say that falling CO2 is not indicative of a heating?-- That's my knowledge. That's right.

So, any change in the ratio generated by a fall in the CO2 is not going to be indicative of a heating?-- Not in these early stages, no.

So, if we can see the translation on Mr Mitchell's graph in almost exactly the order of variants that you would expect - sorry, that is, a four-fold increase with a drop to one-quarter by the CO2 - that suggests that that is not indicative of a heating, doesn't it?-- That immediate rise there in June, yes, it is lost in the analytical problems.

If there was a heating going on, would you not expect to see it reflected in the CO2; just as a fall is not indicative of a heating, a rise is?-- Yes.

And we can see the CO2 is flat from Exhibit 251?-- Yes.

All right. Now, can I just ask you to go to another document, please? I want to show you a document, please. Have you had a graph done which shows the CO correction for Point 16? Have you had a graph done which reflects the CO correction for Point 16 in the same way the correction has been reflected on 251 for the CO2?-- Yes, exactly the same thing - to subtract the value of Point 14 from Point 16 - subtract algebraically.

So, what we do here, to put it in layman's terms - or, even worse, lawyer's terms - we wipe out the background that's indicative on Point 14?-- Well, yes, you compensate. You eliminate the background.

All right. And we can see on this graph that, in fact, means lower CO than what is, in fact, recorded for part of the time, and then there are some fluctuations?-- Yes, there are fluctuations, because sometimes the recorded value for Point 14 goes negative, and that was the reason for my saying that there is an algebraic subtraction here. So, one adds - if you have a negative reported for 14, you have to add that to 16.

All right. And what we can see from this graph, amongst other things, is that at about that period of 20 June CO was rising?-- Yes.

So, if one paused there to look at the CO/CO2 ratio, we know two factors from these two graphs for the relevant time: CO2 was flat and CO was rising?-- That's correct.

280395 D.51 Turn 10 dfc (Warden's Crt)

And would that produce a rising CO/CO2 ratio?-- Yes, if the numerator increases and the denominator stays constant, carrying out the division gives you an increase.

The CO2 flat, not indicative of a heating?-- That's right.

I tender that graph. It can be headed CO correction for point 16.

WARDEN: Exhibit 254.

ADMITTED AND MARKED "EXHIBIT 254"

MR MORRISON: I might just get you to keep a copy with you because it may be that you will need to refer back to it, and while you are looking at that again, that's Exhibit 254, can we also see on 254 what is reflected in the production schedules, namely the drop in CO around 12 June through to 14 June?-- Yes.

Now, can I ask you to look at another document, please? Have you had a graph redone which reflects the CO/CO2 ratio corrected in the same fashion as the previous two graphs, that is corrected to take out the effects of point 14?-- Yes, the correction was applied to both carbon monoxide and the carbon dioxide combined in this graph with two lines.

Does it show, as we look at it, a rise around 20 June or 21 June but nowhere near of the order reflected in Mr Mitchell's graph?-- That's correct, yes.

As we have seen this is a rise driven by CO and not CO2?-- Yes, the CO is essentially constant from there - I'm sorry, the CO2 is essentially constant.

Since we can not detect any rise in the CO2 is it reasonable to say that it's not open to say that this rise is due to a heating?-- Whatever CO comes from a heating, any heating, is lost in the analytical problems, the crudeness of the analyses.

I tender that graph.

WARDEN: Exhibit 255.

ADMITTED AND MARKED "EXHIBIT 255"

MR MORRISON: I will ask you to look at another graph. Have you also had a graph produced which deals with the CO/CO2 ratio but on the basis that it reflects only the figures of CO produced and CO2 produced from time to time?-- Yes. This

XN: MR MORRISON

WIT: VAN DOLAH R W

represents the actual correction by subtracting 14 from 16 to give these numbers that we see in this last graph. I think, if remember correctly, that the previous graph, 255, represents a correction of carbon monoxide to zero and carbon dioxide to three-hundredths per cent. That's 255. So -----

Is that to make point 16 read as though it levels at point 14 -----?-- As though there is pressure going into the panel and this coming out and carbon monoxide - air going in without any carbon monoxide into the panel and this coming out.

Sorry, that's 255?-- 255, yes.

And that's different from the next graph?-- Yes, this graph represents a correction by the subtraction process. The blanks that one sees in here, the gaps in the line, represent times at which at correction for carbon dioxide ended up being zero, and obviously you can't divide by zero, so wherever that happened it shows - the line is interrupted.

So just let me understand this correctly. Exhibit 255 has been generated to reflect air going into the panel without any CO as it enters so that we can determine the level of CO that was coming out?-- Yes.

But air as it went in which did contain the CO₂ level apparent at point 14?-- No, I think it was corrected to .03 per cent CO₂.

The CO₂ was corrected to .03, and why was that selected?-- Well, because that's the concentration that is normally assumed to be in normal atmosphere.

Normal atmosphere?-- Normal air.

So 255 is an attempt to show as best we can on the current data fresh air going into the panel and how it looked coming out?-- Yes.

The next graph though shows us the same ratio but simply on a differential between point 14 and point 16?-- Yes, this seeks to show as best we can the actual production of CO and the actual production of CO₂ in the panel. Admittedly this air has traversed some airways to get to the panel, but whatever it picked up in the way of CO and CO₂ in that traversing the intake airways to get to panel 512, I think, is very small, but in any case is constant between - from point to point.

What we see on the new graph is Graham's Ratio - I'm sorry, I said Graham's Ratio, the other graph?-- CO/CO₂ ratio.

The CO/CO₂ ratio - all I have to do is read the top - containing the move up on 21 or 20 June CO driven?-- Yes.

And then in fact it starts to drop later on?-- I'm not sure the drop is that significant, but it would appear to be so, but when one really looks at the envelope of the data - I want to look at the envelope rather than picking out all the high points and ignoring all the low points.

280395 D.51 Turn 10 dfc (Warden's Crt)

It's not much different from the previous graph in that sense?-- No, that's right.

I tender that graph, CO produced or CO2 produced ratio.

WARDEN: Exhibit 256.

ADMITTED AND MARKED "EXHIBIT 256"

MR MORRISON: Now, we heard mention yesterday, and you are probably familiar with the text that suggests that CO2 increases as much as 100 times greater than CO at the beginning of a heating. In fact I think Mr Mitchell went further yesterday and suggested it could be much more than that, even infinite?-- Yes, I heard that.

But if we take it at 100 times as an indicator, we go back to Exhibit 254 - I think you still have that with you, the CO correction?-- Yes, I have 254.

CO correction for point 16?-- Yes.

We can see a rise there around 20 June thereabouts, that area, of three up to about 6 ppm?-- Yes.

Consistent with the figures that we heard about, the 100 times that for CO2 would have resulted in roughly a doubling from .03 to .06, 300 to 600?-- Well, 100 times 3 ppm is 300 ppm which is 300 to 600.

So 300 to 600 should have been the rise seen in CO2 and it's not there?-- I don't see it, no.

Which would suggest, would you agree, that the rise we see in the CO/CO2 ratio is not due to temperature, but simply CO driven?-- It appears that it's completely CO. The result of CO increase.

Your Worship, we have had printed off the whiteboard the graph that Dr Van Dolah did earlier - I should call it the schematic which I will tender.

WARDEN: We will dignify it by giving it the number 257, thank you.

ADMITTED AND MARKED "EXHIBIT 257"

MR MORRISON: Perhaps its title should be schematic, schematic of CO. Now, can I move to a different point for a moment? You make some comments in your report really commencing, I

XN: MR MORRISON

WIT: VAN DOLAH R W

think, at page 3 and then more particularly at page 6 and following in relation to certain sections of the SIMTARS report and your view of that. Now, there are just a couple of points I want to take you to in relation to that. On page 4 you refer to Table 5.3.2 from the SIMTARS report. Can I pause to ask you - do you have a copy of the SIMTARS report with you at the moment?-- Yes, I think - yes.

Because it may be you will need to refer to the table or some parts as I go. Now, in that section of the report effectively SIMTARS are suggesting that the 161 ppm is representative of what was present in the sealed panel, and I simply want to ask you is that a view that you hold?-- It only represents the sample that was analysed. I've said previously I don't believe that it is indicative of the concentration throughout 512.

The section is page 44 of the SIMTARS report?-- I have it.

You will see further down on that page at Table 5.3.3 SIMTARS purport to establish a CO make not - to be understood in the way we have been talking about CO make most commonly in these proceedings, something in excess of 11,500 lpm. Do you have a view about the utility of that calculation?-- It's quite wrong to make that calculation. That one sample, even ignoring whatever they - the true concentration of carbon monoxide was is again - makes the impossible jump to consider that that concentration, that that analysis represents the entire volume of the panel, the void of the panel.

On page 45 of the report, in Table 5.5.1 are a number of perhaps now historical figures in relation to Graham's Ratio and what it might indicate in terms of new coal and old coal. Now, I think you were present for Mr Humphreys' evidence about that?-- Yes.

Where really he indicated - I think agreed, without being unfair to him, that those figures may have had their day if I can put it that way?-- Yes.

Do you have some view about the utility of such figures and descriptions of new coal and old coal?-- Well, I have problems of distinguishing between new coal and when it becomes old coal, but in the general terms I look back at all of the data in which there are significant variations in what people consider to be normal values of this for a particular coal.

You mentioned earlier even in Mr Graham's own work significant variations from .5 to over two?-- Correct.

Is this the sort of area, the absolute numbers, where experience of a particular seam is essential?-- I believe so. I think it's quite wrong to try to establish these as writ in stone.

In relation to the use of those sort of figures or the Graham's Ratio as well, is there some impact on the ratio after a panel is sealed in relation to the drop in oxygen

levels?-- There are problems and it's difficult to really be sure what exactly the problems are. Normally when people have looked at Graham's Ratio in the laboratory, heating coals and analysing the products, one is - one deals with - they deal with a continuing flow of fresh air, and we know that reaction rates fall off as the oxygen concentration goes down in the air that's reacting with the coal. I don't think that anyone has properly elucidated the impact of that on the ratio of carbon monoxide produced for - to the total oxygen reacted. I don't know of any results anyway that properly elucidates that relationship. In other words, if one looked at coal at a particular temperature that sees oxygen at a concentration of 18 per cent instead of near 21 per cent, or 16 per cent, exactly what that does to the ratio of carbon monoxide produced to a total oxygen reacted, I don't think that has been done. It leads to the suspicion that one should be careful about interpreting the Graham's Ratio in sealed areas where the oxygen is obviously being used up. We are now dealing with vitiated air, air with less than normal amounts of oxygen, and so one is then - I'm at least suspicious and view the results with suspicion of such ratios as Graham's Ratio in those circumstances.

Can I ask you to turn over the page of the SIMTARS report to page 46? In this section, certainly in the top of the page and elsewhere, SIMTARS purport to offer views about average temperatures in the panel as a result of applying figures from the ratios and in particular in that section the Graham's Ratio. Do you have some view about the utility of that analysis?-- Well, they go too far to ascribe particular temperatures as representing an average - a weighted average admittedly - of the coal. The most that one can say - and I think Mr Humphreys said it, perhaps it was Dr Cliff - that the results indicated difference in temperature, one being higher than the other. I think it's quite a mistake to say that there is an average. I don't know how you average one hot spot or a dozen hot spots with a huge amount of extensively reacting coal.

Now, can I ask you one other point that's related to the use of those ratios? You would have heard me asking Mr Humphreys whether he had taken into account the drift in relation to oxygen on the analysers. Now, in relation to the Graham's certainly, would you agree that the interpretation of that is dependent upon a correct oxygen deficiency reading?-- Yes, it's very sensitive to that.

And you might get wildly fluctuating results if you took the correction at .3 as opposed to .4 to allow for this, for the drift?-- Yes. Any impact - anything that you do to change the oxygen and, thus, its impact upon the oxygen deficiency, of course, enters into this thing twice, you see, because you use the oxygen to - as part of the total to find out - total gas to make an estimate, by difference, of the nitrogen. Then you multiply that by a factor to get the equivalent oxygen in fresh air. Then you subtract the oxygen that you found again from that in order to get the oxygen deficiency, and so in air - they are not really compensating. It depends what you are talking about. In fact, there was a - I believe it was Dr Cliff had a graph of the change in Graham's Ratio just as a function of the oxygen that was involved. It's - any change - any fluctuation of the oxygen concentration as reported and used in the calculation can have a drastic effect on the calculation.

I will just ask you to look at a graph. You would have heard that what SIMTARS did was simply apply a .4 correction to account for the drift?-- Yes.

Have you had a graph done which represents the result of applying just an average .4 correction for oxygen?-- Yes, this is a point by point correction of the Maihak recorded values adding .4 per cent oxygen because the Maihak typically was reading things like 20.4 and 20.5 per cent. It never did read what it should have read - 20.9 roughly.

Can we see from this that the application of a straight .4 correction leads to quite meaningless results in relation to Graham's Ratio?-- Well, very erratic anyway.

You can see that by the points that appear to go off the scale one way and then the other?-- Yes.

I tender that graph. Point 16, 512 top return, Graham's Ratio with oxygen correction.

WARDEN: Exhibit 258.

ADMITTED AND MARKED "EXHIBIT 258"

MR MORRISON: Now, can I ask you to go to page - it's 46 where you are at and over the page to 47 in the SIMTARS report? You will have noted at the time of reading the report, no doubt, and since that SIMTARS rely upon laboratory determinations of temperatures and then apply them to what took place?-- Yes.

Now, you have mentioned before you don't - your view is that that's an impermissible approach?-- Well, it's fraught with danger.

I think you can put the SIMTARS report to one side for the moment. Excuse me a moment. I just want to check some notes. I just want to turn to one last topic - I think it's one last topic - and that is in relation to the Graham's Ratio. As with the other areas that we have looked at over those gases, could the same - would you be of the view that the same approach should be applied to the Graham's Ratio as you have done to the CO/CO2 as, say, corrected as against point 14, the blank?-- Yes, I think that this gives the best estimate - obviously a better estimate than just applying a flat percentage correction to point 16 or - yes, point 16.

And have you had some graphs done which show that?-- Yes.

Can I ask you to look at these documents, please? Now, in the same way as we did with the previous graphs, does this now show you the Graham's Ratio over two time periods corrected in the same way?-- Yes. The time periods are really included in the first. It just - the second graph just expands on the last week.

Now, if we take the first graph, it runs with a baseline of 27 July through to 8 August and the data comprehends that period up to 7 August?-- Yes, that's correct.

And does it show the Graham's sitting pretty much constant?-- Well, it shows a slight increase.

Slight increase at the end?-- Yes.

And when we look at that, are we talking about a period around 6 August?-- Well, particularly there, but one sees - I get the feeling that it's creeping up somewhat earlier but very, very slowly. You have to - again sort of have to look at the envelope of the results. These data are point by point subtractions of the point 14 results for carbon monoxide and for oxygen from corresponding results for point 16. It takes

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care of all the problems of barometric pressure variations and instrumental swings, drifts, just plain collapsing, whatever.

So, in terms of what we can do with the data available, this is as close as we can get?-- I believe so.

And the second graph covers a time period 1 August through to 7 August. It's the same data for that period as on the first but simply gives a better view of that time frame?-- It spreads it out to where one can see some of the changes a little bit clearer, I think, than you can where they are all piled up together.

And again showing the graph pretty much flat through to and after 5 August with a slight rise closer to the 6th?-- Yes, it's running in the order of .5 and then increases up to .6 or .7, something like that, something above .5 anyway which is the coordinate line.

I tender those graphs perhaps as one exhibit, Your Worship, they could be kept together.

WARDEN: Exhibit 259.

ADMITTED AND MARKED "EXHIBIT 259"

MR MORRISON: Can I ask you to look at one last document? We have heard before, and I think you have just mentioned it again, that barometric pressure changes have an impact upon the analyser reading oxygen?-- Yes.

And has this graph been produced to compare the changes in the barometer with changes in the way in which oxygen was read at both points 14 and 16?-- Yes. The top red line is the barometric pressure and the intermediate line is point 16 - the other way around, point 14 is the intermediate line, point 16 is the green line, oxygen, point 16.

For the colour-blind, the top one is the barometer pressure, the middle one is point 14, the bottom one is point 16?-- I'm having trouble with the light.

Does that show us that in fact what's been said before is correct: as the barometer rises or falls, you get corresponding rises and falls in temperature?-- One can see diurnal changes in barometer. Some of them are more important changes than the barometric pressures. It doesn't track completely. There are other things happening to the analyser here besides barometric pressure.

I tender that graph, a comparison of oxygen readings.

WARDEN: Exhibit 260.

XN: MR MORRISON

WIT: VAN DOLAH R W

ADMITTED AND MARKED "EXHIBIT 260"

MR MORRISON: I have nothing further for Dr Van Dolah.

CROSS-EXAMINATION:

MR MACSPORRAN: Dr Van Dolah, can I ask you briefly about that second last point firstly, Exhibit 259? Could the witness have that back, please?-- All right.

Did I understand you to say that the graphs depicted on those sheets is the best data available, taking out instrument inaccuracy, drift and swing, barometric pressure, things like that, those sorts of variables?-- I believe it to be so.

And having done that, the Graham's Ratio is then rising from about .5 to .6 or .7; is that so?-- In that range, yes, perhaps starting even a little bit lower.

A little bit lower and going up to as high as potentially .7?-- Yes, of that order.

Is that a trend that would be of concern had it been seen, that is, an upward trend in Graham's Ratio?-- Well, you use the word "concern" and I have heard this throughout these proceedings. Does it indicate something to me? Yes.

Is it consistent with a heating taking place over that period of the increase?-- It would indicate that.

You can hand that back. That's the sort of trend that you talk about. Rather than absolute values, you look at a trend?-- You look at trends.

An upward trend even as small as that would be a matter that could confirm the presence of a heating?-- It gives you suspicions.

Which would require further investigation?-- Yes.

Can I take you back to your report? You have outlined on page 1 the initial source data you had to arrive at your conclusions?-- Yes.

And you confirmed that today. It includes all of the SIMTARS material, which includes the draft report of October last year, as well as the final report of January this year; is that so?-- When I prepared the report I did not have the appendices to the SIMTARS report.

I see?-- I had some of the data, I couldn't really remember - at this point I can't tell you exactly what I had in

XXN: MR MACSPORRAN

WIT: VAN DOLAH R W

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addition, but I did not have the appendices.

I take it, though, you have had access to those since then?--
Yes.

And you had the report of Mr Schaus as registered manager and his statement?-- Yes.

You had Mr Mason's statement and Mr Squires' statement?--
Yes.

Then you sat through a body of evidence here over the last five weeks or so?-- Yes.

You were aware, I take it, that the SIMTARS draft report had been prepared between the incident on 7 August and the start date of these proceedings on 18 October last year?-- Yes, and I might say that all I had was the original draft - I think it was dated October or something - of the SIMTARS report until I arrived here, at which point I was given a copy of the revised one.

And after you have assessed all of that material, including evidence given here and before you arrived, your conclusion is to agree with SIMTARS that the most probable location of the ignition was 512 Panel?-- Yes, I think it's most probable to have started there.

And that the source inside 512 was a spontaneous combustion or heating?-- The most probable cause, again, yes.

So, you would say that SIMTARS got it right?-- Oh, yes.

In respect of the ultimate conclusion relevant to these proceedings?-- Yes, I said so in my report.

Now, when you talk about the oxidation process for coal, you speak of, as you expose more surfaces of coal, an increase in the CO given off?-- Sorry, say again.

As you expose more coal, you get more CO?-- Yes, for a given coal, mmm.

And that's how you might relate the production gain in a particular area to a given CO make?-- Yes.

The two circumstances being connected one to the other?-- Not completely, because production is the coal that leaves the panel and the CO make is caused by the - results from a reaction with the coal that's left in the panel.

The CO that's leaving the coal is picked up by the ventilation and assessed with the calculation to arrive at a CO make figure?-- Yes.

So, ventilation being equal, the CO parts per million and CO make will follow a similar trend?-- If the ventilation is constant.

And the CO is given off in relation to the particular coal, as you say, and one of the factors is the amount of it that is exposed?-- Yes.

The more that's exposed, the more CO you would expect to be given off?-- All other things being equal.

Now, relevant to that process, you say, is the question of whether or not the coal has been drained of methane, first of all?-- It has an effect.

If it has been drained of methane, you say the process of oxygen reacting with the coal is enhanced?-- Facilitated.

Facilitated; enabled?-- Yes.

So, in that sense, you get coal that gives off more CO if it has been drained of methane?-- The rate of reaction is higher. When you say "giving off more", this implies a time frame that-----

Perhaps I can confine it this way: would it give off more CO in a given time frame than coal that had not been drained of methane?-- For the same coal, I think that's right, yes.

So, if you are comparing a panel that was drained of methane with one that hadn't been drained, you would expect a higher CO parts per million and potentially higher CO make?-- All

factors being constant, yes.

Now, once you have large areas of loose coal or coal surfaces exposed giving off more CO, those conditions are conducive to the development, potentially, of spon com, aren't they?-- Well, the mere reaction of coal with oxygen does not lead to spon com.

No, but it generates heat, doesn't it?-- It generates heat, yes.

That's why you say in your report that critical at that stage is the ventilation to that area?-- Yes.

Because if the ventilation doesn't take the heat that's generated away, you have conditions that give rise to spontaneous combustion?-- Yes, the classical statement is when the heat removed is less than the heat generated, the temperature goes up and it can lead to spontaneous combustion.

So, if a method of mining gives rise to more coal being exposed faster, you have conditions that more readily permit spontaneous combustion to occur, don't you?-- I don't think that follows. Let me hear that again, please?

If you have a mining method that exposes more coal and leaves behind more coal at a faster rate, you have conditions that are more readily available for the development of spontaneous combustion?-- I find that formulation or statement or question to be difficult. It isn't necessarily so.

No. But a critical factor in whether it is so or not would depend on what the ventilation is doing over that period?-- It would be one factor, yes.

It would be a fairly important factor, wouldn't it?-- Oh, yes.

Because if you had a mining method exposing more coal at a faster rate and inadequate ventilation, you would have conditions very conducive to spon com?-- More conditions.

Well, I suppose it is a question of degree, isn't it?-- Well, it is a question of the loose coal and its distribution. If we take a flat plane and put a nice layer of loose coal on that flat plane, there is a lot of surface there and a lot of coal to react and a lot of CO is going to be produced and heat is going to be produced as a result of it, but spontaneous combustion is very unlikely because of the distribution of this loose coal and all of the other factors that are involved in the total mining picture that can have an overriding influence - just not the coal and just not the ventilation.

But if you have a bord and pillar method of mining, you are going to have areas that aren't as well ventilated as other areas, is that so, within the same section?-- Yes.

And that, in turn, can have an effect upon whether spontaneous combustion develops or not?-- It can.

If the ventilation flow to a particular area inside a bord and pillar mine drops entirely to nothing, you have got conditions very conducive to the development of spontaneous combustion?-- You have to have a little bit of supply of air to the coal if it is going to keep on reacting.

Well, intermittent supply of air?-- That's generally regarded as not desirable if one wants to prevent spontaneous combustion.

Exactly. So, if you have changing ventilation reactions in a bord and pillar mine where you have loose coal lying around, you have potentially ideal conditions for the development of spon com?-- I would argue with "ideal", but I could create more ideal conditions really if I set about to do it.

You would certainly have conditions that are conducive to the development of that condition?-- Yes.

And one sure way of preventing that happening is to make sure the ventilation is adequate? Is the word "adequate" causing you-----?-- Yes, I'm having difficulty with that because I can conceive of places where spon com can take place and that general ventilation of the section wouldn't do much for you.

I suppose, to simplify it to this extent, what I am suggesting really is this: that the history of extraction phase in 512 undoubtedly left areas that weren't ventilated very well at all as the panel progressed out; is that so?-- I don't know.

You don't agree with that proposition?-- I didn't disagree. I just don't know that.

Haven't you looked at the evidence relating to air backing up the No 2 heading?-- On an intermittent basis, yes.

Which means, I think in your own words, the ventilation in that area was inadequate, or there wasn't sufficient ventilation-----?-- Was inadequate.

Yes?-- Yes.

So, you have areas inbye of where the air was backing up that weren't being properly ventilated?-- "Properly" is another term that I have problems with. Again, it is a question of the amount of ventilation to remove the heat so as to keep it from building up.

On those occasions, intermittently as you say, when air was backing up No 2, the ventilation in that roadway would be inadequate to remove heat at any potential site inbye that point?-- No, not necessarily. The movement of the air out could be removing some of the heat from the heating source.

But not sufficient heat to prevent the reaction continuing in a heating?-- Those are your words, not mine.

I am asking you, I suppose?-- I don't agree.

You don't agree?-- No.

Why not?-- Well, because it is a question of where the heating is and what the air is moving past that heating, and as I just made the statement, the air backing up could be moving air past that heating and removing some of that heat from the heating, if it was there.

But if the-----?-- All it is is taking heat away from the source of heat, and it doesn't say anything about the direction that you are moving that.

If it is not taking heat away from the source of the heat at a rate that that source produces the heat, you have conditions for spontaneous combustion to continue?-- The temperature will go up.

So, if some of the heat is being taken up the No 2 road during the reversal, but not all of it, you would have a heating potentially inbye?-- No, I can't say that.

As a possibility?-- Yes, there is a possibility, but not as a certainty.

And certainly the air coming back up No 2 must indicate the inadequacy of the ventilation in that roadway?-- It was inadequate for the mining process, I think, but I can't say that it was inadequate as far as any particular heating was concerned somewhere in the panel.

It would be - the ventilation would be conducive - or the lack of ventilation in No 2 would be - create conditions more conducive to the development of a heating inbye than ventilation was pushing air down No 2; is that so - compare the two situations?-- Well, you said one was a lack of ventilation. All I'm saying is that it was inadequate. I don't say that there was none.

I don't say there was none?-- You said "lack", I thought.

I will rephrase it this way: if you had air going down No 2 roadway, which was an intake roadway; is that so?-- Yes.

And no backing up?-- I'm sorry?

And no backing up?-- "Now", is it?

No backing up in the roadway?-- "No" or "now"?

No?-- "No"?

No?-- None?

None, nil?-- All right, I understand the conditions.

So, we have air going down No 2 as a normal ventilation pattern for an intake roadway?-- Yes.

No backing up?-- All right.

Normal ventilation?-- Right.

If you compare that situation with intake roadway No 2 which has air backing up it, all right?-- Yes.

The second situation would be more conducive with the development of spontaneous combustion than the first - potentially?-- Potentially; I will go that far.

All right. Of course, we know, don't we, from your conclusions that there was, in fact, a heating, or perhaps several of them inside 512?-- Yes, I think that's right.

And would you agree that this phenomena of the air backing up No 2 is a potential indication of how it could start?-- No.

Not even potentially?-- I think the prime indication is that it was inadequate ventilation of the panel and that went down 2 heading, but again it is a question of the removal of heat faster than it is being produced-----

And the removal of heat - sorry, I'll let you finish?-- And the short-term movement of part of the air up against the normal ventilation current still does not tell me that one way or the other whether heat is being removed to the extent that a heating is going to accelerate, the temperature is going to increase, or whether it is not.

In any event, the mining method we have talked about would result in leaving more loose coal than other methods; that's accepted, is it not?-- Yes.

And furthermore, would result in leaving more loose coal in various areas inside 512?-- Yes.

Some behind pillars?-- Yes.

Some beside pillars?-- Yes.

Some in ramped areas?-- Yes.

Or bottoms?-- Yes.

That is a factor which would be relevant to the assessment of whether such coal could develop spon com?-- Yes.

And that goes back to your point about its location within the panel - that is, the location of the coal and the access of the ventilation flow to those areas?-- Yes.

And just looking at 512 and assessing the whole picture, as you have, do you concede that there were areas inside 512 where spontaneous combustion could develop?-- Yes.

Through lack of air - proper adequate air flow to those areas?-- Again, going beyond the question of air flow.

In what way?-- In terms of a crushed pillar where heatings can take place inside a pillar, and the air can be going around on the outside and-----

That's one such side of a heating?-- Yes, and there are many such variations. There is not a single way in which a spontaneous combustion can get started. In the particular configuration of coal, there are many ways.

And that makes it much more difficult to detect the signs of such a heating?-- Yes.

And makes it obvious that you have got to be very vigilant in monitoring such events?-- Yes.

And often the signs can be rather subtle?-- Yes.

But because they are subtle doesn't mean that they are not occurring?-- That's true. They may be lost in the background in the noise.

And I think your evidence here is, is it not, that's what can happen with smell, for instance, as an indication of spontaneous combustion?-- Yes.

You agree, I take it, that a description such as "tarry or benzeney type smells" are smells that, if they are accurate - accurately reported - relates to an indication of spontaneous combustion?-- If they are accurate. I found those descriptions to be a little bit difficult, but then this is a subjective thing and somebody's benzene is somebody else's tar, I guess, but near one of which smells to me like hot coal, but, you know-----

Certainly. There is various ways of describing what might relate to coal burning or heating to the extent to give off fumes, chemicals, but those sorts of descriptions are consistent, aren't they, with descriptions of such a process taking place?-- Well, they are someone's description and this is a frequent indication of a heating, yes.

And there are varying views about what temperature coal has to be at to give off such products that can be detected in that way?-- I'm sure that there are, and I'm sure there are variations in coal.

So, it might vary from coal to coal, country to country, seam to seam?-- Seam to seam, particularly, you are right; yeah, coal to coal.

In any event, your view, as you expressed it earlier, if my note is correct, would be that if there was a detection of such smells and they couldn't be detected by others, you certainly wouldn't dismiss the first such detection of smell as being wrong?-- I would not reject it out of hand. I think that it is something that requires further investigation.

And further investigation would involve more than simply going underground to see on a given day whether you could repeat

detection of such a smell - I mean, it is a factor?-- Well, going underground is a pretty broad sort of statement.

Going underground to the area where the smell was detected, and if you couldn't detect the same smell, you could hardly dismiss out of hand the first report, could you?-- This is a judgment call.

But your experience has been, as I understood it, and your expert opinion is that the fact that you can't repeat such a smell doesn't mean you dismiss the first indication of it?-- That's what I said earlier.

You would really take it very seriously?-- Yes.

And that's what you mean, isn't it, when you talk about the signs in the days leading up to the explosion on the 7th?-- Yes.

The signs clearly indicating that a heating was taking place inside 512?-- Did I say "clearly"?

I will see what you said. It is page 5, I think, second last paragraph, about half-way through. You say, "A heating was probably occurring, based on various observations in the days just preceding sealing. Additional sites could be developing but the available data do not provide a way of distinguishing between sites growing in number or size and increasing temperatures (while still in the low temperature regime)."?-- Yes, I said that statement.

What you are referring to there as "various observations in days just preceding sealing" relate to haze and smell, don't they?-- Yes.

And perhaps other signs?-- I'm not sure what they were.

So, it is confined to haze and smell, is it?-- Well, I guess there were shimmies and things, but I don't understand what they meant, exactly, but, yes.

But signs indicate to you that there was a heating probably taking place inside 512 in the days leading up to sealing?-- Yes, that's right.

And you were aware, I take it when you gave that opinion, that there had been investigations underground to see whether those signs, haze and smell, could be repeated?-- Yes, I was aware that others had gone underground to investigate.

And others had been by and large unable to repeat the signs we talk of?-- Or had a different opinion as to what it was - what the smell was.

In spite of that your conclusion then is that there was indeed a heating occurring at that time?-- No, my conclusion is that a heating was probably occurring.

Based upon those signs?-- Yes.

Smell and haze?-- Yes.

Is that a convenient time?

WARDEN: Thank you, Mr MacSporran. We will take the lunch adjournment, gentlemen. Resume at 2.15.

THE COURT ADJOURNED AT 1.02 P.M. UNTIL 2.15 P.M.

THE COURT RESUMED AT 2.17 P.M.

ROBERT WAYNE VAN DOLAH, CONTINUING:

MR MACSPORRAN: Dr Van Dolah, we had concluded at the break on the topic of smell being one indicator of a spontaneous combustion occurring inside a panel. You recall those questions?-- Yes.

I think you may have said as much already, but do you agree that it's not uncommon where spontaneous combustion is occurring for smell to appear fleetingly and then not be readily detected soon thereafter?-- Yes, it's been reported that way, yes.

And what in your experience and opinion is the cause for that sort of phenomena, that is smell coming and going fleetingly like that?-- Could be a number of causes, minor changes in the ventilation pattern, a roof fall that might cover the heating. There are all sorts of variations on the same theme, but we are talking about something that's obviously not being produced in large quantities and on a continuous basis in large quantities otherwise it would be there on a continuing basis and would be detected repeatedly.

So there are a whole host of factors that come into play on the question of whether or not a smell might linger, for

instance, in the panel to be detected?-- I suppose, yes.

Some of them you've mentioned such as the quantity of the products of combustion giving rise to the smell?-- Yes.

If it's a smallish but intense heating you might have less smell associated with that than a larger although less warm heating potentially?-- Well, yes, it depends on how intense we are talking. If it's very intense it's going to become evident more and more, it's going to grow.

And then, of course, the changes to ventilation, would have a very significant bearing upon whether you could detect such a smell?-- Depending if the changes were significant.

And likewise I suppose the air quantity we are talking about would be relevant?-- Yes, to a certain extent.

If you have, for instance, a very high quantity of air going through a panel it may to some extent mask the smell that's coming out of the goaf?-- Well, it surely dilutes it and would make it much more difficult to detect in the return.

Is that a reason why on occasions it's recommended that if the ventilation quantity has dropped it can make the detection of a smell easier, for instance?-- Well, it might facilitate that, but it would sure worry a lot of people in a gassy mine.

It certainly has other disadvantages, but it is one way of making it easier to detect such a smell?-- Easier, not necessarily easy.

I think you were in Court - you may have been in Court on more than one occasion when the volume of the SIMTARS seminar material from 1989 was referred to?-- Yes.

I don't necessarily need to show you that, I don't think. You recall the passages in there dealing with the coming and going, the fleeting appearance of smells?-- I read that, yes.

You would agree with the sentiment expressed in that material?-- I've seen it elsewhere as well.

Now, you were asked questions and you agreed with the proposition that increased rates of production can result in an increased CO make in a panel?-- Say again? It sounds to me like you said the same thing.

Increased rates of production in a panel can result in increasing levels of CO make being detected in that panel?-- Well, CO make is a measure of production.

Mining production I'm talking about?-- Sorry, yes.

You were shown the graphs, I think, to look at whether or not there was a correlation between the rate of production, mining production inside 512 on extraction?-- Yes.

And the CO make for the panel?-- Yes.

I think your words were there was a rough - a rough correlation between the two graphs?-- Something like that, yes.

Could the witness see those, please, Your Worship, 219 and 245, I think. Do you have those?-- Yes, I have them.

Perhaps you could tell us - it might be quicker if you tell us what parts of those graphs simply don't correlate?-- In Exhibit 245 which deals with the weekly tonnes production, the points on the co-ordinate of 29 May and the following week, 5 June are not matched by corresponding high rates of carbon monoxide make as illustrated in Exhibit 219.

Is it a fair summary of Exhibit 245, the production - tonnage graph that it shows between 29 May and at least 5 June an increasing rate of production of tonnes of coal mined, increasing rate between 29 May and 5 June?-- All right, yes.

Do you want to give some other explanation or description of that?-- A particular production figure bothered me as calling it a rate, but I accept that terminology. It's the amount of production for that week is the item, and these two points I'm saying do not show the very large increase in the carbon monoxide make, but those are the main points that deviate from a nice correlation between the two.

If we just stick with these points for the moment, the tonnage mined - I suppose week ending 5 June, was greater than the tonnage mined week ending 29 May; is that so? It's on 245?-- I see 29 May. What's the other one?

5 June, next one?-- 5 June, right.

So the tonnage for 5 June shows an increase over the tonnage for 29 May?-- But not significant from my point of view.

But it is an increase?-- It might have been to the production deputy, but not to me.

Not significant so far as bonuses go?-- Whatever.

But it is an increase?-- Yes.

In the same period on 219 which is the CO make graph - when I say the same period, it really is -----?-- It's close.

28 May to 4 June perhaps?-- Yes.

It shows a decrease in CO make, doesn't it?-- Yes.

Well, that clearly is a point of difference between the graph -----?-- I don't consider either to be a significant change.

Well, I was asking you for your opinion as to whether the graphs differed and didn't correlate and you nominated these points?-- These two points, yes.

So there is that difference?-- There is a difference in the relationship to the rest of the graph in both cases. The difference between those two weeks is not significant to me either in the form of production or in the form of carbon monoxide make. I'm saying for all intents and purposes those are equivalent weeks in both cases. They are not high relative to the previous week or relative to the following week to the extent that in the case of the make compared to the case of the tonnage. So they are different. I didn't say it was a perfect correlation.

I know you didn't, that's what I'm asking, you see. It's not - it's a rough correlation to use your term?-- Yes.

And in terms of CO and indeed CO make being produced from oxidation of coal as opposed to heating, it's very difficult, isn't it, to rely upon a correlation between production and CO make?-- No.

Because again let's go back to accepting trends rather than specific points as being important. I see a corresponding trend in the production and the CO make and that to me is the important thing and not the correspondence of week to week make versus production.

So because you have - basically an ever increasing rate of production, that's tonnage?-- That's what's shown.

You would be happy to relate to that - as a reason why you would have the ever increasing CO make rate?-- I think it's a large factor.

It certainly wouldn't be sufficient, would it, to exclude the presence of a heating inside that panel?-- It's just not indicated. I have no way of including it or excluding it.

Well, isn't that the point, that prima facie you would have some concerns, to use that term, about an ever increasing CO make trend?-- No.

You wouldn't at first appearances have concern about an ever increasing CO make?-- Not when I look at the - at what is happening in the panel.

And that includes the rate of production of a coal?-- Yes.

But forget about the production just for a moment. If you saw a graph such as in 219, CO make at the start of production ever increasing to sealing. That would at face value be a matter that you would want to look into very carefully, wouldn't it?-- Yes, when I first saw it I wondered why it was different and so I went through the rest of the material that I had until I came across the production figures which were not graphed. They were just numbers, but then I saw that this was larger than previous panels.

That would tell you that you would expect to have more coal exposed over the period?-- Yes.

You explained your diagram on the whiteboard, how that works. You have coal that's exposed which after a time stops giving off carbon monoxide?-- I didn't say that. Keeps on, but at a lower rate.

At a lower rate?-- Yes.

As its rate decreases it's replaced by other coal surfaces that are replaced at a higher rate?-- It's not replaced, added to.

My incorrect terminology, added to so that in that way, as you've described, you have an ever increasing production of CO?-- In that scenario, yes.

So one possible explanation for CO and CO make ever increasing could be related to production of coal?-- Yes.

But what I'm saying, you see, is would you be prepared to accept that as being the reason without further investigation?-- Well, when I saw it I investigated further into the data that I had.

Well, what other data did you look at to ascertain whether the trend of CO make was due to production increasing throughout the life of the panel or some other cause?-- Well, the only data that I had was - at the time was the comparative production figures for that and some other recent panels and the relative CO makes for the other panels.

Well, at the end of that exercise you must have been completely satisfied that the CO make trend for 512 was explained on the basis of rates of production of coal?-- I'm never satisfied with partial information and I was in San Diego at the time and I was stuck with what I had.

When was it then that you concluded it's probably due to a heating as opposed to production?-- What was properly due to a heating -----

The CO make trend?-- No.

You never concluded that?-- I make, I think, statements very clearly in my report that it's masked by the background.

When you say "masked", do you mean that a percentage of the increasing CO make would be due to the presence of a heating?-- Could be due to.

But that trend is hidden or masked by the trend - the same sort of trend relating to increased production of coal over the same period?-- What I'm saying is its contribution is hidden by the larger production of CO from the extensive reaction of the coal with air.

Well, how could you ever ascertain what part of the CO make was attributable to oxidation of coal as opposed to, for instance, a heating? How could you possibly investigate that aspect to distinguish between the two?-- Well, it's

exceedingly difficult when one is dealing with a large panel such as this and the possibility of a relatively small heating that makes a very small contribution.

Well, again is it an assumption that it's a small heating and makes a small contribution?-- Well, if it were a large heating I think there would be other overt signs of it that would be apparent.

So part of the conclusion you draw about it being small is that there were not significant other signs of it being a heating as opposed to a large area of oxidising coal?-- That's right.

Again I suppose we come back to what other signs there were to draw the distinction between oxidising coal and a heating; is that so?-- Yes.

It's the only way you could ever be satisfied that there was a heating present in addition to a large area of oxidising coal?-- I wouldn't say that it's the only way.

It's certainly a valid way?-- It is a way.

And those signs again would be smell and haze; would they not?-- I would prefer to rely on smell than haze, but -----

But you would certainly rely upon smell as being a feature distinguishing the two?-- Well, I would - this is - again I made a statement earlier, this is a judgment call that must relate to the people that are in charge.

Part of that judgment would be whether you could adequately dismiss reports to you of smells?-- That's part of the judgment call, I guess.

Whether the investigation you carried out satisfied you that the smell reported to you was either inaccurate, imagination or a host of other factors that might lead you to discount it?-- You keep using the pronoun "you". I'm not a mine undermanager or a deputy or - I'm a scientist trying to find answers here.

No doubt in these circumstances you are more than happy to be not a mine deputy or undermanager, but it would be necessary to discount after an investigation reports to you of such things as smell and haze if you were trying to distinguish between whether it was coal oxidising or a heating; is that so?-- I don't think so, if I understood your question. Could you say it again, please?

If you had reports of smell and haze and you had some concerns about whether your CO make trend reflected oxidising coal or a heating you would need to discount the smell and haze reports; is that so?-- If I wanted to distinguish -----

Between oxidising coal simply and a heating?-- No, I don't think that's right.

Why is that not right?-- Because if you want to make this distinction you would take into account not discount.

Take into account smell and haze?-- It's one indication.

And one indication that would tell you that what you had was not oxidising coal but a heating?-- Well, let's get the semantics a little bit clarified here. I made the point earlier that the earliest reactions that are involved in the coal probably are not best described as oxidation. Once you have a good heating going there is oxidation going on. Can we use the terms "extensive" and "intensive" maybe?

All right, I'm happy to use those, doctor?-- All right.

How would you distinguish between extensive and intensive situations by assessing smell and haze?-- Well, if you believed that the smell truly existed it is indicative of an intensive heating rather than the extensive reaction with air of the coal.

And to conclude that it was nothing more than extensive reaction of the coal you would have to put to one side or discount reports of smell and haze, that is prove them false, if you like?-- All right, I accept that.

Because if you didn't there would be doubt, wouldn't there?-- Yes.

Doubt about whether it was extensive oxidation of coal or intensive heating?-- It's not one or the other.

Is there another possibility, is there?-- Yes, it's one, and the other is what we have to think about.

If you could not prove false signs or reports of smell and haze, you would be left with an active heating?-- Of some sort.

Of some sort. And if you are left with an active heating of some sort and sealed the panel, you would risk an explosion as the panel went through its explosive range?-- If the heating developed to a flame, yes.

And you wouldn't know whether it would or not after you had sealed except by some form of close monitoring behind the seals; is that so?-- Well, I'm troubled by your expansion of the question to - with your exception.

Perhaps I will come back to that a little later. Can I take you back to the graphs, 245 and 219? Are they the only points you wished to point out as being points of dissimilarity between the two trends, that is, the points of 29 May and really 5 June, I suppose?-- Well, they appear to be the most obvious. I come back to relying upon the trend of the two.

Are there any other points, though, that you can point out of dissimilarity between the two trends?-- Well, there is a reduced production figure for the - reported for 10 July compared to only a slight increase in the CO make for the 9th - reported for 9 July.

And that's another difference, is it?-- Yes.

Any others?-- Those are the significant ones.

Are there any others that aren't so significant but worth mentioning?-- No.

Exhibit 245 doesn't have, or doesn't seem to have the production figures for the week ending 5 August, does it, if you look at the supporting data which is the tabulation behind the graph? I think the last one - unless my copy is defective - the last one I have is 31 July, the week ending 31 July; is that so, the same with yours - with the exhibit?-- Yes, that's what I have.

And production, I think, on the evidence, continued after 31 July and, I think, was concluded in the early hours of 5 August, the Friday morning. That's when production stopped, I think that's the evidence. I might be corrected about that, but that's my recollection of the evidence. You don't have those figures in the material?-- I don't see them.

Have you had regard to those figures before giving evidence today?-- I don't - I may have, I just don't recall.

In any event, when production stopped in the early hours of 5 August, what would you expect to happen to the CO make?-- It would be perhaps reasonably constant, the same as it had been.

That being because you were no longer exposing more coal through production?-- That's correct.

So, even if you had a slight increase to take account of coal that had been exposed up to the close of production, thereafter you would have a levelling off and perhaps even a drop?-- Perhaps.

Most likely, isn't it?-- Reasonable.

You certainly wouldn't expect an extended increase after production ceased?-- I would not.

And that's what Exhibit 219, firstly - that's the CO make graph - indicates, an increasing CO make up to 6 August, doesn't it?-- It indicates essentially a levelling off.

When you say "levelling off", are you comparing the end point on the 6th, or perhaps the 5th it might be, with the point back on about the 15th or so of July?-- More or less. Again, I do not consider these make figures to be that precise, though I hesitate to suggest that there are significant differences with small variations in this CO make.

All right. Can I take you to Exhibit 158, please? Perhaps just before you look at that, doctor, part of the bundle in front of you, I think, or maybe not - could you see Exhibit 221 as well? If I could just take you to 221 firstly. You see that's the CO make for the same panel, 512, for the same period?-- Yes.

Based on - it's said to be BHP as reported and that's data as reported, plus Exhibit 152. I can indicate to you a little later if we need to what 152 is about?-- I think I recall essentially what it is.

Well, you see the trend there is spot readings taken between 23 July and 6 August. Fairly significant increasing trend, isn't it?-- Well, it increases as shown here from the period of the order of 23 July but it isn't that significant an increase if one looks at the entire trend beginning back at the beginning of the extraction, which is the point that I have been trying to make.

Yes. In fact, a straight line regression would continue on from about 15 July straight up, straight through those points as a line of best fit?-- But that's not the regression I'm talking about.

When I say 15 July, I'm just choosing a point, but that trend would go from day one right through, is that so, as a line of best fit?-- From day one meaning a little before 30 April?

Yes?-- To?

To 5 August?-- Yeah.

So, the trend in that same upward fashion continued after production stopped, if you accept it stopped in the early hours of 5 August?-- Well, I thought we said that the trend went to 5 August.

Well, all right. Just put that to one side and take Exhibit 158, if you would. I take it you do see a significant - if it is the case that a CO make trend continues upward after production stops, it is relating not to production but to something else?-- As reported, yes.

Do you mean to qualify it by "as reported"?-- Yes.

Do you mean to say by that that there is potentially some error in the recordings of an increasing trend after production stopped?-- Well, there is error in the estimate of trend - of CO make at any time.

I think you have already referred to the reading of Mr Tuffs?-- Yes.

I think you have used that yourself in your data?-- I did.

That was a reading of - what was it on Mr Tuffs' -----?-- 16 plus, 16.68 maybe.

Was that based on his CO parts per million Drager reading?-- No.

It was based on the Unor, was it?-- No. It was on his reading, as I - he had a reading of 7 ppm, if I remember correctly.

7 or 8, thereabouts anyway?-- Somewhere, and -----

So, it was his Drager reading?-- Depends on which one of these points that we are talking about. In my report -----

I think you say in your figure 3 spot value at 20:30, which was 8.30?-- Yes.

Now, do you know whether that was - that's the Unor, isn't it?-- Yes, at that level it is the Unor reading, yes.

And the Unor reading was something over 10 ppm?-- Something like that, yes.

And you would consider, wouldn't you, that the Unor reading was potentially more accurate than the deputy's Drager reading?-- Well, it reads what it sees more accurately. I'm not sure it sees the same thing.

Well, we accept the Unor reading was over 10?-- Yes.

It's a CO make figure of about 25 or so, isn't it?-- That's what it calculates to, yes.

And that's on the Saturday night at 8.30?-- That was written on the table that I took it from, yes.

Which is about roughly 36 hours or more after production ceased; is that so?-- I'm not sure when production ceased, but it's more than 24 hours, I guess, yes.

Well, that's a significant feature of the trend, isn't it?--
If it is a valid result, and I'm not sure that it is.

Why wouldn't it be, doctor?-- By virtue of the velocity
measurement.

Velocity is 1.81, isn't it?-- That's what is reported.

From the deputy's anemometer reading?-- That is what is
reported.

And, indeed, have you used the deputies' velocity readings to
calculate the remaining points on your figure 3?-- Yes, I
did.

So, I suppose the whole appearance of it is potentially
subject to some error?-- Well, I'm more concerned about the
precision - the accuracy of this particular value because
there were all sorts of things happening to the ventilation in
512 at this point.

This is after sealing had commenced?-- Yes.

Well, are you saying then the reading should be disregarded
entirely or treated with some caution?-- It should be
treated with a lot of caution, I think.

You know, of course, I assume, that Mr Mason himself
calculated on the Saturday afternoon, 6 August, a CO make of
19 lpm?-- I learned that in these proceedings.

Well, that, indeed, tends to support the veracity of the Tuffs
reading sometime later that same night, doesn't it?-- It's
subject to the same problems.

So, you would discount both?-- I just say that I'd look at
these with some caution.

Well, you would look at them and you would say perhaps the
conditions in 512 need some further investigation?-- At 8.30
at night on that date I don't know what further investigation
you would do inside of 512.

Well, investigation to ascertain whether you had a heating in
512 or simply the remnants of large areas or extensive areas
of oxidation?-- They were in the process of sealing.

Well, they had a sample tube into the panel, didn't they?--
Yes.

From which they could have obtained a bag sample for analysis
on the gas chromatograph?-- I would have to refresh my
memory as to exactly when that sample point was put in place.

Certainly if we are looking at the Saturday night, certainly
it was there at the time the panel was finally sealed at, say,
1 o'clock, 1.30 Sunday morning, the 7th?-- Right.

280395 D.51 Turn 14 mkg (Warden's Crt)

If it was there, it could have been used to sample the atmosphere behind those seals; is that so?-- At that particular point in the atmosphere, yes.

I suppose what you are saying is that it would be difficult to establish what was going on behind the seals and, hence, establish whether or not you had a heating; is that so?-- At that point in time it would be very difficult, I think.

And that would mean, wouldn't it, that you would have to treat the whole situation very conservatively and assume the worst?-- That's a judgment call.

Well, is that the judgment call that you would make on that data?-- I wouldn't make that call. I wasn't in that position to make a call.

You don't want to express an opinion?-- No.

Of course, if you were trying to establish whether simply leaving more loose coal on production was the reason behind this CO make trend, such reports on the Saturday night of 19 and 25 lpm would tend to point towards the fact of a heating, wouldn't it?-- I find non sequiturs in your question, sir.

Well, I will try and improve. If you were concerned about a situation inside 512 and for that purpose you were conducting some sort of investigation to satisfy yourself there was no heating present - that's the assumption firstly, you understand that, conducting some sort of investigation to satisfy yourself what's happening inside 512?-- This is Saturday night?

Well, yes, Saturday/Saturday night. Calculations of 19 and 25 lpm would tend to indicate that you had a heating inside 512 at that time?-- It would suggest that, yes.

That would be suggested on the basic parameters of the 10 to 20 lpm figures?-- No.

Would it be based upon the trend?-- Yes.

And the fact production had stopped?-- Yes.

So, once production stopped and the CO make continued upwards, you would have clear evidence that there was a heating inside the panel?-- Clear evidence if you believed those numbers, yes.

And if you had some doubt about the numbers, you would be left in a state of doubt generally, wouldn't you?-- Yes.

You couple to those litres per minute figures indications of smell and haze and the evidence becomes stronger, doesn't it?-- Yes.

And you add to that the assessment by the manager of the mine, Mr Schaus, for the Friday, 5 August, an estimation of

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19 lpm?-- I don't recall that specifically.

Have you seen the record book entry that relates to 5 August made by Mr Schaus?-- No.

Do you wish to see it? You are more than able to if you wish to look at it?-- If it says it there I will take your word for it, I don't need to read it myself.

The evidence from Mr Schaus is that that record of 19 lpm relating to the Friday was placed in the book by him on the Sunday when he visited the mine?-- Yes, I recall that now.

Well, again, that figure of 19 lpm would tend to indicate there was a heating present inside the panel?-- It would suggest that, yes.

Now, I think you have said already that the monitoring point behind the seals was not in any way giving a representative sample of the atmosphere behind those seals?-- The total atmosphere.

The total atmosphere?-- Yes.

It would be grabbing a whiff, I think you described it as, of the atmosphere behind the seals or at the monitoring point?-- Yes.

For that reason it was unrealistic and potentially misleading to do calculations based upon those readings from that point to reflect the whole situation behind the seals?-- I believe so.

The effect, though, of where the monitor point was would surely be to, if anything, underestimate the levels of CO behind the seals; do you agree with that?-- I have no way of knowing for sure.

Given the dip, gradient and layout of the panel, wouldn't that be the most likely scenario, that is, that point 5 was monitoring concentrations of CO less than in other areas of the panel?-- Well, I'm sure that it's seeing more than at the floor and probably less than at the roof. What it's seeing about some place that's 400 metres away I can't be sure.

But it could be - one possibility is that point 5 was underestimating the CO building up inside the panel behind the seals?-- It's possible.

And if you are looking at the trend of CO build-up behind the seals, it increases, I think your report indicates, from about 12 or so, thereabouts, at the point of sealing or shortly before sealing through to about 100 - just over 160 ppm before it takes off vertically?-- Yes, I remember that.

That's figures 5 and 6, I think?-- Yes.

Now, you have indicated that shows a linear increase in CO

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parts per million after sealing?-- In the first part of it.

The first part being up to about 160 ppm?-- No.

You are distinguishing between the 6 ppm per hour, 6.6, 8.6 and then -----?-- The last 30, 45 minutes, an hour, whatever, it might be at 10.

And then, of course, the last sample to leave point 5, I think, before the explosion shows in excess of 1,000 ppm?-- The last sample analysed before, yes.

Well, that rate of increase, or that trend of increasing CO behind the seals, do you say that wouldn't have alerted anyone to the presence of a spontaneous combustion behind the seals?-- Not the 6 ppm that's essentially linear for many hours.

You see, if you say that point 5 is not representative of the atmosphere behind the seals, how can you say that the 6 ppm per hour is simply evidence of or isn't evidence of a heating behind the seals?-- It's all the information I have, looking at that.

Wouldn't you treat such figures very conservatively knowing where the monitor point was and the conditions existing behind the seals?-- I would treat them as what they are saying.

Useless. They would be totally useless, you think, those figures behind the seals?-- I didn't say that.

Well, would they be useful for anything?-- Useful to show what is happening at that seal point in terms of that particular bit of atmosphere.

Well, it certainly wouldn't tell you that there was not a heating behind the seals?-- No, it doesn't tell you that.

It leaves that question open, doesn't it?-- It leaves the question open.

Did you compare the CO parts per million rise behind the seals with any other panel or data from any other panel?-- I believe I did. I didn't in the report, I don't think.

Do you have some notes you wish to refer to?-- I'm trying to think. Oh, behind the seals, no. What I am thinking about are some relative make graphs showing makes of different panels, but I don't - but I'm not sure about 5 North. There may have been something.

Again, at the stage of sealing or after sealing, there is no question of increasing CO make or parts per million in the course of production, is there?-- Say again, please?

After sealing, there can be no question that any increase in CO parts per million can relate to production mining increases?-- No, that's correct.

Well, you don't think you compared the rise in CO parts per million behind the seals in 512 with data from any other panel?-- I don't believe so.

Would that be a relevant exercise to carry out - to compare the trend in other panels once they were sealed?-- Yes, the data were available, yes.

Have you read Mr Highton's report?-- Yes.

Did you notice in there there is reference to parts per million behind the seals in-----?-- Yes, I do recall that now.

Do you recall there being a significant difference in the rate of increase in CO parts per million in 512 compared to 401/402?-- Yes.

Did you assess that difference?-- Yes, I did, and I see the same difference in the slope of the curves relating carbon monoxide make with time for those two panels.

Well, did you see a much greater increase in the CO parts per million behind the 512 seals compared with the 401/402-----?-- Yes.

Was that difference significant in your opinion?-- Well, it was significant, but it also was related to and illustrated by - illustrated is a poor word - but related to the rate of increase of CO make with time, that I also looked at, which has a very significant difference in slope.

But I thought we were attributing that difference to production rates. Isn't that your evidence?-- We were attributing that rate of increase to production, yes, but looking at the kind of end rate of CO make compared - comparing the two panels - there is no way that the CO make stops as soon as you start sealing - as soon as you seal, the oxygen continues to react and CO continues to be produced. Now, if it is producing at a high rate in one panel and at a low rate in another panel, the rate of increase behind the seal is going to vary in the same way.

So, you saw no significance in the different rates so far as confirmation of presence of a heating is concerned?-- No, I didn't find anything like that. What I saw was confirmation that one was producing CO at the point - at the time of sealing at a much greater rate than the other one, so the rate of build-up of CO was quite different in the two panels.

All right. But, again, I don't wish to be repetitive about

this, but aren't we really saying that the rate of production of CO make in 512 being higher than 401/402 relates to the difference in production?-- It got there by virtue of differences in production.

And once the panels are sealed, there is no differences in production, is there?-- No, but there is a rate at the point of sealing that is significantly different in the two panels.

You think that rate carries on for a time after sealing to reflect the rise in CO parts per million?-- Yes, of course.

So, you don't agree with Mr Highton that the difference in rates behind the seals in 401/402 and 512 is an indication of a heating inside 512?-- I don't see that it is a positive indication.

But you certainly agree, as I think you have, that you would certainly get no comfort from those figures in terms of dispelling the belief that you had a heating in 512?-- "Comfort" and "concern" - these are terms I don't use normally.

You couldn't use those figures to negative a heating behind the 512 seal?-- That's correct.

Doctor, I take it you would agree that there needs to be quite some considerable work done on actually quantifying the relationship between CO make and rates of production of mining?-- Yes, it is not a simple matter because, as I said earlier, it is not the tonnage that you take out of the panel, it is the tonnage that you leave behind and its form that is important.

It is not a simple matter, as you have told us; it is quite complex?-- Yes.

And at this stage we are left with the proposition that there is a rough correlation between the trend for production and the CO make trend?-- Yes, given a particular mining method in a particular mine, yes.

But to be more definite about that, there needs to be a lot more work done - research work done on a particular coal seam to ascertain the degree of correlation?-- Well, to correlate with the mining methods, perhaps, as well as the coal seam, yes.

There has been some criticism of the SIMTARS material in relying upon laboratory work - laboratory analysis - and that's particularly in relation to the self-heating characteristics of certain coal and the adiabatic oven tests, but you can't simply extrapolate that on to a working coal seam and hope to have reliable, meaningful results. Does that fairly summarise the criticism made of the SIMTARS material in that respect?-- I don't believe so.

Perhaps you can just tell us quickly?-- I don't criticise the SIMTARS data as far as showing a sensitivity or susceptibility

to heating by using an adiabatic furnace approach. It is one, and I don't know enough about it really, although I have looked into it in some detail, but I don't know how it compares exactly with other countries' similar approaches.

That is an approach adopted worldwide?-- Some form of adiabatic furnace or one in some way that tries to minimise heat losses and maximise reaction and seeks some measure of rate of reaction - time to temperature, crossing over in the British form, a minimum temperature that will accelerate under laboratory conditions in the Bureau of Mines form - all of these tend to seek a comparison between coals of varying types and are probably quite valid in that sense of comparison. Relating that to conditions that would be found in a mine gets much more difficult.

But I suppose if it is the only data that you have, you have to use it?-- Well, use it in the sense of increasing the care with which you mine and watch out for spontaneous heating.

Reference has been made to an article by Mr Kock and Funkemeyer, and you have seen that article, I take it, have you?-- Yes.

When did you first see that article, do you recall?-- Oh, two or three weeks ago, I suppose - since I've been here.

And it wasn't, I take it, an article within your knowledge prior to coming here?-- No, I was not aware of that.

The article is entitled "Fire Prevention in Workings with Rider Seams Prone to Spontaneous Combustion"?-- Yes.

Can you tell us what you understand that to mean? "Rider seams", what are they?-- These are seams that lie above the seam that you are mining. They are typically - they may be separated by a short interval - an interval of clayey mudstone, and they may be large or thin seams of coal, they may be useful coal or they may be waste. You may mine it, you may then throw it outside or you may try to leave it.

What's the significance, so far as the article is concerned, with the fact that a rider seam lies above a seam being worked?-- Because in their case they weren't - as I understood they weren't mining that coal - they weren't taking the main seam plus the interval plus the rider coal, and they were leaving it in the goaf, and this means that you have - you are leaving a reactive material in the goaf and this is asking for the possibility of spontaneous combustion, if it is susceptible to that.

So, you are mining a seam, and as you retreat the seam above, in effect, caves with fresh coal into the goaf?-- Yes, the roof caves, and if it has rider seams in it, they come down, of course.

So, it is a different situation to what we had in 512 where you were mining and leaving pillars with some loose coal?-- Mmm.

In a rider seam, you are, in effect, mining and replacing the void almost entirely from loose coal from the seam above?-- Well, no, not from the seam above, but with all the roof and other stuff that's coming down, yes.

And the other stuff coming down includes the rider seam of coal?-- Yes.

And the danger in that is that you are going to have, inevitably, a much higher CO make from coal above than comes into your goaf?-- Higher than?

Higher than what you didn't have coming into your goaf?-- Of course you would have a higher CO make if there wasn't any coal there at all.

So, the particularly difficulty with seams having rider seams above them is that you are going to have a higher CO make which you then have to interpret; is that so?-- You use a comparative and that's what's bothering me. I keep coming back to "higher than what?".

Well, if you had no rider seam and you were extracting coal and the rider seam wasn't caving into your goaf, you would have less coal in your goaf, wouldn't you?-- Yes.

And hence you would have a lower CO make?-- Assuming the same reactivity of the two sets of coals.

And the whole point of the article by Kock and Funkemeyer is that with the rider seam caving into your goaf, you are going to have, inevitably, a higher CO make which you then must interpret?-- All right.

And interpreting it, you have to distinguish it or satisfy yourself that it is either a large extensive oxidation or a heating?-- Yep.

And your heating may be masked?-- Yes.

But that's in a case where you have this rider seam caving into your goaf?-- Yes.

It is different to this situation we are talking about here, isn't it?-- Yes.

I mean, in that situation, that is with the rider seam, you expect much higher CO make assuming the same level of oxidation?-- You must anticipate the possibility, yes.

Here with 512, it is a possibility that by leaving loose coal and mining in the way we are talking about, you are going to have the higher CO make?-- Yes.

It is nowhere near as clear as the rider seam situation, is it?-- I find it difficult to make a comparison on clarity.

Do you agree that the article goes on to say when you get up

to levels of 20 and 30 litres per minute CO make, you have to take steps to reduce the level?-- In their mining situation, yes.

Because they have set those parameters of 10 to 20; is that so?-- Yes.

Subject to the rider seam situation where you are going to have higher make - that's recognised in the article?-- Yes.

But even when it gets up to 20 and 30, even there it recommends that steps be taken to ascertain the course of such a make?-- Yes.

Such a course recommended is much more vigilant monitoring and sampling; is that so?-- Yes.

I am talking generally. We can go to the article specifically if you want to, but I'm talking generally?-- That's right, except I think it is important to recognise the kind of mining that they were doing.

Was that advancing long wall?-- I believe so.

And then the article goes on to recommend ultimately, as a tool to satisfy yourself that it is extensive oxidation as opposed to spontaneous combustion, "analysis of the higher hydrocarbons"?-- Yes.

That's a technique that's available and was available at Moura on 7 August - "analysis of the higher hydrocarbons"?-- I don't know the details of the capability of their gas chromatograph, but in theory it was available.

I think you may have been present for some evidence that the chromatograph has difficulty with hydrocarbons when the carbon monoxide is less than 10 ppm?-- It has difficulty with carbon monoxide - when the carbon monoxide is less than 10 ppm. It has difficulty with very tiny levels of hydrocarbons.

In any event you know there was no attempt made here to analyse any such sample?-- None that I know of.

Just one matter, doctor: you mentioned, I think, that the haze as an indicator of spontaneous combustion - you didn't think was terribly reliable because it would disperse in the air flow. Did I understand you to say that?-- Probably something like that, yes.

And that can be a difficulty, can't it, in areas with high air flow?-- Yes.

You wouldn't expect, for instance, a haze, even if it came from a spontaneous combustion, to remain in place in such air flows as 512 had?-- With reasonable ventilation, it moves through the panel and it would be difficult, I think, to see in the return.

So, you might have someone seeing it and someone soon after

being unable to detect it in the same area or close by? There would be nothing inconsistent about those features, would there?-- No.

You say in your report - is Your Worship having an afternoon break?

WARDEN: Go on for a while yet, thank you.

MR MacSPORRAN: You say in your report that - on page 1 I'm referring to, doctor - "Some mostly circumstantial evidence prompted a close look at 5 South as the origination site but no substantiating hard evidence was found."?-- Yes.

You made that statement in your initial report in January 1995?-- Yes.

And that was based upon the data you then had, obviously, to assess the situation?-- Yes.

Since that time, you have assessed other information, including evidence given before this Inquiry?-- Yes.

And I take it from your evidence-in-chief earlier with Mr Morrison your view has not changed. There is no other hard evidence pointing towards 5 South as being the site of ignition?-- That's correct.

I take it in assessing that, and holding that opinion, you have had regard to the fact of a methane layer apparently being detected inside 520 panel on the morning of Friday, 5 August?-- I have heard that.

You heard that here?-- Yes.

You have heard that action was taken to flush that layer by opening the regulator in the 5 South bottom return, I think it was?-- Yes, I have heard that.

I don't think you would have heard any evidence of the size of such a layer or its quantity?-- I don't recall that.

Or its concentration?-- No.

Or where it came from?-- No.

Or whether the flushing action was successful or not?-- I don't recall.

Or whether, in fact, the layer returned after being flushed on the 5th?-- Don't know.

Well, would that be a relevant factor to assess when looking at the source of the first explosion?-- Relevant, yes.

I take it - in conceding it is relevant, on what basis have you discounted it as a likely source of the first explosion - that is the area of 5 South?-- Are we talking 520 or 5 South?

Well, 520 and 5 South. They are related areas, aren't they?-- Yes.

520 being the stub end, if you like, of the 5 South panel. So, if you had a layer in 520, you could anticipate it being relevant to a possible source of ignition with men working in 5 South?-- Yes.

How have you dealt with that prospect in your assessment?-- Well, my feeling is that despite the fact that the first explosion was a very weak one, I don't see the possibility of an accumulation of methane in that section would do what it did as the first explosion. It bothers me because there were problems that 5 South - the circumstantial evidence was that they weren't running any coal and the deputy of the section was some place. It occurred when Squires was on the telephone to the section and a methane monitor alarm located outbye quite-a-ways sounded more or less at the same time and there were lots of things like that. All told, I couldn't find any good substantiating evidence to support an idea that the first explosion occurred down there.

I take it from your response you agree with the MSHA experts, Mr Stephan and Urosek, that the first explosion was a rather weak explosion?-- Oh, yes.

You also agree the effect of that would most likely have been to not significantly injure the miners in 5 South?-- From pressure and wind velocity effects, correct.

You would have expected on the data you have seen that that crew or the people in 5 South could have survived the first explosion?-- Survived the trauma of physical injury from the pressures and wind effects.

The issue then would be what action they may have taken at the point of the first explosion to perhaps finally being overcome by concentrations of poisonous gas?-- I think very high concentrations of very toxic gas got there very quickly.

Relevant to their ability to survive those conditions would be their self-rescuers?-- Relevant, yes.

And oxygen self-rescuers would have improved their prospects in that regard?-- If they were immediately available.

Is it your understanding that oxygen self-rescuers - and if they are taken underground by the miners, they should be readily available to carry with them at work?-- Well, it depends on the mining situation, but a lot of them are pretty bulky and heavy for constant wear.

In any event, turning back, if you like, to the issue of 5 South being the source of the first explosion, you have told us why you discounted that. Did you have regard to Mr Highton's comments in his report about the possibility of 5 South being the point of origin?-- I read those comments.

And did you read his comments about the 5 South Point 7

monitoring point and its behaviour?-- Yes.

And I take it you don't agree with the proposition he advances then?-- I looked very carefully at both point 7 and point 6 and there are funny things that are happening there, but I had to ultimately discount them as being significant. Point 6 was particularly disappointing. It was peculiar in that it had a headstart in its way to the surface over point 7, and yet it had this long delay - lag time, if I remember correctly. In any case, afterwards, it clearly had suffered a lot of trauma and, so, in the end, I discounted the-----

You would agree with this proposition, though, wouldn't you - and this was expressed by Mr Highton, page 31 of his report: "I believe the results are such that this section of 5 South cannot be completely ruled out as the source of the explosion. The balance of probabilities are, however, weighted towards 512 as being the most likely cause."?-- Yes.

So you would agree that you can't completely rule out 5 South?-- That's right.

Do you agree further that to do so, that is to complete ruling out 5 South for the point of origin of the first explosion, you would need to conduct an underground investigation?-- I'm not sure it would be successful in that goal.

It's certainly the most obvious course to take to establish with some certainty - or to hope to establish with any certainty the cause of the first if not the second explosion?-- Well - could you say that again? How did you start that question?

It's certainly the most obvious course you could adopt in the hope to establish the cause of the first if not the second explosion?-- Well, it is a course.

Can you suggest others to completely rule out 5 South?-- Well, you can do borehole examinations for openers.

Any others?-- None occur to me at the moment.

You would anticipate there to be evidence available to an underground investigation to establish the cause of this incident?-- Maybe.

It's a strong possibility, isn't it?-- There is a strong possibility depending upon what you found that it might - it might indicate a cause and an ignition point, for example. It wouldn't necessarily be definitive and completely without question. It depends on what was the cause. If there was a piece of faulty electrical equipment with an obvious fault - I'm reminded of one in an explosion proof compartment with the inspection plate improperly reassembled. If you had a case like that you would see it at the end. More subtle facts of cable damage and so forth may or may not be apparent after the second explosion and after perhaps a fire.

So the simple answer is you won't know until you do the investigation?-- And then you may not.

It's routinely done in the United States, isn't it?-- I've heard that.

Do you agree with it as a fact?-- I leave it to the people that do the investigations.

So you accept the expertise in that area of Mr Stephan and Mr Urosek?-- Yes.

Surely you would confirm for us that it's routinely done in the United States that mines are re-entered, recovered and investigated?-- I think it's standard for MSHA to try to do that where possible. There may be some exceptions, I don't know.

It's standard in most countries in the world, isn't it?-- I don't know that.

You don't know that?-- No.

I have nothing further, thank you, Your Worship.

CROSS-EXAMINATION:

MR MARTIN: Speaking as to practice in the United States, whose responsibility is it to ensure that the Unor analysing system is kept in calibration?-- I would assume that it's the mine operator, but I don't know. You would have to ask the MSHA people that. They are the people that police these things.

Can I just ask you to look at Exhibit 251? Did you have that there still?-- No, I don't believe so.

That's the CO2 correction for point 16 with reference to point 14?-- Yes.

Am I right in assuming from that document that the instrument was calibrated on or about 21 June?-- Yes, it was.

And looking back over time to the commencement of that information on 29 March it wasn't calibrated in that time, was it? It was out of calibration?-- It seemed to be, yes.

There has been a lot of evidence given today and yesterday about CO/CO2, Graham's Ratio, that is, and Graham's Ratio and graphs produced. The Inquiry may have this difficulty in that we know that the CO/CO2 ratio and Graham's Ratio was not regarded by mine staff at all up to 7 August 1994. So that really raises a question for the future, doesn't it? You are going to be back in America soon and we are going to be left here to cope with the Bowen Basin. So what I need to ask you, and what the Inquiry probably needs to know from you is with the history of No 2 quite recently, there are 11 men lying entombed there, could have been 20 or 21, what should the mining industry do in relation to mining seams, that's the underground seams, for the future? What do you say the industry should do?-- Exercise even more diligence than perhaps is exercised now with regard to the possibility of spontaneous combustion. Perhaps to the extent of modifying mining methods.

Can you suggest in which respect mining methods should be modified?-- No, I'm not a mining engineer.

But certainly more vigilance - I think that was your term, wasn't it?-- Yes.

Than was exercised by 7 August 1994?-- I did not make any specific comparison.

Well, that's reasonable, isn't it? We are talking about that

XXN: MR MARTIN

WIT: VAN DOLAH R W

incident, aren't we?-- Yes.

What would you recommend for the future in relation to, say, usage of the gas chromatograph?-- It is a useful tool that should be used for looking for the other constituents from a heating.

Such as hydrogen and the ethylenes and -----?-- Hydrogen and ethylene are the first ones to really look for that are not common to seam gases, and - but it requires probably some very expert attention to the details of gas chromatography to see it in very large quantities of air in very low concentrations, and it may require some different - well, might even require some different approaches to look for the very small quantities that perhaps be part of a return that is mostly looking at low temperature extensive reaction.

Thank you.

RE-EXAMINATION:

MR CLAIR: Dr Van Dolah, you said in the course of your evidence-in-chief that when you first saw that graph that's represented in 219 - I'm not too sure whether it was precisely the 219 graph, but at least it's one that's represented here, I understand from your evidence, that you then went looking for answers to help explain what you regarded as or described in your evidence as an extraordinarily high production of CO?-- Yes.

And that, of course, was your reaction when you first looked at the graph of CO production in 512 Panel, that it was an extraordinarily high production of CO?-- The graph that I saw that first attracted my attention was the one that has the linear regressions of several panels on from 401/402, 511, 5 North as well as 512.

I think if you've got Exhibit 21 in front of you there you may find it in there?-- 221?

Exhibit 21 is one that you had earlier, I'm not sure that you still have it. It's one that comprises a number of pages and has that table on the front?-- I think it's gone back.

It's coming over to you now. The last page of that document, at least in my copy -----?-- Yes, it wasn't this. It was the one with the linear regression, straight lines for each of the -----

For each of the panels?-- Yes, yes.

Well, in any event, it was certainly a graph which represented the CO make in 512 in a way - it's in your report; is that right? Is that the one you are speaking of?-- Yes.

I'm sorry, I thought you were speaking of one that wasn't in your report. It's not given a number, but it's the -----?-- But I was -----

The first document?-- Yes, of course. It's this one.

That linear regression graph was designed to represent the CO make in 512 Panel and the CO make in the various other panels mentioned; is that so?-- Well, it's a linear regression of the actual make which means that it's the best straight line that went through all of these other ups and downs.

To come back to my question, when you saw that graph did you regard the graph as representing an extraordinarily high production of CO as you mention in your evidence-in-chief?-- Yes, it was a slope that particularly attracted my attention.

You also said that you were looking for answers, as it were, to that, and you said again in your evidence-in-chief that part of the answer was something that you discovered on looking through the documentation that had been provided to you and that was the higher rate of production from CO - from 512 Panel?-- Yes.

Higher rate of coal production?-- Yes.

In 512 Panel. I will come to that further in a moment, but did you find any other matters that you regarded as being an answer to the question why this extraordinarily high production of CO in 512 Panel?-- I recall that as being the principal thing that I had at the time that I prepared the report. I found confirmation of this in the actual tabulated data from the Unor system and how - the changes there in terms of the general build-up, but I also had the - I recall at least the one table that is like this which gives a CO make for 512 and -----

Over a longer period of time?-- Yes, over the extraction.

Just for the record, the document you are nominating there is the front page of Exhibit 21; is that right?-- Yes, perhaps, yes.

Just so that the transcript is not confusing?-- 21, yes, but it was the final document actually prepared signed by Mr Morieson, prepared after the explosion, and in fact I referred to it in my report.

You say the final document prepared after the event?-- Of that type, yes.

Was it -----?-- It's the one that was labelled with an FP 700 010 and it's in the SIMTARS table - report as well.

Would you perhaps look to page 14 which is perhaps five pages from the back of that Exhibit 21? You may find part of it there?-- Yes.

There are in fact two pages of it running from 28 February

through to 6 August with some notes on the bottom of the second page?-- This is the one.

Now, I understand you to be saying that in fact that document simply reaffirmed the fact that there was this increasing rate of CO make?-- Yes.

Is that right?-- Yes.

So that didn't really provide any other answer?-- No.

For the extraordinarily high production of CO, it simply added a bit more to the picture?-- Yes, that's correct. It wasn't another answer, but it was one more thing that I found in looking through the stack of documents.

Now, the answer that you seem to be pointing to, at least partly for this extraordinarily high production of CO, is the higher rate of coal production?-- I think that was the only information that I had that was pertinent to when I prepared this report before coming here.

Putting aside any question of spontaneous combustion being present in the panel during the period that we have been considering - during the extraction phase and up to the time of the explosion, is there anything else that you regard as being partly the answer to that question, that is anything other than the higher rate of coal production?-- That I've subsequently learned?

Yes, that you've subsequently learned or -----?-- Yes, it was the nature of the extraction and the mining method that was used in the extraction. All I had up until that time was a diagram of the extracted panel showing the slack that had taken place in the pillars and some - I think somewhere there was some indication of taking out some of the 5/6 area as well. It was information about taking the bottoms, but I had no idea of the nature, exactly how the bottoms were taken until I came here.

Was that information that you subsequently learned and that provided then some further matter by way of explanation of the extraordinarily high production of CO?-- Yes.

So there were two things, one was the actual amount of coal produced?-- Yes.

The other was the method by which it was produced?-- Yes.

Which led to more than usual loose coal?-- Yes.

Anything other than that that you've discovered in the course of your investigations?-- No, none come to mind.

280395 D.51 Turn 16 dfc (Warden's Crt)

Now, just looking for a moment at what you had to say about the method of coal mining in 512 and the result that there was loose coal, more loose coal than usual left in the panel, I understood you to say that that on the one hand may explain partly the extraordinarily high production of CO in the panel?-- Yes.

On the other hand, I understood you to say that having loose coal like that left about in the panel would in itself increase the chances of spontaneous combustion becoming a problem in the panel?-- Yes.

And no doubt that in itself then, that feature, the abundance of loose coal that's been referred to, that feature should have created a high degree of vigilance about spontaneous combustion or the risk of spontaneous combustion in 512, would that be so?-- It's generally agreed, I think, that one wants to minimise loose coal if one is dealing with coal that has the tendency to spontaneously combust.

I mean, to put it simply, you don't need to have a PhD in the field that you have worked in during your long career to know that having loose coal in the panel is going to enhance the risk of spontaneous combustion, it's something that would be known to anybody who was reasonably knowledgeable about production of coal; is that so?-- Yes, it is.

Now, you have been asked quite a number of questions about the correlation or otherwise between the graph of coal production and the CO make in 512. I don't want to take you back to that. To some extent there is some subjectivity about the assessment of correlation, would that be so?-- That's right, I see trends.

And it's the trends, of course, that are important, as you have said?-- Yes.

Now, of course, the first point would be, from what you have had to say here today, that in any panel - in any panel - one would expect this cumulative effect of exposed coal to lead to some increase in the CO make over the life of the panel, am I right there?-- Yes.

Simply because of that graph that you drew for us this morning, there is going to be a cumulative effect because you get a sudden rise in the production of CO from the newly exposed coal but a more gradual decline in the production of that CO so that the cumulative effect grows over time?-- Yes.

It would have to be an extraordinarily slow rate of production to - not to have some increase in the rate of CO make as a result of the exposure of loose coal?-- In this type of mining, yes.

So that in any panel, in any extraction panel or any panel during extraction phase, you are going to expect to have some increase in the rate of CO make?-- Yes.

What you are saying here is that because there was more loose coal being exposed and a greater rate of production, then one might expect to have a greater increase in the CO make?-- Yes, the total coal mined and location would increase the reaction with oxygen to carbon monoxide, yes.

Now, the problem arises really as to how one measures that,

isn't that so?-- Measures?

The problem arises - in attempting to use CO make as some guide as to what's happening in the panel and in particular as an indicator of whether or not there is spontaneous combustion in a panel, the first thing to do is to establish a background; is that right?-- Yes.

And that background, of course, as we have just now established, is going to be - is going to have a contribution from this cumulative increase in CO make arising from the exposure of coal?-- Yes, and it's a moving target.

It's a moving target, exactly, and the question that I come back to then is how do we - in what scientific fashion can we look to establish the background?-- The background is not a fixed thing even in a panel, so what one has to look for is significant deviations. If one is just looking at carbon monoxide and carbon monoxide make, it probably is going to be lost in the background - lost in the noise of the - lost in the variation of the carbon monoxide as you measure it.

Well, does that mean, doctor, that if we are looking at the - looking for some means of detecting the existence of a small but intense heating in a panel such as 512, that we can't reasonably expect to see it in or by way of looking at changes in the CO make?-- It's most difficult to see it in terms of changes in CO make.

Well, is there any scientific way that you can think of that the problem can be approached?-- Once a heating gets to a reasonably high temperature, and this is perhaps 150 degrees on up, something like that, 150 degrees Celsius, perhaps even something lower than that, but in any case well above the slightly higher than ambient temperature at the low temperature reaction, then one needs to seek to determine the other constituents that are coming out of the coal, hydrogen, ethylene, ultimately acetylene, some of the other product gases if they are not seam gases, and we are talking such minute quantities. Quantities may be large but the concentration is the thing that's difficult to - that must be determined, but, you know, in theory that can be determined, but it's only those things that will indicate that there is a very hot spot some place and it isn't a CO make whatever the level.

Well then, I take it, of course, that the concern arises where there is a small but intense heating which is not producing large amounts of CO?-- That's correct.

And you say that that may well be masked by this problem of increase in CO attributable to both method and amount of production?-- Yeah, its contribution to the total gas that's coming out in the return is very - can be very small.

Now, in terms of looking at some scientific way to approach it, if one was of the view that the rate of production and the method of production was contributing to something which otherwise presented as an extraordinarily high CO make, then

would there be some benefit in trying at that time to make some comparison between the rate of production and the increase in the CO make, or even the increase in the rate of production and the increase in the CO make?-- I think basically the numbers are not precise enough to give you much information that is really useful.

But if in fact you are attempting to establish a background, wouldn't that be the way to go about it?-- Oh, it's useful, yes.

I mean, that would have to be a starting point, wouldn't it?-- Yes.

And if you were of the view that your increase in CO make, your extraordinarily high increase in CO make, was needing explanation and the explanation that occurred to you was that there was some - that it could be attributed to the means and amount of coal production, then wouldn't you seek to chart your production against your - or your increase in production against your increase in CO make and at least see what came out?-- That could be a useful first step, yes.

I mean, if you genuinely believed that it was the means and amount of production that was causing your increase in CO make, that would be your first step, wouldn't it?-- Yes, because it's easily measured I come back to the point that it's not the coal that you take out that's causing you the problem, or potentially causing you the problem.

But there is going to be a relationship -----?-- There is a relationship.

----- between the amount of coal you take out and the amount of coal you leave behind?-- If you maintain a constant mining method, yes.

Well now, the other thing that you might do in the circumstances if you had this extraordinarily high CO make that you are seeking to explain is that you would be perhaps even excessively vigilant about monitoring of other signs; is that so?-- I'm not sure that I understand what you mean by "monitoring other signs".

Perhaps the suggestion of a CO make, for instance, that's reported that seems, whilst out of line with the make up to that point, nevertheless exceedingly high?-- I think that anything unusual needs to be investigated.

Reports of a slight benzeney smell or a strong benzene smell or a slight tar smell, those sorts of things?-- They shouldn't be ignored -----

Well -----?-- ----- out of hand.

Mr Barraclough said that a smell would be one of the most dangerous things you could have in a mine. You would agree with that sentiment? I mean a smell of that kind?-- Well, this again is a judgment factor. I would hesitate to use

those terms myself, but that's - you know, that's his choice.

But certainly something you wouldn't dismiss, you would carry out a full investigation?-- It would - I think one would - I would recommend that an investigation be made.

And that investigation would be using all means at your disposal including a gas chromatograph, examination of a sample of gases from various parts of the panel, would you agree with that?-- If they were accessible.

Well, at least from those parts of the panel that were accessible?-- Yes.

I mean, we know here that right down the top return and across the back of the panel were areas that were accessible?-- I seem to have heard varying reports of how accessible they were.

That again might be a subjective matter, but that's the evidence that's been given. Now, just assume that for a moment. Would you agree with the evidence that's been given that in trying to determine whether there is an extensive, mild heating or a creation of warmth as opposed to a small, intense heating, that there is a benefit in taking samples at various points throughout the panel rather than simply relying on a sample that's coming out of the top return?-- If it's feasible.

I'm sorry?-- If it's feasible.

If it's feasible, yes. I'm saying assuming it is feasible to go down the top return and across the back of the panel with access through each of the stoppings that you have seen referred to in evidence, there would be some benefit in doing that, isn't that so?-- There could be.

And on this question of whether or not one would readily dismiss a higher than usual CO reading in parts per million, you have mentioned in the course of your report and I think in the course of your evidence today that you can have these fleeting smells; is that so?-- Yes.

And, of course, that's on the basis that there may be a smell being created by a small, intense heating in an area that is perhaps not well ventilated and somebody opens a stopping or does something or there is some change that causes some ventilation to pass through that area and it might just pick up a whiff and carry it outbye?-- Yes.

And then because the stopping is closed again or some other change is made, the whiff could be carried outbye but not be followed by any others at least for some considerable time; is that right?-- That's possible.

And that could also happen if you have got carbon monoxide being created from a heating like that along with the smell; is that so?-- Yes, yes. It's there in larger quantities but it also could be - and I think I make the point in my report

that there might be areas in the mine that don't have a full contribution to the return air.

So that again there could be an area slow ventilation, virtually an area of dead ventilation, and some circumstance picks up a sample of the gases being created there including carbon monoxide, carries it outbye, but either the closing of a stopping or some other change in ventilation reverts or causes the situation to revert to what it was and whatever was carried out of that section is no longer carried out so that you get a plug of gases, as it were, coming from the area of the heating?-- I find it more difficult to think in terms of a plug of gases all of a sudden escaping from whatever part of the goaf it was in to be different than a whiff of an odour.

You would regard that as different?-- Yes.

To the whiff of an odour?-- Yes, and I would think that any peculiar readings of carbon monoxide in the return, be it by Drager tubes or the Unor system, would be looked at first as very suspicious rather than indicative of something that just escaped from the goaf.

But having regard to what you say about the possibility at least of a whiff being able to be carried outbye, that perhaps temporary occurrence of a higher level of CO would at least require some substantial investigation; is that right?-- If it was one point on the Unor quite different from all the other points before and after I would say that it wasn't really a very significant point because I see all sorts of ups and downs and funnies in the Unor data.

Now, you have also said in the course of your evidence that because of these variables between one panel and another and one type of coal to another and having regard to different methods of extraction, that you wouldn't or you don't believe that absolute figures in terms of CO make - what I will call alert and alarm levels - have any universal relevance. I think that's the way you put it?-- Any one figure, yes, that's correct.

You did, however, say that such figures may provide certain benchmarks - they were the words you used this morning, I think it was?-- Yes, I used the word "benchmark" but I didn't mean to use it in a way of saying that a benchmark that is useful in the German advancing longwall is necessarily a useful benchmark in a bord and pillar mine in Queensland - a panel in Queensland, and I meant to say that benchmarks are useful if they have been determined to be appropriate to a particular mine, a particular operation.

Can I return to that in a moment? Is Your Worship going to take an afternoon break?

WARDEN: Yes, unless you are going to finish very quickly.

MR CLAIR: No, I won't finish very quickly.

WARDEN: We will take 10 minutes, thank you.

RXN: MR CLAIR

WIT: VAN DOLAH R W

280395 D.51 Turn 18 sbd (Warden's Crt)

THE COURT ADJOURNED AT 4.10 P.M.

THE COURT RESUMED AT 4.30 P.M.

ROBERT WAYNE VAN DOLAH, CONTINUING:

MR CLAIR: Doctor, just before the break, I was asking you about your statement earlier that the figures in respect of CO make may be used as benchmarks, and I think your answer was to the effect that you weren't intending to imply that they were benchmarks that could be carried universally, but rather they might be benchmarks that applied to a particular mine or even to a particular panel in a mine?-- That's correct.

Now, I want to explore, though, the extent to which there can be some establishing of benchmarks that at least provide a starting point in determining what an appropriate CO make might be. Now, first of all, the - in this case in 512 panel, we do know that, in fact, we have got quite a good history now of the CO make in 512 panel - we have probably got six or seven different versions of it at least amongst the many graphs - and we can also say on the basis of your opinion, along with others, that the cause of the explosion on the night of the 7th of the August last year was probably an ignition of an explosive mixture in 512 panel and that the source of ignition was probably a heating in the panel; am I right?-- Ultimately, yes.

Now, first of all, to what extent does that enable us to say, "Well, look, here we have some history in this case at Moura No 2. We know that there was an explosion as a result of a heating, most probably, within 24 hours of sealing of 512 panel, and we know that the CO make in 512 panel followed this particular course represented by the graphs in evidence here."? I mean, is that a starting point in establishing benchmarks?-- It is only a point. It is one history.

Well, it is. But if we just for the moment assume that the explosion on the night of 7 August was caused by a heating - let's assume that?-- Yes.

There is no doubt, is there, that the heating existed at the time of sealing?-- In all probability.

Well, you have referred in your own evidence to there being signs of the heatings over the days leading up to the sealing?-- Yes.

And it is probably fair to say that the heating had existed in the panel for some considerable time before the - or had developed in the panel over some considerable time prior to the date of sealing on 6 August?-- I think that's true.

RXN: MR CLAIR

WIT: VAN DOLAH R W

I mean, a heating that would be sufficient to ignite the explosive mixture on the night following the sealing is not one that would have developed rapidly - that is, developed from scratch rapidly over a few days prior to sealing?-- No, I think it probably had quite a long history. It is hard to say how long.

It may even have gone back to June when there were reports of a slight tarry smell, on one version, and certainly a benzeney type smell and even a recording in one deputy's report of a strong benzene smell?-- It is possible. It would have probably had to be very well hidden much of the intervening time.

Why do you say that? Why do you say that?-- Well, if it were - I come back to the fact that I spoke to earlier that there was a lot of activity in that panel for the rest of June and through July. They were actively mining in there. They were actively moving the miner from one location to another location and changing the ventilation to accommodate the miner and doing all kinds of things, and it seemed to me it would have to be pretty well hidden in various ways - possibly in several different ways at the same time - but there are different ways for it not to become apparent repetitively to more than one person. In this gap of six weeks or five weeks or whatever, nothing was reported in the month of July-----

Can I pause there a moment? There was, there was a reading of 8 ppm CO on the morning of 22 July?-- By?

By Deputy Bryon?-- Yeah, a Drager reading.

A Drager reading, yes, that's right?-- Yes.

Experienced deputy?-- That's so.

That would cause sufficient concern to - at least at that point - instigate the establishing of a system for taking of readings to calculate the CO make on a shift by shift basis?-- Yes.

So, there was something in July?-- Yeah, I was thinking about no smells.

Yes, that's so, but I think you made the point yourself that the difficulty with a small intense heating is that signs such as smells, if it is in an area of poor ventilation - which one would ordinarily suspect it would be-----?-- Not necessarily.

Well, certainly there is more chance of the heating developing in an area of poor ventilation; is that so?-- Not necessarily.

Not necessarily. Well, I will pass on from that. Put that aspect to one side. But, nevertheless, I think you have said yourself that these signs, such as a smell - forget for the moment increase in CO make - but a smell or a haze - such signs could very well be hidden, particularly in a panel with a large air quantity going through it?-- Yes.

So, it is not surprising that it wouldn't be noticed that - that those signs wouldn't be noticed over that period of time, is it?-- Well, it could happen, but I think - again, the probability is much better that - much higher that it would have been sensed again in this period of July when there was a lot of activity closer down to where people had postulated that it - there may have been a heating.

The activity was actually retreating outbye?-- Yes.

As extraction continued-----?-- Yes.

-----the goaf got larger?-- Yes.

And the area where the heating may well have been located became more and more remote?-- Yes.

And inaccessible?-- Yes.

Isn't that so?-- Yes.

And the air quantity remained at relatively high levels?--
Yes.

For the panel, for the size of the panel?-- Yes.

So that that feature of a smell or a haze being masked by the high air quantity remained throughout that time?-- Lost in any case possibly.

But the one thing that does remain, of course, is that the heating may well have been producing more CO?-- May have been.

And can I come back to this: in terms of the increase in CO make that you might expect from the means of production and the rate of production of coal in the panel, there is really no way that you can measure that, is there? I mean you wouldn't - if you were there at the time you couldn't have put a measurement on that?-- No, not precisely at all.

So there is really no way of saying that the existence of that heating in 512 Panel is not showing up or was not showing up in the CO make, the increasing CO make?-- There is no way of saying that it didn't show up and there is no way of showing that it did show up. It's lost.

The one thing we do know though is that assuming that the source of ignition was the heating in 512, the one thing that we do know is that there was then a likelihood of a heating being existent in the panel over a period of time going up to 6 August?-- It's possible.

So if we did want to look at establishing a history, that is with a view to predicting some benchmarks for alert and alarm levels of CO for the Moura No 2 Mine or a mine in that area, then one would look to this history, isn't that so, and say, "Well, look, here we go. There is a heating at the end and here are the CO make levels leading up to it." Those CO make levels provide benchmarks, alert and alarm levels which we can use, isn't that right?-- I don't believe so.

Why is that?-- Well, because the rate of increase of CO make started out at a higher level in the beginning than towards the end as I look at the data.

The rate of increase in CO make?-- Yes, we are really talking of rate which is the make as a function of time, and -----

You are saying it climbed more rapidly at the beginning and tended to level out towards the end?-- Tended to level off, yes.

Why do you say that that denies the prospect of the existence of the heating being reflected in the CO make?-- Well, you see, I've been bothered by that and I wondered why there seems to be an apparent levelling off of the CO make at a time that there may have been a heating getting started in there, and then I heard testimony that said that they were able to do a better job of cleaning up towards the end of the panel and

less loose coal was left in the panel, so this is one possible explanation. Another possible explanation is that some of the things that - some of the reactive coal is in pillars at the bottom of the panel and these aren't being repeated to the same extent as towards the end of the extraction of the panel.

A higher proportion of reactive coal at the back end of the panel; is that what you are suggesting?-- That's what I'm suggesting, yes.

When you made your report on page 3 you refer to that levelling off and you said that - and I'm referring to the second last paragraph on that page, you said, "The levelling off may indicate that the increasingly deep goaf had areas that were not being thoroughly swept by the ventilation air."?-- Yes.

"The indicated changes on 5 and 6 August suggest some increased reactivity that might have the potential of developing into a hazardous situation.", but I'm just not too sure to what extent you retreated from that paragraph in your report. You did make reference to it this morning, but let me ask you this: that possibility still remains, doesn't it, that as extraction continued and work retreated outbye, that there were larger goaf areas and that the goaf areas became - perhaps because they were larger or for other reasons - became increasingly difficult to ventilate so that there were areas of the goaf that weren't being thoroughly swept, as you say, thoroughly swept by the ventilation air. I mean that is one explanation for the levelling off in the CO make, isn't it?-- It's possible.

It's the first one that suggested itself to you before you learned of cleaner mining towards the end of the panel?-- Yes, I was struggling to get an understanding of why this should level off.

But just to be clear on this, you are not saying that this isn't a explanation that's equally open?-- It's still open.

So really that takes away from the strength of your suggestion that the levelling off towards the end of the panel - levelling off in CO make towards the end of the panel in some way denies the fact that the heating is represented in the increasing CO make?-- I think it's lost in what we see.

But you see, that's what I'm asking you. Why do you say that? Because we can't measure the increase that's attributable to the method of mining. I think you've already agreed with that. We can't measure the increase that's attributable to the mining method or the rate of production of coal?-- At which point in the extraction are we talking about?

Well, at any point?-- No, no, I didn't say that.

You can't measure the actually effect in terms of CO make?-- Well, in a qualitative way, because I see the reasonable correspondence between production rates and CO make rates.

But that's the only way in which you would attribute any measurement, qualitative or quantitative or otherwise?-- Well, I've said already that I'm not - I look for trends and I see the same trend.

Well, it really comes back then to the point that if there is not a correlation between those two items, the rate of increase in production and the rate of increase in CO make, then to the extent that there is a difference if it's a higher CO make, it really requires some other explanation?-- Assuming that the mining method didn't change in the process which is still one of these things that we can't quantify.

Assuming that the CO make just for the moment can be said to be represented - or should I say assuming that the effects of the heating can be said to be represented in the CO make for panel 512, would you agree that that then should be part of a history that establishes benchmarks for CO make for the future?-- But you are making an assumption that -----

That you are not prepared to make?-- No, I'm not prepared to make that.

I'm asking you to make that assumption. If it could be said that the CO make did in some way to some extent represent the heating, isn't it so that that's at least a starting point for establishing benchmarks in the future?-- Somehow that logic escapes me. I'm not following you somehow.

Well, you see, the starting point is how do you establish a benchmark if you don't have regard to events like this. How do you establish a benchmark for a particular mine? That's a benchmark of CO production?-- Well, I don't think you do it by changing the mining method for each panel.

Let's assume that there was a panel 513 and somebody had to make an assessment as to what rate - what CO make was appropriate for the panel with a view to fixing alert and alarm levels?-- Yes.

Is it valid for them to start by having regard to the levels of CO make in 512 and then making any appropriate adjustments for different mining method that might be used in the next panel?-- I think the adjustment becomes more important than the starting point.

Now, I gather from what you say that you say that the amount of carbon monoxide that may be produced by a heating, particularly at the early stages, is such that it's going to be swallowed up in this change in mining method?-- In a panel like this with so much potentially react - and reacting coal it's a struggle to discriminate a small contribution from a heating against a very large background of the extensive reaction.

Just before we leave that point, of course, if you have a reaction by way of increased CO make as a result of your method of mining, there is no reason why the increased CO make as a result of a heating in the panel isn't simply reflected

by some addition, as it were, some cumulative amount of CO or CO production, CO make?-- Yes, it would - the hope is that you can see that in this change.

That's exactly what we are exploring at the moment?-- Yes.

To try to establish a background. That's so, isn't it?-- Yes, but to see some change above that background, but the change has to be significant when you are dealing with 40 or so cubic metres per second of air and a lot of reacting coal and a little bit of hot coal, but -----

But of course in some way a background has to be established, doesn't it?-- You try to, yes.

In the United States, according to evidence that's been led, there is a practice whereby the district inspector receives a petition in respect of alert and alarm levels for gases where there is a monitoring system similar to the Unor type system. There is evidence given about that by Mr Mitchell yesterday?-- I bow to his knowledge.

I was about to ask you are you familiar with that practice?-- Not in detail, yes.

You haven't had involvement yourself with any procedure whereby - either as a consultant or as an official at any time whereby you've had to determine what is an appropriate alert and alarm levels in a monitoring system?-- No, I've had no such experience.

The same sort of difficulty of establishing a background is applicable to the CO in parts per million measurement after sealing; isn't that right? Again one needs to know a background in order to know whether the rate of increase in CO level is an appropriate one?-- Well, one has a first approach to that by looking at the CO production in the panel at the end of - just before sealing when it was - you still had full ventilation of the panel and you looked to see what the total make, if you like, of that panel is at that particular point in time. Now, once you seal you've got all the problems that I have spoken to at length of the sampling problem, of sniffing a little bit of a very large atmosphere.

I appreciate that, and I think all of that has been explored with you?-- Yes.

I simply want to deal with this aspect. You say that having regard to the rate of production at the time of sealing, rate of CO production at the time of sealing, that you wouldn't regard that increase of 6 ppm per hour as being a matter of concern - I use that word, you may not like it - a matter of concern after sealing?-- It doesn't look unreasonable.

Now, how do you say that? You see, that's what I want to come back to. What is it that enables you to say here today that 6 ppm doesn't look unreasonable?-- Well, I look at the relative production between, let's say, 401/402 and 512 at the end of production - at the end of extraction and just before sealing.

You don't see a valid comparison being the rate of actual increase in CO level after sealing in one panel with the rate of increase in CO level in another panel after sealing? You were referred to what was contained - the comparison done in Mr Highton's report. You don't see any validity in that comparison?-- It's - the comparison that I'm making is that there is - 401/402 at the end of extraction was producing a relatively small CO make compared to the CO make in 512 at the end of extraction. So, I expect that the accumulation of CO once it's sealed - the accumulation of CO once the two panels are sealed to reflect the make that was going on at the time of sealing or just prior to sealing.

In effect, you are extending the curve, you say?-- No, I'm taking it straight out from that point.

Well, perhaps extending what might be called the linear regression?-- No. See, I'm looking at this rate of increase and I'm looking at the end point and comparing that with the end point of - and I see a substantial increase in the make at the two - in the two panels.

A comparison that's made by Mr Highton - I am referring to page 15 of his report and it's only brief, I won't get the report out and put it in front of you - is this: that it took approximately seven days for the CO in 401/402 to reach a figure of approaching 150 ppm, in 512 it took approximately 20 hours, a rate of increase over eight times greater. Now, you don't regard that as a valid comparison?-- Well, it's a comparison and the numbers come out correct perhaps. Again there's the problem with sampling, the problem that the two panels are quite different in size, shape and all sorts of things, and so I say that one is greater than the other. When it comes down to whether it's six times or eight times or twice, this gets lost as far as I'm concerned in the problems of knowing exactly what's going on inside the panel.

There is only one way to find out what's going on inside the panel after sealing and that is what's coming off your monitoring point; is that so?-- That's true, but it may give some rather bad information to you.

If you were confronted with those figures, that is, that it increased to - the CO in parts per million increased to 150 ppm at a rate of increase over eight times greater than 401/402 - if you were confronted by that at the time, would you have considered it appropriate to look further, carry out some other investigations?-- After sealing?

After sealing. These figures I am giving you are figures after sealing?-- Well, it isn't clear to me what other investigations one would make.

Well, would it lead you to a conclusion that there may well be a heating? Mr Highton forms the view as a result of that, or at least goes on to express his opinion that that rate of increase over eight times greater than in 401/402 was an indication of spontaneous activity. Do you agree with that?-- I think there was a heating there, yes.

But do you agree that that is an indication of spontaneous activity?-- It is an indication, yes.

Okay. Well, I won't press the other question. Now, just before I leave that point, of course what you said about in some way explaining the rate of increase of CO in parts per million after sealing because of a higher CO make at the time of sealing is dependent, of course, on that CO make at the time of sealing - that high CO make at the time of sealing being attributable to method of mining and the amount of loose coal?-- At that point in time it's the amount of loose coal.

Well, amount of loose coal, yes?-- And, well, coal available for reaction. Loose coal is a funny way of putting it in totality.

Of course, if there was a component in that CO make at the time of sealing that was attributable to the existence of the heating in the panel, then you couldn't find any comfort - to use a word that you don't particularly like - but you couldn't find any comfort in the explanation that you relied on earlier, that is, that the rate of increase in the CO in parts per million after sealing simply reflected what was happening before? Do you understand my question?-- Yes, I understand your question and I'm trying to find a different way of putting it than I have already answered which says that that amount of carbon monoxide make, given all of the uncertainties of sampling, given all the uncertainties of incomplete mixing in the panel, is not out of line with the amount of carbon monoxide that was being produced at the end of the extraction. Now, I have in no way said that I didn't think there was a heating going on at the later stages here, that it was some contribution. What I have said repeatedly is that right up to the end - nearly the end of the extraction process, that the evidence for that heating seems to me to be lost in the overall background of the CO production throughout the panel.

But, you see, I was postulating to you earlier that some of that CO make represented at the time of sealing may well be attributable to the existence of a heating?-- I'm sure it is.

What I'm saying is this: that if some of that is attributable to the existence of a heating, then the rate of increase in production of CO or the rate of increase in CO readings in parts per million after sealing couldn't be simply explained on the basis of the high CO make at the time of sealing, isn't that right?-- I thought I just answered that in the negative, but somehow we are not communicating.

It may have been an answer with too full an explanation for a dense lawyer to pick up at this time of the day. Now, there is just one further point that I want to ask you about and that is in respect of your concerns about the method of sampling behind the seals. I know you have said that the more sampling points the better, but you also made a point that one of the difficulties that arises is the level at which - the height at which sampling is made?-- Yes.

One suggestion that's been raised in a report - and I think it was Mr Mitchell - is that there be a pipe wedge between the roof and the floor with a series of openings equidistant along the length of the pipe - I think the way he put it - with a total surface area not exceeding the total surface area of the cross-section of the pipe. Now, do you see that as an answer? Does that give you a representative sample from top to bottom at least at the monitor point?-- Well, it helps, yes.

It helps?-- Yes.

One final point - and I'm looking at the last paragraph in your report - you say in the fourth last line, "Evidence of this heating was not available in form of timely, dramatic changes in data that were being obtained." Now, can I ask you this: you really don't need to have, or at least one shouldn't be looking for dramatic changes in data in order to determine whether there is a heating in a panel, isn't that so?-- Well, I think the point that I'm making, one cannot look at the minute changes and be sure that they mean anything.

But is my proposition correct, that really one shouldn't be looking for dramatic changes in data, rather one should be looking at all of the signs and the reports and carrying out a full investigation in order to determine whether in fact what might be described as subtle changes are indicating the existence of a heating, isn't that right?-- One should not ignore any data that's available.

Put it this way: if one waited for dramatic changes in data to be satisfied that there was a heating, then there is every chance of missing it, isn't that right?-- Say again, please.

If one waited for dramatic changes in data in order to determine whether there was a heating in a panel, then there is every chance that one would miss it - one would miss the existence of the heating?-- How?

By missing out on the subtle changes that indicate the existence of the heating perhaps, isn't that right?-- Well,

the subtle changes I'm referring to, and I think you are referring to, are changes in the data that are coming. I don't think that it refers to a subtle smell that someone may have had sometime in the past. I don't want to discount that, but what I'm saying is that the small wiggles early on in the carbon monoxide indicated by the Unor system after sealing or even before sealing have to be looked at with a great deal of care because they show just an ordinary continuing progression and that if there is a heating that is contributing to it, as I think there probably was, that contribution is lost in the overall picture is what I am saying.

You see, my question was not a pointless one because we have had a procession of witnesses through the Inquiry - you may have heard some of them - who have said that they didn't consider that there was a heating because they understood that in order to get an indication of a heating from CO make it really needed - a graph really needed to be at what is described as an exponential stage?-- I think part of this was perhaps reflecting the history of 5 North where there was a dramatic change in carbon monoxide that was observed and they sealed and they stopped it.

Let me ask you this then: it's really not a correct approach - and we need to establish this for the future, do we not - it's not a correct approach to wait until there is a CO make graph that's moving into its exponential phase before deciding that the data indicates that there is a heating, isn't that so?-- This is a judgment call again.

Well, let me put it to you this way: that if in fact one could satisfactorily establish a background level of CO make - just assume that can be done, taking into account methods of mining, rate of production of coal and anything else - if one could establish satisfactorily a background make, any sustained rise above that background would warrant investigation, wouldn't it?-- Yes, it would.

Thank you, I have nothing further, Your Worship.

WARDEN: Colliery owners?

MR MORRISON: I am pausing because I don't know whether Your Worship wants me to go ahead of the panel or after. I'm happy to do either.

WARDEN: It might save some time.

EXAMINATION:

MR PARKIN: Dr Van Dolah, in cross-examination by Mr Morrison did I understand you to say that coal which has been drained of methane is more liable to spontaneous combustion?-- All things - other things being equal, it facilitates a reaction with oxygen of the air, yes.

I think you mentioned water had something to do with that?-- Well, the drainage - the methane drainage may remove bed moisture and if it ends up with the coal being dry and I had reports of it being dusty and all, then, whence, when it is ventilated by means of being exposed and if it's exposed to moist air, the moist air is more reactive than it would be than if the coal were saturated with water to begin with.

The reason for the question was that after drainage it was indicated that the coal was dusty and in some areas water is infused back into the drained areas to replace the moisture, and I guess the question was: would that return it to the status quo in terms of CO or its -----?-- Yes, to the extent that it replenishes the water - the moisture in the coal, yes.

Witnesses at this Inquiry have stated had they been aware of the report of smells along with other relevant information like CO make, at the time they would have had a major concern, and you are aware of that? Do you share that feeling?-- Again, I'm a scientist. I will point out indications and I will - you know - but this is a judgment call.

It is a judgment call, but the thing is that if one does ascertain a smell, it needs to be thoroughly investigated?-- Yes.

The mining method, I think you mentioned, is very important to CO make - like long wall faces, bord and pillar; you would agree with that?-- Yes.

Therefore, I think one of the things that has come out of this Inquiry is that, you know, the background CO make is important; do you agree with that?-- Yes.

And, of course, at Moura No 2 a very good CO make graph system was developed; do you agree with that?-- Sorry?

At Moura No 2 there was a very good system of CO make graphs used at the mine prior to the explosion; do you agree with that?-- A good system - it relied upon some velocity measurements plus some carbon monoxide measurements, but it was being posted.

I may say that had it been communicated properly, it would have been a good system; do you agree with that - you know, the method of the CO make? As you have said earlier, and we certainly agree with you, it is the trends that one looks at, not one individual indicator?-- Exactly right, correct. Yes, I agree.

The trends of the CO make up to the time of the explosion - should there have been a concern, in your opinion, looking at the trends of the CO make?-- At what period of time?

Up to the time of the incident?-- Yes.

With the information that was available at the time?-- I think there are indications that it is increasing at the very end, yes.

You said that 512 was different in terms of its CO make to all other panels?-- It seems to be.

Should that have been an indicator to management to monitor the panel more closely, in your opinion?-- I don't know that. There was an immediate rationale for the increased make, I think.

I would like to spend a little time on this monitoring point - point 5 - this is behind the sealed area - and if we assume that the monitor point was approximately a metre from the roof - and I think that's where it was - I stand to be corrected?-- That's what I understand.

The CH₄ increased from approximately .75 to about 4.75 in approximately 22 hours?-- Yes.

And I think you have mentioned, and I certainly agree with you, that that monitoring point would only monitor a fraction of the panel itself?-- Yes.

What I am coming to is the fact that the panel is approximately 400 metres long and it is something like a 50 metre drop from 510 down to the bottom of 512, so the average gradient would be about 1 in 8, or something of that order; what do you think - I mean, I'm thinking now in terms of layering of Stage 4 - what do you think would be the scenario behind the seals?-- Inside the seals?

Yes. I mean, it may be a difficult question. I'm trying to come to grips with the layering, where it would be. Presumably the CH₄ would migrate towards the seals, but that would take time, surely?-- It is a fairly slow process this natural convection, which is really a function of the - what kind of mixing of the gases are there, and what the density differences are.

But would you - I guess I'll come back to the question - would you think that that rate of increase was particularly fast with regards to CH₄?-- Well, there was a substantial make even before - you know, during the extraction process, if one looks at it, it is not as great a make as SIMTARS have used in their calculation for the filling up of the panel, because they didn't subtract out the methane that was being recorded from point 14 in the pump room, which was about 1,500 - 1,400 to 1,500 per cent at that time, so it was less than that - that apparent make - but, even so, it was a substantial amount of methane coming into that panel, and how this is going to be reflected exactly at one sampling point in No 3 heading is a very difficult question that I can't answer, really.

Can I take you to Figure 5 in your report, and I promise not to spend too much time on this. Mr Clair has just spent some time talking to you about it. We can see that in 22 hours we have got 150 parts - approximately 150 ppm at 10 o'clock on the evening of the 7th?-- Yes.

Now, I think it is the rate of increase over the time that's a concern?-- Yes.

I mean, if you looked - sure this panel is sealed and one would expect that the CO would increase over time?-- It is going to accumulate, yes.

But we are talking about the rate here?-- Yes.

I mean, that's increased, I mean, roughly over 1,000 per cent in 22 hours. How does that compare to before it was sealed?-- It isn't much different. If you take the rate, it is - if one takes 12 as a beginning point - 12 ppm at the beginning point, which is one of the early numbers that one has after sealing, and 150 - forgetting that last point or two - it is 138 ppm in

22 hours, which is about 6 ppm per hour.

Well, I guess I'm just asking for your view. I mean, previous evidence has suggested that it was rapid, but in your opinion that's not the case?-- Well, it is rapid, but so is the production of CO at the time of sealing, and it was quite rapid a week before that it was sealed, and this is reflected here. As I say, I did this back-of-the-envelope calculation and with all the problems of trying to use one little sample point as representative of the atmosphere and all the problems of mixing and so forth, the numbers come out to be reasonable. Now, what the contribution is of what is producing CO and what the temperature of it is, I have no way of knowing.

Well, we do know that the Graham's Ratio had moved from approximately point 2 to point 7 over the same time period, and taking into account the problems with the Graham's Ratio after sealing, would one not assume that something was going on behind those seals?-- Yes.

So, there is no doubt in your mind at all regarding that issue?-- There is no doubt in my mind that there was a heating going on and was being slowly reflected in some changes of things - the calculation that we did, which I think is the best calculation one can make - a Graham's Ratio - which is literally the loss of oxygen by virtue of adsorption reaction with the coal in 16 compared to the oxygen that was there as reflected by point 14, and the CO production is reflected by the differences, and this gives you the best calculation of Graham's Ratio because it involves no concerns about the accuracy of the analysis of all the gases in going through the sample, but still involved complicated - involved calculation of the oxygen deficiency. This gives you the oxygen that is - that was adsorbed in panel 512 with the caveat that a little bit may have been lost in the passage through the airways.

Just turning to another subject: have you got a view on where the second explosion may have occurred?-- No.

One can assume that the miners in 5 South died of CO poisoning?-- I believe so.

You agree with that?-- Yes.

What are your views on oxygen self-rescuers versus portable or non-portable refuge chambers?-- The oxygen self-rescuers provide a chance for escape, or, depending on the circumstances, a time for finding some kind of refuge. We went through the exercise of looking at refuge chambers somewhere - I don't know how many were built. It is my understanding that the whole concept of a refuge chamber was a very unpopular one with the miners.

So, would you advocate the fact the one would use the normal self-rescuer to escape from the face, as it were, and for these oxygen self-rescuers to be located somewhere near the face vicinity so that at least miners could - on the job - could quickly retreat to a situation where they could get the

oxygen self-rescuers?-- That would be very helpful. The optimum situation would be a constant-wear oxygen self-rescuer, where one doesn't have to change - donning of one and take it off and don their second one.

Is that possible now?-- There are oxygen self-rescuers that are - some of them are being worn. I don't know what the proportion is, but there are - there is at least one that is light enough and small enough in size that most miners, I think, can get - it depends on the miner and what his job is and what he is having to do and what the height of the coal is, and all sorts of other things.

For the future, in terms of CO indicators, you know, what are your views? Should we continue with the CO make and the Graham's Ratio and the CO/CO2 ratio? Do you see those as still the best indicators for this spontaneous heating?-- I still think that CO represents the best possibility for early warning, and in many circumstances, perhaps all, CO make gets around some of the other problems that might be associated with just carbon monoxide parts per million, and so on.

Dr Van Dolah, one final question: in your view, the explosion occurred in 512 panel?-- In all probability; that's the most probable spot.

It would appear that all the experts agree with you?-- Apparently.

It would appear that more people agree that the fate of the 5 South miners was that they did die of CO poisoning?-- I think that would be the most probable situation.

Now, in light of those two very important facts, what's your view on re-entry with this evidence in mind?-- Well, I believe that the risk benefit ratio is very bad; that there is a very high risk to the re-entry and the benefits to be derived from the intelligence that one might get on exploration of the mine would not really be very good, so that one could go in and end up with no more intelligence than what we have at present.

Do you believe that after the - one final point: do you believe that after the first explosion there would have been any small fires underground?-- Yes, I think so, and - but - well, to me it's a very logical cause of ignition for the second explosion - that the proper mix found a little bit of flame, or maybe a lot of flame, but the proper mix got there and ignited, but the - it is the second explosion and the continuing fires that lead me to be very pessimistic that one might find useful information on re-entry.

Thank you very much. I have no further questions.

EXAMINATION:

MR NEILSON: Dr Van Dolah, you have indicated once again to Mr Parkin, and I take you to page 2 of your report - you say there, "I share the opinion of many investigators in the field that carbon monoxide provides the best means of early warning of spontaneous combustion."?-- Yes, sir.

Given the testimony that you provided us with today and, I'd suggest, at least from my point of view, some confusion that now surrounds that theory, what sort of qualification would you put on that if you were to, for example - and I'll just ask you to do this: accept the fact that the early detection of spontaneous combustion at any coal mine will, in the main, be dependent upon the statutory officials of the mine - and I'm talking about people like the mine manager, undermanagers and deputies - what would you say to them in terms of the confusion that I'm suggesting now - when we learn that carbon monoxide make is influenced by so many other factors, such as coal being exposed, the rate of production, and a whole range of other things, if we are to continue on with the belief that carbon monoxide is the best means of detecting an early spontaneous combustion event, where do we go now?-- Well, it is refining one's knowledge of the factors influencing the production of carbon monoxide and looking for the trend and the deviation from a trend, and a trend has to be established in a mine - in a panel - for a method, and it may not be perfect then, by any means, but it is at least - the approach that I see as necessary is that you have to factor in a lot more things than people have typically factored in before - typically looking at the carbon monoxide and relying just on that without paying a lot of attention to why it is coming out at the rate it is coming out and what are the changes and what are the significance of these changes, and what's changing about the trend I think is the only answer that I can give you, and it is not a good answer, but I don't know the perfect answer.

You will accept the fact that in looking at any changes in trends it's very important that we try and establish a lower level or some level that gives us a great deal of comfort in safety when it comes to the lives of the people underground?-- Yes, sir.

Can I then take you to page 4 of your report?-- Yes.

On the second line from the top you say, "I do not think that fixed levels such as 10 or 20 litres can have universal application.", and you are talking there about the German - I call it the German experience?-- Yes.

Now, as I understand it the reason you say that, and I think you said it today, is for a number of factors, one of which is they mainly apply that to longwall applications or longwall methods of mining, so that could have some bearing or some relevance where you may be looking at a different method of mining such as No 2 Mine was bord and pillar?-- Yes.

The other reason is that the coals vary?-- Yes.

We may be looking at a different type of coal, and I know that somebody suggested that coals are coals are coals. First of all, one question to you, and given that I accept the fact that coals do have different qualities - and I talk to a lot of the marketing people as well - so if we had a situation where we were looking at formulating some view, some principle that we could rely on to detect spontaneous combustion in its early stages, and we accept the fact that, yes, the German experience says that they have established these two benchmarks of 10 lpm and 20 lpm, however, our coals - or at a particular coal mine be it Moura No 2 or Collinsville or anywhere else, or Gordonstone, if we were looking at establishing a similar principle, if we are looking at two seams, one in Germany and one here in Queensland that are both liable to spontaneous combustion, would their physical factors be of such significance that we would need to move too far away from the 10 and 20 lpm mark, accepting that we may have to make some adjustment?-- Well, I don't know what you mean by how far, but what I'm only saying is that I do not believe one can translate the German experience directly to any given mine, or better, I should perhaps say I don't believe that you can translate it to all mines, that there is any kind of magic about 10 and 20. They found it to be useful in the German mines. It may be useful in some mines in Australia. It may be completely out of the park for other mines.

I may have confused you a little bit. I guess what I'm really asking is if we accept that the 10 and 20 litres may have no relevance at all to our mines, is it reasonable then to say, well, the principle is good because it establishes two levels, one which is a lower level that gives us some warning, and another level that, if we keep approaching that and in fact exceed it, it can tell us that we have got a very bad situation. What I'm asking you is should we, in your opinion, adopt the principle given that we would have to establish those two levels, probably not just for Australian coals, but maybe for every coal seam or every mine for that matter, and

maybe in some cases each panel?-- Well, my problem with that, sir, is that I find it difficult to think in terms of a number that says - even though it's different for a different mine or a different seam, that says, "We are in very deep trouble.", or however you put it, because I can conceive of a situation in which low temperature carbon monoxide make that results only in coal getting a few degrees above ambient temperature, exceeding that benchmark, whatever level that you put it without a heating at an intensive point. So I despair of - if you set these things by executive fiat or by law at a particular level, I can see it being passed without there being a great deal of danger in a particular mine, and that's why I argue against these numbers having any specific significance. It may well be that for some mines five is a proper number and maybe six or 10 indicates a real problem, and in another mine doubling from one level to another level might not mean anything more than just we are making a lot of CO from a lot of coal that's reacting.

That brings me to another question. We were talking about the monitoring point behind the seals, and I think you said that - I think it was a general statement that a sample really is no more than a sniff of what is happening in any given point in time at a given point?-- Yes.

And I think you qualified that to say that that may in no way represent what is in fact taking place behind the seals in the general area?-- Well, I think "no way" is perhaps a bit strong. I hope I didn't quite go that far.

No, I think you said it may be, it may not -----?-- It may not, exactly, and - because I think that it is stratified within any one location in terms of concentration, and I think there surely is a concentration difference between the bottom of the panel and the top of the panel, and this is one little bit that I think is probably only slightly representative of the total.

You see, the thing that concerns me is that - I don't disagree with you, and since you advise, and I think you advised Mr Morrison of that, we then went through a procedure with all the rest of your testimony where you've then been asked questions that relate to data that was gathered by that one sampling point?-- Yes.

It may well be that we have been examining something here this afternoon in your testimony that really means nothing in terms of what may have been happening behind that sealed area, doesn't it?-- Possibly.

Can I ask you first of all if you know what is the situation in the United States in relation to monitoring points? Is there any statute that says they must be located in certain areas or - and where those areas would be when they should be installed?-- I'm really not the person to ask that question of because I'm not familiar with the latest developments with respect to the regulations and exactly what is done. I know that fire protection schemes must be approved, and if a monitoring system is in place I'm sure the district manager

has issued some sort of a blessing for it.

Maybe the people from MSHA would be -----?-- They would be much better, yes.

Well, just in terms of that, without going too far away from it, what advice would I get - if I asked you for your advice as to what we should look for or what approach we should take to monitoring points in the future, particularly for panels such as the 512 one, what advice would you offer?-- In the pre-sealing phase, in the development phase?

No, maybe in the development face phase. I mean when you are going to go into the panel should you first of all, before you even commence mining, have a ventilation plan? Obviously you have to?-- Yes.

Should the monitoring points be part of that plan and installed properly?-- It might be a good idea, yes. I haven't really thought of that part of it.

Would you have any information to offer on, for example, where they should be placed?-- Clearly the return is going to give you the overall picture, but if you could have some additional points down closer to where parts of the return are being made up, if I may use that, there were means whereby some of the air went into the bottom of 13 and pretty well across the panel, as I understood it, and a point down in there would perhaps be very useful as well.

You've been asked quite a deal of questions about this question of smell, and I think you agreed that it is quite a normal feature in areas similar to 512 where there may be interrupted ventilation to have smells that come and go?-- Yes.

Would that be like a wafting sensation coming and going?-- Well, it's -----

Please say yes. That's all right. That was for somebody else's benefit. Thank you.

EXAMINATION:

PROF ROXBOROUGH: Dr Van Dolah, I would like to follow up on Mr Clair and Mr Neilson's point concerning CO make benchmarks for Australia and in particular Moura 2. You, and most if not all of the experts that we have heard, have discounted the general relevance of the German criterion of 10 and 20 lpm. However, it's true, is it not, that the experience of heatings at Moura is in fact quite compliant with those German criterion. They are the only two panels - assuming that there was a heating in 512, the only two panels that have in fact exceeded 20 lpm are the ones where they were heating, and all other panels didn't reach the lower limit of 10 lpm. So there

is reasonable compliance?-- It would appear so, yes.

Have you any comment to make with regard to that? I suppose what I'm saying is that notwithstanding the limitations and the faults of using the CO make levels, they would in fact have worked at Moura had they been applied?-- Yes, if in fact the ones that exceeded 20 were correct. I have a lot of problems with being sure of the validity of those last measurements.

On the evidence and the figures that we have they would appear to be consistent with that?-- Yes, it's close.

In a question, I think Mr Parkin was asking you, about the gas distribution scenario in the goaf after sealing, and I think in evidence you said that in the - that there was likely to be a significant ingress of methane into the goaf, quite a rapid ingress of methane into the goaf after sealing?-- Yes.

I think you said in the absence of significant mixing agents that this would tend to layer, this would tend to congregate near the roof?-- Yes.

Given that it's an incline section, that the gas would tend to migrate towards the No 1 return?-- Well, much of it is going to come up to 2 and 3 and 4 and so on, because it's my understanding that much of the goaf was fairly well sealed off from between 2 and 1 headings down to the very bottom.

Okay, let's not be specific on the top return. Let's say towards the top end?-- Yes, I quite agree.

It would be true, would it not, that there would, however, be within the panel an explosive range of methane somewhere?-- At this time I think it's quite - that it did exist, yes.

If we are assuming that there is layering of methane with a very high concentration then you don't get an immediate cut off -----?-- Of course not.

----- and then move into fresh air. You will grade through and eventually there will be a layer, if you like, which is an explosive layer?-- Yes.

And sooner or later that explosive layer will visit all parts of the panel?-- In area, yes, but not in the full depth of the -----

Well, if we have fresh methane coming in all the time then the methane rich layer at the highest point is going to get thicker and thicker or deeper and deeper which is pushing down the explosive mixture which will then make an excursion right across the goaf, would that not be true?-- You used the words "in time" and I have to agree with that, but in the early stages, of course, this explosive mixture may not exist near the floor or the bottom of the panel in much of a -----

Well, I think if you took a gradient of one in seven and a four or five metre thick seam you can probably predict the

rate at which it might - well, perhaps you can't predict the rate, but it would in a fairly short distance across a panel stretch from roof to floor, would it not? I've done a little sketch. May I ask you to have a look at that? If it's necessary I'll get other copies made. So we are looking at a situation there about a third of the way down the panel as I've drawn it in which we have an arbitrary layer of methane which is in the explosive range?-- Yes.

What I'm saying is that as the upper layer of CH₄, the methane rich layer becomes larger then that explosive range is going to move down the panel, and all else being equal it will transgress most if not all the width of the panel?-- Well, yes, but I have a somewhat different visualisation of this than what this is in the sense of anticipating some mixing of the methane. I said probably coming mostly out of the roof area, but I also have the problem of warm air coming out of a heating containing carbon monoxide and warming the air that's coming up from this heating, and this is going to come up and mix with this air. So what I have is - in my concept, a roof layer that is rich in methane getting leaner and leaner as - because of the mixing of these other gases that is coming up into it that's also wanting to get up to the roof and the whole thing sort of mixing up, going up. The fresh air, if we can use that expression once it's sealed, moving down, and the whole thing undergoing a certain amount of mixing by virtue of these natural convections, but the process is slow. What I see here is something that is probably close to the picture, as I see it, late in the stage of filling with methane, not early in the stage, not the first few hours - first day of the sealing.

So if we have these thermal effects, if you like, in the goaf, and we are going to get some mixing?-- Yes.

And possibly an increase in the amount of explosive or a wider distribution, if you like, of the explosive range of methane in the goaf as a consequence?-- It's possible, yes.

I don't suppose we could take that any further, but the point

I was trying to drive at was that sooner or later the explosive range - or methane in the explosive range would visit most parts of the goaf?-- Yes, I agree.

You have explained - I think it was in giving evidence to Mr Morrison - that observed hazes or shimmies can be due to refraction, I think you said, due to particulate material in the atmosphere?-- The shimmy, not the haze.

The shimmy?-- Yes.

I guess the point I want to make is that refraction occurs to the light that is passing through that atmosphere?-- Yes.

Would that apply equally to light that's being reflected because you would be observing it with incident light from the source of viewing -----?-- Yes.

----- rather than light coming through. Would the same apply?-- I think what you do is see through this layer of varying densities and, thus, varying refraction at something and that's when you can - you see these shimmies, if you see them at all. I think it's quite difficult in a mine under most circumstances.

But you are not sure whether there is a difference between viewing a shimmy with reflected - the effect of refraction being limited to light that is being shone through the haze as opposed to being reflected from it?-- The shimmy, not the haze. I distinguish between those two.

Okay?-- Well, I think there is a difference, yes. What I'm saying is that I think you may be able to see it if your light beam is going through it but you are seeing some object through it; that you will see the little wavery sort of things, which I assume is what people are talking about when they talk about shimmy. I have never seen it in a mine myself, so I'm at a loss as to what they are talking about for sure.

A couple of quick final ones, if I may, Dr Van Dolah. Do you agree with the view that has been expressed by others that water barriers in the path of a methane explosion would not stop or retard its progress?-- They will take up some energy from the flame of a methane explosion but they will not stop a methane explosion, in my belief.

And I think you have answered the question with regard to the probable position of an ignition - not an ignition - of a heating in the goaf of 512. It's more likely to have been toward the back of the panel than the front of the panel, would that be true?-- It depends on the heating. I have difficulty in trying to place it anywhere. If one looks at a place where there may be a crushing of a pillar and a heating as a result of this crushing of the pillar, then the point at which you have got the greatest pressure differential across that pillar is a likely spot and where that is is -----

280395 D.51 Turn 23 mkg (Warden's Crt)

Sure, but on the sheer basis of time of exposure to the atmosphere, the balance of probabilities would be -----?--
Yes.

And that would include crushing, I suppose, crushing at the back of the pillar, assuming it's much the same as it is near the front of the pillar, would have been exposed that much longer?-- Even in a crushed zone it takes time for this process to develop, yes.

No more questions, thank you.

EXAMINATION:

MR ELLICOTT: Could the witness be shown this, please? You will be pleased to know that I am not going to ask you to read extensively from this?-- Thank you.

It's supplied primarily to put it on the record. I believe the first schedule given was a copy of a section of a spread sheet?-- Yes.

Can you accept that that is derived from base data that has come from Exhibit 21 and Exhibit 245?-- Yes.

Can I ask you to look at the first graph which is entitled "512 Panel, CO Make and Production Rate"?-- Yes.

Can you accept that that is, in effect, a combination of Exhibit 219 which shows CO make and Exhibit 245 which shows production rates for the panel but put on a constant time basis?-- I accept that.

So, equivalent time points are plotted equivalently. I think there has been some suggestion that CO make was in some way following production rate?-- Yes, I've suggested the trend is.

Would you agree with me that if CO make was totally dependent on production rate or very closely followed it, that the ratio between them would be very near constant - all other things being equal, of course?-- Sure, yes.

So, that would in fact be the case, that the ratios should be near constant?-- With your caveat of all other things being equal.

I suppose given not only a close relationship but a linear relationship between them?-- Yes, assuming that the - again, CO make results from coal left inside.

Yes, but that is some constant factor of what is taken out?-- May not be.

It may not be, all right. Can I ask you to look at the final

XN: PANEL

WIT: VAN DOLAH R W

graph which is in fact a plot from that data of that ratio?--
Yes.

And it's "512 Panel, CO Make Per Production Rate", and it's a plot of litres per minute per kilotonne per day over most of the life of 512 Panel. Would you accept that that's a measure of the tightness by which CO make follows production rates?-- It's an indication of it, yes.

And would you accept that at about mid-June there is a fair departure from that?-- Yes.

But that, of course, may be due to a host of other factors?--
Yes.

Such as a mine method change?-- All kinds of things.

A different ratio of coal being left?-- Yes.

That coal being left in a different form?-- Yes.

There may have been ventilation changes at that time?-- Yes. I think that's about the time of the holiday and off day for maintenance, and all the consequences of that I'm not quite sure, I haven't really been able to evaluate.

I believe there is some evidence that the goaf may have been flushed?-- Yes.

So, you would agree, I take it, from all this that CO make in 512 Panel didn't in fact follow production rate all that closely for a host of reasons?-- Yes.

That's the purpose of my material. Thank you.

MR CLAIR: Your Worship, there have been some documents shown to the witness. There was a diagram that Professor Roxborough passed over to the witness. It may be appropriate, since the witness has referred to that, that that be tendered. I tender that.

WARDEN: Exhibit 261.

ADMITTED AND MARKED "EXHIBIT 261"

MR CLAIR: And then three documents that Mr Ellicott passed over to the witness. It may be appropriate to tender those as one exhibit, Your Worship. I tender those three documents.

WARDEN: Those three documents Exhibit 262.

ADMITTED AND MARKED "EXHIBIT 262"

MR CLAIR: I just have some brief questions, Your Worship.

WARDEN: Excuse me. I was going to terminate because Mr Morrison wants to continue tomorrow morning.

MR CLAIR: Yes, okay, Your Worship.

WARDEN: It's past six and we will have trouble with the transcript. Thank you, gentlemen. Can we adjourn till 9 o'clock tomorrow? Witness, you can't go yet. You are stood down. You will be required tomorrow morning, 9 o'clock; do you understand that?-- I understand.

I'm sorry we couldn't finish today but you have had a long day and we will continue tomorrow morning?-- I'm glad for the break now.

I thought you might be.

THE COURT ADJOURNED AT 6.02 P.M. TILL 9 A.M. THE FOLLOWING DAY

WARDEN'S COURT

MR F W WINDRIDGE, Warden and Coroner
MR R J PARKIN, General Manager, Capricorn Coal Pty Ltd
MR P J NEILSON, District Secretary, United Mine Workers' Union
MR C ELLICOTT, Training and Development Officer, Department of
Mineral Resources, New South Wales
PROF F F ROXBOROUGH, Professor of Mining Engineering, School
of Mines, University of New South Wales

IN THE MATTER OF A CORONIAL INQUIRY IN CONJUNCTION WITH
AN INQUIRY (PURSUANT TO SECTION 74 OF THE COAL MINING
ACT 1925) INTO THE NATURE AND CAUSE OF AN ACCIDENT AT
MOURA UNDERGROUND MINE NO 2 ON SUNDAY-MONDAY, 7-8 AUGUST
1994

GLADSTONE

..DATE 29/03/95

..DAY 52

THE COURT RESUMED AT 9.27 A.M.

ROBERT WAYNE VAN DOLAH, CONTINUING:

WARDEN: Thank you, gentlemen. Mr Van Dolah, please retake the stand. You are on the former oath you took yesterday?-- Yes.

When Mr Van Dolah's evidence is finished, could we have a meeting with counsel and instructing clerks outside, please?

MR CLAIR: Could the witness see Exhibit 262? They are the graphs that were tendered at the conclusion of evidence yesterday afternoon. I think, in fact - there we are. Can you go to the third page of that, please, doctor? It is the document described as the "CO Make Per Production Rate". It is a graph that combines the two graphs that we have looked at previously, Exhibits 219 and 245. Now, I think you agreed yesterday afternoon in answer to some of my questions that, in fact, if the increase in CO make were attributable to the production rate, which resulted from the amount of coal and, perhaps, the method of coal, then you would expect that they should track one another, at least relatively closely; is that right?-- I think I said something like that, yes, sir.

In terms of how that notion is represented on this graph here, is it the case that starting off at that point of 6 lpm per kilotonne per day, then you might expect that if there was that tracking, that this would proceed as a straight line graph, effectively, across the page - that's horizontally?-- Could I have that again?

If the increase in CO make were attributable to the - what we will call the production rate, but production rate arising out of both the method of mining with the loose coal and the amount of coal, would you expect that this would proceed as a straight line horizontal graph?-- No.

From the starting point?-- No.

What would you expect?-- I would expect an upward trend, as we see.

And on what basis?-- Well, on the basis that we have been talking about ever since I have been here - the increase in the amount of coal left - coal surfaces left in the panel to react with air as time goes on. The one thing that is constant here is the fact that the abscissa here is time - it is the time of developing - of extracting the panel. During this extraction period, more and more coal surface is made available to react with the air, so we expect an increase in - sorry, we are talking-----

I'm referring you to the graph that, in fact, represents the litres per minute per kilotonnes per day?-- Yes.

RXN: MR CLAIR

WIT: VAN DOLAH R W

The additional coal that's exposed is exposed because of the rate of production and the method of mining; is that so?-- Yes, I was not reading litres of - hang on. No, I continue to expect the rate of carbon monoxide make - the amount of carbon monoxide make to increase with time.

Certainly increase with time, but on this particular graph there is simply not a time factor to be taken into account. I mean, the graph doesn't just represent the carbon monoxide make in litres per minute, it actually reflects also the production rate, doesn't it, because it is litres per minute per kilotonne per day on the Y axis?-- Well, one Y axis I read litres per minute.

Sorry?-- Perhaps I'm looking at the wrong one.

Yes, the third page?-- It was the third.

In fact, it is the second page in yours. Sorry, I thought we were ad idem in that we were talking about the single line graph that combines the other two graphs, 219 and 245?-- I have that one now.

Now, to come back to my question: given that this graph is designed to reflect the increases in production, or the changes in the rate of production of the coal, would you expect that, given what you have said, the CO make is attributable, at least to some extent, to the rate of production - would you expect that this would move - or how would you expect this graph to move from that starting point of 6? Should it move in a straight line - horizontal line across the page?-- Well, I've made two points in the past, the most significant point I want to continue to make is it isn't the coal that you take out of the panel that influences the carbon monoxide make inside the panel, it is the coal and its character inside the panel that's doing it. Now, this was prefaced by all things - all other things being equal, or words to that effect, and anything that deviates from everything else being constant can have an impact on these data.

I'm just trying to establish what things, then, may deviate. You say it is the coal that's left behind, so we are talking about, to some extent, the change in method of mining, the loose coal?-- That can have an effect.

And, of course, other changes such as ventilation changes in the panel which might somehow have a bearing on the measurement, at least, of CO make?-- It would have an influence on the measurement in so far as it changes the efficiency of the ventilation in sweeping all of the panel.

And perhaps - well, can I ask you, then, what other factors would you see as having a bearing?-- Well, another very obvious factor is the production figure itself. For example, one very high point here represents a week in which there were only three days of production. If one had used the same logic for a week in which there was no production, that point would

be at infinity, because the divisor would be a zero. Now, the other things, of course, that I've already talked about several times is the reported better clean up towards the end of the panel extraction than at the beginning of the panel. Other possibilities are that all of the sloughing of fenders and ribs from pillars doesn't take place immediately that they are exposed - that this continues to happen as time goes on.

With sloughing of coal and-----?-- Sloughing of the ribs.

Yes?-- And the crushing as the roof continues to work on its support, and so all of these things are continuing to work on the back of the - as well as the front of the newly slabbed pillars towards the front of the seam, so it is not - it is not a static affair in which we are just running some more coal up the conveyor and everything else staying constant; everything else isn't staying constant.

It is changing progressively, but in the end result what the graph does indicate - that graph that we are looking at there - what it does indicate is that certainly it can't be said that the CO make tracks the rate of production. I mean, that's apparent from the net result of combining those two graphs; isn't that so? That's the first thing that can be said?-- That's what these data indicate. I never made that comment. I said that - looking at it I saw a trend that was similar between the two.

The second aspect that appears plain is that from around about early June - 6 June or thereabouts - the CO make appears to be running above, at least, the starting point represented on the - that 6 lpm per kilotonne per day and continues to run above that right through to the last point plotted on that graph, which is about the end of July; is that right? Am I interpreting the graph correctly?-- That's what the graph says, but I think that there are some flaws there, perhaps, in the basic logic.

You say you think there are flaws in the basic logic?-- Well, I just gave you one - that if you have no production, for example, then the curve goes to infinity.

Yes, but, in fact, that wasn't the case at any time?-- It was half - or something of the order of half a normal week.

Half a week's production. Thank you, doctor.

WARDEN: Thank you. Mr Morrison?

RE-EXAMINATION:

MR MORRISON: Dr Van Dolah, can I deal with a few points, please? I want to go back in time to when Mr MacSporran was asking you some questions and, in each case, if you would like to peruse the transcript, then I can give you the pages and we will do that, but I hope that I'm giving you a fair summary or at least a reasonable summary. Mr MacSporran was asking you some questions about the phenomenon of air backing up the No 2 heading; do you recall those questions?-- Yes.

And you were answering him saying that even if air was backing up the No 2 heading, that doesn't mean that heat is not being removed from a source of heat?-- That, in itself, that's correct.

And it may be removed, in fact, by the movement of the air outbye?-- Could be.

Now, we know certainly one of the things that was described here - the one in mid-June - was, in fact, of a layer near the roof moving outbye but ventilation lower down moving inbye?-- Yes.

If that's the situation, clearly enough there is still ventilation going into the panel, isn't there, in that area?-- Yes.

That's the event described by Mr McCamley - I forget the precise dimensions of the layer - he may not have ever described them - but the layer was near the roof and the balance of the air was cool intake air going down the No 2 heading?-- Yes, I recall that.

In that situation, then, there is clearly still ventilation moving in and through the area?-- Yes.

Now, in terms of events such as a reversal of air in No 2, or generally, does the duration of those events have some impact upon their effect - in other words - can I make myself clear - if they are only a short duration of a few hours, is there, in effect, a minimum? Is that the way it goes?-- If we are talking about the effect on a potential heating, any change that's only of hours long duration has a pretty small effect, because depending on the state of the heating, it can grow, it can stay static, it can start to cool off some, but all of these processes are pretty slow, and it is not like a flame going out - if you snuff a candle, it's gone. These things are very slow and very deliberate and heat transfer in coal is very slow, heat transfer to air if it is not moving very fast is slow, and, so, nothing changes very much on short periods of time, and by short periods of time, I'm using an hour scale - hours scale.

A number of hours?-- A number of hours.

RXN: MR MORRISON

WIT: VAN DOLAH R W

So it doesn't necessarily follow that you get any major change at all as a result of such events?-- No major change. Obviously if the air flow goes down but still is adequate to supply air to the reacting coal it can accelerate. At the same time, if the air speeds up it takes more heat away. All kinds of things happen.

Mr MacSporran also asked you some questions about page 5 of your report where you refer to the question of smells and so forth, and in particular a sentence by yourself that a heating was probably occurring based on various observations in the days just proceeding sealing which you identified as being essentially the smells and a report of haze?-- Yes.

Should that paragraph be read separately from the one that precedes it which deals with the topic generally?-- No, it's continuing the same discussion of smells.

In the previous paragraph, am I right in reading it as indicating - or at least indicating your view that there is some uncertainty about the hazes and the smells, their source and their veracity?-- Well, I'm only reporting what I read was that there were - in one case there was even a question as to the identity of material being smelled, and in other cases the smells couldn't be repeated. I just raised the question that if a smell is believable, if it's accepted as a fact, it's indicative of a heating. If there is a question about it there is a question about what its significance is.

Do I understand from that paragraph and your answer that in a sense you are of a like mind to Mr Mitchell who expressed the view in his report that dependence on those sort of signatures was questionable and possibly impractical?-- Well, they are fleeting frequently and it's a question of - you know, if you smell it you may be convinced. If you don't smell it ----

You may not be?-- There may be a question.

We should read your comments in that paragraph to which Mr MacSporran took you subject to what was said in the previous paragraph?-- Are we on page 5?

The penultimate paragraph is the one to which Mr MacSporran took you, then the central major paragraph is the one to which I'm referring?-- Well, I'm making a general statement that there were several reported smells or sightings in the day or two immediately preceding the sealing, and that's what I say, that it was probably occurring. I don't know that it was occurring. I think it was. It's probable. I have to couch it in those terms.

In so far as you've made that observation in the next paragraph, that seems to be in a paragraph which deals rather with observations drawn from not just that source but other factors such as the Graham's Ratio increasing and so forth?-- Yes, that's right. In writing this it was, and I obviously was thinking about everything that I knew about the situation at the time.

What I'm getting at is -----?-- So I said it probably was occurring.

In that paragraph the comment is really with a hindsight perspective. As such you are drawing together a few of the features in making that comment?-- Features including Graham's Ratio, as faulty as it might be.

In terms of such indicia and assessment of their impact at the time they become apparent and as to what one does with them is really a matter for operators at the time?-- Well, it's a matter for the people there to accept it and - or say, "So what?", or whatever.

They have to make a judgment?-- It was a judgment factor again, a judgment call.

Mr MacSporran also took you to the proposition which I think Mr Clair has touched briefly on this morning, that is the proposition about what happens to CO make once production stops?-- Yes.

As I read your evidence in the transcript your statement or view really was that when production stops CO make stays reasonably constant or perhaps stays reasonably constant?-- Yes.

Mr MacSporran was asking you whether you would agree that you should not expect an extended increase in CO make. I think you agreed with that. You pointed out the graphs show a falling off?-- Yes.

But is it something that's linear and constant or is it subject to all sorts of changing factors?-- Well, it's obviously subject to two things. One, the two measurements that go into it and the significance of those two measurements and the accuracy of them. CO make is a product of a concentration times, effectively, a velocity calculation - a velocity measurement that translates to a volume, and anything that influences the ventilation, the efficiency of sweeping the panel, anything that reduces the quantity of ventilation will increase the CO make, provides less air to dilute the CO that's in the panel.

In fact after production stops you could get an increase in CO make depending on what is going on inside?-- Of course.

There is one factor that I'm interested in in particular and you mentioned like factors to Mr Clair just a moment ago, that is to say if after production ceased we had, for instance, a pillar crushing out, that would, of its own force, expose a whole brand new set of faces of coal to oxygen?-- It would add additional coal to the reacting mass, yes.

So that of itself, non-production exposure, if I can call it that, would act on a CO make?-- Yes.

Likewise could we expect if we got roof falls that would bring down coal or impact on coal we would expect the same thing?--

Well, the roof fall can do all kinds of things. It might just blow a lot of extra carbon monoxide out of the panel on a short-term basis that might just happen to coincide with a measurement by a Drager. Of course it wouldn't - it would be visible if it happened in the Unor data.

It might also expose more coal by its own force?-- Possibly, yes. Might cover up some coal.

The reason I asked, after production ceased there is some evidence that there was quite a substantial roof fall in the panel. Whatever the impact of that roof fall in reality could have an effect on CO make?-- All possible changes can have possible impacts, yes.

The roof fall I'm referring to is after production on 5 August. There was no way of precisely defining where it was because it was within the goaf and people couldn't get down there to check it out. Now, when it comes to the time of sealing, the sealing operation, we have heard, and perhaps you can indicate whether you agree or not, has a couple of impacts. Firstly, CO parts per million go up by very force of the sealing procedure?-- Yes.

And ventilation in the panel is obviously affected?-- Yes.

Now, in terms of the significance of a CO make figure we have also heard, and perhaps you could tell me if you agree, that we really have to match a velocity with a reading, a CO reading?-- That's -----

To get an ultimately true CO make?-- That would eliminate another possible error, yes.

Well, ventilation changes are a source of errors in CO make, aren't they?-- Yes.

So, for instance, you were referred by Mr MacSporran to Mr Tuffs' reading?-- Yes.

If that was taken at a time when there were ventilation alterations from normal, that would affect the validity of his figure?-- Yes.

And likewise any figure taken at a time when ventilation was altering for a variety of reasons?-- One needs to measure accurately the ventilation at the same time as the carbon monoxide in order to have a make at that particular time.

In that connection Mr MacSporran asked you to make an express assumption about a couple of figures of 19 and 25 litres post production?-- Yes.

The express assumption that he asked you to make was that those readings were obtained as part of an investigation into the panel. He put it two ways, I think, investigation to satisfy yourself there was no heating present or an investigation into the circumstances in the panel. When you responded to him I assume you operated on that express

assumption you were asked to make?-- Yes.

Now, the figures of 19 and 25, we know that no-one in fact got 25?-- Except me.

Except you?-- That's a completely synthetic number that I created taking the Tuffs' volume - velocity measurement which I distrusted at the time, but it was the only one I had, and a Unor reading taken as close - matching as close as I could to the time that he reportedly made the velocity measurement of 2030 hours, and so by going back, I think it's 33 minutes, with the clock time - computer clock and the lag time corrections made I - there was a reading available that was within a couple of minutes or so of that time.

It's a synthetic number?-- It's completely synthetic because it was not a carbon monoxide make made by him and I just cannot believe the number because of the changes that were taking place at the time that it was made.

You are there referring to ventilation changes?-- Things impacting the ventilation flow through the panel, yes.

Mr MacSporran also took you to Mr Kock's article and asked you about the similarities or dissimilarities between advancing longwall and rider faces - or rider seams, I'm sorry, as opposed to Australian conditions, and asked you to agree, which I think you did do, that the situation that the German operators are dealing with is different from the situation in Australia?-- Yes, very much so.

Nonetheless the principles that you applied in advancing your views about production and CO make, are they the same principles that Mr Kock applies?-- Well, they are different. The difference really lies in the nature of production by the advancing longwalls.

Can you just explain what you mean by that?-- Yes, clearly the whole idea of longwall winning of coal is to take the coal off the seam supporting the roof as long as you've got men and equipment under it and you are taking the coal out by shearer or whatever, and then as you mine the seam you allow the roof to collapse, and the end result is that you have a goaf that is gradually being effectively sealed off from the ventilation to the extent that your pack roads as you move along are effective seals, but what you have is a volume of goaf that is seeing the ventilation air, most of which you would like to go just along the face, and this is a continuing more or less steady state of affair with progressively the goaf being mostly sealed off as the roof is coming down. In contrast what we have in 512, in any bord and pillar situation on extraction, is an expanding goaf through the life of the panel and there is no constant goaf that is moving with the panel, and now, if you've got this more or less constant goaf that is being ventilated as well as your face, if you have a heating that develops your heating is much more - it's either along a pack road, it's - it is much more concentrated and easier to detect than what we have here in this vast goaf area that is expanding as the extraction process continues.

Just in relation to that point, Professor Roxborough directed some questions to you about the levels of 10 and 20 and I think Mr Clair may have done the same, and I think either the Professor or Mr Clair made the point to you that if you have the levels of 20, one of the problems that might occur is that miners - I think you might have put forward this proposition - miners might think there is danger when in fact there is not if the figures aren't true or aren't a good guide?-- I'm not sure how I phrased it, but I think that it's a mistake to establish benchmarks based upon some other mine's experience. I think it's necessary to establish an experience factor within the mine that you are interested in.

I think the example you postulated yesterday, from memory, was that you might have over the benchmark level generated by an extensive heating that's not in fact likely to take off?-- That's correct.

The corollary might also be true if one sets benchmarks that don't truly apply to the mine, that you might have miners thinking they are safe when they are not?-- Well, that is a possible flaw in having any fixed benchmark, not - without regard for the particular mining situation.

We have seen that a review panel consisting of a wide cross-section of persons with some expertise took the view in relation to those rules that they should be modified away from the benchmarks to get rid of the absolute numbers and to substitute a rule which basically goes like this: that if the CO make increases over and above the background make for a particular panel, then one should investigate or take steps. That is essentially what you are advocating?-- Yes, and that background is much easier to establish in a longwall situation where one has something approaching a steady state kind of a goaf to contend with.

Now, can I turn to a point which was allied with what I mentioned before and that's this: Mr Clair directed some questions to you about the levelling off feature that one sees in this case. You offered three points by way of explanation that might affect what he was talking about. That was that there was better cleaning up at the end of the panel?-- That was reported.

Ventilation may not be sweeping the entirety of the goaf in the way it was before?-- It gets bigger and more difficult to keep it properly and swept as the extraction proceeds.

And the third one was that there may have been reactive coal in the bottom of the panel that's not reflected by the top of the panel or in the top of the panel; in other words, a change in the seam. There might have been some reactive coal at the bottom -----?-- Yes, indeed. There may be in-seam variations in the reactivity of the coal, yes.

And is there in fact a fourth feature that might be referred to in this same context in relation to the method of slabbing pillars?-- Well, again, I've already made the point this morning that this - the slabbing of - well, the sloughing of the pillars really is not something that takes place immediately that the pillars - that they have finished slabbing the pillars, it can occur at a later time, and if it continues to occur, it continues to add fresh surfaces and what might be a particularly serious kind of coal from a heating point of view to the total mass of coal that's reacting.

And a slightly allied point: if there was a change in the method of slabbing the pillars themselves during mining, that might be a factor as well?-- That could be a factor.

Now, Mr Clair asked you about figure 1 of your report. As I

recall it took some time in surfacing at the time?-- Yes.

But they are the figures in relation to the linear regressions panel by panel?-- Yes, sir.

And he asked you some questions about what your reaction was to it when you saw that, the high CO make for 512, and he was directing questions to effectively what you had said, namely, that you had seen that graph and then looked for reasons as to why it might be so. If you look at that graph alone, does it give you any answers of itself?-- No.

Is it the case that you really have to investigate why the graph is the way it is?-- Yes, it's - it just shows a higher rate of carbon monoxide make with time and an increase with time and that's all.

At the time you had some data which I think you mentioned included the Maihak data, some information about the method of make but not complete, some information about methane drainage but perhaps not complete?-- Yes.

And some production figures but not -----?-- Yes, I had production figures. I didn't have the graph but I had the basic numbers.

So, the process is not, as it were, to explain away the way it appears but simply to explore reasons why it might appear the way it does?-- Yes, exactly. I looked for what factors might result in this higher rate.

Now, Mr Clair also asked you - actually it may not have been Mr Clair, it might have been one of the members of the panel - asked you to look at the rise in CO parts per million after sealing, taking you, I think, to figures 5 and 6 in your report?-- Yes.

And - no, it was Mr Clair - asked you whether you agreed with Mr Highton's comment that it was a rapid increase and indicative of a heating from spontaneous combustion. Now, of itself does the graph tell you anything?-- Of itself it indicates a rapid increase in accumulation of carbon monoxide.

And you have made the point before and I think again today that that increase is consistent with the CO make prior to sealing?-- Prior to sealing. It doesn't really carry any surprises.

And of itself would you regard it as an indicator of heating from spontaneous combustion?-- Not of itself. It's just a rate of accumulation as witnessed by one sample point.

Now, lastly, can I just ask you to have a look at some documents, please? You were asked some questions about what I might call for the second time the Ellicott diagrams in relation to CO litres per minute per kilotonne per day?-- That's an invasion on a classical designation.

Well, perhaps I'm not bold enough to do it again, but I'm bold

enough to do it so far. Now, you have basically expressed the view that you can see some trends that are similar between production and CO make?-- Yes.

But you would not expect there to be the straight line graph, as it were, that might follow upon the assumptions Mr Ellicott asked you to make?-- Well, he couched these with caveats of all other things being equal, and that would modify things a great deal if they were in fact - if that was in fact the case.

Can I just ask you to look at a couple of documents, please? Now, has an exercise been done to, as it were, test the assumptions that you were asked to make - I am not talking about the everything else being equal part, that would be an infinite exercise, I am sure, but can we look at the data on the front page first?-- Yes.

And here what's been done is in the second column we have taken - or there has been taken I suppose I should say - the CO make figures from Mr Ellicott's data?-- Yes.

And in the next column production rate. Starting with the first figure and then working down, a theoretical figure has been taken which is, as it were, the product of a coefficient applied to the CO make figure?-- Yes.

In this case a division by 10 and addition by .5?-- Yes, that's correct.

And then has the same - exactly the same coefficient been applied to any subsequent CO make figure to produce the theoretical production rate figures?-- Yes.

So, in fact what this data then shows us is CO make and production rate with a perfect correlation, exactly the same coefficient in every case; is that so? The same coefficient has been applied as between the CO make and production rate in every case?-- The same coefficient has been applied.

And so we have a perfect correlation whether one is going from CO make to production rate or vice versa?-- Yes.

And can we see then that graph and the graph which follows, in other words, CO make and production figures, perfectly tracking one another as a result of that?-- Yes.

Nonetheless, when we do the calculation to get the CO make per production rate, contrary to a uniform figure, be it unity or otherwise, the figures vary?-- Yes.

And that's what's shown in the third graph?-- Yes.

So, in fact, even making the assumption that there is a close, if not perfect, relationship constantly between CO make and production rate, one doesn't end up with a straight line graph?-- Well, that's right.

And does that demonstrate perhaps one of the features about

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making the assumptions that were made for Exhibit 262, that it really assumes that - that's 262, that graph there?-- Yes.

Really assumes that at every point of production the CO make is generated only by that production?-- Yes, that's right, which is not a correct assumption.

Because of all the background make from the previous days - previous weeks and so forth?-- And again my point that it's the coal that's not moved out that is producing the carbon monoxide.

I tender the bundle of graphs and data.

WARDEN: Exhibit 263.

ADMITTED AND MARKED "EXHIBIT 263"

MR MORRISON: I suppose I should give a name for them, shouldn't I? Theoretical CO make and production rate graphs and data. I have nothing further for Dr Van Dolah.

WARDEN: Professor Roxborough has a couple of questions.

FURTHER EXAMINATION:

PROF ROXBOROUGH: Just a quick question, Dr Van Dolah, a possible situation in the goaf that I don't think has been considered which would be worth having your views on. I seem to recall some time ago that evidence was given that stone dust was liberally spread throughout the goaf. I may be right, I may be wrong on that, but I seem to recollect it. I guess my question is: what, in your view, would be the effect of the presence of stone dusting the goaf?-- It would have two possible effects that I can think of. If it - well, the coal that is covered with stone dust provides - has less opportunity for reaction with air. I'm thinking now of loose coal that might be on the floor. Coal that is - that comes from a slabbing pillar - sloughing pillar, I should say, that is, it might be reacting, would not really be covered with a coal dust, so it wouldn't apply there - stone dust, so it wouldn't apply. Crushed pillars, of course, it would have no effect on impeding the access of oxygen to the coal, but there could be an effect. I think it would be probably fairly minor. The second effect would be if the coal were wet and some acid were forming from sulphur in the coal, whatever the form. This would react with the stone dust and could give you false results in the carbon monoxide/carbon dioxide ratio. There may be other things, but those occur to me now.

So, you are not able to say that it would have a significant

FXN: PANEL

WIT: VAN DOLAH R W

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inhibiting effect on the production or the potential for a heating?-- It's hard to say, unless it were a really thick layer on top of all the loose coal, then it would, but if it's - if it doesn't really impede the access of oxygen to it significantly, it wouldn't have much effect, I don't think.

Thank you.

WARDEN: Thank you, gentlemen. Could we have a short adjournment for that meeting, please, and that will be the morning break as well. The witness is excused.

WITNESS EXCUSED

THE COURT ADJOURNED AT 10.15 A.M.

THE COURT RESUMED AT 11.08 A.M.

ROBERT WAYNE VAN DOLAH, RECALLED:

WARDEN: Thank you, witness, you have been recalled for a couple of questions by one of the panel members. We apologise. We thought you were finished and you were in a relaxing frame of mind. Thanks for coming back. Mr Parkin?

FURTHER EXAMINATION:

MR PARKIN: Dr Van Dolah, I would like to also add the panel's apologies for calling you back, but we believe it to be a very crucial question and one that you might be able to help the Inquiry with. The question is regarding the first explosion. I think you can visualise what I am going to say without giving you a plan, but if you wish you can look at one?-- I don't think I need it.

If we look at the - if we take a point at the bottom of 510, it's approximately 1,250 metres or thereabouts from the bottom of 510 to the main dips - that's where the crew were working in the main dips?-- Yes.

And we do know that those guys down in the main dips were knocked off their feet, and there is a right angle bend in that, as you know, so it's 700 metres from the bottom of 510 and then another 500-odd metres down to the bottom of the dips, and then if we look from that same point at the bottom of 510 to the crew in 5 South, which is approximately 800 metres, that's to the face line?-- Yes.

Can you just indicate to us, in your view, as to what might have happened there in terms of the first explosion? I might help you by just saying that we have heard on a number of occasions that the first explosion was a mild one, and the question is: I'm wondering what effect that first explosion would have had on the miners in 5 South?-- Well, I agree that the first explosion was quite a mild explosion and the products that are indicated from the first explosion - that's deal with that first - give me the impression that much of the methane that burned burned as a rather rich mixture producing large quantities of carbon monoxide. There were indications, but it's difficult to separate out, the methane wasn't burned where the flame may have been by virtue of being too rich from the methane that came out of a drainage range or another sealed panel by virtue of its seals being breached, but in any case, of course, there was a great deal of methane liberated and recorded as passing through the fan after the first explosion, but a great amount of CO, carbon monoxide, was produced and was evident in the analyses, albeit that a great

uncertainty as far as a number of the analyses - the analytical points, that is, the sampling points, are concerned, where they were after - or the actual sampling was done after the first explosion by virtue of the disruption of the tube bundle line. It is my feeling that the weak explosion did not generate pressures, wind forces, forces of any kind, that in themselves caused serious injury to people in 5 South. I feel that they were probably engulfed in a very toxic atmosphere from the first explosion, very rich in carbon monoxide, very high concentrations relatively of carbon monoxide, not only being an irrespirable atmosphere, an atmosphere that one couldn't breathe, but one that might be so rich in carbon monoxide as to make it difficult or impossible to continue to use the self-rescuers of the type that they had by virtue of the very high temperature of the inspired air if it's very rich in carbon monoxide. So, I think that there is a good possibility that after the first explosion there was sufficient ventilation controls perhaps to direct the flow that might have just engulfed the outbye portions from 512 and on out into the mine and other parts of the area, but the ventilation flow then delivered those toxic products back to 5 South and, of course, 520, but without - well, making it very difficult to survive for any length of time there and - but it really is an open question, but that's my best judgment.

Thank you very much, Dr Van Dolah. That will prove to be most helpful.

WARDEN: Just before you go, anything arising out of that? No. Thank you once again, Dr Van Dolah?-- I don't want to appear too anxious to leave.

You are excused, you may go.

WITNESS EXCUSED

MR CLAIR: May it please Your Worship, I call Andrew John Self.

MR MORRISON: Just before he starts, can I have an indulgence just before Mr Self starts to get rid of some documents that have been requested and need to be added to complete the record? In relation to the production figures that were attached to Exhibit - I forget the number - 245, the production graphs, the last page was missing, 7 August. We have now provided it in this bundle, and a request was made for the production figures for about a month before extraction and they are the first four pages of the bundle. So, if I might entitle those "Production Figures 27 March to 17 April and week ending 7 August". Actually, I will do them separately. Production figures 27 March to 17 April I will do first.

WARDEN: Exhibit 264.

FXN: PANEL

WIT: VAN DOLAH R W

ADMITTED AND MARKED "EXHIBIT 264"

MR MORRISON: And separately as part of Exhibit 245 production figures for week ending 7 August.

WARDEN: That document will be added to Exhibit 245.

MR MORRISON: I am just getting some copies made of the 7 August page and I will provide five copies of that in a moment. I just ran out of copies.

MR CLAIR: I'm sorry, I didn't hear what Mr Morrison said.

MR MORRISON: I am just having some copies made of the 7 August page. I ran out of copies.

MR CLAIR: There is a 7 August page at the back of the bundle just handed to us.

MR MORRISON: I think they are doing things behind my back here. I don't think the panel have that yet. Secondly, Professor Roxborough requested some figures on cutter pick usage, and I tender a document responding to that request, cutter pick usage for the months August 1993 through to July 1994 together with a cover sheet dated 2 March 1995.

WARDEN: That's Exhibit 265.

ADMITTED AND MARKED "EXHIBIT 265"

MR MORRISON: Lastly, Professor Roxborough also requested some borehole data on the strata in the area. Can I tender a bundle of documents which I will entitle simply "Borehole Data - Strata No 2 Moura Mine", and I will tender only one copy of that. It's a rather large bundle and I'm not sure that everybody is interested in it. If they want it, they can have it.

WARDEN: Thank you, that will be sufficient.

MR MORRISON: Thank you.

WARDEN: I will make that Exhibit 266.

ANDREW JOHN SELF, SWORN AND EXAMINED:

MR CLAIR: Your full name is Andrew John Self; is that correct?-- Yes, it is.

Mr Self, you are employed by International Mining Consultants Pty Ltd; is that so?-- That is so.

And you have prepared a report for the purposes of this Inquiry?-- Yes.

That report was prepared at the request of BHP Australia Coal?-- That's correct.

Your Worship, again in accordance with the practice indicated earlier, I will allow Mr Morrison to take Mr Self through his evidence.

EXAMINATION:

MR MORRISON: Mr Self, you have got a copy of the report there with you?-- Yes, I have.

Is that the original you have with you or your own copy?-- It is my copy.

I will find an additional one to tender in a moment. Can I ask you to look at this document, please? Have you had a curriculum vitae prepared for the purpose of tendering at the Inquiry?-- Not particularly for that purpose, but this is my CV.

Does that reveal that you hold the professional and academic qualifications, Bachelor of Science, Second Class Honours, from the University of Nottingham in 1982, major subjects in the course of that study were rock mechanics, mine design and ventilation, amongst other things?-- Yes.

You are the holder of a First Class Certificate of Competency for a manager's ticket since 1984 in the UK?-- That's right.

Has that been converted in Australia?-- No, it hasn't.

In your employment history, starting late in time coming forward, did you undergo a training scheme for management in the South Yorkshire area?-- Yes, I did.

In about 1982 to 1984, following full-time study?-- Yes, that's right.

Since that time, have you held positions as an Overman, Assistant Manager and Manager of various collieries in England?-- Yes, I have.

And since 1990 and 1991, have you been employed by International Mining Consultants Limited?-- Yes, I have.

And have you been employed by them as a ventilation expert?-- Among other things, yes.

And have you, in fact, performed a number of consultancy assignments, both overseas and in Australia?-- Yes, I'd say I would spend probably 70 per cent of my time on ventilation issues.

Those assignments have included Iran, India, the UK, Australia?-- And New Zealand, yes.

And you are currently employed in that capacity?-- Yes.

Dealing still with ventilation matters?-- Yes.

On page 2 you mention a number of the specialisations that you possess. Without running through those, they include a number of aspects of long wall operation, project management, engineering, mine design and other matters to do with the operation of a mine?-- Yes.

And your principal activity for the last five or so years has been in relation to ventilation matters to do with mining?-- Yes.

I tender the CV.

WARDEN: Exhibit 267.

ADMITTED AND MARKED "EXHIBIT 267"

MR MORRISON: Now, can I just show you a copy of the report, please, and ask you to confirm, please, that that is a copy of your report dated 24 January 1995?-- Yes, it is.

And this report deals with ventilation aspects to do with the No 2 Mine?-- Yes.

In a general sense and also in a more specific sense to do with 512?-- Yes.

I tender a copy of the report.

WARDEN: Exhibit 268.

ADMITTED AND MARKED "EXHIBIT 268"

MR MORRISON: Can I turn to the report briefly, if I may, just to identify a few things? On the third page you have a general section which sets forth "General Principles Applicable to Ventilation"?-- Yes.

These are principles not specific to Moura Mine, but applicable to ventilation practices everywhere?-- Yes, generally.

And more specifically, down at the bottom of the page, you then turn to Moura No 2 and deal with a pressure quantity survey that was conducted by IMC in August 1992?-- Yes.

Was that pressure quantity survey done by you?-- It was done by me with assistance from my personnel, yes.

Approximately how long did it take to do?-- The actual physical survey, in the order of a week - seven days.

And can I ask you, in relation to that survey, what was the reason for doing it?-- The reason for doing it was to identify any deficiencies in the circuits, and the intention was that management required greater quantities in working districts.

Was there some figure in mind?-- Yes, they had obviously - they knew what they had available at that time and they set parameters which we helped to achieve.

What were they?-- They wanted 40 cubic metres per second available for an extraction panel and I believe 25 for a development.

And can you tell us what was - what were the levels prior to that time - or at that time?-- Slightly greater than 30 at extraction, and that was the main issue, so they were looking for 25, 30 per cent increase.

And the objective of the work being done was to achieve that increase?-- Yes.

And how did you go about recommending how that might occur?-- I had better rephrase that. The objective was to identify the actions which would lead to the increase.

Is that what was done in the first report?-- Yes.

And subsequent to that, were the recommendations implemented?-- That's correct.

Coming back to the first report, then, the objective was to identify how to get such an increase?-- That's correct.

In the course of doing that work, you conducted a pressure quantity survey of the entire mine, or only sections of it?-- The whole mine.

Obviously not sealed panels?-- No, sorry, the whole of the active mine.

At that time - can you identify what that was, perhaps by reference to either a plan or things behind you?-- The extraction panel was 4 South. Extraction was taking place here.

You are indicating about half-way along 4 South, immediately outbye the sealed portion of 4 South?-- Somewhere there.

I think we may be able to see that a little more clearly. Can you indicate the area where the extraction panel was at the time you did the work?-- Somewhere around this region here.

That's the inbye end of 4 South?-- Yes, partially extracted, yes.

So, the panels 401/402, were they active or sealed?-- 401 was active on development.

On development?-- On development.

Right. 403?-- Actually, the one I'm talking about is 401 working across this way - nothing was happening in 403 about that time - so there was development somewhere around there.

You are indicating about the junction of 401/402 with 403?-- Somewhere like that, yeah.

4 South A?-- No.

And 4 South B?-- No.

What about the panels that we have been discussing here: 512, 510 and 511?-- No, 5 South wasn't developing, and I can't remember the exact distance, but somewhere in the region of this, I would think. 510 was developing, but a shorter distance, but maybe out to there, and 511 and 512 didn't exist at all.

How did you go about doing the work that was done in 1992?-- A pressure quantity survey involves every branch, to use a reasonably technical term. We have air flow measurements taken in it and-----

Sorry, can I just ask you to slow down a little bit. I think this lady is under pressure?-- Each branch would have an air flow measurement. A pressure gradient would be determined at each branch also.

And what's the purpose of that?-- To establish the actual quantities flowing in each branch, and to establish the actual pressure gradient or difference at each branch.

And when you get these measurements, are they plotted or put on some sort of graph or tabular form or computer model?-- That allows you to calculate resistance for each branch of the mine and that, in combination with a pressure quantity characteristic curve of the fan, allows a PC-based model to be computed.

Is it the computer model that is used by yourself in analysing the results?-- Yes, it is partially. That's the tool which we use.

And is it the sort of thing that the more data you have, the better the model can be?-- Certainly.

Conversely, the less data you have, the more uncertain the model might be?-- Certainly.

Now, when that work was done, did you make some recommendations about what should be - what should happen?-- Yes, I did.

Can you tell me what they were?-- Yes, there was one major recommendation, and the reason I say there was "one major" is that that was probably masking any other problems. It was a substantial size problem, which meant that it was best to fix that problem before we moved on to any other issues. That was the pit bottom overcast, and I just refer back again - the shaft is located somewhere here-----

Can you just identify that for the Court? It is opposite the entry to the 5 South drive?-- That's right.

It is the opposite side of the main dips?-- That's right. That's the return or upcast shaft, and the fan is located - or was located on top of that. The return air flow from 510 return right and left, 5 South right and left, and therefore any other panels which were worked in that part of the mine, all passed along this roadway here - single road.

You are indicating there what might be described as the top return 5 South?-- Yes.

Right?-- That air flow then had to pass across the main intakes across to the shaft, and that was a single pit bottom

overcast, and part of that problem is that there was a single return from those districts, which is what I just mentioned. The quantity flowing in that region I can't remember exactly, but over 100 cubic metres per second was required to pass down the single airway and over a single overcast, and the overcast cross-sectional area was quite limited, which led to large pressure drops in that region.

And what was the recommendation you made in relation to the survey that you have done?-- Well, we evaluated some different options, but the most effective and practical option to take was this roadway here, which wasn't in use as a return at the time.

That's the bottom return, 5 South?-- That's correct. There was return air flow along here.

That's 1 North-west?-- Yes, 1 North-west return was purely ventilating an area which wasn't in use at the time, so the straightforward option was to commission that as a return and put an overcast in there at 6 South, which gave us two overcasts back to the shaft and also gave us a second return from all the districts which we have mentioned.

That's a second return for all those districts, such as 5 South, through to 510?-- Yeah, the area which was to be worked in the near future, yes.

And were those recommendations implemented to your knowledge?-- Yes.

Were you involved in the implementation?-- No, I wasn't.

And what was the effect of the implementation?-- Well, the prediction was we wanted to move the fan down its operating curve to a new duty point, which would allow the fan to pass more quantity. This would also reduce the pressure loss in the single return, to which I referred, which would give more pressure and quantity available at the operating districts.

And did that work?-- From the ventilation measurements I have seen, yes, it did. The prediction was to move the fan down from about 1.5 kPa to about 1. There would be a consummate increase in quantity from around 225 to around 240 - sorry, 250 cubic metres per second - and my understanding is that, yes, that was achieved.

Well, we have heard about quantities in 512. Leaving aside really large ones, there is certainly many occasions on which 40 cubic metres was passing through - that level was passing through 512?-- Yes.

Is that of the order which was desired?-- Yes.

You refer in your report to the ventilation system in 1992 - that's the bottom of page 3 - and then on page 4 you move to what you describe as, "Moura No 2 Ventilation System 1994". Is that the description of the update of the computer model that you developed in 1992?-- That's correct.

When you developed the computer model in 1992, were you working off what might be called real data rather than assumptions?-- Yes. To update the model it mainly involved chopping bits off, in actual fact, rather than additions. The predictive part of it involved extension to 510, a fairly short distance there - based on actual data from 510 - extension of 5 South from whatever distance it was - I can't remember - again based on 5 South type data, although there is consistency between data anyway. Various areas were dropped off the model across here in 4 South.

Just pause so we can identify this later on in the transcript. You are saying that you dropped out of the model those areas reflected in 401/402?-- Yes.

403 and 4 South B?-- And 4 South itself across there.

And the most inbye end of 4 South?-- Yes.

They fell out of the model, and some inclusions were the inbye end of 510?-- Yes.

The inbye end of 5 South?-- Yes, and 512. The 512 arrangement was based on 4 South.

And 511 as well?-- 511 wasn't there. It was sealed off, so it took no part in the system.

Just say it again for me, a little more slowly so I can follow it; what did you say about 512 and 4 South?-- The 512 data, that is resistance characteristics, was based on those acquired and measurements taken in 4 South.

And can you make a comment about the applicability of those figures?-- I'd be very confident that the figures would be applicable in the absence of any great changes in roadway type or machines driven, that sort of thing.

And did you understand that there were, in fact, no changes in the roadway type and the machines used to drive?-- Yes.

Is the size or cross-sectional area of the roadways, or the nature of them as well, the governing feature in whether you could apply the figures one to the other?-- Yes, it is.

As you understand, the drives or roadways in 512 are pretty much the same as those in 4 South?-- Yes, it is dependent upon a friction factor, surface area and cross-sectional area.

So your model then for 1994, with that exception of translating the 4 South figures to 512, was based on actual data?-- Yes.

And actual data from this mine for the relevant panels?-- Yes.

In your report, if I can turn back to there, you mention at the bottom of page 4 the problem of changing the performance of the fan, and Figure 1 or Diagram 1 in your report is a reflection of what you are saying there?-- Yes, it is.

And so far as you can determine by what you found in 1994 all of that worked?-- Yes.

Now, if we can turn to page 6 of the report you there deal with the question of ventilation models, and is what we see on page 6 in that section at least general principles that relate to ventilation modelling?-- Yes.

And ventilation modelling in this sense is, do I understand correctly, the computer modelling based possible data of how ventilation will perform in a panel or in the mine?-- Yes, more the mine rather than the panel.

Now, down at the second last paragraph on page 6 you make a point there which is, "It is generally accepted that a 90 degree bend in an airway is equivalent to the addition of an equivalent type of airway length equal to approximately 100 metres."?-- Yes.

Is that relevant for how we view 512?-- It's relevant to ventilation in a general sense. You can't ventilate a mine without asking air flow to pass around corners, and wherever air passes around a corner there is a pressure loss associated with it. So it's necessary to have some idea, an estimate of the pressure losses induced.

When you say "generally accepted", it's accepted by ventilation experts as being equivalent to 100 metres of extra length?-- It has appeared in written work, yes.

Can I turn to the last paragraph on that page, that's page 6, where you point out the weakness of the models, this is a general principle, that the model is as valid as the data on which it is based. Now, can I pause there and ask you this: you've seen, I think, some ventilation assessments produced by Mr Mitchell?-- Yes, I have.

They are described in a footnote in his report as analyses, ventilation analyses by him?-- Yes.

Can you tell us the comparison - or can you offer us some comments on the validity of those assessments in terms of the data base compared to your own?-- My understanding is they are based on estimated data which is not acquired from actual measurements. The analysis looked at 512 Panel in isolation as opposed to the complete ventilation system, and there are some fairly major differences between the resistances used by

Mr Mitchell and the ones I measured at Moura.

The resistance you are talking about in your analysis at least are based on the actual data in the mine?-- Yes.

And if we took a random sample top return in 512 is there a factor of difference between you in terms of what is the measured resistance as opposed to what is the assumed resistance by Mr Mitchell?-- Yes, we have got to look at the quantity flowing in those circuits and the quantity that you are talking about was around about 40 cubic metres per second. That's a known fact from measurements at that regulator. Estimates have to be made for leakage through those stoppings in that roadway between No 2 heading and No 1 which gives an average quantity for that roadway. From Atkinson's Law you can calculate pressure and that's one of the things the computer model does, and based on my resistance figures, depending upon what that quantity was, the pressure drop for that roadway would be of the order of 40 to 60 pascals. That's from the outbye end to the inbye end not including 13 cross-cut.

I think in Mr Mitchell's analysis it was listed at about four pascals?-- It said inches of water gauge. It was of the order of 0.016 inches of water which is around four pascals.

The difference between the analysis on that part and the analysis based on the actual data is a factor of 10 or more?-- Yes, it's basically because the resistances used are different for the 400 metres or so of the top return. That calculates - the four pascals calculates to something in the order of 0.002 Gauls which is Newton seconds per metre to the eight.

You might have to slow down?-- Just say Gauls.

Now, is that measure of difference reflected in other parts of the analyses?-- Yes, the differences in resistances used are consistent throughout.

Does that have some impact, in your opinion, upon the validity of Mr Mitchell's analyses in terms of assessing what was taking place in 512?-- Yes, if the pressure differences calculated by the model are so different then you really can't draw a comparison between the two models.

Now, can I just ask you to go over the page to page 7 of the report? At the top of that page, still dealing with general principles, you refer there to the effect of a shuttle car on the pressure loss in an airway as being greater than that of the 90 degree bend. Now, is this something that has been subject to analysis to your knowledge, that is the actual impact of the presence of a shuttle car in an airway?-- This is very dependent on the size of the airway, the size of the shuttle car and the position in which it is parked. I've measured pressure losses across various things such as locomotives, transports of various sizes and those pressure losses can be quite large.

So in fact the movement of a shuttle car through an airway is

going to have an impact upon the velocity?-- On the pressure loss.

On the pressure loss, I'm sorry?-- Certainly.

And if we look at a bord and pillar mine such as this one, is it right to say that that's just an integral part of the system of mining?-- Yes, it is.

Obviously it depends upon the length of time that the shuttle car is in the airway to determine what the pressure loss is?-- I think the point is that in a working district there are lots of machines moving around, there are people erecting temporary devices and there are a lot of small changes taking place. That's just part of the operational cycle.

So in a normal operation cycle in a bord and pillar mine we are going to have adverse impact on the pressure by the use of the machinery itself?-- Yes.

Does that include PJBs and the like?-- Anything which takes a part or whole of the cross-sectional area will affect the ventilation system.

As soon as there is an impact on the pressure by such a vehicle what's the consequence in terms of air flow?-- There will be a redistribution of air flow amongst the different airways. The airway in which the vehicle is parked or located would suffer a reduction of quantity and there would be increases in quantity in other areas.

So an integral part of bord and pillar mining using vehicles across airways then is going to be occasional or even frequent redistribution of ventilation airways?-- Local changes, yes.

Is there any way to avoid that other than by keeping vehicles out of intake airways?-- I don't believe so.

In terms of transport of men and equipment, obviously the vehicles have to be in the intake airway rather than the return?-- Yes.

And likewise shuttle car operators in intakes rather than returns?-- Yes.

On that basis there is no way of avoiding this question?-- I don't think so.

Is this common so far as you understand it to all bord and pillar operations everywhere?-- I would think so. I can't - I've not seen all bord and pillar operations, but I would think so, yes.

All those that you have seen?-- Not just bord and pillar, all mining operations.

To the last paragraph on page 7, in the general section where you say, "Low air velocities are characteristics of multiple entry coal mines and the existence of areas of low velocity

and a general tendency towards velocities in the range from 0 to 1 m/s can be considered normal for this type of mine.", now, that suggests that a bord and pillar operation can expect and should expect low air velocities in various places?-- Integrally part of a multiple entry mine - the reason to drive multiple entries is to keep velocity down which is to keep pressures down which is - so that you can pass high quantities without excessively high pressures.

So it's a designed part - or a desired part at least of the design of a bord and pillar operation that you do have low air velocities?-- It's a design part and it's unavoidable, yes.

Unavoidable did you say?-- Yes.

In the same way that the impact of vehicles in ventilation airways is unavoidable?-- Well, if you consider a multiple entry system, if you have more than one intake then you have cut-throughs or cross-cuts between the two. Barring any significant changes in resistance characteristics between the two intakes there will be no pressure difference between them. So every cross-cut is potentially a low flow zone.

Is that the way it operates in practice?-- Yes.

So even if we increase the air in this panel, for instance, leaving aside questions of extraction, even if you doubled the air you are still going to get, in relative terms, low velocities down the cut-throughs?-- Yes.

Is that again an unavoidable aspect of bord and pillar mining or multiple entry mining?-- I think so.

You go on in the paragraph there to say that, "Low velocity does not necessarily mean inadequate...", inadequate velocity I assume that means?-- Yes.

In relation to that point, how does one judge whether a velocity or an air flow is adequate or inadequate in your experience?-- There are several criterior, but they are fairly clearly stated in the relevant statutory legislation. To supply oxygen for people to breathe; to dilute noxious gases, and you probably include methane amongst those although it's not noxious so much as flammable; to get rid of things such as dust; to render the atmosphere fit for people to work in. So you would normally assess adequacy by criterior.

They don't seem to be quantitative so much as qualitative criteriors of keeping gas at a certain level for keeping people working comfortably?-- They are quantitative to some extent in that certain parameters are laid down such as the minimum oxygen content for intake mine air and the maximum allowed pollution by methane in certain airways. So they are to some extent quantitative.

How do you tell if ventilation is adequate in a goaf, for instance?-- It's very difficult. You can't gain access - one assumes you cannot gain access to the goaf. The normal - if we assume that oxygen content is okay, that dust is not a

problem, then the normal criterion by which you judge a single panel would be the return air concentrations of methane.

What would you be looking for there or does it depend on mine to mine?-- It depends on mine to mine. It depends on methane make. The statute is fairly clearly laid down. Most people would wish to operate normally at a level considerably below that allowable by law, and it depends on individual operators too. If you have a very gassy mine then normal return air concentrations could be a lot lower than other mines.

In any event, the way in which one judges that adequacy with a goaf situation is by ensuring the ventilation keeps methane in the return very low effectively?-- If the methane concentration in the return is low then you have to consider the ventilation was adequate from that point of view.

In terms of low velocity or low air velocities, what's the impact of the goaf as it opens up in an extraction mode?-- In this particular case, because there was limited caving, a reduction in velocity for a given quantity.

Assuming the absence of caving then is that something that also is just an integral part of this system of mining?-- It is where there is a large - sorry, a small amount of caving taking place, yes.

If there is a large amount of caving?-- A different situation altogether. The resistance of the goaf would be expected to increase by a very large degree.

But in this particular case that you've looked at, that's 512, that degree of caving is not large?-- No, no, it's limited caving, I would think.

So there would be some reduction in velocity simply by virtue of the goaf opening up?-- Yes.

What does that mean to air flows through the goaf?-- Wouldn't make any difference to the air flows through the goaf dependent upon the resistance of that goaf. We have very little means of estimation of the resistance of the goaf. A normal caved goaf would have high resistance, and measurements taken across goafs in New South Wales which would be many, many, many times that of a normal airway. In this particular case you have a larger cross-sectional area. You also have fairly severe irregularities on the roof and floor and sides and you would expect those two factors would probably cancel out. My anticipation would be similar or lower resistance from normal airway characteristics. So very little change to the quantities flowing in each airway but a reduction in velocity due to increased cross-sectional area.

Now, further down on page 7 you turn to the Moura ventilation model that is used for your assessment for this report, basically the updated '94 version of what was done in 1992?-- Yes.

If I can turn back to some matters to do with the model and

what it shows, can I ask you some general points firstly? There has been mention in Mr Mitchell's report of the bleeder return, that is the bottom return being on the antibleeder side. What do you understand by that?-- It seems to be a matter of terminology. A bleeder return to me is one which bleeds air from a goaf, so the terminology would normally be that the right side return was the bleeder and the ride side in this case is actually operating as a bleeder return. The term "bleeder return" was applied to the bottom return, and I believe that's just a case of what it was called. Its purpose is not as a bleeder.

If we can turn to a couple of other things that are mentioned in the same context, there is a suggestion that the ventilation assessments by Mr Mitchell showed that there was excessive leakage from No 2 heading into No 1. Do you concur with that view?-- No, I do not.

Can you tell me why?-- There is no way you can establish what leakage actually was without access to additional data that is beyond the data that's available. We know what the quantity was at the outbye end of the top return and the bottom return, but we have actually no air flow information from the inbye areas, and without such information it's impossible to determine what the actual leakages were. My assessment is based on assuming an average resistance for each stopping and that's the best that we can do.

Is that an assumption that is made in ventilation analyses in other places, other mines or in other panels?-- Yes, it is.

Not just something special to 512?-- No.

It is a standard assumption that's made?-- Yes. It's based on measurements taken in Moura No 2 and various other mines so we have a very good idea on what a normal stopping resistance is.

There is a suggestion also, or at least a criticism made in Mr Mitchell's report that pressure differentials on the regulators weren't measured. Now, can you make a comment in relation to that as to the advisability of it being done and what it might show if it was?-- I can understand what he is saying if you - on development if you measure the pressure differential across a regulator, then if you assumed that the resistance of the development increases linearly with distance then you would expect a decrease in regulation pressure and that is an accurate statement. If you were to measure the pressure drop across a regulator and it were to change, I'm not sure what action would be appropriate to be taken. It could be if a regulator was changed in 510, for example, that would affect the pressure across regulators in 512 and indeed all of the panels or areas of the mine. So a change in pressure across a regulator in itself is not necessarily detrimental. It could just be a reflection of a change elsewhere. It could mean there is increasing resistance or decreasing resistance as a result of leakage in the panel itself. If it was a case of increasing resistance then there is normally not a great deal that can be done about that. You

would expect that to be a result of floor lift or roof falls or whatever. It could be - if there is a change in regulator pressure it could be an unexpected change and that could mean a change in resistance characteristics of a certain part.

So the indicator then, if you got a change in the pressure across the regulators it could be something internal, but it equally could be something external to the panel?-- Yes.

And depending on what caused it that might govern the action taken if any?-- Yes, that single measurement alone is probably fairly meaningless.

In what way?-- In that it doesn't tell you the whole

picture. If you know the pressure across one regulator, then you have one piece of information at a point in time. I really can't see what use could be made of that information.

So, in essence, the criticism of not having taken those pressure differential measurements seems to be misplaced?-- I don't think it's an important issue. It's certainly not a common practice.

Now, can I turn to another feature that has been mentioned, though not specifically in Mr Mitchell's report, and that is the phenomenon of layering that's occupied some time at this Inquiry. Can you help the Inquiry by giving some information about the causes of layering?-- Yes. Layering is dependent upon the local methane make, the velocity and the width of a roadway. A layering index can be calculated and it's desirable to have a high layering index to reduce the likelihood of layering. If a layering occurs in a single roadway, then there could be many reasons or several reasons or combinations of reasons for that. If there is a reduction in the velocity in that airway, then that could trigger layering. That could also be due to an increasing methane make locally.

Is layering an uncommon or a common event if we are talking about bord and pillar operations?-- It's common in all operations, less common where velocities are high, so it would be less common in the UK situation where there are less entries. In a situation where velocities are normally low, layering is a very common experience.

You were talking earlier on about a section of your report that indicates in multi-heading panels such as this one the idea is to have low velocities?-- Yes.

So, in that sense is layering then something that you could expect from time to time?-- Yes, I would agree with that, it's something that you experience quite regularly.

You mentioned the layering index. Now, you would have seen a layering index calculated in Mr Mitchell's report?-- Yes.

Do you have some view to offer in relation to that?-- It's based on the assumption that the general body at the time the 1.8 per cent methane determination was made was general body. If that was the case, that would be very different from a layer itself. A layer is normally not thick, maybe 100 millimetres or more than that, but certainly not more than 2 or 300 millimetres in normal circumstances. I think what Mr Mitchell was describing was a complete reversal of the air flow where the whole general body contained elevated levels of methane.

Rather than a layering -----?-- That's not a layer, that's a general body concentration.

Now, did you do some calculations based upon an assumed layer of about 100 mills thick?-- I did. There is some fairly

broad assumptions in there. If you assume the layer is 100 mills thick, if you assume the concentration average of the layer was 1.8 per cent - and that's a fairly difficult determination to make - but if that is assumed, and if you assume that the velocity of that layer must have been greater than the velocity of the incoming air flow, otherwise there could not be a layer -----

That's a reasonably valid assumption?-- It's reasonable. Then that gives you a local methane make, and a layering index calculated from that was in the order of 3.5.

Now, what can you say about a layering index of 3.5?-- Well, the layering index required to prevent layering varies with - particularly with dip but it varies with quite a few other factors. The National Coal Board guideline was always 5 to prevent layering which would indicate 3.5 was in the region - somewhere in the don't know kind of region, so it could have been on the verge of layering.

What actions can be taken to remedy layering?-- Well, the actions to - it's related to surface roughness and velocity mainly. You can't increase surface roughness or roadway width, for example. You generally can't do much about the local methane make unless you use the outside controls. So, the one thing you can alter is velocity, so you could make local ventilation changes which would increase the velocity.

And that's a way to remedy a layering event?-- Yes.

And perhaps, given what you say, the only way?-- It's the only practical control method which people on site have, yes.

Is an event of layering - if we stick with that layering example we have been discussing where you have got methane coming out in concentrations such as 1.8 - is that something that should be put up with, let go, or should steps be taken to remove it?-- If there was a layer of that type, then you would take actions to remove it.

And from what you say, about the only practical action you could take would be to increase the velocity?-- Yes.

By local changes?-- That's not quite true. You could make large scale changes.

What, you mean to the entire panel?-- To the entire mine if it really came to that.

And that would require then, I assume, if you wanted to increase velocity in this panel at the expense of other panels, other panels may have to be shut down?-- It could be that, or it could be you increase the quantity in the whole mine so that all velocity is increased. We are talking major changes here.

Now, in relation to layering, we know the physical features of it in the sense that you have described it. What can cause it in terms of a change in features, barometric change or

temperature change, things of that nature?-- The two main things are increased methane make or reduced velocity or a combination of the two. Increased methane make may be due to quite a few reasons. Changes in barometric pressure is one. Change in temperature gradient is another. Increased methane make due to interseam emission is one. If there was a creation of a crack from a certain seam to a different seam, that could locally increase methane make or if there had just been a particularly high period of production over a short period of time. If a pillar was being extracted that hadn't been drained as well as other pillars, that could increase methane make. There are quite a few reasons.

A view has been expressed that it was due here to leaky stoppings between 1 and 2 heading. Do you subscribe to that view?-- If there were leaky stoppings outbye of the point where the layering occurred, then that could reduce velocity in the inbye section and that could lead to layering, that is possible.

Do your analyses enable you to give some view about whether that sort of leakage was present here?-- No, it's not reasonable to try and estimate what leakages were beyond taking averages. You can't point to a single stopping and say that particular one was leaky.

All right. Now, you mentioned before in relation to the assumptions, or one of the assumptions for 512 data that you translated 4 South data?-- Yes.

Is there a comparison that could be made between those panels in terms of quantity as well?-- Yes. The measured quantity in 4 South was just over 30 cubic metres per second.

And how does that then impact upon what we do with 512?-- That means that in 4 South the velocity would generally be lower than that in 512.

So, is the translation of the data then on the conservative side?-- Sorry, I don't understand what you mean.

I'm sorry. In terms of using the data for 512, it's a conservative translation of data, it's not assuming wild things at all?-- No, I think it's a realistic estimate. I'm not sure it's conservative, it's just realistic.

Now, can I turn back to the report for a moment at page 8? You were here dealing still with the 1994 ventilation model and you list a number of assumptions there that you made in producing the model?-- Yes.

Now, the assumptions that you have listed there are reasonable, in your view?-- Yes.

Now, if we turn over to page 10 you there discuss a topic of quantity of air flow and in those paragraphs deal with a number of the features that we have discussed in the last 10 minutes or so, the 40 cubic metres being sought and adequate air flow in terms of methane and layering. Can I

take you to a couple of other points, please? You discuss in the second paragraph the impact of closing off the bottom regulator?-- Yes.

And can you give us, in paraphrased form, the impact?-- The effect of a regulation change - any regulation change affects all other ventilation splits. It would affect 512 top return to a greater extent than others purely due to proximity, it would affect 510 top and bottom return air flows, and it would affect 5 South to some extent. Then on a macro sort of scale it would affect the total mine quantity by increasing the mine resistance. That would be a very small effect.

If one wanted to put it in - what I will call lawyers' terms - if you close down the bottom regulator and one asked, "Where does the air go?", it would go to a number of places?-- Yes, it does. Some would go to the top return, some would go to 510, some would go to 5 South.

Now, in that paragraph you indicate that the model predicted an increase of about 10 per cent in the quantity of air and the actual measurements turned out at around 7.5 per cent?-- Yes.

You express the view, as I read it, that the 7.5 per cent change is within expectation, it correlates with the model?-- Yes, it's reasonable.

So that the actuality reflected the model to a reasonable degree?-- Yes.

If we can go a little further down to the fourth last paragraph, you there refer to the actions taken on 17 June to deal with the layering incident that we have been discussing?-- Yes.

And consistent with what you have told us earlier, in your view those actions were appropriate actions?-- They appear to be aimed at increasing the velocity in 2 heading, so to combat layering they were appropriate, yes.

Now, can we go down just to examine some of the figures which you have included in the report just to establish something? Figure 1 shows the air flow quantities at 12 July '94. These are all fold-out sheets towards the rear of the report; is that right?-- Yes.

And figure 2 is specific to 512 Panel at the same time, that is, 12 July '94?-- That's assuming, yes.

Now, on figure 2 can we see the figures in the top return indicating the volume of air in that return?-- Yes, you can.

So that the figure, say, 40.6 is referring to cubic metres?-- Yes, it is.

Now, by distinction, figures 3 and 4 deal with the position when the panel was partly and then fully sealed?-- Yes.

Sorry, as we read - the report doesn't quite make it clear, but in fact are there three plans all part of figure 2? One is volumes, one is pressure drops?-- That's correct.

And the third is resistances?-- That's right.

And that's then reflected, I think, for each of the subsequent figures?-- That's correct.

So, if we turn to figure 3, this is giving us quantities, pressure drops and resistances for the partly sealed panel?-- Yes.

And, in a nutshell, what do we derive from those figures?-- We have the bottom return sealed off and No 5 heading sealed off, so all of the air flow into the panel takes place in 2 and 3, and No 1 return is open and regulated as before.

And do we see a loss of volume?-- Yes.

And is that to be expected?-- Yes, by partial sealing you will increase the resistance of that panel, more specifically you will increase its resistance relative to other panels, so you would expect some loss of quantity.

Is that a progressive thing, that as the seals start going up and effectively what I might call throttling off intake airways, that one would gradually see that impact?-- Yes.

Does that have an impact necessarily then on the velocities?-- Yes, it has an effect on the quantities and, therefore, the velocities, yes.

And would you expect them to vary or drop or increase or ----?-- They drop proportionately to the loss of quantity at the regulator.

So, if we were sealing off this panel, 512, and we were sealing this off and the air was coming out the top return, we should expect to see a drop in velocity there?-- Yes.

And if you saw an increase in velocity, there would have to be some extraneous cause for that?-- It would mean someone had altered the regulation on that split, I would suggest.

Now, the fully sealed position is revealed in figure 4. Again, there are, I think, three sheets to figure 4?-- Yes.

And we see in figure 4, notwithstanding that they are very low, there are in fact - the model predicates some differences in volume in various parts of the panel: .2 up the main return varying to .1 across the bottom of the panel and to .1 towards the top third of the panel. Can you explain what that is?-- Yes, indicating that there are small pressure differences or pressure drops across seals and, therefore, very small quantities flowing in and out of sealed areas, but what you have got to take into account is that this does not take into account buoyancy effects or temperature effects.

Buoyancy effect of gases?-- Yes.

Temperature effects generally?-- Yes.

Those two effects could be quite varied; is that right?--
Yes, there is no way that you can really estimate those factors, certainly not practically.

Well, can I turn back to the report for a moment? One of the things that we have heard about in this Inquiry is a lot of discussion about the impact of compartment pillars. Now, you probably are aware of what they are, but they are the large pillars that were not slabbed sitting between, I think, 4 and 5 cross-cut and around 9 cross-cut. Now, can you offer the Inquiry some assistance on what your view is as to the impact of them in terms of ventilation?-- There would be an increase in resistance for two reasons. One is there is a 90 degree - or actually it's less than 90 - but there is a change in direction of the air flow to pass around the compartment pillar, so there is obviously going to be a pressure drop as a result of that and at the same time the intakes - the number of intakes drops from four to three, so a compartment pillar would be more resistant than a comparable pillar - normal pillar, if you accept that term.

Now, on page 12 do you deal with this topic in some detail, if we can go to that. Do I understand that the conclusion really is that the impact of the compartment pillars is minimal?-- Yes, it is. The calculations are based on reasonable estimates. The resistance of a compartment pillar being twice that of a normal pillar means the panel was effectively one pillar longer, which is a fairly small change. If you calculate the pressure drops due to such a change, then you come out with answers in the order of an increase of 1 pascal, for example, or 2 pascals even across a pillar, and that's in the context of a total pressure drop around the pillar of 100 pascals.

Well, a very minimal -----?-- Yes, most of the pressure drop in this case would fairly obviously occur in the top return. Because there is only one of it and it's taking the majority of the panel's air flow, so the majority of the pressure drop is in that air split.

You go on in the second last paragraph to refer to the fact that there might be low velocity areas as a result of the compartment pillars?-- Yes.

Now, we have heard the expression used here a number of times about "dead spots" as if to indicate no ventilation whatsoever?-- Yes.

Do you agree with that assessment?-- It's very unlikely that you would get anywhere in a mine with zero velocity. It is possible. In this case I would find it fairly unlikely. There would be a very low velocity, but no velocity is fairly unlikely.

But as I read that paragraph, the point you make is that areas

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of low velocity such as would be generated perhaps by the compartment pillars are no different to areas of low velocity generated in any multi-heading panel?-- No, they are different in shape, that's all. You would get a near triangular effect to the side of the pillar inbye and outbye that was a low velocity zone, but in any other effect they are the same as any cross-cut.

Do we see that reflected in figures 7 and 8, the last two figures in the report, the potential low velocity areas around compartment pillars in 7 and around normal pillars in 8?-- Yes, 8 is not meant to show all the potential low velocity zones; it's just an example.

So, the fact that there might be those low velocity areas is nothing unusual and in this case the impact is minimal?-- It is symptomatic of multiple entry mines, as I said before, yes.

Is it any different in your view that you have the low velocities generated by, say, a pillar, as opposed to a cut-through?-- I can't see any great physical difference.

In any multi-heading panel, that is to say with multiple entries and cut-throughs, are the cut-throughs going to be low velocity areas?-- Yes.

And velocities of the order you are discussing at page 12?-- Yes.

And is there much that can be done about that?-- It is a feature of the mining. There could be things that could be done about it, but the whole point of multiple intakes, for example, is that you have got multiple intakes and they have got to be connected together for access reasons. It would be possible to put seals or stoppings up in cross-cuts, but then you would have near zero velocities.

In the last paragraph on page 12, you make a comparison of 512 with 4 South, and can you tell us the conclusion of the comparison?-- There are differences in that 4 South didn't have compartment pillars but it did have areas where the number of intakes varied and there was some fairly similar features.

And in terms of the loss of quantity?-- Well, the quantity was lower in 4 South. 512 we know varied quite a bit. It seemed to range between high 30's and 50, and 4 South was 30 to 34.

And, in effect, is it the comparison then that 4 South would have been similar to 512?-- I would think so in most ways, yes.

And was there any splitting around pillars in 4 South as a result of those entries changing? You mentioned that the entries changed?-- Yes. Whenever a number of entries change, there is going to be some air going around corners to accommodate the change. Yes, there was.

So, that is a very similar feature about 4 South that's the same as 512?-- Yes.

Now, can I just turn to page 11? If I can go back one page in the report? You deal in section 6.2 with the impact of the stoppings at the back of the panel, as it were?-- Yes.

They are the stoppings between 12 and 13 cross-cut, headings 2 through to 5 or 6?-- Yes.

Or 5, I think. Now, in your view, as it seems if you read the report, those stoppings with holes in them serve the purpose of increasing the flow through the goaf?-- Increasing the flow in the upper part of the goaf.

And is that, in your view, a suitable thing?-- I understand the problem was that the upper part of the goaf wasn't ventilated to any great extent. It would rely only on leakage through the stoppings at the back and the upper part, and that the quantity, and therefore velocity, in 2 heading intake was low, and if you reduce the resistance in the upper part of the goaf - upper part at the back - then you would expect an increase, albeit small, in the intake quantity in 2 heading, and you would expect the quantities in the upper part of the goaf would increase.

So, they, in fact, serve an appropriate purpose?-- For the objectives that were stated, yes.

And in so far as they have an effect on air flow in the - say, the No 2 heading, that effect is minimal?-- Yes.

Now, can I take you over to a slightly different part of the report? At page 13 you deal with layering, and I don't wish to go back to that, but below that in 7.1, you deal with a number of the actions that have been referred to here being actions to reduce layering, or to counteract ventilation questions. Now, you have derived the events from the evidence that's been given in this inquiry; is that right?-- Yes.

And listing them there, as we look at them, the hole cut in the stopping at 12 cross-cut and through to No 4, which is the door in No 2 heading between 12 and 13, opened a little more than it was, do you draw conclusions about all of those at the top of page 14?-- Yes, all of those would tend to increase the quantity in 2 heading.

And in that sense, in terms of the objectives, they were actions that performed or achieved the results of the objectives?-- Yes. Going back to what we said about trying to increase the velocity in 2 heading to combat layering, and these are the types of things where you would attempt to increase the quantity and therefore the velocity.

From a ventilation point of view, appropriate?-- Fairly normal changes.

Next, then, the regulator in the bottom return - that's No 5-----?-- Mmm.

-----is closed down further. That one you deal with in the second last paragraph on page 14?-- Yes.

And in a nutshell that resulted in a small loss of air quantity in No 2?-- Yes.

So, if the objective of doing that was to increase the air in No 2, it didn't achieve that objective?-- No.

But did it have a significant impact otherwise?-- I don't know what you mean by "significant", really. There would be a reduction in the air flow in that airway.

All right?-- There would be a change in air flow and increase in the top return. The overall quantity would go down slightly, so all quantities would reduce by a very small amount.

It is the amount I am interested in. The loss was about 1 cubic metre?-- That's on the limits of measurement accuracy.

It seems the impact was fairly small?-- Yes.

Now, 6, then, was in relation to a stopping being placed across the prep seal in 4 heading, which you deal with in the second last paragraph on page 14, and you conclude that that would have increased the quantity in numbers 2 and 3, but the effect inbye is minimal?-- Yes.

So, it has pumped more air down the two intakes but not really achieved much in the bottom of the panel?-- No, the attempt is increase the resistance of the bottom intake, and therefore close selective air flow, if you could term it that way, in the upper intakes, and outbye that would happen, but the general tendency of the air flow is to head towards the path of least resistance, which it would continue to do irrespective of that stopping.

The last one you deal with, No 7, are the segregation stoppings that were put in for a period of time. You conclude, really, that there would be some restriction of air flow leading from those, and its effect inbye is really minimal?-- No 7 is an extension of what we just spoke about. It is an attempt to force more air flow into 2 heading intake, and if there were segregation stoppings continued all the way inbye, that would be the case. What would happen in practice is when the air flow reached the inbye segregation stopping, it would then follow the laws of physics and go where it was required to go.

Now, can I just turn back to No 5 for a moment, because you mention on page 14 a secondary impact from No 5, which is the regulator in the bottom return being throttled down?-- Yes.

And that is that the resistance of 512 increases relative to the total mine?-- Yes.

So, that would suggest, then, a reduction in panel air flow?-- Yes.

And if we can go back to the - that lawyer's question - if the air has gone from 512, where has it gone to? Can you express a view about that?-- It would be distributed to other panels, dependent upon the resistance of each panel.

So, there is no specific one place it might head?-- No.

It might, depending on what the ventilation controls are otherwise?-- That's right. If all the other regulators stayed in the same position, then each one would receive an increase of quantity.

Now, on page 15 you deal with specifically regulation of the bottom return. As I read it - tell me if I'm wrong or right - the conclusion you reach, basically, is that on regulation of that, 510 is the main beneficiary?-- Yes.

And perhaps to a lesser extent 5 South?-- Yes.

Can I turn to another question that is akin to ventilation, and that is in relation to another topic we have discussed at quite some length here, and that is CO make? There are, it seems from a number of witnesses, a variety of reasons why CO make might increase. Do you concur with that view, or can you tell us what they are?-- I think the problem - I have two problems with the CO make as I have indicated - I will probably put the first one out the way fairly quickly. It relies on air flow measurements, and I've not got huge confidence in people's ability to measure air flow accurately. We only ever attempt to get within plus or minus 5 per cent on air flow measurement, and I've seen widely varying measurements made, so I have got a lot of doubt on relying on a criteria which is dependent on something we can't measure very accurately.

Can you just bear in mind the stenographer, please? Keep going?-- So, I've got big problems with relying on CO make for that reason. The other difficulty I have with it is that the make of CO at a given temperature will vary with the surface area of coal exposed, and, in most cases, we have very little idea of how much surface area is exposed, so we try and make a scientific assessment of something where we don't know of some of the parameters.

You mentioned that you had seen widely fluctuating measurements of velocity?-- Yes.

Is this during the period when you were in charge of mines?-- Throughout my career, yes.

And are you able to quantify the sort of fluctuations that you get? Are they sort of an assessed deviation, or how many times people get it wrong?-- I think the worst one I've seen is 50 per cent between two readings; so, one reading was half the other one, and that's in the same air flow within a few minutes of each other and two apparently reasonable traverses.

Now, can I turn to one area that you may be able to give some comments on? Mr Mitchell expressed the view that a good air flow was required through the goaf to cool temperatures in the goaf - to cool heating in the goaf. Can you express a view on whether that's so, and how does one determine what's a good air flow? Is it possible?-- There are probably two main schools of thought on control of spon com, mainly determined by geography. One school of thought says you do not supply oxygen to coal which may oxidise, and this is more the UK view, in that goafs are sealed as well as possible during operation, and the idea there is not to supply oxygen and to maintain equilibrium at a very low temperature - near to ambient or near to local ambient - and the other school of

thought says that you supply air flow, you acknowledge that oxidation will take place, but that there is sufficient air flow to achieve equilibrium - that is, heat in equals heat out. That won't necessarily take place at a higher temperature. As for determination of what is the correct air flow and what leakage air flow will cause spon com, I think most people have got to agree that we don't know, but a low quantity of air flow - that is, in a sealed area - then we know that spon com doesn't exist, and there are many proven cases of that. I think Mr Mitchell states that the best way to control a spon com is not to have a pressure differential across the site, and that is sealing, but with higher air flows, there is oxidation, there is production of heat, there is elevation of temperature, there is cooling due to that air flow, and somewhere in between the two is a situation which is neither of those, which is where equilibrium is not achieved and temperatures continues to rise. I don't think many people would disagree with those statements, but the problem I've got is that we have very little idea of what constitutes the low air flow and how low has that flow got to be to prevent spon com and at what point does it become critical air flow in support of the escalation of temperature. We don't know what point these air flows become sufficient to strip heat from the process to achieve equilibrium.

So, judgments about the - about whether the flow is good, bad or indifferent, or adequate, are very difficult judgments to make?-- Very much so, yes.

All right. Now, in relation to - can I go back to one point, please, for a moment - that was the air reversals that we were talking about before?-- Yes.

There are two features: one is layering and one is a full body air reversal?-- Yes.

Does an air reversal up an intake have any significance in relation to spontaneous combustion in your experience?-- You are talking total general body reversal?

Yes?-- It is possible if we had a location of a spontaneous combustion incident which was in equilibrium, such that the air flow across it is required to keep it in equilibrium, then if a reversal then occurred, that equilibrium will be disturbed. It is possible if that situation remained the case, that the temperature would continue to rise, and it is also possible that if air flow was restored, then you would achieve equilibrium once more, albeit at a higher temperature.

And if the temperature rose to such a state that it caused a general body reversal, would you expect to see the signs of the heating otherwise?-- You would think so, yes.

And in relation to layering, is layering something that spontaneous combustion causes?-- I've never linked the two. It has never been an issue. Layering - it is possible if you elevated temperature that that would encourage the layering.

On an outlying point to those two, if you had a reversal of

air or a layering that produced a smell from a spontaneous combustion event, in your experience does that smell come and go, or is it repetitive?-- It can come and go. I've investigated a lot of smells in my time, and they are more often spurious than not, and they do tend to come and go, yes.

You say they are more often spurious than not. What do you mean by that?-- I mean I have investigated a lot and the number of times when it has turned out to be something which was identifiable have been small.

Have you had experience where people have identified smells and it's turned out not to be a spon com type smell at all?-- Certainly have, yes.

And what sort of things do they get mixed up with that?-- Usually something based on oil.

How can that occur?-- It is very much an experience based thing and very few people have actually known that they have identified a smell from a spon com incident. A lot of people smell what they call benzene, and it surprises me that it is always benzene that's described. I don't think I know what benzene smells like. You hear some very strange descriptions of smells and it is a very subjective thing. One man's benzene is one man's nothing else.

You mentioned the oil?-- The oil. Yes, usually with hydrocarbons, we are talking - that's why the benzene aspect comes in, I guess, or the tar. Oil can be spilled maybe in the goaf, maybe just spilled on the floor and someone smells it and thinks it is significant and makes a report, which is the appropriate thing to do, or you could get a hot surface on a machine, particularly where there is a spillage of oil on to a machine, where someone tops up a machine that's overheated due to a low level, for example, and you can get hot hydrocarbons and people report it and it has to be investigated.

And you have experienced that oil on the hot surface yourself?-- Many times, yes.

And that could easily lead to identification of smells that people think are due to spon com that turn out not to be?-- I've got a problem with smells in that, as I said, it is based on experience. The thing about smells is that there are a lot of human noses in a mine, so it can be a good indicator. It is just a lot of monitoring points travelling around the mine, many locations, so the potential for sense of smell to be useful is very high, but the problem is that very few people actually know what they have smelled, and I've investigated too many personally that turned out to be absolutely nothing. Maybe sometimes there is a smell and it is never repeated, so a negative result doesn't necessarily mean there wasn't a smell at that time, but I've known a lot which have turned out to be nothing.

In your experience then, in assessing the impact of a report of a smell it would be very important to investigate it, weigh up the for and against?-- Yes.

Indeed rely upon your own experience in the investigation?-- Yes.

I have nothing further, thank you, Your Worship.

WARDEN: Thank you.

CROSS-EXAMINATION:

MR MACSPORRAN: Mr Self, can I take up that last point with you firstly? I take it you would agree that a rising CO make trend would be something you would want to investigate in terms of whether it indicated spon com or not; is that so?-- Yes, I think I'm the most conservative person with regard to spon com that I know, and I have a real problem with anything that might indicate it, yes.

So if you saw a rising or a continuously rising CO make trend you would be put on notice to some extent and want to look into it?-- I would look for reasons, yes.

One of the things you would consider along with the rise in CO make trend is a report of a smell?-- In that context, yes.

Because the two could indicate in combination that there is a heating taking place as opposed to something quite innocent?-- That's possible.

You would certainly take any report of a smell quite seriously in that context?-- I've learned to do that, yes.

When you say you investigated many reports of smells to find that they are spurious, you have said that?-- Yes.

When you say that, do you mean that you have been unable to link the smell with a spon com or you've actually identified the smell as being something other than spon com?-- Probably 50/50 I would think. The usual thing is the person who located the smell gets taken back down there and taken to the exact spot, and then we look for reasons what it might have been.

On about 50 per cent of those occasions it's been identified to be something else?-- Yes.

How?-- By, for example, repeating the smell. If there is - if we look at reports and see that we had a machine problem somewhere that's always a favourite. So if you can repeat the smell by starting the machine up and putting oil on a hot surface, for example.

Has that been done, has it?-- Yes.

So you would go back down to the exact spot?-- Yes.

And you start the machine?-- Yes.

And you have an oily smell, for instance, given off by the machine or oil on the machine and the person who detected the smell will say, "That's the smell I smelled before."?-- That's the ideal case, but you are lucky if you get it that accurately.

I was going to say there would be very few ideal cases, wouldn't there?-- Yes.

What other cases have there been where the smell has been positively identified as being something other than spon com?-- Usually based on oil or grease.

We have had the case where you restart the machine; have there been other cases you have come across where the smell has been identified in some other way?-- Yes, just the simple case of oil on its own.

You go down to the same spot and the smell would be there, would it?-- The smell is still there and you go and find the source of it, yes.

How would you go about finding the source of the smell?-- Investigation, physical search.

So you walk around with the person who detected the smell?-- Yes.

To see where the smell appeared to be coming from?-- Yes.

What cases can you indicate for us that you've been involved with where a smell has been found to be something other than spon com?-- A few.

Tell us about them?-- That kind of thing.

Well, where you've walked around the mine and you've come across something that is giving off a smell that's been able to be identified, is that what you mean?-- That's what I mean, yes.

What sort of things have you found that have given off smells that haven't been spon com?-- Oil or grease.

In what context?-- Oil has been emptied out of a barrel somewhere, grease which has been thrown to the side of a roadway, sometimes connected with electrical problems where you get an overheating cable and some of the materials that form part of that cable will overheat, or inside electrical transformers, that kind of thing.

Those occasions in total have been about 50 per cent of the time?-- Yeah, that's a stab in the dark.

Rough estimate?-- Yes.

So on those occasions when you've done a thorough investigation you've been able to isolate the smell as being not related to spontaneous combustion?-- Yes.

And hence your mine is at rest?-- You would obviously take some determinations of mine air at the same time.

So as well as tracking down the smell as being not related to spon com -----?-- Yes.

----- you would do further investigations to test the mine atmosphere to establish whether was no, for instance, high CO readings?-- Looking for changes, yes.

You might check the CO make trend?-- No, the CO make, when I operated in the UK, was not commonly used. There are reasons for that. The last mine I worked at had been in operation for maybe 70 years with employees who had been there for 30 plus years, so they got a very, very good picture of what parts per million CO you would expect at a certain point given the ventilation changes didn't occur. The mining method was the same for a long, long time and the dimensions of mining panels didn't change for a long, long time significantly. So we had got a very good data base of what to expect.

So in effect you knew the background?-- Very accurately.

And with confidence in the background you could afford not to pay any particular attention to the CO make. It would only be a confirmation, if you like, of what you already knew?-- As you know, CO make came out of Germany and there are good reasons to rely on CO make, as you know. As I said, I've got concerns about air flow measurement problems. If we recognise an increase in CO ppm at a certain point then the air flow would be measured mainly in the point of view of establishing if we had got a real change in CO or if we just got a change in ventilation at that point. Again, as you are probably aware, Graham's Ratio is widely accepted in the UK and that's what would be used.

I think you've said then that - in summary is this the case: if you had a smell reported to you there would be a detailed investigation to locate the source of the smell firstly?-- You would attempt to eliminate it, yes.

If you could eliminate it as you did in 50 per cent of the occasions, speaking roughly, you would still do a further investigation to make sure there were no other changes taking place in the mine atmosphere indicating something such as spon com occurring?-- Yes.

And if you, at the end of that investigation, couldn't find any other signs of spon com you would have some reason to be confident that there was no spon com occurring?-- Well, you are looking for evidence and the more evidence you acquire then the safer you feel.

Now, on the other occasions when you weren't able to track down the smell, and that was about half the occasions you mentioned, you would be left in a state of doubt, wouldn't you?-- Yes.

Would that prompt a further investigation of the mine atmosphere?-- I don't think the procedure would change. If there was an indication there might be a problem then you would - actions you would take wouldn't depend on whether the smell was identified or not.

Well, it might be this though, might it not: if you couldn't identify the smell you would have some reservations about dismissing the prospect of there being spontaneous combustion inside the panel?-- Are we talking specifically inside a panel?

Well, perhaps not at this stage, just generally if you had a report of a smell consistent with the sort of smell you might expect from spon com and your investigation was not able to eliminate that smell as coming from spon com what would your next step be?-- As I said, further analysis.

And if there were no other signs you could detect relating to spon com, but you still couldn't trace the smell, where would you be left?-- You would be left in a case of doubt. You would have two choices. One would be to write it off. The other one would be that you could step up your analysis. In other words, you look more carefully at that point for a period, what period would depend on the circumstances.

Realistically with safety in the mine the last thing you do is write it off; is that so?-- I think that would depend on where it occurred. As I said, we have got a lot of knowledge that the worst of the spon com mines I've worked at we had a lot of knowledge about what you would expect in a given circumstance, so we - I'd say we'd have enough knowledge that a smell in a certain place would be treated differently to one in a different place.

Are you aware generally of the sort of mining and practices at 512 at Moura No 2?-- Yes, I think so.

There doesn't seem to have been such a wide knowledge of the background for 512, does there?-- No.

As you are referring to was present in the UK?-- Yes, that's correct.

So if we are using your proposition about how the investigation might proceed in the UK, it would seem to be necessary to proceed differently here perhaps?-- This case is very different from an advancing longwall situation, yes.

Here perhaps you require a very detailed investigation to eliminate reported smell relating to spon com. That's a very general statement, but what I'm saying, I suppose, is that you would really require an extensive, thorough investigation?--

It would be very difficult to eliminate.

In those circumstances you would have to treat the whole situation very conservatively?-- As I said, I'm very conservative with spon com anyway, so I don't think there is any degree of conservatism.

Well, in your opinion, I suppose, what it would require is an assumption that there may be spon com present until you could prove positively otherwise?-- I'm not sure if that's an assumption, but you would investigate to prove to yourself that there was not.

That would be particularly the case if you were considering having been underground or in a panel that had been sealed and was going through its explosive range, because that's the critical time, isn't it?-- It is a critical time.

And the critical time so far as the safety of men underground goes?-- I'm not sure if that case is more critical than others.

Certainly a critical time?-- It is critical, sure.

If you have a potential ignition source behind a sealed area it's a very critical time, isn't it?-- Yes.

Can I just take you to your report very quickly on pages 14 and 15 where you deal with the actions taken - starting on page 13, I suppose, but the reference to what was done in your opinion about that on pages 14 and 15 concerning the actions to reduce layering. Now, is it a fair summary of that to say that the actions that were taken in total, perhaps whilst well meaning, had limited effect?-- They would be small effects.

Small effects?-- Yes.

Is the end result of that you might clear a layer that was perceived to exist, but you couldn't guarantee with those things that you would prevent the thing from occurring?-- I don't think these are intended to be and probably would not be permanent cures.

So they are cures that might disperse a layer there and then, but certainly wouldn't be a cure that would prevent it coming back?-- No.

You have to deal with it on a case by case basis?-- Certainly.

You say generally with the layout of a bord and pillar mine, and that includes 512, obviously you would expect areas within that panel to be of low velocity?-- Yes.

That doesn't necessarily mean in your opinion that you don't have adequate air flow in the panel, but you certainly have lower velocity than perhaps other panels?-- That's correct.

The lower velocity can, in circumstances, result in lower air

flows, can't it?-- Lower velocity means lower air flow relative to different velocity, yes.

Lower velocity with resistance is - perhaps I can put it this way: the lower velocity won't result in lower air flows unless there is a change in resistance?-- I'm sorry, I don't understand that question. I missed the point, I think.

If you are comparing two panels, one that has a higher velocity than the other of air flow, and they are the same resistance, you will have greater air flow - air quantity in the panel with higher velocity; is that generally true?-- For given quantities dependent upon a cross-sectional area and velocity, so if you multiply velocity by cross-sectional area you get quantity. I'm not quite sure what point you are trying to make about the resistance and the quantity.

I'm sorry, I may have misunderstood your evidence. I thought if the resistance changed with the same velocity you have different air quantities?-- Not necessarily the case.

In any event, bord and pillar mining of necessity involves lower velocities of air into the panel?-- Lower than if there are single entries for example, yes.

That has particular relevance in the cross-cuts all the way down the panel?-- Yes.

Very low velocity?-- Yes.

Is that potentially a problem for the development of a spon com?-- As I said earlier, there is a certain critical quantity of air flow to supply oxygen. We don't know what that air flow is, so yes, there is potential in low quantity areas, yes.

The reason for that is, as I think you told us earlier, at least one of the theories about spontaneous combustion is that if you don't provide sufficient quantity of air to disperse the heat the heating process can increase, the rate of reaction increases and you have a spontaneous combustion developing?-- Yes.

So at a site where you have low velocity such as the cross-cuts you've mentioned here, you may not be sufficiently taking heat away from the site of reacting coal which would enable a spon com to develop?-- That's correct. The converse is true where if there is too small a quantity of air flow to supply the process then it can -----

Extinguish it?-- "Extinguish" is a funny word to use.

Lessen the reaction?-- Come to a state of equilibrium.

So that it's not a heat - the heat is not increasing?-- Yes.

So a panel like this bord and pillar of necessity carries with it the risk of the development of spon com for those reasons?-- I think that's a fair comment.

That's something that's widely known?-- I would say so.

So far as 512 was concerned, would have been widely known from the start of extraction? Its very design, the multiple entries, low velocity - by its very design it would have been a known candidate for spon com?-- I think that's probably true of any mine in Australia, any underground mine in Australia.

Your opinion would be that that requires some vigilance in monitoring for the development of a spon com?-- Yes.

And one of the tools for that would be CO make?-- As I said earlier, I've got problems with that.

With your reservations about it, but it's certainly one of the tools, isn't it?-- It is of - I would have problems relying on CO make personally.

Just in relation to smells again before I leave that topic, one of the problems you say with relying upon a report of a smell is that people don't really know what they have actually smelled?-- Yes.

It might be something different in their experience, but it might not relate to spontaneous combustion?-- That's right. In the UK it became a lot harder when the redundancy program took effect. We were left with an inexperienced workforce.

Which is a very relevant factor obviously?-- Absolutely.

If you had here men who have smelled, for instance, the products of combustion from No 4 in '86, that would be a relevant feature to consider as to whether their report of a smell is accurate or wide of the mark?-- I don't know. I've never smelled the products of combustion from an explosion so I don't know.

Would you expect them to be similar to a spon com smell?-- I've smelled the products of combustion from spon com on many occasions and they are fairly distinctive to me, but I'm just comparing them with what I've smelled before.

What about the smell that we are told is given off by the No 1 mine at the entrance to Moura?-- No 1 mine?

I think it's No 1. At the entrance to the Moura mines there is an old mine that the evidence seems to indicate periodically gives off a smell, a burning coal smell. You are not familiar with that?-- I don't know.

Anyway, people who had smelled a smell of burning coal before that would be a relevant factor to take into account to assess the significance of their reported smells?-- It would - we are looking for early detection and we are not really talking about combustion, we are talking about the oxidation process. So burning coal, I would think, would be fairly different

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Than heating coal?-- I would think so, but I don't know.

A different smell?-- I would think so.

It might be a question of degrees, the event of the smell?--
I really don't know.

Is that a convenient time, Your Worship?

WARDEN: Thank you. I think it would be a convenient time.
Can we resume at two o'clock or shortly thereafter, thank you?

THE COURT ADJOURNED AT 12.59 P.M. UNTIL 2 P.M..

THE COURT RESUMED AT 2.15 P.M.

ANDREW JOHN SELF, CONTINUING:

WARDEN: Thank you, witness. Thank you, Mr MacSporran.

MR MACSPORRAN: Mr Self, can I just bring you back to the question of layering for a moment? Layering can occur, can it not, when you have an area of methane which is less dense than the air migrating to the roof of a roadway, for instance?-- Yes.

You can have in that same layer products of combustion, can't you?-- Yes, you could.

Because as the material - as the coal heats and gives off the products of its combustion, those products, in turn, will be lighter than air and would rise by virtue of that fact to the roof?-- Yes, that's possible.

So, a layer, for instance, of methane might include increased concentration of CO, for instance, from a heating?-- Yes.

And if it is in that layer or a part of that layer, it may not be entering the return and being picked up by the monitoring point in a return?-- That is true.

That would mean that the effect or the signs of a heating would be masked, if you like, by the layering effect?-- Partially, yes.

Now, one reservation you had, I think, about CO make and using it was the degree of uncertainty in the measurements that go to make up the final figure?-- Air velocities, yes.

And there are some - several variables, aren't there? Firstly, there is the cross-sectional area of the mine roadway?-- Yes.

And that is measured certainly but there is some uncertainty about the accuracy of such a measurement?-- There is but that would be a constant error assuming the measurements are taken at the same place.

Then there is - I suppose the main one you would say is the potential error in taking the air velocity measurement?-- That's right.

There is a whole host of factors that come into play, not the least of which is the ability of an individual employee to operate the anemometer successfully to record the result?-- Yes, I've got no problems with anemometers. It's basically the operation of the instrument.

The instrument is good but it requires a person to operate it

to get a result?-- Yes.

And there is a set procedure that should be followed to obtain such a result?-- It depends what you mean by "set". The National Coal Board guidelines are set, but whether they are accepted universally I couldn't really say.

Do they involve, in summary form, traversing a roadway from one side to the other up and down three times and then averaging the results?-- Well, yeah, the intention is to take three traverses which will give a velocity on each occasion and then take the average of the three readings.

Now, the instrument itself - that is, the anemometer - is itself calibrated, isn't it?-- Yes.

And is that done - perhaps I should ask you: how is that done?-- The anemometer is put into an air stream of known velocity in a laboratory condition and the air flow measured using the anemometer and the two are then compared and a curve is drawn which shows the actual air speed and the measured air speed with that instrument.

And that involves, what, holding or placing the anemometer into the path of the known air stream?-- Yes, a wind tunnel.

The conditions under which you traverse a cross-section of a roadway are somewhat different to that sort of test, aren't they?-- Yes, they are.

Because the direction in which the instrument itself is held can be quite different to front-on to the air stream?-- You are talking about the angle of use.

Angle of use, and that, in turn, can introduce a further uncertainty, can't it?-- Yes, that was an inherent error, I suppose, in that you cannot hold the instrument perpendicular to air flow at all times, and that's one of the reasons for taking the three measurements and taking the average, and it's also one of the reasons that anything that's more than 5 per cent from the average is discarded to eliminate graphical error.

Now, ideally, the taking of the three measurements eliminates such an error, but you couldn't be sure that it would. I mean, the idea is that it should, but there would be an element of uncertainty about that itself, wouldn't there?-- Yes.

In any event, if we take the cross-sectional area of the roadway, firstly, there would be an error potentially of plus or minus 5 per cent? You would say constant, but that's -----?-- That would be a reasonable estimate, yes.

The anemometer, in the way it's used, plus or minus 10 per cent?-- That's subject to the person taking the measurement, and when multiple people take the measurement the error is compounded.

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So, it may be higher than 10 per cent?-- Well, one person could be consistently 10 per cent high and the other person could be consistently 10 per cent low.

So, again, there is a degree of uncertainty even about the standard deviation?-- Yes.

And, indeed, is that problem compounded itself by the increased error margin with the anemometer in low air velocities?-- Yes.

That is, the rate of error or the degree of error increases with the lower velocity - the lowering velocity?-- Yes. That's not all that straightforward. An anemometer is measuring mass velocity, not actually flow rate, so it depends on the density of the air going around it. An anemometer has a certain inertia and so a heavy vaned anemometer will respond more slowly to changes in velocity than would one with a light vane. This is why there are low, medium and high speed anemometers.

So, again, if you have a low velocity in a roadway, you could have a greater uncertainty of measurement than 10 per cent?-- Certainly.

Again, depending upon the particular employee who is using the instrument?-- Yes.

All of which can compound upon each other?-- Yes.

Finally you have the carbon monoxide concentration itself which is most often taken by the use of a Drager tube?-- Yes.

Again, there is a subjective element in the use of that instrument?-- In the reading of it, yes.

And, indeed, the required number of pumps to achieve a result itself introduces an error factor?-- There are potential errors in the operation of the machine, yes.

So, we say that with the Drager tube you have - on average, a reasonable figure is plus or minus 5 per cent, possibly higher?-- Well, you read a Drager normally to plus or minus 1 ppm. In other words, if it's 6 point something, it would be 6, or if it's 6.7, for example, you would read it to 7, so there is an error there.

Now, again, just take the obvious, I suppose. The error factors in each of those measurements, that is, cross-sectional roadway, air velocity and CO parts per million, are cumulative?-- Yes.

In terms of the resultant figure of CO make?-- Yes, they are. I am not really interested in cross-sectional area because that's a fixed error, whereas the others are variables.

In any event, if you are going to use CO make at all, you

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should be aware of that potential margin for error?-- Yes.

And that would mean you would have, ideally, a range of values into which your CO make might fit; that is, a lower range and an upper range?-- I understand what you mean.

You would have that, would you?-- I would look at it from a different point of view and say that I thought the method has got its own problems. I wouldn't necessarily try and incorporate those problems in my analysis. I would look for a different method.

But if you were in fact at a mine using CO make, you would have to be aware of that potential error and adopt a worse case scenario, wouldn't you, if that was one of your monitoring tools?-- Yes.

So, you would, again, adopt a conservative approach and table the highest CO make reading?-- That would be possible, but it would degrade the analysis, in my view. If you always assumed the worst case, then it's the cry wolf syndrome, I think. It could be misleading.

It could be misleading but would err on the side of caution?-- Certainly.

And safety?-- Certainly.

Though production might suffer?-- Potentially, yes.

So, it's really a case of being aware of those uncertainties or errors in measurement in either taking account of them or discarding them?-- In my view, it discards the method in my mind, yes.

Could I take you then quickly to another part of your report, and that is figure 4 which deals with the scenario when the panel was fully sealed?-- Yes, I have it.

And I think it's the top plan that deals with that figure which is concerned with air quantities; is that so?-- Yes.

Now, am I correct in reading that to interpret it to mean that a panel in a fully sealed state would still have air coming in through the seals and going out through the seals?-- It would if you accept the buoyancy and temperature effect are discarded.

I think, as you told us, this plan disregards those effect?-- Yes, it doesn't take them into account, yes.

It has air coming in whereabouts? Can you nominate it for us in the roadways?-- In this particular case coming in 2, 3 and 4 or 5. I'm not sure what you term the last intake down the dip.

I think your plan actually combines roadways 3 and 4, doesn't it, as one?-- It does.

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So, it's coming in 2?-- It's coming in the intakes.

It is coming in all the intakes?-- Yes.

And going out through?-- The returns.

So, the ventilation pattern pre-sealing is preserved post-sealing to some extent?-- All that's happened is you have inserted higher resistance in all roadways.

Now, what effects do you say the buoyancy and temperature of the gas has on that scenario?-- I can't estimate that. They would have an effect, but I can estimate what that effect would be.

Could it have the effect, for instance, of air coming out of some of the intakes through the seals?-- Certainly.

So, it wouldn't be out of the question to have air from a sealed panel coming out the No 3 and/or No 4 roadways?-- No, it wouldn't.

And if that was happening, you would expect whatever products are inside the sealed area and whatever gases are there - some of that to be coming out into the - out from the sealed area?-- Yes, what you are referring to is the seals - the term is breathing out. Barometric changes can change that situation, so that during periods of a high barometer, seals will breathe in so that fresh air is taken in diluting the atmosphere inside, and the reverse - converse is true.

Now, does that scenario depend upon ventilation controls outside the sealed area?-- Yes.

What assumptions have you made for the purposes of that particular plan in figure 4, can you tell us from looking at the plan?-- Yes, I have taken the regulated quantity readings from the monthly ventilation surveys.

Do you know when the most recent ventilation survey that you looked at was done for those quantities?-- The most recent?

Recent to when you did the plan I mean?-- The plan was taken from the - I took the date at which the sealing took place and took the monthly reading prior to that. I can't remember the exact date.

12 July seems to be the date?-- It was certainly July, yes.

What about the state of the regulators at the point of sealing and after sealing?-- State of the regulators?

Yes, open or closed or -----?-- Set to a position which gives the quantities which were recorded in the ventilation survey.

So, the path of the air that might breathe out or the atmosphere that might breathe out through the seals, what happens to it then will depend upon the setting of the

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regulators outside that sealed panel; is that so?-- That's true.

And that's not part of your analysis, or is it?-- I hadn't considered that aspect, no.

So, your analysis really deals with a situation of air coming in and going out of the sealed panel, but what happens to it thereafter is another question altogether?-- It is a question, yes.

Ideally it should be taken away - if the seals are breathing, the atmosphere should be taken away and out of the mine, shouldn't it?-- Well, what normally happens, the seal is never placed actually at the intersection, so if a seal is breathing out you could get an accumulation of certain gases close to the seal, and if that accumulation continued then it would spill out of the area where the seal was constructed into the main ventilation air stream.

And it would be taken away as it should be?-- Yes, it would.

Out of the mine?-- Yes.

Again, that scenario - the ideal situation would depend upon the settings of regulators and other ventilation appliances outside the sealed area?-- Yes, it would. The issue is the pressure difference between certain seals and, yes, that would be affected by what quantity of air flow was passing and that would be determined by a regulator setting.

Now, again, just to be clear, as I understand it, that's not part of your analysis for figure 4?-- No, it's not.

Thank you. Nothing further, Your Worship.

CROSS-EXAMINATION:

MR MARTIN: Mr Self, a few things, if you wouldn't mind. You spoke about fluctuating velocity measurements and, of course, the individual taking?-- Yes.

Do you agree that a permanently stationed velocity measuring device would be appropriate to remove that problem?-- I'm not really sure what you mean by "appropriate". There's also a problem with a permanently stationed velocity measuring device, and I make assumptions of what type you mean, but I assume you mean a fixed point measurement.

Yes, I do?-- Which is not representative of the average velocity in that airway. However, that would be a fixed error.

Yes, exactly, and could be accommodated for?-- It could be - an error factor could be built into the software, yes.

On page 8 of your report you set out your various assumptions and earlier in your report you set out your formula, that is, the resistance of an airway is directly proportional to the surface roughness and inversely to the third power of the cross-sectional area?-- Yes.

I, therefore, suggest to you that assumption 7 is unupportable?-- Assumption 7?

I think it's 6 actually?-- The last one?

Yes?-- The estimation of resistance of a goaf is a very difficult thing to do. We know the cross-sectional area increased, there are no measurements of that; it would be a fair assumption that surface roughness increased, and my assessment is that the resistance would either stay the same or decrease.

But if that's wrong to any significant extent, what happens to all of your conclusions?-- What happens to the conclusions?

Yes?-- It depends on how large the error was, and I can't estimate that.

That's the thing about your report, it's much based on assumptions?-- It's based on assumptions which are stated in the report, yes.

Could I take you to figure 4 in your report, please? There are three of them. I think it's the first of the three, which is the fully sealed result volumes?-- Yes.

It's the case, isn't it, I suggest, that on that figure, that data, the optimum location for the final monitoring point behind 512 seals is in No 5 heading?-- That's what we were just saying, it does not take into account temperature and buoyancy, and I wouldn't draw any very finite conclusions from where the air flows are shown.

That figure, I think, shows a regulator, doesn't it, in the No 1 entry of 510 outbye the junction of No 1 entry in 512, isn't it?-- Regulator 11?

Yes, I just couldn't read my copy?-- Yes.

And your analysis indicates a flow of 2 cubic metres per second through that regulator?-- Yes.

Where did you get that figure from?-- That was an estimate provided by Jaques Abrahamse.

It's not in any data?-- I'm sorry?

It's not in any written data that you are aware of?-- Not that I'm aware of.

Do you know where he got it from?-- An estimate from physical observations, in other words, near zero flow.

And if that data should be incorrect, what are the consequences?-- The panel being sealed with very little flow inside and .1 and .2 cubic metres per second are as near zero as you would get. I wouldn't draw too many conclusions from the size of those air flows. That panel is effectively removed from the ventilation system. So, that 2 cubic metres per second number could be very inaccurate, to have very little effect on the ventilation system.

Still talking about figure 4, do you know anything about a double brattice in a cross-cut in 510 through which air was shown flowing towards the No 2 entry in 512? It's not on your plan?-- That's in the central - where it says "2.4"?

Yes, I think that's the point?-- That air flow - if you look at the 2.4 and compare that with the adjacent airways ----

I'm sorry, it's 10.4, just to the right?-- The brattice is represented here by the 2.4 airway.

Would you just look at Exhibit 112? The brattice isn't in that same position, is it, as on your plan?-- There is a brattice shown in both the No 2 and No 3 headings on this plan as a machine door - sorry, 4 or 5, whatever you want to call that.

You say that's in the same position as on your plan?-- Well, I say it is.

Appropriately, I suggest to you, that double brattice - if you compare Exhibit 112 - is not in the same position?-- It's not technically counted as a resistor. I don't know what the resistance of that brattice was.

What does that do to your theories?-- It would reduce the quantity in that heading and that would be replaced by the quantity in the other two headings.

Weren't you told about that by Mr Abrahamse?-- I can't remember.

Do you know anything about a door in No 1 entry of 510 between 1 and 2 entries in 512?-- I can see it on the plan.

Do you know whether at any time - what the open area of that door was?-- What the open area was?

Yes?-- An air door doesn't have an open area. It is a stopping with a door in it that would normally be closed, so, no, I don't.

If I just might take you, please, to Figure 5, I think it is. Do you know that prior to 17 June there were major roof falls in what I might loosely call "the goaf"?-- I know there were roof falls in the goaf.

Would you describe them as major - is that what you knew - major falls?-- I don't know. I can't answer that.

Well, assume that there were major falls, for instance, in number 12 cross-cut between 2 and 3 entries, or headings, and in the No 3 heading between 8 and 9, and a third between 9 and 10 cross-cuts - assume that's the case; did you consider that in your calculations?-- Roof falls can be considered - in order to evaluate the effect of the roof fall would require estimation of the resistance of the area affected by the roof fall. I think that's impractical, so I would not try and incorporate that in a ventilation model.

You didn't take those into account at all?-- No, I did not.

Could I take you again to Figure 5 and to Diagram 2? Do you see your Diagram 2 in your report?-- Yes, I do.

And Figure 5? What and where are the node names for what might be cross-cut 7? What I'm suggesting to you is that it is on one diagram and not on the other?-- Sorry, Figure 2 did you say?

Diagram 2, I'm sorry?-- Okay. We are back earlier.

Looking in comparison at Figure 5, there is no node names for what might be cross-cut 7; in other words, you have changed your model?-- These outputs are often the same model - it's not possible, but I'll look. Cross-cut 7 is not represented individually on Diagram 2.

But isn't it the case that you have changed your model?-- Cross-cut 7 is shown on Figure 5 because at that time it was assumed extraction was taking place at cross-cut 7.

You say that there is no significance in it not being on Diagram 2?-- Diagram 2 is there to show the node names that apply and the general layout.

Can I ask you to consider your Figures 5 and 6? That takes you back, I think, to page 11 of your report, or emerges from. See, on Figure 5, you have the 16.4, 10.6 and 7.1, don't you, down around about cross-cut 7?-- Yes.

And on Figure 6, in the same area, you have point 6, point 7 and point 7, haven't you?-- That's correct.

You didn't bother discussing those differences in your report anywhere, did you?-- Those low air flows that you are talking about there reflects the fact when mining down dip - if we say a 5 or 6 heading, that the majority of the air flow would be directed towards a continuous miner, and the headings 2, 3 and 4 would be sealed as a bag seal - sorry, stopped with a bag seal in order to direct the air flow to the miner, and, no, I

did not discuss that.

But you say in the second last paragraph on page 11 that the effect of that was an increasing quantity flowing across the goaf?-- Sorry?

You say in the second last paragraph on page 11 that the effect of that was increasing the quantity of air flowing across the goaf, don't you?-- The opening of the hole in each stopping would increase the quantity across the goaf.

Could I take you to Figure 7? Actually, it is not figure, it is probably Diagram 7. Where is it? Just to make it absolutely plain, the shaded areas towards the outbye section, you say that represents the potential areas of low velocity?-- Yes, I do.

Of course, we are talking about pre-sealing?-- Yes.

It must be?-- Yes.

Can I take you to Figure 2 - Diagram 2, I should say - to Figure 2 - not Diagram 2, Figure 2?-- Yes, I have it.

That's fully sealed - the pre-sealing result volumes?-- Yes.

You see, inbye down around about cross-cuts 8 or 9, you have got huge differences, lower pressures, haven't you?-- Sorry, I'm not quite with you. Huge differences where?

Well, you have got point 2, point 8, point 13, point 27 inbye towards the back of the panel, down around probably 8 or 9 cross-cuts?-- Yes.

They're areas of very low velocity, aren't they?-- Low quantity and therefore velocity, yes.

And much more likely, I suggest, to be a site of spontaneous combustion than the significantly higher pressures and velocities and air quantities further outbye?-- You mean because the velocity is lower, the potential for spon com is higher than where the velocity is higher, then I agree.

Yes. Thank you.

MR HARRISON: I have no questions, Your Worship.

WARDEN: Mr Clair?

RE-EXAMINATION:

MR CLAIR: Mr Self, you were asked questions about layering, and I think at one point you distinguished between what you would regard as layering and what might be regarded as a reversal of air. I'm not sure whether that's the term you use

- "reversal"?-- Yes, I do.

Now, can I ask you this: what sort of circumstances could give rise to reversal?-- It would have to be a fairly major ventilation change if reversal occurred. Mr Mitchell pointed out an example of that - if there was a stopping that was extremely leaky, then you would ensure air in the reverse direction in 2 heading; that's one example of what would create that.

When you speak of a stopping being extremely leaky, are you talking about a stopping between 1 and 2 headings?-- Yes.

On one of the cross-cuts?-- Yes.

Are there any other circumstances that could cause - well, let me ask you this: when you refer to "reversal", are you referring to a reversal of air across the whole height of the roadway?-- Yes.

Let me postulate this situation - I don't know how familiar you are with the evidence in the matter - but a situation where there were, in fact, two layers of air in No 2 heading with the upper layer of warmer air moving outbye, bearing in mind No 2 is an intake heading, the warmer upper layer of air moving outbye and the lower cooler layer of air covering the general body of the roadway moving inbye, what sort of circumstances could create that situation?-- I probably didn't make myself clear. That's a classic layer.

That is a classic layer?-- Yes.

With the upper layer moving in the opposite direction?-- Yes, there has got to be movement to overcome the velocity of air going inbye.

So, the upper layer, you say, doesn't stay still; it tends to move outbye?-- It has got to move outbye to create itself and reach a point where again equilibrium is reached.

So, in effect, a layering does involve the movement of air in opposite directions?-- Yes, in most cases.

Now, you did speak of the ways in which that situation might be dealt with. You said that there may be local changes that can be made to address it?-- Yes.

Or there could be larger scale changes, such as closing down some areas in the mine?-- Yes.

Or increasing velocity for the whole of the mine?-- Yes.

Which in turn, of course, improve the quantity of air moving through the section where the layering is?-- It would increase it, yes.

Now, your attention was obviously drawn for the purposes of your report to certain steps that were taken-----?-- Yes.

-----in 512 panel on at least one and possibly more occasions?-- Yes.

With a view to addressing this problem of layering in that No 2 heading?-- Yes.

Now, one of those steps, for instance, was to punch a hole in the stopping between 1 and 2 headings at 12 cross-cut?-- Yes.

And that was one that was referred to your attention. Now, if we can just address that, so as to at least be able to look at the effects of local changes? If there is a hole made in a stopping in that position, that thereby increases the pressure differential in so far as that position is concerned, and as against where air is coming into the goaf area; is that right?-- The action itself wouldn't make any change to pressure differential. The action would reduce the existence of air flow to that panel, which would increase the air flow in that part.

It would increase the air flow in that part. I gather from what you say that the increased air flow in that area wouldn't necessarily lead to an equal and opposite decreased air flow simply in - for instance, in this case in the 512 goaf, but rather it would have an effect on a much wider area?-- There are probably too many variables to make the statement which you just did. If the quantity in the top return remained the same, and the resistance was reduced by the path that you talked about, then there would be an increase in quantity along that path and you would anticipate a slight reduction in quantity elsewhere.

Elsewhere in the goaf?-- Yes.

You see, this is what I want to address. How widely does that affect the ventilation of the area? Does it simply have an effect on the goaf, or does it have an effect both on the goaf and perhaps on other areas outbye of 512?-- In a small way it would affect the whole panel.

The whole panel?-- Yes.

But nevertheless the change remains relatively local?-- Yes.

The effects of the change, I should say?-- By a local change, I'm talking about a change within that panel.

When the air flow then is increased in the air where the stopping is being punched or opened to some extent, then that will decrease the air flow in other areas?-- Yes, by a small amount, yes.

So that while that might improve the ventilation, to speak in more general terms - might improve the ventilation to clear any layering in the immediate area where the stopping has been punched - it will decrease the amount of ventilation that might be moving through other areas of the goaf and, in particular, other areas of low pressure?-- That is possible.

Okay. And probable?-- There would be some change in ventilation in the goaf, there is no doubt about that. The changes would be small. Exactly where the increases/decreases took place is fairly conjectural.

So that while you may have said to Mr Morrison that creating a change by way of increasing air flow - well, perhaps I should go back one step. I think at one point Mr Morrison was asking you about the effect of closing off the regulator in No 5 heading?-- Yes.

And I think that your explanation of the results of that was to the effect that that wouldn't necessarily mean - or that that wouldn't mean that the same quantity of air is still entering 512 panel but going elsewhere in the panel, but rather that would affect the amount of air - the quantity of air actually coming into the panel; am I correct there?-- It would affect the total panel air flow. It would cause a slight increase in the top return quantity and obviously a reduction in the bottom return quantity. The overall effect would be a reduction.

Not an equal and opposite increase in the top return?-- Because there is more to this ventilation system than just 512.

Some of the air that was previously entering 512 panel will go elsewhere in the mine?-- That's right.

I think you said certainly 510, and it may affect other areas?-- It will affect closer panels than the ones further away, yes.

If there is a change down the back of the panel - putting a hole in the stopping at cross-cut 12 - the effects of that are more likely to be local to 512 panel?-- Certainly.

Can I move to another topic - spontaneous combustion? You have been asked a number of questions about this. I think you said that there were two schools of thought in terms of how to deal with it?-- Probably more than two. There is just two opposite theories, really.

You identify two. One of those was to create a zero pressure differential across the area of the heating?-- Yes.

Now, of course, that means, in effect, that there is no air passing over the area of the heating; is that correct?-- That's correct.

In a gassy mine, that's simply not an answer, is it?-- I don't agree.

You don't agree with that?-- No, I don't.

Well, perhaps I should ask you this: what is the effect, then, of having no air passing over the heating?-- If there is zero pressure differential across an area of coal that may be a risk of spontaneous combustion, there will never be a

heating.

You say that the heating won't continue to increase in temperature?-- No, I'm saying it will never start.

You are saying that it will never start?-- Yes.

But what about where there is a heating there already? This is the position I am talking about?-- I am talking about prevention, you are talking about control.

Did I understand you to say that one way to deal with an existing heating is to create a zero pressure differential?-- I don't know if I said that, but it is correct.

And, of course, I think you went on to say that sealing the panel-----?-- Yes.

-----achieves, well, pretty well that, depending on where the heating is?-- Yes.

I think you have indicated outbye in the panel you may have some pressure differential, but let's assume that there is a heating in an area of the panel where sealing means that there is zero pressure differential and therefore nothing passing over the heating?-- Yes.

Now, what I'm suggesting is that the difficulty is that if there is an existing heating and there is zero pressure differential, then you have a build-up of methane in a gassy mine?-- Yes.

To a point where there is an explosive mixture?-- Yes.

And you have an explosive mixture in the area where there is a heating; am I correct?-- Yes.

And if the heating is sufficiently hot, you have then got a source of ignition and an explosive mixture?-- Yes.

Which means you will have an explosion?-- This is why I said that prevention is different from control.

That's correct, but I'm dealing with a control situation?-- Okay. If you catch a spontaneous combustion event at an early stage and put a zero pressure differential across it, then there will be an early rise in temperature due to lack of cooling, followed by oxygen depletion, which will be followed by a drop in temperature, which is all critical to getting it at an early stage.

So, that's dependent, in fact, on getting it at an early stage?-- Most certainly.

If, in fact, the heating is not still at an early stage and one seals the panel?-- Yes.

Then the consequences that follow - and I will see whether you agree with this - are these: that on the one hand there is a

depletion of oxygen?-- Yes.

Because the panel has been sealed, and there is only a certain amount of oxygen left in the panel?-- Yes.

That oxygen will be depleted both by the production of other gases which would displace it - is that so?-- It only depletes it by consumption.

And by consumption?-- It is displaced by other gases yes.

Displaced by the gases and depleted by consumption, the consumption being by way of general oxidation?-- By any form of oxidation.

And also by way of consumption at the site of any heating itself?-- Yes.

Which is going to consume it relatively more quickly?-- Yes - oh, per volume of coal, yes.

Per volume of coal?-- But there is probably a lot greater surface area, in effect, that is not affected, so it is possible that the - or it is quite likely that the general oxidation will take place more quickly in terms of consumed oxygen.

Yes, volume of oxygen consumed in a panel like 512 by way of oxidation you say would be greater than you would expect to be consumed by a small heating?-- I'm saying if there is a small heating, then the rest of the panel will consume oxygen more quickly than the rest of the panel, yes - or that's possible.

But, nevertheless, there is a period of time during which that consumption of oxygen or displacement of oxygen, or the two combined, perhaps I should say, takes place - there is a period of time over which the oxygen is either consumed or displaced?-- Yes.

Now, of course, if the panel moved into the explosive range before the oxygen was either displaced or consumed, then it will move into the explosive range when there is still a heating in the panel?-- That's potentially true, yes.

In which case, an explosion will result?-- An explosion could result.

If the sorts of ignition and the explosive-----?-- Come together, yes.

-----mixture come together. So, how does one address this in practice, then, if there is suspicion of a heating? Obviously the simple answer is not, "Well, let's seal the panel."; is that right?-- It is not a simple answer, that's true.

Before you went ahead and sealed the panel, you would want to know more about just how substantial the heating is; is that so?-- You would always want to know the state of a heating, yes, I would agree.

Because if you didn't - if you didn't investigate the suspected heating in order to determine just how substantial it is, at the time you sealed you wouldn't know - you wouldn't know just what's going to win the race, as it were - that is, whether the oxygen is going to be depleted or consumed before the panel moves into the explosive range, or whether the panel is going to be into the explosive range while the heating is still there?-- I think it is a very difficult issue.

Yes, okay. Just one other matter briefly: you were asked some questions by Mr Martin in respect of the information contained in your report, and, in particular, he drew your attention to the 2 cubic metres per second in Figure 4?-- Yes.

Which you said was based on an estimate given to you by Jacques Abrahamse. Now, clearly that was an assumption - whether it is his assumption or your assumption, it was an assumption?-- No, it is a reasonable assumption that there is a regulator in place there and that regulator was closed down completely. Both Jacques and I are experienced enough to make an estimate of what it would be at that point and what the likely leakage was. It is not an unreasonable estimate.

You say it is not an unreasonable estimate, but it is not actual data that you had?-- It is not actual data, no.

So, to the extent that it is not data you had, it is an assumption, am I right?-- Agreed.

Well, before I pass on, why do you say that you considered it to be a reasonable assumption?-- Because the regulator at that position was the standard type of low level regulator, I believe, which was closed, which is effectively a stopping.

Now, what then enables you to say that that leads to a 2 cubic metre per second pressure differential?-- We have a good idea on what resistance you would expect on a closed door from previous data.

Now, you have assumed that that stopping was closed and fully closed?-- Yes.

Never any suggestion to you that that stopping might have had any damage to it, or-----?-- Could have been damaged at times. I do not know.

In the course of going about this sealing process, for instance, nothing was suggested to you about that?-- I can't remember.

Anyway, let me pass on. That, I think you've agreed, was an assumption; you say it was based on a reasonable estimate, but nevertheless an assumption. Is that isolated in your report as being an assumption or is it in some way covered in the matters that you refer to as the assumptions on which your report is based?-- I don't think it is.

Are there other items that you've relied on of that nature?-- I don't think so. The reason that I would not list that as a specific assumption is that I see it as a fairly minor matter.

But are there other such minor matters that you have relied on that haven't been isolated as assumptions on which you based your report?-- I can't think of any.

You can't think of any?-- No, I can't.

The other matter you were asked about was the double brattice that was referred to by Mr Martin?-- Yes.

Did I understand you to say that you had no information on the existence of that double brattice, this is in what in effect is the extension of the No 2 heading in 512?-- Yes.

But where it becomes a cross-cut in 510. It's outbye of the seals?-- Yes. No, I knew that the double brattice was in position. I don't know at what stage it was erected after sealing and I would see no point in trying to guess at what stage it was erected.

But you don't seem to have taken it into account in your figures?-- No, I haven't. The figure I have drawn is immediately post sealing.

Immediately post sealing?-- Yes.

And you say you don't know whether that was up or not at the time, that double brattice?-- I'm fairly sure it wasn't, but I don't really know.

However, in the next inbye cross-cut in 510 you have proceeded on the basis that there was a stopping there?-- No, I haven't. I looked at the air flow. I thought maybe there was a restriction there, but there isn't. The reason the air flow is low in that airway is due to the conveyor.

Due to the conveyor?-- Yes.

Running down to the belt road in 512. I have no further questions.

WARDEN: Thank you. Mr Parkin?

EXAMINATION:

MR PARKIN: Mr Self, during cross-examination by Mr Morrison did I understand you to say that layering is something that you can have on a regular basis?-- I'm not sure if I said regular, but it's a fairly common event that I've seen.

Having said that, do you agree that good ventilation practice would prevent layering in the first instance?-- I'd say the better ventilation systems wouldn't have layering, that's right. The better the ventilation the less likelihood -----

I think the point I'm trying to make is if you've got a situation where you get layering on a regular basis then you should be doing something about it?-- I agree with that. I'm not sure - when I said seeing it regularly, I don't necessarily mean regularly in one place. I mean I've seen it on a lot of occasions.

But I mean you do agree with me that if you get layering at all in a panel such as 512 you should be doing something about it?-- I think if layering was occurring regularly you would take some actions on the next panel to fix whatever problem it was. Whether you could take action on that panel, I don't know.

What are your comments on ventilation of 512?-- In terms of what, Mr Parkin?

Well, I mean do you think the ventilation practices were adequate in there?-- I think in terms of quantity that's probably a high air flow given the methane make.

But I mean it's a question of distribution of the air in the panel's life?-- Yes, it is. So is a problem with a non-caving goaf. You are going to get very large cross-sectional areas in there no matter how much quantity of air flow you put into it. You would never achieve high quantities or velocities everywhere.

Certainly a panel like 512 is certainly not the easiest of panels to ventilate, is it?-- No, it's not.

Just a comment on page 7 of your report, you talk about a shuttle car and electrical switch gear or a continuous miner causing pressure loss and would act effectively as a regulator?-- Yes.

I don't think anybody would disagree with that statement, but do you agree that a panel - the ventilation of the panel should be organised such that those type of things don't effect the ventilation of the working panel?-- They shouldn't have a substantial effect on the panel, but they will make local changes to the ventilation.

Could the witness be shown Exhibit 196, please? I don't know if you've seen this before, Mr Self, but it's looking at the

total quantity of ventilation in the 512 Panel?-- Yes.

I take you down to 15/7. You will see that there is something like over 57 cubic metres per second in the panel, and then on the 22nd there is a drop of 10 cubic metres per second, and then again there was another drop of 10 cubic metres per second on the 23rd, and I presume that's when the bottom return was closed. Do you know where the other 10 cubic metres went to?-- Sorry, which 10? The first 10 or the second 10?

The first 10?-- No, I don't. I'd be guessing if I tried to tell you.

Well, would you know where 20 cubic metres per second went to?-- You mean the two 10s together?

Yes?-- The most likely thing is when the first 10 went missing was due to ventilation changes in other parts of the mine, that is the requirement elsewhere increased and therefore a regulator somewhere - or regulators, were opened which would cause a loss to 512, and as you said, the second 10 would appear to be the case where the bottom regulator is closed off, and as we discussed before, that would increase the quantity elsewhere too.

Would it be fair to say then that the - you know, the manager or his subordinates should know about that? If you look at 20 cubic metres in 57, it's a fair percentage of the ventilation in 512?-- Yes, it is.

Do you think they should know about it, know where it's gone to?-- They should know the changes have been made, yes.

You have stated that you are a most conservative person with regards to spontaneous combustion?-- I think so.

I applaud that statement, Mr Self. What are your comments regarding the fact that benzene and tarry type smells had been reported by competent people before the explosion and the CO make trend had increased such that the manager had reported 19 lpm in the mine record book on 5 August?-- Regards the smells, we have discussed that. I think every smell is - that's not a true statement - every smell which could be symptomatic of spon com needs attention, and how thoroughly you investigate such things depends on the individual, I think. You need to justify to yourself that this is a situation that is under control. So there is the smells. The CO make, I would find it very hard to interpret CO make in a panel like this. A longwall situation, the volume of coal that you are sampling is quite small, because most times you remove all of the seam if not - or at least the majority, and the compaction and the actions taken to reduce waste leakage, certainly advancing faces, means that the actual volume of coal sampled is small. So if there is an increased CO make it must necessarily represent a small volume of coal. So a ramping up of CO make in that case can be seen to be a problem. When you've got increasing amounts of coal being exposed, and in this case I understand it was an ever

increasing rate, then I think it would be extremely difficult to interpret any trend or take any meaning from that graph.

Even though the mine has got a history of spontaneous combustion?-- I'm not saying there wasn't a heating there, I'm saying I would find it very hard to interpret the data I've seen.

I'm asking you the question in terms of what your thoughts are in terms of these parameters?-- My thoughts are that if ----

I'm sorry, I'm trying to glean from your experience?-- Yes, my thoughts are if CO make was enhanced then it would have to be something you would be concerned about, but I would find it very difficult to draw any conclusions from that and I would have to rely on the things I have relied on in the past, the ratios.

The ratios?-- Yes.

Well, we might come to that. Could the witness be shown Exhibit 253? This is Dr Van Dolah's report, and if you go to Figure 5 - I think it's about four or five pages from the back. Have you got Figure 5?-- I have it.

This is after sealing and it shows the rate of CO build-up up to the time - virtually up to the time of the incident. So at 10 o'clock on the night of 7 August, approximately 22 hours after sealing, the CO had increased from 12 ppm to some 150 ppm. These are approximate figures?-- Yes.

In your experience what kind of signal will that give you, and I'm speaking here in terms of the time?-- That's a fairly rapid rise. I've seen curves or - it's not actually a curve. I've seen graphs which are much, much steeper than this without evidence of a fire. The most extreme one I've seen went to well over 100 ppm in one hour and was opened up again the next day and there was oxidation and that was all. That was a case where there was a very large area of coal involved because it was broken through into old workings. That was - a fairly regular event was to seal that section off, allow it to deoxidise itself and open it up 24 hours later. That was a normal practice. I find that, frankly, rather surprising to say the least, but it is a steep rise.

That would cause you some concern, wouldn't it?-- It would cause concern, but I wasn't there at that time. It's very hard to judge it.

I'm just trying to glean from your experience, nothing else?-- Yes.

If we say - and you like the Graham's Ratio?-- That's an interesting way of putting it. It's got me out of trouble a lot of times.

If I was to say to you, and I do accept that after a panel is sealed one has to take due recognisance behind a sealed area when you are looking at Graham's Ratio?-- Yes.

But if I was to say to you over that same time period the ratio increased from about .2 to about .7, what would that indicate to you?-- I've got problems with Graham's Ratio behind a seal. Graham's Ratio - I'm telling you what you already know, but it relies on incoming oxygen being at 20.93 and the ratio of oxygen to nitrogen being .265 standard, and if that is not the case then the ratio - whether it's invalidated or degraded I'm not really sure, but it becomes less reliable if you are not basing your calculation on fresh air. If you look at the situation behind a seal then you've at no point got fresh air once oxidation has taken place. So the interpretation of that ratio, once you've got a certain stage of oxidation having taken place, is very difficult to interpret.

It is. Especially over a time period?-- As more time goes on.

The worse it gets?-- That's right.

Over 22 hours it may not indicate something to you though?-- It indicates a rise in trend in Graham's Ratio which - any rise in trend of that ratio I've reacted to in the past personally.

At the same time the panel has gone into the explosive range, so if you look at all the parameters, smells and the CO make, the rapid rise of CO, and okay if you disregard the ratio, what does that suggest to you?-- It tells me there could be a problem.

I've no further questions, thank you.

EXAMINATION:

MR NEILSON: Mr Self, once again to try and glean from your own experience, you've indicated that you have virtually no faith in the system of CO make and the reasons why?-- Yes.

You have said that you in the past have relied upon the Graham's Ratio?-- Yes.

And I think that was in relation to the mines that you had experience in?-- Yes.

And I take it they were mainly in longwall mines?-- Yes.

Can we now take you to a situation such as the Moura No 2 Mine, a mine which develops and extracts panels in a fashion similar to what happened in 512? What sort of spontaneous combustion management - or what system of management of spontaneous combustion would you introduce if you had been a manager in a mine such as that?-- I think it's hard to say what I would have done at that time.

Sorry, what would you do now?-- You've really got to look at all the facts of which I'm aware, and knowing what you do - you obviously decisions would be different from what they were at that time. Under normal circumstances the return air concentrations or Graham's Ratio or CO2 ratio - CO/CO2 ratio would be deemed to be adequate in the top return, and I don't really think many people would try and monitor it other than there unless you decided to monitor it at the inbye end of the return, in which case you would lose the leakage which had taken place from 2 to 1 heading, and I found it surprising that CO/CO2 ratio appears not to show any real evidence of what is happening. Whether there are rises or not they are at a very, very low level, and I was equally surprised, although Graham's Ratio, I understand, has had problems due to the lack of determination of oxygen content, but the corrected graphs I've seen don't really indicate the situation which we now assume to have taken place and I find that to be a major concern. The only improvement to monitoring which I can think of which is of any use, I think, is to monitor atmosphere at all exits from the goaf and that would then divide that goaf up into portions and you could make comparisons between sections, and if there was a small localised heating in one particular area then you would expect to get changes in the air that passed over that section and came out of a certain regulator at the back of the panel when compared to other sections. The answer is - I don't know if it's the answer, but more intensive monitoring is what I'm saying.

That was going to be my next question if you didn't touch on that. You've also indicated that after a panel has been sealed you would not rely upon all - you may not rely upon the Graham's Ratio because it relies upon fresh air?-- Yes.

What would you rely upon?-- You would really look at - I'm looking at a different context. My experience is in the UK, and the Act there says that all seals will be five metres thick - or there is a formula that allows you to work that out and it's five metres thick. So you would be less concerned about a rise like this.

I'm not quite with you. Are you saying that you wouldn't worry if there was an explosion?-- I'm saying that the consequences of an explosion would be much, much reduced.

I may have misled you with the question. What I'm asking is - and once again I'm referring to a mine or a panel similar to 512 -----?-- Yes.

----- that's been sealed, and you've indicated that - and you would continue to monitor the atmosphere behind the seals?-- Yes.

If you would not use a Graham's Ratio to determine or attempt to determine what might be happening in terms - and if you were looking for an event of spontaneous combustion, then what system would you use?-- You could look at CO/CO2 ratio and the other, as Mr Parkin touched on, is the rate of rise of CO, but neither of those is an absolute determination of what is

happening. The rate of rise of CO, the same arguments apply to that as the arguments that apply to the CO make during production. It's a very, very difficult topic and I'm afraid I haven't got a sound answer for you.

If you also look for the presence of other gases would that assist you?-- Yes, the rate of decrease of oxygen, the rate of increase of nitrogen, obviously CH₄ is a major issue, but in terms of being able to place absolute rates or rates of change that mean something I can't, and I think that's experience based.

How about the use of a gas chromatograph?-- Sure, if you start getting hydrogen in samples then that's - you are starting to get towards some positive evidence, yes - or hydrocarbons same comments would apply.

Just one other question. I want to take you to your comments about smell, and I accept that many people smell something strange in a mine for the first time and they may not be able to identify exactly what that is, but you've indicated that you have smelled a heating?-- Yes.

You've indicated that it's quite frequent in an underground coal mine to get oily smells from machinery where motors may heat up and that sort of thing?-- Certainly.

But would you yourself be confused between the two?-- I'm not sure. I don't think so, but I really couldn't give you 100 per cent on that.

Could I ask it this way: once you've smelled a heating in an underground coal mine you don't forget it, do you?-- I think that's very common.

EXAMINATION:

PROF ROXBOROUGH: Mr Self, you expressed the opinion in answer to a question by Mr Morrison that there would be no dead spots in the 512 goaf; is that right?-- I think I said that I think the likelihood of actual dead spots in that a zero velocity existed would be unlikely.

Which means that all parts of the goaf would be reached?-- There would be some flow, I think.

What about in the ramp areas?-- I'm not sure. I've had descriptions of what happened in the ramping areas, but I'm not entirely sure on the way it was left after ramping had taken place.

But in any case, and in connection with the same question and answer you gave to Mr Clair was that if you had no pressure differential then you won't get a heating?-- Yes.

And I think you said that oxidation might start, but as a result of oxygen depletion it would eventually extinguish itself; is that the sort of mechanism that you are eluding to?-- Yes.

However, would it not be true that the heating would generate its own thermal gradient and cause an air flow as a consequence?-- Yes, there are some fairly extreme steps taken to prevent ventilation of a goaf in the UK and Germany and all European mines, I expect, very different from retreat mines, as you know. In an advancing face, the air has to pass all of the goaf before it can get to the face itself which is not the case in retreat mine so the steps taken to seal roadway sides involves some very detailed attention. So the steps taken to prevent oxygen ingress into the goaf are quite severe.

So are you now saying it is possible with a zero pressure differential to get a heating?-- I'm saying that. You take all the steps that you can to prevent the ingress of air and that's a function of pressure across the goaf and the resistance to air flow into the goaf.

But with the possibility of free movement of air, even though there isn't a pressure differential, the fire itself or the heating itself causes the pressure differential?-- Driven by a thermal gradient, yes.

When finally sealing a panel like 512, presumably the air flow doesn't suddenly stop. I mean the air has got momentum and there are some temperatures differentials within the panel that allows the air to continue moving in some way or other?-- Yes.

Can you say anything about air movements - likely air movements in the panel after sealing? Not necessarily the path that it might take, but the nature of the movement, how long it would persist? Would it persist for minutes, hours or days? I'm thinking of this mainly in the context of its ability to stir things up rather than follow a particular path?-- I don't really know. I've never made any estimates or made any measurements of air flow once the driving force has been removed. I really couldn't say.

Couldn't even guess?-- I wouldn't like to guess.

Thank you very much. No further questions.

EXAMINATION:

MR ELLICOTT: In your experience with the detection of heatings, can you indicate what proportion of those detected were detected by smell or some other personal observation before they were detected by any form of mine monitoring system?-- Hard to make an estimate. There is - I've certainly experienced, in my own experience, quite a few that

have been early detected by smell, mainly on the grounds that there are more noses than there are monitoring points.

So would it be a significant proportion would you say?--
Could be.

In those cases where smell has been detected and an investigation has been conducted which may have been inconclusive, have there been cases where there was then a subsequent spon com?-- I can remember cases - or a case, and this is an old spon com in pit bottom type situation within a pillar where things have been smelled and then gone away and then there has been a delay, and then there has been another report of a smell and that's gone away, and then eventually the old heating has started to produce things which you could measure.

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In your experience in the UK is the tube bundle system used for determining Graham's Ratio or is a separate sampling and full analysis by a gas chromatograph used?-- Both systems.

Both systems are used?-- Yes.

All the time?-- Yes.

Does Graham's Ratio depend on intake air being fresh air or does it depend on intake air not being oxygen deficient?-- I think the latter is more correct, yes.

Thank you, nothing further.

FURTHER RE-EXAMINATION:

MR CLAIR: Thank you, Your Worship. Just one matter, Mr Self. You mentioned that in the UK, and I think you mentioned also some European countries, that in order to deal with the prospect of spontaneous combustion that there were - and I think these were your words - extreme steps taken to avoid oxygen getting into the goaf?-- Yes.

In what kinds of mines?-- That is in the longwall advancing mine I'm talking about.

Advancing longwalls?-- Yes.

Bord and pillar?-- There is no bord and pillar in the United Kingdom.

None at all?-- No.

Nevertheless, looking at a bord and pillar situation -----?-- Sorry, Mr Clair, that's not an accurate statement. The National Coal Board operated coal mines don't have bord and pillar. There are some very small operations that do bord and pillar.

Now, addressing yourself there to the bord and pillar situation, the equivalent to that kind of approach would be what, a progressive sealing as one moves out of the panel?-- Yes.

So that in this case if one were to take the preventive approach that, I gather, you would favour?-- Yes.

Then once the panel had extracted back to, say, the barrier pillars between - I think it's 8 and 9 cross-cut there, a preventive measure would be to erect a set of seals across there and then continue to extract?-- That would be the analogy, yes.

Okay. Thank you, Your Worship.

FRXN: MR CLAIR

WIT: SELF A J

WARDEN: Mr Morrison?

FURTHER CROSS-EXAMINATION:

MR MORRISON: Mr Self, just a couple of things. You were being asked by Mr MacSporran about the difficulties about taking measurements in terms of cross-sectional area, velocity by use of anemometer and CO by use of Drager, and he put a number of percentages to you and then went on with the proposition that you should not always assume the worst case scenario. Your response to that was you wouldn't because that would effectively degrade the analysis, the cry wolf syndrome I think you called it?-- Yes.

In looking at all those things, do you hold the view of others that really one is looking for trends?-- Yes, I do.

So, in effect, you are looking for the line of best fit from the data?-- You are looking for a change from the normal situation, if you can establish what normal is.

In looking for trends, one wouldn't always look for a worst case scenario, would one?-- No, you wouldn't. The worst case scenario is potentially a problem. We had a lot of troubles with alarms going off on the Unor systems or tube bundle systems, and every time an alarm goes off the credibility of the system goes down one notch, so you have got to be careful you don't shout for - cry wolf, as I said, too many times. It becomes a normal practice.

You were asked about the assumptions you made in your report. I just want to find the page. If you have a look at your assumptions - Mr Clair asked you about one in particular and that was the figure of 2 cubic metres per second at the regulator?-- Yes.

In relation to that, as I understood it, you said a couple of things. Firstly, that it was a figure that had been estimated for you by Mr Abrahamse?-- Yes.

And, secondly, that you considered that data from other sources validated that?-- Yes, it's based on - that's a leakage basically through a stopping or a door and we have got a very good feel for what the resistance of a door is.

Now, if I look at page 8 of your report where the assumptions are, it seems to me that the second assumption in fact contains assumptions about regulators?-- But not that one specifically.

Not that one specifically?-- Yes.

Is that not a 512 regulator - with the exception of 512 regulators where additional data was available?-- But in the state it was in it was a closed regulator; it was no longer

regulating, it was stopping.

There were some questions asked just lastly by Mr Clair about progressive sealing and you were making a comment to him about whether or not progressive sealing has taken place in the past?-- Yes.

In a gassy mine with roof falls, progressive sealing could lead to a dangerous situation, couldn't it?-- Yes, it could.

If you have got seals damaged by roof fall, then you are going to have a sudden outflow of methane into the working area?-- That's right.

With obvious results?-- Not obvious to me, no.

Well, harmful to men?-- Not necessarily.

Potentially so?-- Potentially so.

You wouldn't like that situation to occur?-- No.

I have nothing further of Mr Self, Your Worship.

WARDEN: Thank you. Mr Neilson has -----

MR CLAIR: Just one matter arising out of that, Your Worship.

FURTHER RE-EXAMINATION:

MR CLAIR: Mr Self, the situation I postulated to you was sealing across and in the area of the barrier pillars there between 8 and 9?-- Yes.

Is there really any prospect of roof falls if one was to seal across the roadways adjacent to those barrier pillars?-- I don't know, that's outside my experience.

Thank you, Your Worship.

FURTHER EXAMINATION:

MR NEILSON: Mr Self, I apologise, I forgot to ask you a question. In explaining your reluctance to use carbon monoxide - and, as I said, you gave some reasons why - one of those reasons was the wildly varying fluctuations in air velocity readings, and I think you indicated that you had seen examples of even errors of 50 per cent?-- I certainly have.

Or differences of 50 per cent?-- Yes.

I take it you are referring to the use of the vane anemometer?-- Yes, I am.

Well, could you tell me, or tell the Inquiry, if there is a better way to measure air velocity?-- No, I think the vane anemometer is universally used, but it's a matter of training, experience.

Well, can I ask it this way: is there another instrument that is as reliable that doesn't cause those sort of fluctuations?-- Well, the problem - there is a vortex shedding device which is a solid state method, no moving parts, of measuring air flow, but the problem is the same in that it's the traverse which is the difficulty. You are looking for an average velocity which means you have got to sample the cross-sectional area that you are interested in in an average fashion, and if the instrument spends more time in the high velocity zones than the low velocity zones, you will get an inappropriate result, and conversely so too, so there is nothing wrong with the instrument at all.

It relies upon the ability of the people?-- Yes.

In other words, make sure people are well trained and know how to use the instrument properly?-- Yes, I think I made some comments in the report that it requires training and it requires an appropriate level of skill and experience but also practice. You get out of practice in doing this and your first few measurements after you have not done some are dodgy.

Thank you.

WARDEN: Thank you, witness, you may stand down.

WITNESS EXCUSED

WARDEN: We will have a five minute break before we start on the next witness, please.

THE COURT ADJOURNED AT 3.39 P.M.

THE COURT RESUMED AT 3.58 P.M.

WARDEN: It is some time since you took the last oath. Would you reswear, please?

BRIAN JOHN LYNE, RECALLED, RESWORN AND FURTHER EXAMINED:

MR CLAIR: Mr Lyne you may not remember this but you have given evidence before this Inquiry on a past occasion; is that so?-- I do remember.

On that occasion you produced your report; is that so?-- That's correct.

And that was tendered and became Exhibit 1?-- Correct.

Do you have a copy of that in front of you?-- No, I have the later version of that in front of me now.

I see. You say there is a later version. The report that was tendered last year was what was called an initial report, I think?-- That's correct.

And you have done a final report since then?-- Yes, and I understand that was actually presented to the Inquiry the first day it resumed this year.

That's been tendered also before the Inquiry?-- I understand so. I wasn't here for the first two days.

I think that was made Exhibit 1A, if I recall rightly. Have a look at that, if you would, since you weren't here at the time it was tendered - Exhibit 1A?-- Yes, that's correct.

There is also a letter annexed to that new exhibit; is that right?-- That's correct, yes.

Which is part of that exhibit. Now, there are also a number of annexures which were tendered on the last occasion - annexures to your report?-- Yes, that's the first occasion.

That's when you were in the witness-box?-- That's correct.

They are referred to also in the modified report - that's Exhibit 1A?-- That's correct.

That modified report, by the way, is dated 24 January 1995; is that so?-- That's correct.

Now, I don't intend to take you in detail through your report. It may be that your own counsel will take you through some detail of it, but I want to go to some areas which you deal with and ask you to expand and to pass some opinions, in some

XN: MR CLAIR

WIT: LYNE B J

cases, relevant to what you see as being relevant to the role of the Inspectorate. Can you go to section 2.6 - that's at page 5?-- Yes.

That section deals with gas monitoring?-- Correct.

You have described there what you understood to be the nature of the gas monitoring system installed at Moura No 2?-- That's correct.

And you have referred in the course of that to the various things which were shown as part of the computer monitor, and you go on to say that the system was one which sends alarms when gas levels exceeded preset levels?-- Correct.

You go on to say, "The system was regularly calibrated to ensure traceability and acceptable levels of accuracy."?-- Yes.

Now, in making that statement, what did you rely on?-- Well, to a limited extent the inspectors would, from time to time, have a look at that, but principally every two years I had a system where I had sent people from SIMTARS, and mainly it was Stewart Bell, to go through all of the mines in Central Queensland and conduct an audit on the operation and the function of all gas monitoring systems at all underground coal mines, and that was to confirm in my mind that this equipment was functioning and operative and there were people there who could operate it properly.

That was done every two years, you say?-- Yes, that was the decision I had made.

Was there some record kept of that and of the results of those audits?-- Yes, there are reports of that. In fact, 1994 was to be the next year that that was to occur.

How long have you been Chief Inspector?-- Five years.

When did you institute this system?-- In 1990. I started in November '89 and - I can't remember the date - I think it might have been September 1990 that the first audit was done, and then there was another audit done in 1992.

And you say that 1994 was to be the next one?-- That's correct.

As far as other mines are concerned, has this system of auditing each two years been continued?-- Yes, all the audits were done consecutively, so every mine was done in a system right throughout the state.

What was sought to be established by the audit?-- The fact that the equipment that was put in place was both being maintained properly, that it was in calibration, that it had sufficient spares - that means it could be relied upon to function well - and that there were people at the mines who knew how to operate the equipment.

Were there any parameters established as to, for instance, how many people should be qualified to operate any particular piece of equipment?-- No, there weren't. I left that to the judgment of Stewart Bell, who was the person in charge of the gas division in SIMTARS, to give an opinion on that.

Was it part of the - or were there any instructions established for the audit?-- There were no written instructions, other than I - you are testing my memory now. I do remember writing to people and saying that Stewart Bell - or SIMTARS was to do this audit, and they were doing it at my request.

You make reference also to the gas chromatograph. I take it that's another piece of monitoring equipment that would have been subject to this audit?-- Everything was subject to the audit.

Was there any guideline as to what ought to be happening at the mines in respect of persons qualified to operate the gas chromatograph - how many there should be, what level of expertise they should have, and how frequently their training should be updated?-- No. The reason that I got SIMTARS to do it was that they were experts in this field and the inspectorate themselves aren't experts in the field and it was - I saw it as being appropriate that people who do the - that SIMTARS were an appropriate group to assess whether there were sufficient persons there at a mine to ensure that the results or gas samples put through a chromatograph, or the monitoring system, was adequate to provide that service consistently throughout the year.

Were there reports furnished to you as a result of each audit?-- Yes, there were.

Do you recall whether you were satisfied with all aspects of the audit in respect of Moura No 2 on the two occasions that it was carried out?-- I do recall that, and, yes, I was satisfied. The very first audit, if my memory serves - it has been quite a while since I've read it, but I do recall that in the first instance that Moura was one of the better performing of the underground mines.

In terms of these monitoring systems, or-----?-- Yes, and the people available, and the second report in 1992 wasn't as good as the first, but it still was at a satisfactory level, and there were no requirements for retraining or additional persons at that time.

Did the audit report indicate to you the numbers of personnel that were qualified to operate the equipment, both the Unor equipment and the gas chromatograph, for instance?-- I believe it did. I'm now - as I say, it is now quite a while since I have read it. The report is available, and our legal counsel do have both reports.

Okay. Well, let me ask you this: did you consider that the frequency of the audit - every two years - was an adequate frequency to ensure that the monitoring systems were operating

properly on a longer term basis - or perhaps I should say on a day-to-day basis over the longer term?-- Yes, I did.

Had there been any system of audit before you established this system?-- Not that I'm aware.

So, it was a new step, as far as you are aware?-- I would imagine so.

Can I ask you this: moving away from this two yearly audit that you have spoken of to the more frequent inspections that were carried out at the mines by inspectors - both inspectors of coal mines and the electrical inspectors and mechanical inspectors - what role did you perceive those inspectors to have in respect of the gas monitoring equipment - the Unor and the gas chromatograph during the routine, regular inspections?-- Well, their role is to see that, firstly, the equipment was available and that, where appropriate, it was being used in compliance with what the regulations say, and that's their role - to ensure that it is available for use in both the monitoring of the gases and the underground roadways, which is a requirement of the legislation, and that's, I guess, in essence, the role which they had. The issue of the assessment of how good the system was is not something that the inspectorate are really trained in doing, and that's why the audit was done by a specialist in that field.

Every two years?-- Mmm.

But you say that the Inspectorate's duty was to ensure that the equipment was available for use?-- Mmm.

No doubt able to be effectively used?-- Yes.

And, in fact, was being used for the purposes of monitoring gas levels in underground roadways?-- That's correct.

And that you saw to be, in fact, the statutory requirement?-- That's correct.

Now, were there any instructions issued to inspectors as to what they were to look for in connection with the gas monitoring equipment?-- No, there were not.

Was there any established practice that you are aware of in terms of what inspectors were to do in a practical sense during the visit to ensure compliance with the statutory requirement?-- No. There isn't a - there wasn't a fixed system to say that every third visit or once a year you need to audit or do a specific inspection of a particular plant at the mine.

You have heard some of the evidence in this matter, perhaps not all of it?-- Yes.

But a fair proportion of it?-- A fair proportion.

And perhaps that which you haven't heard, at least you've become aware of other aspects of it?-- I don't know that.

Well, put it this way: your knowledge isn't limited entirely to the evidence for which you were present, am I correct in saying that?-- I would - mostly to what I've heard?

It's true to say that in so far as the Unor system at Moura No 2 was concerned there were a few problem areas that have evidenced themselves in the course of the testimony here; is that so?-- Yes.

Let me just identify some. There seemed to be some ongoing problem with at least one, and perhaps more monitor points. You will recall the evidence about point 18 obviously being a monitor point that wasn't reading as it should?-- That's true.

Now, in terms of problems identified by the Inspectorate under the system that was in place it seems that that problem at least came to the notice of the inspectors?-- Right.

Or one or more of them?-- One of them.

So that the system to that extent was working well. It did come to his notice?-- Yes.

However, it seems that that problem persisted over a reasonable period of time, and in spite of visits from the inspector, seemingly because there was an assurance that there would be attention paid to that point to solving that problem?-- That's my understanding.

Now, nevertheless, over a period of time it doesn't seem to have been solved. Do you see that there may perhaps be a need for some tightening up of the kind of surveillance that is exercised by the Inspectorate in respect of the monitoring system in light of that particular body of evidence?-- I tend - if my memory serves me correctly, the ones that were found to fail - or found to be long delay periods were actually fixed and they had become - it was later ones that were not repaired. That's my knowledge of the situation.

You are taking issue with my assertion that this problem persisted over some considerable period of time?-- Yeah, one particular issue stayed a long time, if that's the case, that's not clear in my mind.

I don't want to dwell on it or get bogged down in showing you documents in relation to that. Let me just come back to the question. In respect of actual surveillance of what is happening and in terms of inspectors having perhaps some reasonable powers in ensuring that these problems are fixed, do you see any need for a change to the current system? I mean - perhaps I should say this as a starting point: do you accept that there was a situation where there was simply an assurance to the inspector that it would be fixed, but that at

least -----?-- Certainly that's where most of these things start from, and I do - if I remember, I think it was point 18 was the issue that was the ongoing one.

Let me move on to some other areas in respect of the gas monitoring. Another problem area that seems to have emerged is the fact that there seemed to be a range of people who had a role in adjusting the pre-determined alarm levels for gases in the various roadways - gases at various monitoring points?-- That's true.

Now, it seems apparent from the evidence that the inspectors didn't become in any way involved in the question as to what levels ought to be set for a lower alarm level or an upper alarm level?-- That's true.

In respect of particular gases at particular monitor points?-- That's true.

Let me ask you this first of all: do you see that there would be any good purpose served in inspectors playing more of a role in this question of what alert and alarm levels, if we can call them that, should be set for particular gases at particular monitor points?-- Probably indirectly, but not directly in that it would seem to me that the appropriate way is that things may change at a mine for various reasons, but the primary responsibility for setting the appropriate alarm levels, I would suggest, should be more in the line of the management, and this is now my opinion after having listened to quite a bit of the evidence. The controls over who changes those levels is something which needs to be tightened up considerably, but I don't see it necessarily being an inspector that might come in once a month or whenever and somehow tell a person what the alarm levels should or should not be.

You agree that the alert and alarm levels on gases in the roadways are matters of some considerable importance given that what we are talking about is a monitoring system that is designed to provide an alarm when gases exceed a certain level, that is some indication of danger?-- It certainly is, and that is why the legislation requires gas monitoring systems.

You've heard some evidence about the American system where it appears that there is some involvement on the part of what I'll call the equivalent of the Inspectorate in the determination of alert and alarm levels and in any adjustment of those levels?-- I have.

Do you see any particular advantages or disadvantages in that process?-- I would see some - I would see some disadvantages. I can see some, you know, obviously possibly some benefits, but I don't see that the - I believe that, for instance, for taking out second workings such as we were talking about in 512 or any panel throughout the State in second workings, there is an extraction system needing to be submitted and that may well include in the future, for instance, a statement from the - the management, the company will say how they intend to

take the coal out and then put in the case of, "I suggest..." what the alarm levels may be appropriate for in the ventilation system, and that might vary in accordance with the type of machinery they have. For instance, whether they have diesel machinery or battery powered machinery or different types of coals. This is the sort of thing that they would need to put in, and I would - this is my - again thinking out aloud, that the alarm levels that are set would be justified as part of their application system, but not approved as such.

But not -----?-- Approved as the American system is.

Not approved?-- Mmm.

Well, surely if the whole extraction plan was approved that would imply some approval of the alert and alarms levels?-- Well, our plans aren't approved in the terms of the Act and the regulations. They are acknowledged - or noted I think the wording is.

What if they weren't - let me put it this way: if it was submitted to the inspector and he didn't approve of it - he disapproved of it to be more positive - what would happen?-- He takes it back to the company and points out the reasons why the application is not acceptable, and indeed this does happen, and points out either the risk or the method has got some shortcomings, and I haven't ever struck a case where the company hasn't - the manager hasn't taken steps to alleviate that risk or problem.

What about if the company said, "No, I think your suggestions are unreasonable and we don't intend to change it." What happens?-- The inspector is - it's yet to happen, but if he did say that the inspector has the powers to take steps in which that part of the mine, for instance, might not work until he is satisfied.

Has the powers to -----?-- Stop that area if he determines it is a risk to persons.

Power to stop the extraction going ahead?-- That's right.

So, in effect if he doesn't approve of what's happening then he has got the power to stop it going ahead?-- More that if he sees the situation that there is - people are put at risk he can stop it going ahead and stop it happening. There is a difference.

Are you saying that his concern is with matters of safety?-- Correct.

And if he doesn't think that what is being established respects all of the needs for safety he can stop the panel proceeding?-- Correct.

So, in effect there is an implicit approval in his allowing it to proceed. There is an implicit approval on his part of the safety measures that are involved in the extraction plan?-- You can put it that way. There is also an implicit

requirement that the management must be able to justify the standards which they are adopting.

You did say that perhaps in the future it could be part of an extraction plan that the alert and alarm levels for gases during extraction be nominated?-- Could be.

So it's certainly not a wasted exercise to explore first of all the possibilities for the nomination of particular parameters for particular extractions; is that right? Am I right there?-- It may not be.

Secondly, it's not unrealistic to think then that certain fixed parameters could be put in place for extraction panels in the future?-- Yes, that's true.

Against the background of what we have heard in evidence here. Would you agree that on one view of the evidence that's been given here that had there been some involvement of - some wider involvement of people, perhaps people from SIMTARS or even people within the Inspectorate in terms of fixing and what might be considered to be a safe level of CO make for 512 Panel, that there might well have been a different approach taken to the sorts of CO make levels that were being seen towards the end of the extraction phase?-- That may have had some effect, and I think that the issue of how far CO make has taken as a prescriptive form is yet to be tested. There is certainly some doubt in my mind, and I have been - followed the path of CO make until now, but -----

I want to come back to this question of the role of the Inspectorate in a day-to-day sense during their routine visits in so far as the gas monitoring system is concerned. I was pointing out some areas that seem to present as problem areas, and in that connection I made reference to the pre-set levels on the Unor system. One of the problems that seems to present itself is that there was no prescribed authority for specific persons at the mine to actually set or reset the alert and alarm levels on the Unor. Was that a matter that should have been of concern to the Inspectorate?-- I would like to say yes, but there is no regulation as such in which the Inspectorate can do or has the power to enforce such a position.

Well, you did refer to the regulation before that there is an obligation to monitor gases?-- That's correct.

In the underground roadways?-- Mmm.

You wouldn't see that as part of the monitoring of gases, that is that there be an effective system to give warning if certain levels of gases are exceeded?-- The people who have - all the mines that have - all mines have the systems in place, and they all do have levels of alarms and warning systems in them, but that is again, as I say, to record the particular nature in the particular mine. So it's not as if they don't have them in place, but there is no - hasn't been an auditing system on behalf of the Inspectorate to regularly go and check either the location of where the sampling points are nor the

levels into which they are - that the alarms are set.

You did say earlier that you saw it as part of the audit system that, that's the two yearly audit system, that the auditor ensured that there were people at the mine who could - who were qualified to operate the system?-- Correct.

Was it any part of that audit system to ensure that there was, as it were, a group of people specifically authorised and qualified to determine and set the alert and alarm levels on the system?-- No, it wasn't. The criterior for the audit was to ensure that the system was properly operative and in calibration.

As opposed to perhaps properly operated, is that what you are saying?-- I will leave those words there, probably.

Well, on this question as to whether it was being properly operated can I move to another area associated with it, and that is the question of acknowledgment of the alarm on the Unor system. The records that we have seen indicate two things about the way in which the system was operated. One is that there were occasions on which alarms registered at the Unor system but remained unacknowledged at the system for long periods of time, eight hours in one case, I think three or four hours in another. You have become aware of that evidence?-- Yes, I have.

The other aspect that became apparent from the records is that although the Unor system had the opportunity in-built for alarms to be acknowledged by somebody who gave a specific number to identify himself as the person acknowledging the alarm, that system at least wasn't universally or anywhere near universally used, and again that presents from the records?-- That's correct.

Now, did you see it as the role of the Inspector to concern

himself with that aspect of the operation of the system, that is, when he arrived at the mine for his routine inspection that he should have a look at the records, particularly the alarm log and perhaps see what was happening in relation to the response to alarms?-- It's not something that I had myself previously addressed. I would agree that it is something that should be addressed.

Okay. Now, you mention in your report, "The system was regularly calibrated to ensure traceability and acceptable levels of accuracy." What were you depending on in relation to that, the audit?-- Yes.

Or something beyond the audit?-- Primarily the audit. I know that the - I think the Electrical Inspector, Mr McMaster, also did checks on that as well.

Well, I think he has told us that he was aware that people came from Maihak to calibrate the system each six months?-- That's right.

However, it does appear that at least in respect of one of the points that the - again on an ongoing day-to-day basis - that there wasn't an accurate calibration. I am referring to point 14 which was one that should have presented fairly obviously to anyone who was looking at the system and looking at the print-outs of readings from time to time. Now, do you think that the Inspector or one of the Inspectors on their routine visits should be looking at records to ensure, in between any visits from Maihak, that the equipment is remaining calibrated?-- Well, to do that I would need to probably train my Inspectors in that skill to a higher degree than what they are now. It is not something that you would do without a sound knowledge base.

Well, now, as you might appreciate, one of the reasons I'm raising these things is that it does appear that although these problems were presenting, nobody within the mine management itself addressed them?-- It would appear that it hadn't been well addressed, true.

So, it really raises the question, you see, as to whether there needs to be some closer supervision from outside the mine of these things, particularly these matters that are related to safety; do agree with that?-- Yes, I would agree with that, but not necessarily has to be outside. It's something that possibly could become a responsibility - for instance, a ventilation officer might have that responsibility, if you decide to go down that path. The primary area - in my view, the primary area of responsibility of making sure that something is operating should be at the mine. The accountability should not be of an inspector.

Would you agree that without any change in legislation or practice at the moment, that there ought to be somebody at the mine, whether it be the ventilation officer or someone else in management, who would take responsibility and should take responsibility in respect of these problems that I have

isolated, both recognising them and ensuring that they were corrected?-- I wouldn't disagree with that.

And I think the postulation I was putting to you is that obviously although that responsibility existed, there was nobody addressing these problems?-- Well, I haven't seen-----

From within management?-- It would seem so from what I have heard, yes.

The gas chromatograph, you say, was subject to the two yearly audit, and part of that audit was to ensure that there were people there who were qualified to use it. I think you also mentioned at one point that part of the audit was to ensure that the instrument was being used also?-- No, no. The equipment needs - there are two different systems of - gas detection systems at almost all of our mines. Except for some of the small mines, all mines have a gas chromatograph. That's not a requirement under the legislation, and the gas chromatograph is something that the Inspectorate has - I will use the word - strongly encouraged mines to employ. Moura is one of those mines that has done that. In fact, most of the big mines actually have that. So that the gas chromatograph needs to be available, but most routine operations of gas monitoring is done through an infra-red system which is the Maihak.

Is there a philosophy within the Inspectorate as to the use of the gas chromatograph?-- There is nothing written, if that's what you're asking, not that I'm - nothing, no. This was even before I became Chief Inspector too.

You say that certainly there is an encouragement for mines to have one. Is there an encouragement for mines to use it?-- I would see that as being implicit.

Okay. But you don't know what's done on a day-to-day basis in terms of contact between the Inspector and the mine to encourage its use not just for calibration purposes but, rather, to analyse samples of gases?-- No, there is nothing specified for the Inspectorate to participate in that area.

Now, you do say in your report that the mine's gas chromatograph was linked to the SIMTARS calibration system via a computer and modem link. Just on that point, any sample - we have heard that the samples were sent for calibration purposes on Mondays and Fridays, I think it was, to SIMTARS twice a week to check the calibration. As far as you are aware, there is no reason why other samples can't be set up for analysis on line to SIMTARS, or is that something beyond your knowledge?-- No, I'm aware of what SIMTARS - basically - you know, reasonably aware of what SIMTARS can do. You can detect - send the analysis of a gas sample to SIMTARS at any stage that you wish through the modem.

So that if there was not somebody there at the mine who could recognise the significance of particular readings, there is no problem in, in effect, sending the analysis on line to SIMTARS

where there may be somebody who could - or where there would be somebody who could, in effect, make a useful reading of the analysis?-- I think more likely that the circumstance would be that the analysis would be done by a person at the mine who knew how to operate the machine. It would be where they needed some expertise in gas analysis, maybe a problem with the gas chromatograph - operating the chromatograph unit itself, they could then get in touch with the people at SIMTARS to give them immediately or very quickly an opinion on the results of that sample.

Okay. There is no bar to that. I mean, it's not as though SIMTARS charges some inordinate fee to give that kind of assistance?-- As far as I know it's there as part of their system support.

Part of their CAMGAS system?-- Yes.

Can I move to 2.8, a section of your report dealing with safety record?-- Yes.

You say there, "The safety performance at Moura No 2 Mine had shown a steady and consistent improvement over the past five years and had moved from one of the poorest performers to one of the better underground mines in the state underground coal industry."?-- That's true.

The basis on which you say that it had moved to being one of the better underground mines is some data; is that right?-- That's true.

Is that the data contained in that table there?-- That's true.

Is there anything beyond that data that you rely on?-- I guess that's the most common method of measurement of safety performance.

Can I just ask you about the significance of that table? The second column is -----?-- The lost time injury frequency rate.

Lost time injury frequency rate. The third column is?-- The number of employees.

At any given time. And the fourth column?-- Is the total tonnage produced in that year, total raw tonnage produced.

In the year?-- Mmm.

Now, in terms of feedback from your Inspectors, did what they had to tell you support what was contained in this data, that is, that there was an improvement in the safety record?-- There certainly was.

Did you understand that there were still some problems being addressed at Moura, ongoing problems with cable flashes, I think we were told, over a period of time?-- Yes, that's true.

Did that impinge on your assessment that it had moved to one of the better underground mines in the state underground coal industry?-- The record that I was talking of there is from the safety record for injury frequency rates. Certainly Moura, being an older mine, had a number of problems with old equipment that sometimes didn't perform as well as what it could and so our Inspectors had, over a number of years, concentrated on its activities at the Moura Mine and, indeed, there had been a marked improvement.

Had been a marked improvement?-- Yes.

But there was still some problems there, I think is the way that it was put. Although those problems were being addressed, there was still some problems there?-- That's true.

In 1994?-- That's true.

When you look across the board and take that into account, does it cut across the opinion you have expressed here about it being one of the better underground mines?-- No. If we use the issue of the cable flashes - see, part of what an Inspector also does is to look at the opinion and the actions of the management, and where a manager or the staff stop an operation if they have a cable flash, because they have had a failure, or whatever the system has been, and then bring out - involve the Inspector, that's showing a high level of commitment because there really - while it's a reportable occurrence, it, many times under our legislation, would simply require it has to be reported, but the cable would be changed and production would sort of start again. So, I think that what has been - was the evidence was that the - at this mine safety had been wound up several pegs above what was normally being considered to be industry practice.

I understand you to say that normally industry practice would be not to report it; is that what you said?-- No, no, I said they would normally take the cable off the machine, report the incident, replace the cable and recommence production.

What you are saying is that at Moura No 2 they would stop production?-- Yes, until an Inspector actually came and participated in an investigation.

Now, I want to go over to page 7 and touch briefly on 5 South which is dealt with in 3.1.2, and you are here just outlining the events prior to the first explosion. You say towards the bottom of the page - or you refer towards the bottom of the page to events or the situation at 23:30 hours on the Sunday evening. Now, it seems from the evidence that - well, clear from the evidence that the men who were there in 5 South at that time had been left there without a vehicle?-- That's true. That's my understanding.

Now, has there been any practice within the industry or any belief within the industry as to the practice that ought to be adopted in terms of leaving some transport there with miners

during a working shift?-- In some places that has been the case. It does become very difficult, particularly in cases where you have heard the term "hot seat changes", for that to happen. The reason for that industry standard or requirement for that, there needs to be available transport for bringing people out of the mine.

Do you think it would be a good practice - at least a good idea to adopt some industry standard in the future?-- It's good to have a standard, yes, yes.

And a standard in this case requiring that where there is a crew working in a panel, that they always be left with means of transport?-- It would be very good. You must realise that to do such a thing with hot seat changes, you would have to have duplicated transport systems; in other words, you would probably need 50 per cent more vehicles to be available - and I'm talking about being operatively available - than what you might have now.

Okay. You see that as being a disadvantage that outweighs the advantages of having a vehicle present there, or are you just saying that that would be one consequence of it?-- It would be a consequence of it.

It certainly wouldn't outweigh the advantages of having a vehicle there?-- No, having a vehicle there would be the ideal.

I mean, we don't know, but there is a possibility, isn't there, that the presence of a vehicle at 5 South that night may have made a difference?-- I have no way of knowing. It may have.

Okay. Can I move to 3.1.4, "Sealed Areas"? There is reference there to the 512 Panel having been sealed using a seal design which had not been used at the mine previously. That was the Tecrete seals; is that right?-- True.

Now, are you aware of the involvement of the Inspectorate in the use of those seals at Moura No 2 for the first time?-- No, I'm not.

That is, as final seals?-- No, I'm not.

Was that a matter that came to your attention at any time?-- No.

Is it a matter that would concern you at all?-- Normally it would not.

You say normally it wouldn't. You mean it's not a matter that would normally come to your attention?-- That's true.

From your own point of view, either then or now, do you have any particular basis to object to the use of Tecrete seals?-- No.

On this same question in respect of final seals on a panel,

the legislation has a requirement as to how strong the seals, final seals, should be; is that right?-- That's true.

I think they are to be built to a strength of 345 kilopascals?-- That's right.

Now, has there been any confusion about the interpretation of that requirement in terms of the Inspectorate's views?-- I think that would be a way of putting it.

Well, what's your understanding of that requirement?-- The 345 kPa - I would have to admit to you that when I read this - I grew up in the school of psi and I hadn't learnt how to convert, to be truthful, and so what a 345 kPa stopping meant I did not know, and the only seals that I had seen - normally explosion-proof - previously was on a trip that I had been through in 1990 to America. I saw some - an experimental mine - 20 psi seals, but I'm not aware - I hadn't been aware of a 345 kPa seal. I'm not aware that my Inspectors are aware of those either.

I see?-- I can tell you that there has been none built in New South Wales or Queensland, to the best of my knowledge, and I've been to most places.

Do I understand you to say that seals erected in Queensland don't make the requirement as a matter of course?-- I'm saying that.

In that respect, the legislation simply isn't enforced?-- It hasn't been. If I can also make mention that that was also recognised in 1989 at the conference at SIMTARS, as well, as being something which wasn't addressed.

Something that wasn't addressed?-- Mmm.

Is this a readily accepted - that while this requirement is there, that it is simply not going to be in force - readily accepted both from the regulator's point of view - that's the inspectorate - and mining authorities, and from the industry point of view?-- Now it has been brought to our attention it won't be readily accepted, yes.

Tell me, are you yourself aware of any research or steps being taken to do research in what kinds of seals should be used to provide an explosion proof seal?-- The term "explosion proof" does create some difficulty in that there are explosions which can exceed the 345 kPa as well, so there needs to be a number, I guess, if we are going to set out to have a number provided, which has been agreed to be 345 kPa. The thrust of our legislation currently is that we are looking at managing the risk and building a 345 kPa seal. For instance, in this particular case, it may well have taken a considerable period of time, and would not necessarily have been completed by the time the explosion occurred, and there have been instances of people who have been killed, and this is particularly in England, building the explosion-proof seals - killed in the construction of those seals.

I see. There has been mention made by one witness - I think it was Mr Schaus - of having metal doors in place that can be quickly swung down from the roof to provide almost an instant seal?-- The only ones that I'm aware of of that type of design so far have been installed in the 20 psi strength.

What's that in kilopascals?-- Multiply by 7, if you like.

140 kilopascals, if you like?-- Roughly.

The next section of the report deals with 512 panel, and in that connection you make reference to the fact that, "Carbon monoxide levels in the panel" - this is as a matter of history - "tended upwards throughout the extraction phase...and exceeded 10 lpm by the end of June and did not again decrease below this level." Now, can I ask you this: in terms of the involvement of the Inspectorate, do you think that the level of CO make in this extraction panel is a matter which the Inspectorate should have been concerning itself with during routine inspections?-- Probably, yes.

And as far as you're aware, was there some accepted wisdom within the Inspectorate as to what were the appropriate - what I'll call alert and alarm levels in terms of CO make?-- No, I'm not aware that there was any set level of alarm for 10 litres or 20 lpm.

What was your own view? Prior to hearing all the evidence here, what was your own view, first of all, as to the value of CO make?-- I was involved with a meeting that's been covered - it was a Minerisk meeting back in 1992. I first heard of CO make back in about '87 as part of Mines Rescue, and at that stage I do recall that the - it was put forward as a theory that we needed to sort of try and validate whether it was a reliable indicator or not, but it was more accurately in tune with the quantity of air, and so it was more appropriate than the traditional parts per million. I must confess that the issue of 10 ppm was - I knew about the 10 ppm - of a heating.

10 ppm?-- Sorry, 10 lpm and the 20 lpm figures from the Mines Rescue periods.

Well, where did you learn of that? Through something that was said at a seminar, or through literature?-- No, I got the Mackenzie-Wood book as part of my Mines Rescue work, and it was raised there.

This is in 1987?-- Mmm.

Or later?-- No, '87 I was given that.

Okay. Well, did it become part of your fund of knowledge at that time?-- Yeah, I was aware of the 10 lpm and 20 lpm.

Was this then a matter that you took forward within the Inspectorate after you commenced in Queensland?-- No, it wasn't.

You say that you were part of the Minerisk review?-- True.

If I can call it that - in 1992?-- True.

Obviously at that time you were still aware of the 10 and 20 lpm?-- True.

The parameters that have been discussed. To what extent have you, prior to that time - to what extent had you discussed that with other inspectors, or at least communicated that to other inspectors?-- I don't remember - I don't believe I've actually formally communicated it to any of the other inspectors previously.

After the Minerisk review, was there anything done to make the Inspectorate aware of the importance of calculating CO make as opposed to having regard to CO in parts per million?-- Well, there wasn't, and the Minerisk review was something which was conducted over a couple of days, but it actually never, ever got completed so it was actually an incomplete review of the whole process.

We have heard that it was promulgated through the magazines?-- Yeah, some sections of it.

Was there-----?-- That review is really a - you might say a buzz session where people could sit down and sort of throw together ideas, they went up on the white board and the results you have seen published is really the typed-up version of the white board results.

Were there steps taken by the Inspectorate - I'm putting SIMTARS to one side - but were there steps taken by the Inspectorate to introduce this concept into the industry - that's at the mines themselves - this concept of using the CO make as opposed to parts per million?-- Well, other than the SIMTARS '89 seminar, I'm not aware of - I'm not aware of any direction from the Inspectorate that CO make should be the way in which it is read - or monitored.

Did you understand yourself that there was good sense in calculating the CO make because parts per million can be misleading with varying air quantities?-- That's true.

I mean, you did appreciate that yourself?-- Very much.

Did you think it was important to get that message out and about in the industry, particularly in areas where spontaneous combustion was a potential problem?-- I tend to remember that I actually spoke to Phil Reed at Moura about this matter in one of my earlier visits, because I was quite surprised when I came to Queensland as to the quantities of air that people were using in their mines. It was far in excess of what the underground mines in New South Wales did, and, because of that, the - I was aware that the small changes in parts per million made a big difference in CO make, and, if I recall - and I believe I'm pretty accurate in this - that my comments were - and this is, again, according to my visits - particularly to the Moura mine - because Moura had a history of blowing up in the '86 disaster - was that indicators needed to be looked at very carefully at the mine. Because of the high volumes of air that were being used in the - I did do - had done the calculation of - at Moura for the No 4 Mine, realising that a 1 ppm change reflected in about 3 and a half lpm increase in CO make, and 1 ppm was a very difficult amount to actually monitor, both with a Drager tube - it is very difficult to accurately determine, and it meant that the gas chromatograph - not the gas - the gas monitoring system had to be kept in very good calibration to make those figures meaningful, and I do recall discussing that at that early stage.

With Phil Reed?-- Yes.

So, what you are saying is you understood clearly the importance of using CO make as opposed to CO in parts per million?-- Yes.

Well, you discussed it with Phil Reed. Did you discuss with him anything about the need to ensure that this system was used at the mine - was, in effect, established, as the system

for measurement of CO?-- I remember we discussed it. I don't remember whether or not - you know, as it subsequently turned out Phil Reed used it anyway, but I don't - haven't got a memory in my mind that there was any objection to it at all.

You didn't see a need to establish some ongoing checks as part of the surveillance of monitoring systems - surveillance by the Inspectorate of monitoring systems - any ongoing checks to ensure that the people were using the CO make?-- No.

Or understood the CO make?-- No, I hadn't.

Okay. Can I take you over to another section of your report, the area dealing with post first explosion, which commences on page 9, section 4. There was an incident team of some kind set up; is that right?-- True. Hang on, where is this at? Are you talking about the mine?

Yes?-- Yes.

Who were the members of that incident team, do you remember?-- On the night, yeah, there was the mine manager Mr Schaus, Mr Mason was there, Inspector Walker, Mr Allison - actually, what happened-----

Just before you go on, does that exhaust your memory as to the members of the incident team?-- Well, I suggest they are the key members, but I'm about to adjust one other part - there were many other - for instance, Inspector Bell was there, and Inspector McMaster, and later Inspector Bancroft was there, and there was also additional district check inspectors, and what the arrangements were was that we cycled people so that - rostered people on so there would be someone in attendance around the clock.

You arrived at the mine some time in the early hours of the Monday; is that right?-- No, I arrived there about 11 or 12 - about midday, or early afternoon. I can't remember now.

Did you become part of the incident team yourself?-- No.

You didn't?-- Purposely not.

Were you there, in effect, as chief inspector to take some control of operations?-- My role in going up there was to oversee what both my inspectors were doing, and things that were going on around that mine, and, as you will probably get to hear later, I have had a fair bit of experience in fires, explosions, sealing of mines, and so I had some ideas on - knowledge of what to look for - problem areas. So, what I - I addressed myself to doing was to remain objective without being involved in the minute per minute decisions that were probably there.

Nevertheless, you, as Chief Inspector, were in a position to make decisions?-- Yes.

And decisions that needed to be made in respect of management of-----?-- If I needed to, yes.

4.4 refers to gas drainage, and in that connection I simply want to ask you this: has there been consideration given to the - as far as you know - to the use and, in fact, required use of safety valves in methane drainage ranges?-- No, because I had not known about those until I discussed the matter with our two gentlemen from MSHA since they have been here.

So, that was something that wasn't on the agenda earlier, but is it something that might be on the agenda for the future?-- Certainly will be on agenda.

That is, required use. That could be something, the subject of some regulation; is that right?-- Again we are managing the risk, and there may be other ways of doing it, but I am not aware of what they are.

4.5.1, over at the top of page 11, you are dealing with the gas monitor. You say in the second full paragraph on that page 11 that, "Apart from the relocation problem the tube bundle system continued to function normally and in doing so provided what may prove to be the best monitored mine explosion to date in the history of coal mining." Now, you do refer earlier to the damage that the monitoring system may well have sustained?-- Yes.

And we have heard evidence about the fact that tubes may well have been shortened and the atmosphere as being sampled post-explosion may well have been in quite different areas to the location of the original monitor points; is that right?-- Yes.

Did you see that as cutting across the effectiveness of that post-explosion monitoring?-- It did.

Does it cut across your opinion about whether this may prove to be the best monitored mine explosion to date?-- I use the term "to date". The only way of doing it better would be to have had an explosion-proof sampling system - sampling lines and pipes or holes, or whatever system it would be, but I certainly checked with MSHA about what data they have had, and they hadn't had anything as well documented as what this is.

Okay. Can I take you over, then, to the section 4.8, the sealing of the mine. You mention there two options that were considered for sealing the mine fan shaft?-- Yes.

One was to fill the shaft with spoil up to the base of the C seam?-- Correct.

The other was to place a concrete or steel lid on the shaft collar which could later be removed?-- Yes.

And thereby allowing an easier re-entry into the mine?-- Correct.

That second option would have allowed an easier re-entry. The second option, filling it up with spoil to the base of C seam,

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may not have allowed an easy re-entry, but at least there would have been some limitation on the amount of spoil in the fan shaft; is that right?-- That's true.

So that it may still have left open the prospect of redeeming the shaft; is that so?-- The shaft could be redeemed now by digging it out again.

Now, you go on to say, "The company decided to adopt the first option and continued to fill the shaft to the surface." Can I ask you this first of all: when you say, "The company decided to adopt the first option...", was that a decision that really might have been a decision for the Chief Inspector or somebody in authority rather than for the company?-- No.

You didn't see yourself as having the authority to say, "This is the way it's to be done."?-- If I had the authority you might well have - option two is the one that I preferred, but that was not what was done.

Now, you say that the company in fact continued to fill the shaft to the surface. Did you voice any objection to that?-- I didn't know about it until it was there.

I see. It was all filled before you even became aware of it?-- True.

Can I go over to the next page? Emergency response systems you've dealt with there. You note two factors in respect of activities - this is post explosion. You say first of all, "No gas samples were put through a chromatograph until SIMTARS staff arrived on site."?-- Yes.

Do you know why that was?-- No, I don't. The samples were at the - the gas chromatograph had been started and was heated up ready to go. The samples were in the bags on the floor.

The second observation you make is that, "The need for senior management staff who were empowered to make key decisions to be available on site twenty four hours per day." was a need that you perceived?-- Mmm.

What prompted you to make that observation?-- It came to a position where the manager, Albert Schaus, and the general manager, Rob Regan - it got to the point where they were just fatigued and left Joe Barraclough at the mine whilst they went home to have a rest, but the decision was given to him - the instruction was given to him not to make any decisions and not to go underground, not to do anything without them coming back to the mine and being involved, and that to me seemed that there was something that could have been done better in that. If you are running an emergency exercise then you need to have 24-hour coverage with people who can make decisions there and then without any restrictions and be responsible for them too.

So you say there was nobody at the mine who had been given authority to make decisions there on the spot?-- That's true.

Where did you see the limits of your authority as Chief Inspector in these circumstances?-- Where did I see the limits of that authority?

And what authority did you think you had yourself?-- I had

the authority that if I saw something which was unsafe or not being done competently, to either stop it or get it fixed and then that would involve whether I took it to Rob Regan or someone above him.

What about in terms of taking positive steps to do something that might be a pro-active step towards saving lives as opposed to reactive -----?-- You would have to describe the condition for the issue of saving lives. That's - I'm sure that if there was an option of saving lives there would be absolutely no holding back on whether Mr Schaus was at home or not. It would occur even with Mr Barraclough being there.

A decision for the Chief Inspector?-- I would certainly be there.

Can I take you over briefly to 5.6? There has been a submission that's been placed before this Inquiry in respect of the use of the CSIRO NUMBAT. You say in your report that due to a number of reasons the NUMBAT was ultimately not used?-- That's true.

Are you able to state briefly what those reasons were?-- I think the report covers a lot of those things. The equipment is not intrinsically safe to start with, but when we got it up it had a problem with the computer system, its control drive system, its cable handling system, its television system, and it operates by television control systems, you see. So, no, it took a while for them to go and find out these various gremlins, as they call them, and finally get it going. It didn't have gas monitoring equipment on it and they got some equipment from the Mines Rescue van and fitted it on to the - on to the top of this machine.

But in spite of gremlins being identified and steps being taken to overcome them, it wasn't ultimately a piece of equipment that you considered to be usable; is that what you are saying?-- It was about to be used - in fact we had taken the barriers down when the second explosion occurred.

Can I take you over to your section 7, "Matters for Consideration"? I don't wish to take you to each of those, it may be that your own counsel will, but you set out there quite a number of matters?-- Yes.

I do want to ask you about the 7.1.7, the mine escapeway. You say there that mines should establish emergency escape systems from any part of a mine where a person may be employed or travelling?-- Yes.

What are you referring to there when you say "emergency escape systems"?-- One of the things that I will say is that in these matters for consideration they really need to be looked at as a number of points rather than each individual point. You mentioned a moment ago about the transport systems being available for persons to come out of the mine. There maybe occasions where it could be appropriate, for instance, for the use of - Refuge Chambers might be an appropriate alternative.

I think you've answered my question sufficiently. When you say there "emergency escape systems", you are talking about a global approach working out ways using all of these other ways you have mentioned?-- Exactly.

Ways in which there can be an escape in an emergency situation underground?-- Yes.

The second last point you refer to is provision of an explosion proof two-way communication system?-- Yes.

We know that that night, it seems at about the time of the explosion, in fact there was a telephone call between 5 South and the surface which was terminated. Now, is there some alternative system that works from underground, a radio system that could survive an explosion of this kind?-- I guess there are two parts to this answer. The first part is, to my knowledge there is no explosion proof system that's two-way. There is a system, for instance, and it's called the PED system, and it is where you can communicate with people from the surface, and through very high powered radio transmissions, send it through the rock and people down working in the mine below will get the message in a digital form on a battery case, and your light flashes and you have to acknowledge that you have a message coming through. So that's one. It is ultimately possible, providing there was sufficient power, to transmit the thing back vertically, but it would have to be in equipment which was not currently available. Technically it's potentially there. Commercially it's not available. The second one is a system that I'm aware of, again since the MSHA people have been across, is that they have a provision over there that they use a seismic charge, and if people were underground and barricaded into a particular position, then after the seismic charge is let off people down below are able to, with a seven pound hammer which is commonly - or some other instrument, hit the roof 10 times and the equipment that they have will actually detect this response and then they know they have survivors.

That's a very basic form of communication, but nevertheless communication -----?-- But it's an emergency procedure.

I see. I've just been handed a document which seems to relate to the PED system that you are talking about. Would you have a look at this? Do you know when that became available?-- This has been available for a couple of years. In fact Cook Colliery had this at least three years ago.

I see, but that brochure there does relate to the system you are talking about?-- That's correct.

I tender that, Your Worship.

WARDEN: Exhibit 269.

ADMITTED AND MARKED "EXHIBIT 269"

MR CLAIR: Now, in the following paragraph you refer to provision to inert underground workings. Do you see that?-- Yes.

There was a recommendation that came out of the Inquiry into the 1986 disaster at Moura No 4 relating to inertisation; is that right?-- True, Recommendation No 8.

And in broad terms that recommendation was?-- Yes, it required the Chief Inspector to assemble a committee to investigate the use - possible use of inertisation systems for underground coal mines in Queensland.

Now, since you were appointed you've taken some steps towards the implementation of that recommendation?-- Yes, it had started prior to my coming into office with the retirement of my predecessor.

Before you go on, I gather from some material that has been provided by your counsel that he may be intending to take you through that in some detail; is that right?-- He may be. I think so. I hope so.

Well, perhaps I will suggest to you that you don't go in detail through it now, but can I just ask you this: ultimately was there some recommendation made to the industry about inertisation?-- There was a report submitted to the industry as such saying that there was a system which was appropriate for the use in Queensland.

There was no such system actually put in place at Moura No 2 before August last year, I take it?-- No.

As far as you know was there any such system put in place at any other mine?-- I know there is no such system in place.

So, in effect whilst there was work done on the recommendation from Moura No 4 from the point of view of the Inspectorate, ultimately it seems there was no positive result achieved?-- That's true.

Can I take you over the page? In fact the remainder of those matters I will leave to be dealt with if they need to be, but I do want to ask you about some other matters. There is new legislation that's been the subject of debate and discussion involving both a new Act and new rules and regulations; is that right?-- True.

I don't want to go into any detail about those, but I want to ask you first of all whether you've had substantial involvement in that process?-- I'm the chairman of that legislation review committee.

Secondly I want to ask you whether you are able to talk about the proposed legislation as it stands at the moment by way of the general thrust that it has having regard to the role of the Inspectorate and generally the role of the authorities.

Does the regulation tend - I should say does the legislation tend towards more self regulation? That is, away from a position where the Inspectorate, for instance, has involvement in decisions in respect of mining and powers to ensure that things are being done properly. Can you put it in short form?-- That's quite a long question you actually gave me there.

It may not need a long answer. Does it have a thrust in that direction or not?-- It needs a long answer.

Perhaps we will start with a one word answer. Does it have a thrust in that direction towards self regulation or doesn't it?-- It does move in the direction of self regulation, yes.

No doubt the process was well under way before 7 August of last year?-- Yes.

You've learned a great deal yourself, no doubt, as a result of your involvement in the investigation of the Moura No 2 explosion?-- Yes.

And as a result of your being here in Court while there has been a good deal of evidence given about practices at the mine and about likely causes of the explosion on 7 August; is that right?-- Yes.

Tell me, in terms of your own position do you think that a move towards self regulation is a good move in light of all that you've learned at this stage? I think you spoke about hot seat changes. You are not changing, but you may be in the hot seat?-- I'm in the hot seat all right.

I mean you are chairman of the review committee, you've told us, but anybody is in a position where he is entitled to change his mind in light of new experiences?-- Let me put it this way: I believe that a number of the criterion that have been used to justify the position of gaining new legislation will need be revisited. I do believe that a change to our existing legislation is rightly necessary and - even before Moura. I don't necessarily believe that it has to be more prescriptive type legislation.

Perhaps more regulatory in terms of ensuring that inspectors have more involvement in decisions made at operating level at the mines?-- No, I don't - I haven't come to that position in my belief yet, no.

Let me ask you this: do you think it might have made a difference - might, I emphasise might - might have made a difference to the events on 7 August last year if members of the Inspectorate had been involved in discussions about what was an appropriate level of CO make for 512 Panel during the week prior to the explosion or even during the weeks prior to the explosion?-- It's possible, but as we have heard through this hearing, through this Inquiry, there is no one specific - you can't sort of - I'm not satisfied that we can simply say that 10 lpm must necessarily work in all circumstances.

I appreciate that, I appreciate that, but my question was do you think it might have made a difference if members of the Inspectorate had been involved in discussions about appropriate levels of CO make?-- It may have. There may be better solutions than what you are suggesting.

Just taking one section at a time, do you think it might have made a difference if members of the Inspectorate regularly checked on the alarm log data out of the Unor system to see whether there were alarms on, for instance, the CO levels in the 512 top return during the week prior to the explosion?-- I would see that it would be a reasonable position to make checking of alarm log levels a regular part of an Inspector's review of the mine - inspection.

Sorry. This comes back to this question of regulation, doesn't it, and involvement of Inspectors because if a mine management is aware that the next time the Inspector comes he's going to have a look and see what's been happening on the alarm log, then you might find that, first of all, there is more care about determining the pre-set levels for alarms, that is, that they are done by people with authority and, secondly, that alarms are acknowledged promptly and some particular steps are taken to address what might be presenting as a problem, isn't that so?-- Yes, that's true. I don't argue with that. There are numbers of other equally important things have come out of this Inquiry we can improve upon too.

That's so, but I want to take this example to say, well, if in fact management is going to behave that little bit better knowing that the Inspector is going to come along and check on these things, then that may well mean that management does take more care across the board, isn't that so?-- I wouldn't argue with that.

Okay. Well, doesn't that support the notion that really what we need is more regulation, or at least that one of the lessons that comes out of the evidence here is what we need is more regulation rather than less regulation?-- I believe we can achieve it by - much of what you are talking about by having systems put in place, proper auditing procedures put in place.

Proper auditing procedures by the Inspectorate?-- Yes.

That may mean more frequent audits?-- Well, there are other ways of - it might, it might.

And it may also mean more thorough audits?-- It might mean that the systems that happened at mines makes the information more readily recoverable.

Okay. This leads me to another question. As at August last year, or even now for that matter, do you have the view that the Inspectorate had sufficient resources to sufficiently carry out the duties that were incumbent upon them even then or even now without any change this legislation?-- Yes, I do.

Again, I don't want to go in detail into this, I don't doubt that it will be done later, but -----?-- Could I just add to that, recognising that I am still down by at least one Inspector's position. I don't suggest that I've got sufficient resources right now that I believe we need. We are trying to fill that position, but when that position is filled, yes.

You may well have been in Court when there was documentation canvassed by Mr Harrison with Mr Walker?-- Yes.

And, as I say, I don't want to take you in detail to that, it may well be that you will be asked in some detail about it by someone else, but I want to ask you about this: in that documentation you seem to be adopting a stance that was resistant - resistant - to the notion that there were insufficient resources at least in Central Queensland for the Inspectors to carry out their job properly?-- I haven't seen any information or letter that says that the Inspectors weren't able to do their job.

The documentation certainly raised the prospect of matters of safety -----?-- May occur.

Yes, being not properly attended to because there were insufficient staff?-- That's the view of a person and there is more to that story that I guess will come out.

Is it a matter that - let me come back to my first question. You are quite happy now that you had sufficient resources for the Inspectors in Central Queensland to carry out their task properly in respect of the mines under their control?-- Yes.

In relation to the position that remained unfilled, was there an intention at some point that that shouldn't be filled?-- That it shouldn't be?

Yes?-- You now better tell me which position you are talking about.

This was the position that Inspector Walker occupied and then moved up to his current position and left the previous one unfilled?-- That position was advertised, Mr Walker's position. When he was made Senior Inspector of Mines, Mr Walker's position was advertised in the paper and it took again a while - I think probably three advertising campaigns to fill it. When that person came across, who came from Western Australia, he elected to live in Mackay rather than Rockhampton and so - and Mackay only ever had previously one mining inspector, so I filled the position with a person who I believed was competent and was able to do the job well. We relocated tasks of the second Inspector up to Mackay. There is only three mining inspectors in Central Queensland. There originally were two in Rockhampton and one in Mackay. When the other person came in - and his name was Mr Trevor Stay - he wanted to go and live with his wife up in Mackay for family reasons - his wife's mother was there - and so we relocated numbers of the tasks, and in fact as it was was that I wanted to relocate - reallocate numbers of the mines, including all

mines north of Emerald, and the Rockhampton Inspectorate collectively came and saw me and said, "Look, we want to have a modern mine in the mines that we deal with.", because if we take the Gordonstone mine away and the Gregory mine away, all they were going to be left with in underground mines would be Moura and Cook and Laleham Collieries, which were all old collieries, and from the professional point of view they asked they be left with Gordonstone so that they had some professional freshness to deal with, and so at that time - and there was - Mr Walker was in the meeting, Mr Biggam, the Senior Inspector of Mackay, was in the meeting - I said, "Okay, we will continue that but if ever you have a problem of meeting the workload, then the mines can be reallocated.", and that's how it was left, and in fact I think there is even some documentation to that effect, and let me just add one extra point just to clarify the matter, and I would like to see it put to bed, is that the only - the Mackay office ended up with looking after - with the new inspector going to Mackay it ended up with just Oakey Creek underground mine and Oakey Creek open-cut as additional mines in their area, and that was for an additional Inspector. Now, you don't need one mine Inspector to cover that workload. So, the workload or capacity was available in Mackay to cover the mines - additional mines.

Just come back to my question. Was there an intention not to fill that position that Mr Walker had left at some stage?-- Well, Mr Walker's position was filled but it was filled in the Mackay office.

I gather from what you say that there was still basically the Central Queensland workload under the Rockhampton office?-- Yes, but that wasn't by choice.

Okay. Now, again, it seems that Mr Walker at least raised with you concerns that really their staffing levels weren't enough to allow them to do their job properly. Was he the only one or were there others who raised their concerns with you?-- No, Mr Walker. It doesn't make any difference; there was no other request for electrical or mechanical inspectors.

Anyway, in your view, you say you didn't see that there was any shortage of manpower to do the job?-- At that particular time, yeah.

Well, is there now?-- The number of underground mines is now growing and so the workload is starting to change again and there are more underground mines proposed, and that may well make a difference in the future.

Assuming that the legislation that has been at least at this stage envisaged, that is, at this point of development - I know you say that the review committee has to go back and revisit it - but if the legislation were introduced as it's presently proposed?-- Yes.

What impact would that have on the number of Inspectors required to carry out the duties under that legislation? Would it mean fewer inspectors? If legislation, you say, has

a thrust towards deregulation, does that mean that there would be fewer Inspectors required?-- No, I was going to - it would mean that the role of the Inspectors would change.

Change from -----?-- Change from a - more into a systems management auditor.

Systems management auditor, but you would say -----?-- You know, obviously mines would be inspected the same - similarly.

Would there be any less presence of Inspectors at mines?-- I can't say that we have actually developed it to that point of being able to give you a "yes" or "no" answer to that. I would suggest that it's - we have trained all of the Inspectors in quality auditing systems and the aim of that is to change the way in which the mines are visited.

Is it any part of this trend towards deregulation that in time it may well make fewer demands on Government finances?-- That's not the - there's been no mandate given to me by anybody in that regard.

Has there been any discussion of that aspect?-- No.

In terms of producing the legislation?-- No. The only thing I would say is that, as with most Government departments, the money doesn't grow, it doesn't get larger every year; they have a policy that Mr Walker referred to of the productivity - 1 per cent productivity dividend. That really means that the - I guess the available funds for doing this sort of work is shrinking. The important part we need to sort of work out is not how to do less, it's how to do better.

Not how to do less more economically but how to do more better more economically?-- Yes.

Nevertheless, more economically in the end result?-- That has to be the end result.

No further questions, Your Worship.

WARDEN: It might be an appropriate time, gentlemen, to terminate proceedings today. Can we have a 9 o'clock start tomorrow at the earliest, thank you? Adjourn the Court. You are stood down, witness. You will be required tomorrow morning.

THE COURT ADJOURNED AT 5.45 P.M. TILL 9 A.M. THE FOLLOWING DAY

WARDEN'S COURT

MR F W WINDRIDGE, Warden and Coroner
MR R J PARKIN, General Manager, Capricorn Coal Pty Ltd
MR P J NEILSON, District Secretary, United Mine Workers' Union
MR C ELLICOTT, Training and Development Officer, Department of
Mineral Resources, New South Wales
PROF F F ROXBOROUGH, Professor of Mining Engineering, School
of Mines, University of New South Wales

IN THE MATTER OF A CORONIAL INQUIRY IN CONJUNCTION WITH
AN INQUIRY (PURSUANT TO SECTION 74 OF THE COAL MINING
ACT 1925) INTO THE NATURE AND CAUSE OF AN ACCIDENT AT
MOURA UNDERGROUND MINE NO 2 ON SUNDAY-MONDAY, 7-8 AUGUST
1994

GLADSTONE

..DATE 30/03/95

..DAY 53

THE COURT RESUMED AT 9.07 A.M.

BRIAN JOHN LYNE, CONTINUING:

WARDEN: Thank you, gentlemen. You are on your former oath, witness. Mr MacSporran, have you any idea of how long your examination will be?

MR MacSPORRAN: Your Worship, I would think about two hours or so, as a rough estimate.

WARDEN: It is just that Mr Harrison is not available Monday, so I did want him to go out of turn, if you like, today, to get it out of the way.

MR HARRISON: Just on that, I have spoken to Mr Martin and Mr Morrison and they don't mind if I go next.

WARDEN: All right.

MR HARRISON: After Mr MacSporran, that is.

WARDEN: After lunch is a short session - 3 o'clock finish today - so we will have to keep an eye on the time.

MR HARRISON: I think we will have enough time.

MR MacSPORRAN: Your Worship, just before I deal with Mr Lyne, there is just a housekeeping matter: during the week there was a question by Mr Neilson, of panel, of - I think it was Dr Van Dolah about the legislation in the United States concerning monitoring behind seals, and Dr Van Dolah said that the MSHA witnesses would be the more appropriate people to ask those things. Perhaps to save time, MSHA has, in fact, provided some information to my instructing solicitor, and the parties have no objection, I understand, to this material simply being tendered. It covers things other than simply the monitoring of gases behind seals, but it all seems to be relevant material, and I'll simply tender it for the use of the panel in whatever form they think desirable. Perhaps I should describe it briefly, so the record knows what it is - perhaps as one exhibit, Your Worship. I will read through it and tender it in a bundle. The first series is general information of the organisational structure of the MSHA organisation; next there's some extracts from the Federal Mine Safety and Health Act, 1977, United States; then there is following that extracts from the Code of Federal Regulations, the same area; extracts from the Belt Air Advisory Committee Report - there are two bundles relating to that work; a report from the Ventilation Division of MSHA on Atmospheric Monitoring Systems in Underground Coal Mines, then there is an example of a petition that was referred to in the evidence which is what an operator company provides for government in the United States for approval, and there is one such petition in the material, and a further example of such a petition

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showing the format and the requirements of it, and then finally there is an extract from the ventilation plan using bleederless ventilation; so perhaps I could tender that material as one exhibit, Your Worship, for convenience?

WARDEN: Exhibit 270.

ADMITTED AND MARKED "EXHIBIT 270"

MR MacSPORRAN: Mr Lyne, have you with you a curriculum vitae?-- Yes, I do.

Could the witness see this, please, Your Worship? That outlines your qualifications and relevant experience; is that so?-- That's true.

If we just go through that quickly; your formal qualifications are Bachelor of Engineering in Mining?-- That's correct.

From the University of New South Wales?-- Correct.

First and Second Class Certificates of Competency from New South Wales?-- Correct.

First Class Certificate of Competency, Queensland?-- Correct.

And certificates in Mines Rescue relating to an involvement with that body over 26 years?-- That is correct.

Now, your experience, going back to 1970 and '71, were you the Deputy Mine Manager at Liddell Colliery, Singleton, New South Wales?-- That's pronounced Liddell.

Liddell, I'm sorry?-- That's correct.

You have outlined on your curriculum vitae the nature of the seam at Liddell?-- That is correct.

1971 to 1975 you were the Deputy Mine Manager, Aberdare North, Cessnock, New South Wales?-- That is true.

You have outlined again on your curriculum vitae some details about that seam and your experience at that particular colliery?-- That's correct.

1975 to 1980, you were manager at Stockrington No 2 Colliery at Newcastle?-- That's correct.

And from 1985 - '80 to '85, you were the Manager at West Wallsend No 2, again at Newcastle?-- That is true.

And you give details of the nature of seams in both of those collieries and relevant experience you have had there?-- That is true.

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In 1985 to 1989, you were the Deputy Chief Mining Engineer and Inspector of Coal Mines, Hunter Valley, New South Wales?-- That is true.

In that role did you visit most underground coal mines in New South Wales?-- Yes, I did.

What was your actual role as Deputy Chief Mining Engineer? What did that involve?-- It was looking at, oftentimes, mining systems and the mining engineering aspects that are required for mining under water bodies, resource recovery, matters of that nature.

Well, then, from 1989 to the present time, you have been the Chief Inspector of Coal Mines here in Queensland?-- That is true.

When in 1989 were you appointed?-- November.

I should perhaps highlight one other feature of your curriculum vitae. During your time in New South Wales, were you involved as an examiner in respect of First and Second Class Certificates of Competency?-- That's right, I was.

And you have a role here in Queensland since taking up your position as Chief Inspector in the role of Chief Examiner in Certificates of Competency?-- I am Chief Examiner with the Board of Examiners here in Queensland, yes.

I tender that curriculum vitae.

WARDEN: Exhibit 271.

ADMITTED AND MARKED "EXHIBIT 271"

MR MacSPORRAN: Mr Lyne, could I take you to the question of your contact and involvement with Moura No 2 generally? What was the schedule of your personal inspections of that mine? Can you tell us that, briefly?-- Yes, I have a - an objective to visit each of the underground coal mines in Queensland once per year - at least once per year.

And on those occasions, what would be the purpose of your visit?-- The purpose of my visit is to gain an understanding of the needs of the particular mines. I often get applications for exemption or approval or permission to conduct certain works in accordance with the legislation, and part of my assessment of that is understanding whether the mining companies or the mine staff are adequately resourced and competent, or sufficiently equipped for doing such work. It is also to gain a feel for the forthcoming needs of the mine, and also to look at the way in which the mine is being run, to put some fresh eyes on the operation, and finally, but certainly not least, is to observe the activities of my staff

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to see whether they both understand whether they have problems at the mine, or they might be overlooking, which is obvious to some fresh eyes.

Are you saying, then, that when you would visit, in particular, Moura No 2, you would do so with one or more of your inspectors?-- Invariably.

When you - in between inspections by yourself, how would you keep up to date with what was happening at the mine and what your Inspectorate was doing at the mine?-- Yes, the mines inspectors complete what is called a record book entry when they do an inspection, and a copy of that - of every record book entry is sent to me in Brisbane, and I read every record book entry of every inspector.

Now-----?-- And where I find matters of concern, I will raise them directly with the inspector.

All right. Could the witness see Exhibit 209, Your Worship? Mr Lyne, do you recognise that as being a summary of the record book entries over the years 1988 to 1994 in respect of Moura No 2 Mine?-- Yes.

Do you see on the first page of that there is a record book entry relating to December 1989, "inspection with CICM", which, I take it, means Chief Inspector of Coal Mines?-- That's true.

Was that an inspection you carried out that time?-- That is true. That was my very first introduction inspection in Queensland at that mine.

Can you turn the page? There is a reference in July 1990 to the same - apparently to the same thing?-- Yes.

Again, do you recall that being an occasion that you visited the mine?-- Yes, that's true.

Do you have any specific recollection of the things covered on that occasion, firstly?-- It is difficult to recall now. I believe that would be the time that I spoke to Mr Reed concerning the monitoring of gases underground and the problems of high ventilating currents and the parts per million accuracy being a potential problem.

And is that the occasion when the topic of CO make was raised, perhaps?-- That is my memory.

So, it might have been around about June 1990 - July?-- July.

1990?-- I do recall it being quite a period of time ago, and it was about that time, I feel.

You see references there on - for the period October 1990 to an overall safety performance review by the whole Inspectorate team?-- Yes.

And do you recall the details of that as set out in the record

book entry?-- I don't specifically remember the October record book entry as such. I do remember numerous campaigns by the Rockhampton Inspectorate in this regard, and this would be one of them.

And the response of the mine management as detailed in these record book entries; is that so? It was a process of raising matters and matters being dealt with?-- That's right.

Can I take you, then, to a period in June 1992? It is on page 4 of the exhibit, and there is no reference there to anything concerning the Chief Inspector of Coal Mines; is that so?-- That is true.

These, of course, are summaries of record book entries themselves?-- That's correct.

Was there, however, some involvement by you with the No 2 Mine at that time?-- Yes, there was. On the Friday, the 12th of June, I was given some information concerning activities that were occurring - reportedly occurring underground at the Moura No 2 Mine where people were operating continuous miners and continuing to cut coal until the miner automatically cut-off on the high levels of methane at the head. The protective system was called the Bacharach system. When I heard about this I was quite concerned and went directly to Mr John Grubb, who I had dealt with numbers of times - he was the General Manager, Operations - and I pointed out my immediate concern and requested immediate action take place to redress that matter.

The manager at that stage was Mr Reed; is that so?-- That's so.

Action was taken to correct that problem?-- It was.

September - next page - September 1992 - there is a reference to - again, apparently yourself and the Central Division Inspectors going to No 2?-- That is true.

The reference there is to discussions at length concerning methane drainage?-- That is true.

Can you tell us briefly what that was about?-- I went through the methane drainage design of the mine and had long discussions again with mine management and I was concerned about the short-term planning that was in action at the mine at that time, and was able to see that within three months of my visit there, they would have mined - about three months of my visit - they would have mined all of the pre-drained coal and we would be in a circumstance - or that mine would be in a circumstance again of mining undrained coal, and I felt that was too short planning for a mine to be operating under. I drew it to their attention. I drew it to their attention that there was insufficient crews on the drilling rig system, they weren't continuously manned, and asked that the total methane drainage system be revisited; in particular, in the mining engineering design part of that.

And as far as you know it was?-- I know it was.

There is reference then in October 1992 to that system, the methane drainage system being checked, is that so, on the same page, October 1992?-- Yes, that was Mr Evans.

Perhaps down - August 1993, methane drainage system to be reviewed as discussed; is that so?-- Sorry, I missed that last comment.

August 1993?-- That was Mr Walker.

Yes, these are follow-ups to the initial discussion that you had with management?-- Yes.

On that same page -----?-- I might add just before you go further, it is recorded there that there were some new Trolex systems applied to the continuous miners which was a far more reliable system than the original Bacharach monitoring system on the continuous miners which was all part of the very appropriate and proper response that Mr Grubb, I believe, had a lot to do with.

We know from the evidence, and it's reflected in these notes, that Mr Schaus became the manager late in 1992; is that so?-- Yes, that's true.

Did you have any official visit to the mine soon after he became manager or did you - or when did you meet him?-- It was a while before I actually met Albert Schaus, and I think my first visit was in '93, in November '93.

The summary of record book entries goes so far as October 1993; is that so?-- That's true.

Perhaps you can hand that exhibit back and then tell us what involvement you had with Moura No 2 since October 1993?-- I went and did an inspection at Moura on 17 November 1993, went underground.

And do you recall what the nature of that inspection or visit was?-- I don't remember that it had any special matter except for updating my understanding of the mine.

The next such occasion you were at the mine?-- Yes, on 20 March I was at the Moura No 2 underground mine. I did not go underground. It was to do with Mines Rescue activities and the fact that at that stage the State manager of Mines Rescue was being - attended on an acting basis by Mr Kerr who was the superintendent of the Moura Rescue Station, and I went there to talk with management and staff and employees about the Mines Rescue system that was in operation there and making sure that their activities were in place which would adequately cover that mine for Mines Rescue response due to the absence of Mr Kerr on numerous occasions with his extra duties that he was given.

Did you hold some position with respect to Mines Rescue, did you, in Queensland?-- I'm on the management committee of the

Mines Rescue. Mines Rescue has had a few problems in its past, and I was given the task on behalf of the Department of making sure that it complied with the finance administration and a number of other matters, and I was very much involved with Mr Kerr on matters relating to Mines Rescue management.

That was the basis for your 20 March 1994 visit?-- That is true. I did not go underground on that occasion.

When was the next occasion you were at the mine?-- At the explosion.

What about April 1994? Did you have some further involvement with the management of the mine, Mr Grubb?-- In February '94 I had some involvement with Mr Grubb.

What was that concerning?-- That was in Brisbane. I had numerous - we had had numerous problems with the safety of more particularly the open-cut mine at Moura, and if I left it as deep and meaningful discussions with Mr Grubb over its progress I think it would be an appropriate statement.

What position did Mr Grubb hold at that stage?-- He was the operations general manager.

Did you have some further discussions with Mr Grubb's successor in July 1994?-- Yes, I did. Mr Grubb finished about the end of June and we were in the process, as an Inspectorate, of introducing auditing into our activities, and we had decided to go to Gregory Mine, which is a Quality Assured mine, to conduct our first auditing trial, and Tim Headly had been made the general manager of all the southern mines which included Moura, and so as part of that meeting the issue of Moura was discussed with him there.

When you say the Inspectorate had been moving towards auditing these mines, was that a change in direction or what was involved there?-- Yes -----

As at July 1994 we are talking about?-- That is correct. We have been moving down the path of getting our inspectors to change the way in which they operate and there has been quite a bit of work done in this regard. In fact, as I think I mentioned yesterday, all of our inspectors have been trained in auditing under quality assurance systems and not that we are looking to audit on a Quality Assured basis, we are ensuring we have got competence in conducting proper audits and we were going to - we have had a preparation of doing an audit at the Gregory Mine which was to have been, if my memory serves me correctly, 9 August. It was planned to be then.

Perhaps I can come back and deal with some of those features when we talk about the current status of the Legislation Review Committee, but as you say, the direction as at July 1994 was towards having the Inspectorate carry out audits of the mines?-- That's one of the directions, yes.

Can I take you then to some questions you were asked yesterday by Mr Clair about your knowledge of CO make? I think you told

us that you had some knowledge starting in about 1987 of the 10 to 20 lpm parameters?-- That is true.

At that stage you were working in a mine in New South Wales?-- No, I was not. I was the Deputy Chief Mining Engineer at that time.

You brought that knowledge with you to Queensland in 1989 as part of your knowledge?-- Yes, I didn't necessarily bring to Queensland - the information was already in Queensland.

You've agreed, I think, that you didn't take any formal steps to instruct your Inspectorate to disseminate such information?-- That is true.

Were you aware of a seminar that had been conducted by SIMTARS just prior to your appointment in Queensland?-- Yes, I was.

Did you know the content of such a seminar?-- I had read numerous papers out of that seminar. I won't say I read all of them, but I was aware of a considerable number of them.

And the material which we are told was three binders of material, did you have a copy of that?-- There was a copy available to me in the Brisbane office.

And had you read the sections dealing with CO make and related matters?-- Yes, I had.

Can you tell us roughly when you had?-- Very early in the piece, I would say around November, I would have - November 1989 I would have remembered reading that. At that time I was doing a lot of pre-reading of what had gone on in Queensland, including the Moura 4 report, the Kianga report and whatever information I could get from the Box Flat exercise to see what type of industry I had actually become involved with.

Now, you were also asked some questions about your knowledge of and involvement with the gas monitoring system at, in particular, Moura No 2. Do you recall those questions yesterday? Perhaps I can put it this way: did you talk yesterday about the auditing in 1990 and 1992 of Moura No 2's gas analysis system?-- Yes.

Would you look at these documents, please?-- Can I just add for the record in relation to the '89 training course conducted by SIMTARS, that I was also aware that both the senior inspectors of Rockhampton and Mackay, the current senior inspector, Mr Walker, had been in attendance at that conference as well.

Were you aware of that at the time? Were you aware of that or did you become aware of that shortly after taking up your position in November 1989?-- I don't remember the exact details of when I became aware of that.

The documents I've had delivered to you, are they the documents referring to the audits in 1990 and 1992?-- That is true.

Your Worship, I'm told 1990 is part of Exhibit 155. I tender the 1992 document separately.

WARDEN: Exhibit 272.

ADMITTED AND MARKED "EXHIBIT 272"

MR MACSPORRAN: Mr Lyne, could I take you then to the 1990 audit briefly? Do you have that in front of you?-- I do.

Is that the report that would have been given to you initially of the audit carried out by Mr Bell from SIMTARS at that time?-- That is true.

Does it cover most aspects relating to the gas monitoring system and related features at Moura No 2?-- That is true.

If you look at the first page of that exhibit do you see it deals with the alarm system on the bottom of that first page?-- Yes.

And there is a section which deals with the acceptance of alarms carried out by entering, it says, "...the respondents camp lamp number."-- Yes, it does.

"If the system is unattended an autodialer rings rostered mine officials."?-- Yes, it does.

This is a report given to you; do you yourself know the source of information leading to the compilation of the report?-- This report was done after an on-site inspection and test by Mr Bell.

As far as you knew Mr Bell visited Moura No 2 to compile this report?-- I know he did visit Moura No 2.

Over the page there is reference to the CAMGAS system; is that so?-- That is true.

And a reference to the fact that it hadn't been at that stage installed at the mine?-- Yes.

Reference on the same page to air velocity, CO make?-- Yes.

The reference there is, "Air velocity measured monthly by manual means."?-- Yes.

"CO make calculated on a monthly basis (weekly for extraction sections)."?-- That's true.

This was the information supplied to you in 1990?-- Yes.

Data trending and interpretation is covered there as well?-- Yes.

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"Trending carried out when needed particularly when inerting goafs."?-- Yes.

"CO levels are plotted during extraction."?-- Yes.

And reference to the Coward and Ellicott plots available automatically on the HP computer attached to the system?-- That's true.

It speaks of the calibration regime on the bottom of that page?-- Yes.

And attachments being a map of the monitoring points and a monitoring point print-out as an example of how the system worked?-- That's true.

The comments section on the last page of the text refers to, "The system installed at Moura functions well and is equipped with a powerful data analysis system based on the HP Personal Computer."?-- That's true.

"Adequate staff have been trained in the operation of the analyser, data interpretation system and the H2/CO chromatograph."?-- That is correct.

"This device should be calibrated regularly and calibration gases should be used within forty-eight hours of delivery due to leakage characteristics of the bags containing the gases."?-- That's true.

"Calibrations carried out with gas bags in excess of one week old are meaningless."?-- Yes.

Then it has three recommendations; is that so?-- Yes.

The first to "Maintain adequate levels of trained staff capable of operating the system."?-- Yes.

The second to, "Calibrate the H2/CO chromatograph regularly."?-- Yes.

And the third to, "Check calibration gases in excess of 12 months old."?-- Yes.

Now, this report was done by Stewart Bell and forwarded to you?-- Yes.

And was a copy of this report then sent back to the mine operator?-- That is true.

At Moura No 2?-- Yes.

Was there any follow-up action taken, to your knowledge, between the audit of August 1990 and that of April 1992 in respect of matters raised in the 1990 audit?-- I don't remember the details, but I do know that the CAMGAS system was actually installed at some stage.

Would you expect that some of the matters may have been addressed at least to some extent during the inspections carried out by your Inspectorate?-- I don't remember that any of these matters here required any further follow-up and I would not say that, no.

Perhaps it's my incorrect use of terminology. You would expect the matters covered in the audit would be things that might routinely be looked at in one form or another on some inspections carried out by the Central Division - just routine observations at the mine?-- As routine observations they may have been.

As opposed to an audit?-- Not specifically in relation to this audit, no.

Well, the next audit then, Exhibit 276, was April - 272, I beg your pardon?-- That's gone back to Mr Dahlke.

Can the witness have that back, please, Your Worship, 272? This was April 1992; is that so?-- Yes.

Again, the format is the same?-- Very similar.

On the first page it refers to "Monitoring System Personnel"?-- Yes.

Is that meant to be an indication of who is able to operate the system?-- Yes.

"Level of Training" on page 2?-- It specifically says there that every undermanager knows how to operate the machinery to me.

Again, do you know personally the source of the information that makes up the body of this report?-- I know that Mr Bell personally went to the mine - to investigate every mine in Queensland.

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Page 2, "Level of Training"?-- Yes.

"In-house training for new personnel"?-- Yes.

"No formal refresher training"?-- Yes.

"No Maihak training offered"?-- Yes.

It talks of the system's availability?-- That's right.

"Alarm Levels" and "Alarm Procedure" on the bottom of that page?-- Yes.

Again the "System Calibration Regime", the next page?-- Yes.

Towards the bottom of that page it refers to the CAMGAS system as then being operational?-- Yes.

And at the bottom of that page "Air/Velocity CO Make". "Air velocity is measured monthly using a velometer and CO make is calculated on a monthly basis."?-- Yes.

Now, at this stage we are talking April 1992, Mr Reed was still the Manager; is that so?-- That's correct.

At the time of the visit apparently Mr McCamley was the then Registered Manager?-- That is right.

The next page, "Data trending". "Trending can be carried out on any gas of interest. Ellicott/Coward plots are available.", and refers to attachments verifying those features?-- That's right.

"Personnel Trained for Above", presumably referring to data trending, etc?-- Yes.

It says, "Management available for interpretation but all other personnel trained on the system can produce trends."?-- Yes.

"Test data supplied by SIMTARS was run through the interpretative software. The correct results were obtained but the operators were not confident."?-- That's right.

So, the audit sought to establish the level of competency of the operators of this system at the site; is that so?-- That they could indeed operate the equipment and yield the correct result.

Then there is a series of comments starting on the bottom of that page, the system remains unchanged from the previous audit?-- Yes.

"...with the exception that a CAMGAS system has been installed."?-- Yes.

"The fixed system has good operational integrity and the supporting software provides adequate data trending and interpretative facilities."?-- That's right.

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Then follows on the next page a series of comments relating to the overall impression created by the audit?-- Yes.

And raises a number of issues?-- Yes.

"Personnel involved in the system were unsure of the equipment ranges. The ranges supplied were different from last time."?-- Yes.

"As a general rule calibration gases over 12 months old should be rechecked. This can easily be accomplished using the gas chromatograph."?-- Yes.

"No formal back-up procedure for the computer system was in place. The system should be backed up regularly and a written procedure should be available for this task."?-- Yes.

"The data interpretation software (Ellicott/Coward) needs to be used regularly to ensure operators are familiar with the system."?-- Yes.

"During this inspection the operators achieved the correct test result but took some time to do so."?-- That's correct.

"No formal fixed system refresher training was available."?-- Yes.

"Emergency trial alarms on the fixed system should be carried out on a regular basis."?-- That's right.

"Overall Rating: system hardware very good to excellent, system personnel good to very good."?-- Yes.

Well, that was the state of things as at April or so 1992; is that right?-- That's right.

The next audit scheduled would have been sometime in 1994?-- That's right.

Had it been in fact scheduled for auditing?-- No. It hadn't been forgotten about, but Mr Bell from SIMTARS had found other employment and SIMTARS were at that stage in the process of changing personnel into - in positions, and it hadn't been forgotten about.

As I say -----?-- It had been spoken about with Mr Bell actually before he left SIMTARS.

The procedure you had in place was to carry out an audit every two years?-- That's right.

Again with the 1992 audit report, after you received it was a copy of it sent to the mine operator at Moura No 2?-- What I had done after the '92 audit was to ask that the - each mine that had it done was to be sent their audit regularly from Mr Bell.

Perhaps you can put that to one side then. Can I take you

then to your report? Do you have that in front of you still?-- Yes, I do.

Could I ask you generally: what was the purpose or your perceived purpose in compiling this report?-- The report was made to assist in putting forward information to this Inquiry into the activities that had occurred on the Sunday, 7 August, and in particular to define that there had been two explosions and that a number of persons - 11 persons to be precise - had not returned to the surface either because of the first or second explosion.

Now, your report itself deals initially with the background - if I can call it that - information concerning the mine and the area; is that so?-- That is true.

It then details the systems in place for monitoring Quality Assurance at the mine before the explosion; is that so?-- Yes.

You then deal with the events that occurred prior to the first explosion?-- Yes.

Can I take you then to page 11 of your report which deals with the events immediately after the first explosion?-- Yes.

You say in section 4.5.2 in your report that boreholes were drilled in those four localities?-- Yes.

Tell us when that was?-- They were drilled after the first explosion and that was due to the fact that the information from the tube bundle system was quite suspect as to where the tube bundle system was actually monitoring the gases underground.

There has been some evidence at this Inquiry about the period between the first and second explosions and the fate of miners underground during those periods. You refer on this page of your report to the results of the gas analysis from the mine including results from those boreholes which were drilled after the first explosion?-- That's correct.

Can you tell us about the prospect of ever sending Mines Rescue personnel back into the mine between those two explosions?-- Yes, we looked at that quite carefully because it was very important that persons going back underground needed to go - to do an investigation and rescue and recovery work would need to go down into an atmosphere that was not likely to put their own lives at serious risk, and indeed the tube bundle information that we had was showing high levels of carbon monoxide and methane gas and were showing an explosive mixture of gases to be underground, so it become - over a wide - possibly a wide area - and it become very important that we tried to establish whether there was a fire underground or some ignition source and we felt that there was possibly some evidence of that.

I think on page 12, if you turn over to the next page of your report, you have a summary section immediately above the start

of section 4.6.2?-- Yes.

And there say that within a short period of time after the explosion much of the mine atmosphere became irrespirable with reported high levels of methane and low oxygen levels as well as high concentrations of carbon monoxide gas?-- That is true.

Now, did that effectively make it impossible to send down any Mines Rescue personnel between the two explosions?-- That plus the fact that there were other hydrocarbons also found in the gas chromatograph readings which were gained early on the Monday morning.

And those readings may or may not have indicated the presence of fire?-- That's true.

All of those conditions had to be assessed to make a decision whether there would be a rescue attempt or not between those two events?-- Very much so.

And data was fairly clearly indicating that there could be no such safe rescue attempt; is that so?-- It would be extremely hazardous.

You refer then in the next section on the same page, 12, to difficulties encountered in taking samples from these boreholes. Can you tell us something about that and perhaps your experience prior to this event of having the difficulty?-- Yes. I would have to go and refer to some notes, but I did have experience in taking samples from boreholes of a mine that was being sealed through a heating in New South Wales. It was Aberdare North Mine, but this was now back in the late 70's, and I had learnt that a problem of taking samples from boreholes was the contamination of other gases and, in particular, things not being sealed at the cap of each borehole, and so, having that experience, I did go out into the field in, as I mentioned earlier, my auditing role to just check and have a look and see what the quality of the installation was like for taking the borehole samples, and it was there that I found that there was air being drawn back down the boreholes. An attempt had been made to close them off but it was not very successful, and I then came back to the mine control group and initiated action to have that repaired.

The difficulty with air and perhaps other gases entering the borehole itself can make the results meaningless or near meaningless; is that so?-- It can totally change them. It can put oxygen into an area where there might not be oxygen, and in particular the fresh boreholes that were put down also went through methane rich coal seams which would have also contaminated those results, and so some of those results were quite suspect.

I think you make reference to what can possibly be done in the future to remedy that situation in the "Matters For Consideration" we will come to shortly?-- I do.

Can you turn to page 13, the next page of your report, and you deal with the events surrounding the second explosion. Were you actually at the mine at that stage?-- Yes, I was.

Whereabouts were you?-- I was actually in the car park when the second explosion occurred.

And at that stage there had been an incident team or control team set up, had there?-- Yes, that was in the office just nearby.

And the office nearby, can you describe that for us?-- It's the undermanager's office of the Moura No 2 Mine, and I was in the car park immediately in front of that office when the second explosion occurred.

You observed the smoke and debris?-- I purposely went to the edge of the cut and watched it happen.

Was the incident team relocated from the undermanager's office?-- That had to occur. After a couple of minutes the fumes and dust from the mine, which were being ejected with some considerable force and volume, were blown over the incident room and the office block and the bathroom by the prevailing wind and it was very dark and very heavily laden with black coal dust.

Was the team relocated to another area some kilometres away from the portals?-- Yes, that had to happen. In fact, the team - the people had to - up on the surface were in concentrations of carbon monoxide, if I remember rightly, around about 400 ppm and that required the putting on of the self-rescuers to relocate from the area.

These were personnel on the surface?-- Pardon?

Personnel on the surface had to don the self-rescuers?-- Yes, that is true.

Can I take you to the next section which deals with the sealing of the mine?-- Yes.

You have told Mr Clair something about this yesterday and you said that the fan shaft was filled without your knowledge?-- It was filled to the surface without my knowledge but the - I was aware that the intention was to fill it between the D and the C seam - up to the base of the C seam.

There had been some discussion, had there, before that as to how the mine would be sealed, what procedure would be used?-- There was quite a bit of discussion in that vein, yes.

During the course of those discussions was the aspect of mine re-entry canvassed at all?-- Yes, it was.

And as you understood it what was the company's attitude at that stage to that prospect?-- The attitude was that if it was necessary, that it could be achieved, and that would be by going back in through the highwall.

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And those discussions occurred before the sealing of the fan shaft at the surface, did they?-- Yes, they did.

Could I take you to page 14? You deal on that page with the response of the Inspectorate and SIMTARS to the incident; is that so?-- Yes.

And it's the case that both the Inspectorate and SIMTARS were on site very soon after the events?-- Yes.

They remained on site for some considerable time while the emergency procedures were put in place and the investigation commenced?-- That is true.

Could I take you to page 15, and at section 5.7 you mention the Mineshield from New South Wales Mines Rescue?-- Yes.

Had it been organised to have it on site, had it?-- Yes.

Was it en route when the second explosion actually occurred?-- I'm told it was.

What is Mineshield, just briefly, if you could tell us at this stage?-- It is a system where liquid nitrogen is transported to a mine site in cryogenic tankers, and they have an LP gas vaporiser unit, which is in a separate Pantehnicon type truck and the liquid nitrogen is heated and vaporised and the nitrogen vapour is then sent underground through pipes and boreholes to inert the underground workings.

And that was an option being considered quite seriously between the two explosions?-- That's true. It is the only nitrogen inerting equipment that's available.

Perhaps we can come back to this in your matters for consideration, but that's an issue that is dealt with there?-- That's true.

You then go on on page 15 to deal with the investigation process?-- Yes.

I take it you took control of that process, did you?-- That is right.

And you detail on that page and following pages how that was carried out?-- That is right.

There was assignment activities to various parts of the Inspectorate?-- That is right.

And you speak on page 16 of the Fault Tree Analysis study that was carried out?-- Yes.

Now, I take it at the stage that was carried out 512 section was a strong contender as the ignition source for this first explosion; is that right?-- Yes.

Why was the Fault Tree Analysis study done?-- Over my years of experience I have learnt that you don't necessarily take the obvious and easiest answer. You look in the broader context of what's gone on, and I thought it was important that we did not decide because of some very early and easily achieved information that was available - that we did not decide it was 512 and 512 only, and therefore we should look at the whole of the potential of the mine to support an ignition of gas, or whatever, for an explosion.

You mention on page 16 in that section having an independent facilitator, Dr W Danaher, from the National Safety Council to

assist in the process?-- Yes, I felt that whilst I was aware of Fault Tree Analysis processes, both from the credibility and also to ensure that the process itself was correctly done, I decided to contract an expert in that field to facilitate that process and let the people who I saw as being - having expertise in the information - to have their energies coordinated by a professional person.

Now, the actual Fault Tree Analysis document and its results are appended to your report. It is apparent there that the 512 panel is the most probable source of the ignition?-- That is true, yes.

The numbers that are referred to there, in terms of what the probabilities are, how were they determined?-- It is actually written in the report. It is a matter of being a form of discriminating between different levels of probability and they work, for instance, in factors of 10, and it is very difficult to precisely say, even though it does include it in the report, that something is a certain number of times more probable than another one.

It is designed to give ranking, is it-----?-- It is a ranking system.

Part of the ongoing investigation process, as you outline on page 16, included borehole video evidence?-- That is true.

And you detail on page 17 the site of some of those boreholes?-- Yes.

You say that, "Evidence gained confirmed theories that 512 seals had been blown out and that the seals around old pre-mined areas had been blown in."?-- That's as much as we could - think we could see.

From the video?-- From the video.

Have you had the opportunity recently to look at some further evidence involving three dimensional enhancing of those video pictures?-- No, I have not.

I suppose to be complete about it, the significance of whether the seals in 512 were blown in or out is to do with whether the ignition was inside or outside that panel?-- Is to do with the direction of forces, yes.

Before I deal with matters for consideration, could I take you back to this question of your involvement with the Legislation Review Committee?-- Yes.

You told us yesterday, I think, that you were the chairman of that committee?-- True.

Can you tell us something about the membership of that committee?-- Yes, we have representatives of the underground mine owners, the open-cut mine owners, the principal mining union, a representative of the Single Bargaining Unit and a representative of the engineering - the Inspectorate, and

myself. I have a secretary who is also with the Inspectorate.

For how long has that committee been in existence?-- At least three years.

And has it met for discussion regularly during that period?-- It has met regularly in the very loose term. There is no two monthly meeting, if that's what you are implying.

I am asking whether it is an ongoing process?-- It is an ongoing process.

And does the process involve distributing material for discussion?-- Among the matters discussed with the committee - and it is the committee's duty to reflect the responses and concerns or support of their clientele.

Now, that process of reviewing the legislation was ongoing at the time of the incident at No 2; is that so?-- That is true.

I want you to tell us, if you could, what emphasis the committee has placed upon various parts of the old legislation and in what direction the committee is going in respect of the proposed new legislation - are there significant departures from the old legislation proposed?-- Oh, yes, there are, yes.

Tell us, firstly, in relation to the concept of duty of care, what the committee's view was with respect to that topic and how it related to proposed new legislation?-- The duty of care was seen as being something which removed the singular accountability of a mine manager for everything that occurred on a site to include the responsibilities of the operating company, who were in charge ultimately of the mine, such that they had a responsibility to ensure that there were correct processes in place at the mine to safely operate.

So, the current legislation places the mine manager as the statutory official who is responsible at the end of the day for mine safety; is that so?-- That is correct.

The new proposal was to extend that to the mine operator and owner?-- That is true. That is one of the differences. There is also a requirement or extending of that responsibility as well down to the employee - that they would be responsible for their actions as well - where they are properly trained.

It makes all of those involved in the process accountable across the board?-- That is right.

Now, you mentioned that you are, in fact, currently the Chairman of the Board of Examiners?-- No, I didn't say that. I am the Chief Examiner. The Chairman of the Board of Examiners is another person.

I'm sorry, you are the Chief Examiner. Is there any proposal in the new legislation to modify that process?-- Yes, there has been. The focus has been to move away from having a statutory certificate, such as given by the Board of

Examiners, and to develop a process where a National Competency Standard or system is in place, and that persons would have competencies determined, which would not necessarily go through a Board of Examiners process.

Well, if it doesn't go through a Board of Examiners process, what process does it go through to determine competency under this new proposal?-- The actual National Competency System for that level of person has not been finalised yet. There is a process in place now to develop what the competencies will be and the training programs for those.

So, that, itself, is an ongoing discussion topic, is it?-- It is a discussion topic, all right. On the 17th of this month I was at a meeting at the Crinum Mine with the MISC - the Mining Industry Study Centre from Rockhampton - for the purpose of developing a National Competency System Training Program for senior mining positions, such as deputies or above, and it was interesting to be at that meeting where there were representatives or people representing the Queensland underground mine owners, and, in particular, at this stage there was a mixture of BHP and other mining companies - there was no commitment at all to adopt the National Competency System.

You mean no commitment to adopt that as opposed to the existing system?-- No.

No commitment to change?-- There was no commitment to accept the National Competency System. There was a clear commitment to change, but the National Competency System was not necessarily that direction.

All right. So, that's a matter that's up for discussion?-- It will be up for a long, serious discussion.

What about the question of safe operating procedures at a mine? Is there some proposal to deal with that in the new legislation?-- Yes, there is. That is to do with having ownership of many of the safety procedures that occur at a mine that will be developed between the employer and the employee and will not directly involve a prescriptive piece of legislation.

Do I understand you to say by that that that's a clear move to deregulation?-- Yeah, you could term it that.

What involvement, if any, under these proposals would the Inspectorate have in looking at issues of safety at the mine?-- The safe operating procedure would be the stated way in which the mine would manage a particular risk, and it would be documented, and it would be part of their training scheme, and what would happen would be that the inspector would review those particular proposals, and if he saw, for instance, in his own experience there were weaknesses or problems with it, he would bring it to the attention of that group and request alteration, and that is what he would be auditing that mine against in the future.

Does this take us back to the direction in which the Inspectorate was heading as about July 1994 to have inspectors audit mines as a means of ensuring a mine is operated safely?-- It will be related directly to that.

Having heard the evidence at the Inquiry, can you make any comment in respect of that direction?-- I guess there are numerous comments I could make in relation to that. I guess I would have some concerns about the viability of having training programs supposedly put in place which are auditable, but which, in fact, aren't carried out in practice, or aren't understood, or aren't trained. That's a concern.

So, you would have some concerns about the viability of that?-- I do.

As opposed to a system of prescriptive regulation having the force of law?-- I think people might have got - yourself might have got even a clear impression yesterday that - about this. I am not a person who actually slavishly believes in regulation. The unfortunate thing that I'm seeing is that if things aren't spelt out in chapter and verse, then they are not happening.

When you say you are seeing that, are you referring to experience-----?-- In this particular instance, I must say.

Is there any proposal in the new legislation as it currently stands - that's a discussion point - to do with the establishment of a Health and Safety Council?-- Yes, there is.

Tell us about that, if you would?-- The Health and Safety Council is effectively a body which is a tripartite body of the industrial groups, the mine owners and the government to come together and review the way in which the legislation, for instance, may be running, and matters of mutual concern in relation to the safety of the industry, and where such things as inquiry recommendations would be made, we would be a body that would assist in the formulation of the types of legislation; if it needed legislative change, or indeed activity change within the industry, to implement such recommendations.

Now, the proposal for that National Council, was that a matter that was raised for discussion prior to this Inquiry?-- It has been under discussion for several years, yes.

As some means by which recommendations by such an Inquiry could be further discussed and advice given to the Minister?-- How it could be practically implemented, yes.

So, it is proposed to put in, in between the Inquiry process and the implementation of recommendations, a further consultative discussion process?-- Yes, with due respect there have been one or two Inquiry results - I must say not with the present Warden, fortunately - but there have been one or two results that have come out that have been very, very difficult to actually understand and, indeed, implement.

Well, in any event, this National Council was a proposal floated, as it were, before this Inquiry was set up?-- That's true.

As one means by which recommendations can be effectively put into operation?-- That's true.

Does that Council have any - or proposed Council have any other function?-- They have one other function, and that was to set the standard for the competencies of persons who would be in supervisory positions at the mines.

Now, what about the question of having the Chief Inspector or his delegate approve machinery for use underground, things like that? Is there any proposed change from that area?-- Yes, the proposal is that the - that mining equipment which is used underground would need to comply with what are called community standards. Ostensibly, that would be Australian standards in flameproofness or diesel engine design, as examples.

And what control, if any, would the Inspectorate or legislation have over those aspects?-- The Inspectorate are involved in the setting of those standards and, indeed, they often chair many of the various Australian standards committees.

What about compliance with-----?-- Compliance with them is something that is part of the audit inspection program. That's the responsibility of the mine management even now.

And under this proposal it would still come within the Inspectorate's ambit, but by way of audit as opposed to anything else?-- Well, yes, and, indeed, inspection to ensure that the types of equipment, for instance, were being maintained in accordance with the Australian Standards.

Under the proposals for amending the legislation is the actual role of the Inspectorate specifically dealt with?-- The role of the Inspectorate?

In any way different from the current legislation?-- No, it's very similar.

So the legislation in that respect may stay the same, but the direction in which it -----?-- The powers of the Inspectorate will effectively stay the same.

As to how those powers are exercised, that would be a matter of policy?-- If the industry changes then the Inspectorate has to be able to accommodate for those changes.

Now, are there any other areas in the committee's discussions that you wish to bring to light at this stage about the proposed legislation?-- I mentioned before about the changing of the competency levels. One of the matters that has come forward is the changing of the statutory positions, and that is a matter of contention, I understand, still with numbers of persons, and there is a proposal - the management structure will be a - it's proposed to be a different structure to what we currently have, and certificates such as the undermanager's certificate, the mine electrician's certificate would be no longer required.

What is the thinking behind that, can you tell us?-- The thinking behind that is that persons would have - the mining companies would develop a management structure which would define the competencies required for the various tasks to run a mine, and people would be trained in those specific competencies and not necessarily a broader range of competencies. So there would be a requirement for having a mining manager for underground who would be in charge of the underground mining operations in like a super-undermanager, if I might use that term, and a mine deputy as being the other person who would be the face supervisor, but no specific intermediary positions as we currently have them, and indeed mine electricians would not be part of that function either.

Can I take you then back to your report and to the question of the matters you raise for consideration? If you go to page 17 of your report, could I ask you firstly when you refer in this report to matters for consideration, are you confining your report in that respect to this incident, Moura No 2?-- No, I'm not.

What do you hope to achieve by raising these matters for consideration?-- I mentioned earlier that I stood and watched the second explosion occur. In my experience in my life, I have experienced many things including major mine fires in underground workings, recovered a mine which has been subject to an explosion, but standing on the edge of the Moura No 2 open-cut and watching that event I could see that there were many lessons that I hadn't understood that would need to be learned and would still affect numbers of the mines still existing in Queensland. Then I felt it was necessary to capture those experiences and put them down on paper so that

the lessons weren't lost and needing to be learned again from another further disaster or some other problem in the future.

Now, you raise these matters not so much particularly relating to this incident and Moura No 2, but you raise these matters for consideration generally for the future of the industry in Queensland?-- That is true. Many of them do relate to Moura No 2, but they are certainly by no means specific to Moura No 2.

Could I take you then through them quickly? The first one you raise on page 17 is surface access roads to mine entrances?-- That is right.

Can you tell us what you have in mind there?-- Yeah, it is very difficult in some of these things to simply and very briefly cover my intentions in dot point form, and maybe what it might be best for me to do would be to use the whiteboard to explain the point that I am trying to make and it may make it a lot clearer, if that's acceptable.

All right - well, do you need to do this with this particular point, do you, the surface access roads to mine entrances?-- I think it would make it clearer very quickly.

All right. With His Worship's leave, if you need to use the whiteboard, go ahead?-- Basically if I use the Moura No 4, we had four entries coming into the mine -----

You said Moura No 4?-- No 2, sorry. The access road - you had two access roads, one down the side here - this is where the office is - and there was another access road down through here. Now, when you look at this whole process, if we had a mechanism to get in here and inert the mine, seal it off, it would become a problem of getting down into the mine without driving past one of these tunnels.

Can you just spell it out for us what the difficulty as you see it is in driving past one of those tunnels after the first explosion?-- Yes, you are going to be driving in an atmosphere which would either be potentially explosive, certainly toxic, and be subject to quite a considerable amount of force.

As those No 2 entrances were designed, that would be the only way you could access those portals; is that so?-- That's true, that's true.

What proposals are there to avoid that problem?-- Well, what I'm suggesting is - and there may be other ways of overcoming the problem, is that you need - we need to be able to access each of these tunnels without actually driving in front of them, and what I'm suggesting might be one of the solutions could be a concrete culvert or some other designed culvert coming out in front of the tunnels and an access road which would allow you to come along the edge of the highwall, but not in the direct line of any forces from the underground roadways. If you needed to come in and do some work at any one of these tunnels you would come in and get access in and

out without being in line with the direct forces.

As you say, that's not the only way, that is a way that has occurred to you. You put it up for discussion?-- I put it up for discussion. When you stand and watch the forces of the gases that come out I would not want to be down in a box cut in such a circumstance. Can I just add one thing? There are many mines - Moura has at least two entrances in. There are many mines that actually have only one roadway coming into it, into the underground tunnel entrance into a box cut that actually lines up almost directly in line with a transport road. Now, under no circumstances can you possibly let a person drive down effectively the gun barrel of a thing like that.

Could you perhaps just label that diagram you've done as "Surface Access" perhaps?-- We will call it 7.1.1.

I tender that diagram, if Your Worship pleases. Mr Lyne, the next matter raised is provision of airlock chambers?-- Yes.

Tell us what you propose about that?-- Yes, I can.

WARDEN: The last diagram is Exhibit 273.

ADMITTED AND MARKED "EXHIBIT 273"

WITNESS: If I might go back to this original diagram again, when it came time for sealing off at Moura number two we did discuss the possibility of having an airlock chamber put in place before the tunnels were sealed and covered in debris. It was virtually impossible to get access - it was impossible to get access down and put an airlock chamber in place without putting - subjecting people to be in front of a tunnel such as this, and so it was impossible to actually do that. So rather than try and do it in an emergency, the time to do it is by mine design. If you are going to seal off a mine it is needing to be done first up.

MR MACSPORRAN: Would it be easier to do it on another separate plan, Mr Lyne? It's a matter for you, whatever you think is more appropriate?-- I don't mind. Again at the tunnel entrance, and this is going in underground, and what I'm suggesting is that there will need to be an airlock and maybe some pre-made doors within this culvert, or it might even be underground here if it was more appropriate - in fact I would suggest it probably would be more appropriate back in there for reasons of air leakage from the mine site, but you can close those things off and you've got an airlock immediately, but you want to be able to come back in - if you want to come back into the mine, I would suggest that any re-entry into Moura 2, the most difficult part is going to be setting up the airlock, not the recovery of the mine.

When you say "back in there", just so we know what you are

talking about, you mean back in underground?-- Back in underground.

What sort of doors would you propose or could be proposed?-- They would be steel doors and they may well be explosion proof, if you wish, and there are designs that I've seen again to about 20 psi type, that's 140 kPa doors. I have seen doors of that nature overseas.

Is that the extent of that diagram?-- Yes.

Do you want to label that for us, if you would?-- 7.1.2.

I tender that diagram, if Your Worship pleases?-- Exhibit 274.

ADMITTED AND MARKED "EXHIBIT 274"

MR MACSPORRAN: Could I take you to the next section? You speak of the ventilating fan. You don't have to draw a diagram if you think you can explain this orally?-- I think I can now.

The ventilating fan, what's your proposal there?-- Well, if I looked at the - when I looked at the design of the elbow on the shaft at Moura it was typical of a number of designs that exist in mines in Australia, and that is that they only have relatively small pressure relief doors.

Just tell us so we understand completely the reason why you have pressure relief doors?-- That's to protect the fan in the event of even a major windblast from a goaf fall or a minor explosion and that's its purpose, and what happens is with an over pressure from underground is that these doors will simply fail to safety, that means they just blow off or blow open and let the air, the excess air, instead of going through and damaging the fan, to release the pressure which is in the fan shaft. Now, the doors that were in this particular mine - I didn't measure them directly, but they appeared to me when I saw them to be around about a metre square, maybe a little larger, but comparing that to - and there was two of them. Comparing that to the diameter of the shaft, it was far, far less than the diameter of the shaft, and so these doors were - would only release a relatively small amount of pressure in the event of a serious incident.

Well, does it appear that the door - doors or at least one of them was actually blown off its hinges in the first incident?-- It's designed that way, yes, it was.

The second explosion which apparently was much stronger, the fan housing was totally removed from the shaft?-- Totally.

How can that be avoided? What design of mine fan can avoid that possibility?-- I would - I believe that - and I haven't

got the engineering design, so I'm just believing that the objectives should be there, that a similar area should be available to release the pressures from underground that are relatively easy to repair and make the fan operative again. You see, the Moura - whilst it lost the fan, was able to continue to run, it wasn't damaged. It was the link between the shaft or the - shaft collar and the fan entry and that's the part that needs different design to allow for major pressure differences to occur, but still close up again reasonably easily and that allows you to control what is going to go on underground if you need to reventilate.

Is there an element to that in having the fan offset from the tunnel entrance?-- Moura itself is offset, but, yes, and I'm aware that the US regulations require it to be offset by 15 feet in their terms and that's been found to be very beneficial, but the part that I'm particularly looking for is that the design of the system is able to withstand the pressures.

You go on to mention in that same section having the ventilating fan designed to allow rapid sealing of the mine?-- Yes, a number of the - and after the West Wallsend No 2 Mine was blown up, and again that was a mine with a very serious explosion, it's evasee or link between the fan and the shaft collar was launched into air. The design of that was changed so that it incorporated a large steel door that in the event of an explosion you would be able to cover the entrance to the shaft with a steel plate which would seal the underground roadways off from that shaft very quickly. It's very difficult to seal a fan off normally.

Unless you make provisions such as that?-- Unless you make provisions, yes.

And that can be quite easily done, can it?-- It's been done.

You go on to make the points about recording operational time, pressures, volume and temperatures and indeed barometric pressure?-- Yes.

Devices can be connected to the fan to record them automatically, can they?-- Them and others. They are indicative of things that I saw as being relevant in this particular case as being worthwhile management tools.

To enable you to have evidence of the occurrence of various events?-- Not so much in these events, it's actually to prevent these events in that it's very important to know when a fan has been stopped and how long it's been stopped for and that's a very important part to know for management people coming in on shift after a break.

THE COURT ADJOURNED AT 10.41 A.M.

THE COURT RESUMED AT 11.03 A.M.

BRIAN JOHN LYNE, CONTINUING:

MR MACSPORRAN: Thank you, Your Worship. Mr Lyne, can I take you then to the next page of your report, page 18, where you deal with, firstly, "Electrical Supply" and you raise some points for consideration in that section; is that so?-- That's right.

Do you wish to add anything to those points?-- No, I think they're quite self-explanatory.

In the next part you deal with "Main Transport Roads"?-- Yes, that's true.

Anything you wish to add there?-- The objective of that is that relocatable materials are to be kept at a minimum where it might be a - for emergency egress.

You then deal in section 7.1.6 with the "Design of Mine Seals". Do you wish to add any comments to that area?-- Yes, I believe that the whole circumstance of explosion-proof seals needs to be looked at from a risk management basis. Explosion-proof seals actually are fine as a preventative measure but there are other ways of managing the risk, and indeed we will cover that later in 7.1.8.

Well, the next section, "Mine Escapeway", you have dealt with some aspects of that with Mr Clair. Do you wish to add anything to those comments?-- Just a small amount there, that I would be looking at the escape system from a mine be looked more globally by the operators, and in particular in having a guaranteed oxygen supply system. That would - I believe, should include, as a minimum, oxygen self-rescuers to be worn by underground employees and from then on the escape system would have to have a guaranteed oxygen supply system through to the surface, and that would be the objective and not be prescribed as a particular way of doing something.

Now, the significance of that area is really that on the evidence here there is some reason for believing that a crew in 5 South would have survived the effects of the first explosion on 7 August; is that so?-- That is true.

And there is further evidence that shortly after that first explosion that area where they were would, in all probability, have been engulfed in a poisonous and toxic atmosphere?-- Or oxygen deficient atmosphere.

So, the sort of things you are raising for consideration under this heading of "Mine Escapeway" have relevance certainly in that way, don't they?-- Very much so.

And you already mentioned, I think, the provision of refuge

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chambers in that context?-- Yes, refuge chambers - there are some in use in metalliferous mines, and indeed I am aware that they have been used in South Africa through the literature that I have read. I just believe that it's one of the options that should be considered as a part of the management of that risk.

Can I then take you to the last section of that page which deals with "Provision to Inert Underground Workings"?-- Yes.

Can you tell us something about that?-- It was mentioned yesterday about the recommendation number 8 out of the Moura No 4 Inquiry. The position is I have been a chairman of a committee that looked at inertisation equipment which was appropriate for Queensland. We have determined that there is a - there is equipment which is commercially available and has been available for quite a long period of time, which is more appropriate than the Mineshield system, and we have made those recommendations available to the industry. Those recommendations haven't been adopted. There is no legislative requirement that they be adopted. It is something which was seen as being an appropriate way of managing the risk involved in explosions.

You have mentioned the committee that was formed arising out of the recommendations for the No 4 Inquiry, 1986?-- Yes.

Did that committee ultimately issue a report?-- Yes, they did.

Would you look at this document, please?-- Yes, that is the report.

All right. Can you tell us, then, in brief form, if you could, the recommendations from that committee?-- It is in brief. The recommendations were that there were two forms of inertisation plant which is seen as being appropriate for Queensland, one of them being what is called a Presser Swing Absorption Nitrogen Plant and the second being an Inert Gas Generator, more commonly termed a jet engine.

And-----?-- They both have specific areas of benefit and use. They are both basically separate systems, but nevertheless very important, particularly in the proactive and reactive management of mine fire explosions.

Now, does the ability to inert an underground mine atmosphere have some relevance in terms of the detection and control of a spontaneous combustion?-- Absolutely. Without oxygen, no fire explosion can occur.

So, having such equipment on site could be a benefit in controlling a heating, for instance?-- Definitely. What's being suggested is not that every mine has one of these things on site, but that they have access to one of these units.

Currently the only access to something similar is the Mineshield Unit in New South Wales; is that so?-- That is correct.

And as we canvassed previously this morning, that unit was on its way to Moura No 2 when the second explosion occurred?-- It has also been demonstrated that it hasn't been overly effective in many, many circumstances which occurs in mines.

Now, that committee report was given to you when? Do you recall the approximate date?-- No, I don't recall it now.

Was it ultimately distributed to all registered mine managers

in Queensland?-- That's true.

Can you tell us when that occurred?-- I think it was late last year, if I remember rightly. It was distributed through the Queensland Mining Council.

You say "last year". Last year was 1994?-- Sorry. Yes, okay, 1993.

Some time in 1993?-- Mmm, yes.

What was the purpose of distributing that committee's report to the registered mine managers?-- To make them aware of the availability of that type of equipment if they wished to make it available at their mines for management of the fire and explosion risk, and explosive mixture risk in a mine.

Now, the report also includes details of specifications of systems?-- Yes.

As well as some details about their cost?-- Yes.

I tender that report, Your Worship.

WARDEN: Exhibit 275.

ADMITTED AND MARKED "EXHIBIT 275"

MR MacSPORRAN: Mr Lyne, have you also had access to a report provided to you from MSHA dealing with the topic of "Inert Gas Mine Fire Fighting Systems"?-- Yes, I have.

Would you look at this document, please?-- I might add in relation to that last matter I do have a video of the jet engine inerting gas generator.

Is that a video compiled whilst the committee was overseas examining the issue?-- It is.

Perhaps I'll tender that video as part of that exhibit, Your Worship, if anyone wishes to view the video at some stage.

WARDEN: The report and video then will be Exhibit 275.

ADMITTED AND MARKED "EXHIBIT 275"

MR MacSPORRAN: The other report that I've handed to you, is that the copy of the particular Inert Gas Mine Fire Fighting System?-- That's right.

And that comes from MSHA; is that so?-- Bureau of Mines.

XN: MR MacSPORRAN

WIT: LYNE B J

All right. And does it deal with various ways of inerting underground atmospheres?-- Yes, it uses the jet engine technology, which is referred to in that previous exhibit, and puts it through their trial mine in Pittsburgh, under a number of different tests and circumstances, each of which have proven to be very successful.

So, that report, if you like, indicates that the technology referred to in the committee's report is not only available, but has been successfully used, at least in the United States?-- Yes.

I tender that report from the Bureau of Mines.

WARDEN: Exhibit 276.

ADMITTED AND MARKED "EXHIBIT 276"

MR MacSPORRAN: Mr Lyne, just with respect to inerting an underground atmosphere, does that have any significance in terms of whether Mines Rescue personnel can enter the mine shortly after that's done?-- It is not because of the inert gas that might cause a problem in re-entering after, for instance, a jet engine would be there, it would be because of the atmospheric temperature. The ambient temperature would be potentially a problem. The inert gas would not be the problem.

But once the atmosphere itself has become inert, it would then, presumably, be much safer for the Mines Rescue personnel to re-enter a mine?-- Yes, the risk of explosion is totally removed.

Do you wish to add anything further to the topic of inerting underground atmospheres?-- Just one brief comment, and that is that it has been shown, to my mind, through this Inquiry, that there is a great difficulty in proving or otherwise the existence of a heating by gas detection means with great accuracy. If we were to use, for instance, and have the ability to use the inert gas generator directly underground, it would take approximately two hours to totally inert the 512 panel, for instance, and that's a very large goaf compared to what most underground mine goafs are.

All right. On the following page you deal-----?-- Just one other thing: I have drawn up another important part. In the first dot point that I have under that section, I have that the inerting equipment must be able to be done from a secure position on the surface, and so I've taken the time to draw - and I have even printed it out to save time - just a basic diagram of possible design that might allow people to put the inert gas generator on one of the tunnels and feed it underground, and the gas generator does have an ability of inerting a total mine. If there was a hanging flame in a

mine, you could inert it from the surface with a great degree of safety and I've just made that diagram available, just to point out what I'm talking about as a secure place from the surface.

Just so we can have some details of what you have drawn, you have the four entries to the No 2 Mine depicted there; is that so?-- Yes.

All of which are sealed?-- Yes.

One of which has the provision to insert the inert gas generator to provide the gas underground?-- That's true.

And you say you have printed that out, have you?-- Yes, I have.

I tender that diagram.

WARDEN: Exhibit 277.

ADMITTED AND MARKED "EXHIBIT 277"

MR MacSPORRAN: Can I take you then to page 19 which deals with gas monitoring?-- Right.

And you raise a number of points in the body of that section; is that so?-- That's right.

Do you wish to speak to any of those at this stage?-- No. The objectives, I believe, are quite clear, both in the idea of having explosion-proof - or be able to monitor gases underground following an explosion, and that could come about by either boreholes or explosion proof sampling points. I also would suggest that there needs to be - the time of the Drager tubes is seen as being limited in the management and detection of spontaneous combustion heatings with the advent of the more modern CO detectors.

Do you say that because of the - perhaps the subjective nature of the reading of a Drager tube and the inherent inaccuracies associated with that?-- Yes, I have used Drager tubes. In fact, I used to detect fires in Aberdare mine in 1970. They are cumbersome and slow and they are not very precise.

Then you deal with Mines Rescue on the same page?-- Yes.

And you make a number of observations under that heading?-- Yes.

Do you wish to elaborate on any of those?-- I think that they are reasonably clear. The issue of the training I see as being part of the competency standard in being able to sample from underground boreholes, so that people are trained in the knowledge of how to eliminate the leaks around boreholes. The

issue of forensic investigation competencies is an area where Mines Rescue teams can discuss important information on their access and re-entry into the underground mines. I believe it is time we actually trained people to know what the evidence or the forces of the explosion are, so therefore it is another competency. The independent communication system at the mine was also important, in that Moura was fortunate it was available - able to use mobile phones, but there are many mines through Central Queensland where mobile phones don't work, and that's something Mines Rescue will need to address in its own right. The next section is to do with the possible allocation of inertisation equipment, and I'm strongly suggesting to this Inquiry that inertisation equipment should be mandatory - not now an option to manage the risk of gas in Queensland - and I would suggest that Mines Rescue may be the appropriate body to manage that.

All right. You deal then on page 20 with Safety Management Systems?-- Yes.

You are suggesting there the key safety risks need to be identified at each mine and a documented Mine Safety Management System be instituted which complements statutory requirements and ensures the safety of persons?-- That's true.

How did you envisage that being implemented?-- I believe that is part of what I'll call the duty of care of the mine owner to establish what the key risks are. It may well be in the transport system, it could be in gas management, it could be in the drift haulage, shaft haulage, it could be in outburst control, it could be in difficult rift conditions, whatever the principal areas of major risk are at a mine.

And you see that as possibly being contained in the concept of duty of care under the proposed legislation?-- Yes, I do.

As opposed to being spelt out in a descriptive form in the legislation itself?-- Well, yeah, that's the way I think, and I'm saying as part of that - in fact, the second last dot point is that I believe that the company - the operator should clearly spell out the circumstances under which persons will be withdrawn from the mine as well; not leave it to sort of some feel good or, you know, vague position.

And the Inspectorate's involvement thereafter would be a - by way of auditing such a system?-- That's right. The people would be trained in that process too.

You deal with training in the next section, 7.5?-- Yes.

And do you see the training aspect of things being initially a responsibility of mine management?-- Well, it is a legislative responsibility as well.

Is that the position in the proposed new legislation?-- It is not actually spelt out chapter and verse like it is in our current legislation.

What is the proposal under the new legislation?-- Well, the details of the regulations in that regard have not been finalised so I can't comment, but that's not the - I know that's not the intention - or hasn't been the intention.

It hasn't been the intention to spell out the requirements of training at a particular mine?-- That's right, yes.

Well, in light of the evidence you've heard at this Inquiry do you think that that is an appropriate direction in which to go in respect to training?-- I am saying there that the training needs to be mine specific, and therefore that relates to very much the previous safety management system that I put in - suggesting in front of that, but I believe that's going to be necessary to provide for safety in our mines, yes.

You refer in that section at the end of it to a training program such as the SIMTARS program which was held in 1989?-- Yes.

You could see benefit in such a program?-- Yes, and I make the comment very appropriately that it is such as SIMTARS - I'm not suggesting that SIMTARS has ownership of all the training that takes place, I'm pointing out that that was a program that I saw as being very thorough and well done and that it should be regularly available, not just once in a life time.

I realise the original SIMTARS seminar was conducted before you were appointed in 1989?-- That's true.

Did you become aware of a proposal to repeat such a program for other mine personnel?-- Yes, I was.

Was there some difficulty in funding as you understood it?-- Yes, there was.

Could you tell us briefly, if you would, what the difficulty was?-- Well, SIMTARS organised the funding and it was funded through both the government initiative, as I understand now the background, and ACARP - or it could have been NERRDC at that stage, and the proposal was after that, and of course I came in after that course, the proposal was that the abbreviated course or a smaller course be presented to undermanagers and deputies, people of that nature, and mine spec inspectors. However, there no funding was forthcoming and SIMTARS were unable to fund it and conduct that course, and they did approach industry, I understand it.

I take it you would be aware generally of the work done by SIMTARS since that time in holding training courses, conferences, seminars dealing with various aspects of mine operation?-- They have attended and presented papers at many of those things and put papers out for publication.

You mention again on page 20 in the next section, 7.6, emergency support services?-- I think it's an important part if I might just interrupt a moment, the issue of persons with coal mine certificates of competency, I believe that it's time

that we moved, even with our current legislation, away from the issue of once a person gets a certificate of competency he has got it for life. I believe there needs to be some currency to that and a commitment - whether it's commitment or requirement, but certainly retraining of persons on a regular basis to keep their competency current is an important part of this whole Inquiry.

To some extent that topic is contained in the current legislation, is it not, in the topic of refresher training?-- To a degree, but those issues of refresher training don't cover all of the skills that are really required of a mine supervisor.

Again what would you envisage to be the way of checking whether there was compliance with such a proposal for training?-- The only way of doing that would be through mine records, and I'm aware of some of the weaknesses maybe in the records that have been kept on this - in relation to some of the training at Moura, but auditing processes looks at records and it also covers sampling of the persons who are supposedly trained to confirm that that training has taken place, and that's one of the advantages of training people in the proper process of auditing.

Can I take you to the next section, 7.5, emergency support services/equipment?-- Yes.

You refer there to the NUMBAT firstly?-- Yes, I do.

You've told us that the NUMBAT wasn't ultimately used in the course of this incident because it had various technical problems?-- That's true.

Is it your view that the NUMBAT is an appropriate sort of emergency vehicle for use in the future?-- No, it's not my view that it's appropriate.

What's your view?-- I believe that - and probably for an equivalent costing, we should be able to import existing technologies such as battery powered scoop trams or battery powered Eimco type machines, and modify those things to operate in inert atmospheres quite safely, again using current technology with spares being available.

You go on to mention on page 21 the topics of emergency mobile mine fan?-- Might I just add one other part to that? I see that that - I've mentioned it also in Mines Rescue the issue of the battery powered equipment to be used in the sealed areas. I do believe, and I've trained in Mines Rescue now for 26 years and until this Inquiry I was still a current trainee, so I believe I come from a fairly good position of knowledge, so I would like to see attempts now made to upgrade the methods of mine re-entry and safety management of Mines Rescue in that - allowing it to become mechanised, and I believe that Mines Rescue will become far more appropriate in such circumstances when you haven't got to carry in heavy loads of surplus equipment, First Aid equipment, stretchers, before you even achieve any worthwhile work in a re-entry of the mine,

and I believe it can be done and very safely, in fact safer than what we are doing now.

You raise for consideration on page 21 the provision of an emergency mobile mine fan; is that so?-- That is true. Again this is part of an overall process. If you are going to use the inert gas generator and you had a circumstance such as at Moura where the elbow of the fan installation was destroyed, if you do need to pull through the mine a ventilating pressure - if you need to pull through the mine the inert gas from a jet engine, you do need, as I say, a mine fan to operate, and under those circumstances you need some mechanism for creating that ventilation pressure.

You raise the topic of a large diameter borehole drill with recovery capsule for rescue purposes?-- Yes, I do. It's something that should be looked at. I know of its availability overseas in the US, South Africa, England. I don't know that it's being used terribly often. It would also need to be reviewed on the basis that many of our mines do have a very soft tertiary cover which may not be appropriate for the use of that equipment, but I don't know, and I think that it's something that we need to look at to make sure whether it's worthwhile or not.

Next you raise the topic of the Probeye which has been mentioned here in evidence on many occasions?-- Yes. I just make that comment, that's not part of even the training process of the use of that type of equipment, and I believe that using the latest technology, and that's been around now for a while, is appropriate.

Finally we have dealt with the topic of the insert gas generator you mention there?-- Yes.

Could I take you then to the last topic there, 7.7, mine re-entry?-- Yes.

You express the view in that section that further consideration, in your opinion, should be given to the benefits in re-opening the mine for the purpose of gaining the maximum amount of evidence and knowledge from this incident?-- That's true.

In order to minimise the possibility of a re-occurrence?-- Yes.

In terms of the probabilities being that the ignition source was within the 512 section, are you able to make any comment at this stage?-- Well, there are a number of factors which are outside there which weren't known at the time of doing this. The relocation of the equipment, for instance, out of - outside of the 512 seals. There is doubt about the - or some doubt about the gases that were in 510 panel. We know of a methane layer the previous - on the previous Friday now out of this Inquiry. The size of that, the source of it, where it was located we don't know.

Can I just ask you now that you mention that, was that

information, that is the fact of a methane layer being detected and dealt with in 520, was that information the subject of the Fault Tree Analysis process?-- No, it wasn't.

Carry on?-- There are just a number of matters to me which are, I guess I find quite puzzling and not the least of which is the large volume of methane gas which was in - which was in the 512 Panel, and I cannot see how - I have difficulty in understanding how such a large body of gas could have such a low pressure where it ignited particularly down in the lower areas of the panel.

You've heard the evidence from the MSHA experts, Mr Stephan and Mr Urosek, of the benefits of an underground investigation. Do you agree with that view?-- I do, and I particularly - I met Mr Stephan in 1990 when I was involved with a review of the Moura No 4 Inquiry, and I determined that there is expertise there that we hadn't availed ourself of in Queensland from people who have actually been down examining the effects of blasts, and indeed as you will see in my curriculum vitae, I was also involved in the recovery of quite extensive areas of West Wallsend No 2 and I recognised that I went down there, and the people that were supporting me in New South Wales to investigate that, we did not know what we were looking for in looking for the source of the blast and the explosion, and I'm talking about the scientific people that were available there in New South Wales, and I can see similar problems to that being - having occurred in Queensland, and I felt - that that's why I particularly have been supportive of bringing the MSHA people across to tap into that expertise and open our eyes.

In that same vein do you see some benefit in having a regular interchange program between Departmental officers and MSHA officers?-- I believe if we are going to be a world's best practice that's what we have to do.

I take it it goes without saying that any proposal to re-enter No 2 would be on the basis of a detailed study as to the feasibility of it and whether it could be done safely?-- There is no doubt in my mind that it can be done safely. I suggest to you that West Wallsend re-entry was a very difficult mine to re-enter and it was done very safely.

Can I just ask you on a different point slightly, is there an association in New South Wales of mine managers?-- Yes, there is.

And do they meet regularly?-- Approximately quarterly.

Is there such an association in Queensland to your knowledge?-- No, there isn't.

Has that been a topic of discussion in Queensland?-- There has been numerous discussions, and I'm aware of discussions even before I came to Queensland.

Firstly, do you see any benefit in having such an organisation in Queensland?-- I do.

Briefly again, if you would, tell us what you see as being the advantages of such an organisation?-- Particularly in the sharing of information on current methods of working and/or problems that people have experienced. New South Wales, for instance, have papers delivered by managers who have been in the problems of having outburst problems or new equipment being introduced into their industry, and it's one venue where people with similar types of problems or interests can meet and gain current and up-to-date knowledge and have good industry contacts established.

Thank you. Thank you, Your Worship.

WARDEN: Thank you. Mr Harrison?

CROSS-EXAMINATION:

MR HARRISON: Mr Lyne, you spoke earlier this morning about lessons to be learnt from the No 2 incident; from the Inspectorate's point of view what lessons do you think the Inspectorate should learn from the incident?-- I think probably one of the bigger lessons out of it, Mr Harrison, is the benefits of actually doing a structured audit.

A structured audit in terms of - sorry, with emphasis on mines safety, is that what you meant?-- Well, that's what mines inspectors do, focus on mine safety.

That's their role, isn't it?-- That's right.

Has been there role now for some years, as you see it?-- No argument.

This audit that you talk about, are you talking about implementation of a system whereby the operators themselves should have their own audit procedures and your people would then audit the audit?-- No.

Just tell me a bit more about what you are proposing should be covered in that audit and who should do it?-- Each of the mines have a method of doing particular work, and under current legislation there are requirements in the legislation to have many and varied procedures, and the requirement that we are looking for would be that the inspector would come in and go through and audit the processes for managing the principle risks, and that audit would cover both the procedure that was established by the company and confirming that that was actually applied to the workplace.

If I can go back to the rationale behind that. Would it be to try and get early detection of what we found was the case here, that people had very limited knowledge about matters, for example, such as spontaneous combustion or CO make?-- It would determine that. There are other processes as well to determine that which we are looking at.

Yes, and is this to do with training and retraining that you are talking about there?-- Not necessarily. It could include those too.

You see, you have been here and you have heard most of the evidence at this Inquiry, haven't you?-- That's true.

And you have heard people from deputies up to the mine manager indicate that they did not have an extensive knowledge of matters such as spontaneous combustion, CO make, for example?-- I've heard that said.

And, for instance, virtually everyone said that they did not know what were the accepted - I probably should put that in adverted commas now - "accepted" parameters for CO make. You heard that, didn't you?-- I've heard that.

And was that a matter of concern to you?-- I would say that anyone who has even covered anything in CO make in any training since would have to have heard of 10 and 20 parts - 20 lpm.

But was it a matter of concern to you in the sense that people came here and fairly consistently expressed a knowledge which you might describe as limited in those areas?-- Yes, that does concern me.

Now, do you see this audit, or any other procedures that you are proposing for the future, as being of assistance in that regard?-- Very much so.

The audit, firstly. What else? What other procedures do you think need to be followed in the future so that we, hopefully, won't have a repeat of this type of situation?-- Well, that's why I've mentioned a few things in those matters for consideration, the issues of training and retraining, identification of the risks, setting of standards.

Within your own department are you proposing to increase this auditing procedure or to - what's a better way of putting it - implement this auditing procedure in the future, are you?-- Yes.

Going much further, I take it, than the type of audit you have described here with the gas monitoring equipment?-- A different type of audit than that.

Can you just give me an idea of the range of matters that would be covered in that audit, as you see it?-- We are still in the process of developing the audit document. In fact, there is ongoing development of this within the Inspectorate even now, but basically it will be looking at the

procedures that are in place, the systems that are required and auditing whether they are in place and whether the people are being trained in accordance with those procedures and in compliance, of course, with the legislation.

Would there be some means within that proposed audit of trying to assess the safety knowledge of various mine officials in underground mines?-- That becomes a very subjective matter. There is one issue that is part of the training course that I didn't mention earlier, something we have learnt from our MSHA contacts, and that is the process which is called the MERD, it's a Mine Emergency Response Development program, and what happens there is that the American equivalent of our Inspectorate go to a mine and create a particular emergency of some type and all staff are put through various positions of difficulty, and whilst it mightn't be perfect, it does have a potential of raising whether persons have been trained, persons are competent, persons have equipment and that the equipment is available to use. So, it actually looks at the whole process, and that's something that I'd very much like to follow up on in getting a number of our Inspectors competent in that area.

On this area of lack of knowledge that I've raised with you, I take it that you are not going to look at No 2 and just focus on matters such as spontaneous combustion and CO make, you are going to look at the overall picture in relation to safety in the future with your audits?-- I thought I'd made that quite clear.

And how often are you proposing to have an audit of this type?-- Again, that might depend upon the risk that's involved, the timing of that audit. I have not come to any conclusions as to the number or frequency.

What personnel from the Inspectorate would you seek to have involved?-- I would expect to have at least people representing the engineering and mining functions doing that, and obviously the size of the operation, the complexity of the operation would determine the number of persons who were involved.

We are not talking about something where you breeze in and out in two days, are we? We are talking about something far more substantial than that?-- As I say, we haven't actually conducted our first audit at this time and we haven't got experience in it. I would suggest that the first audits that we do will probably take more time than what some of latter ones do.

And when you talk of assessment of the risk, I take it that mines which have seams which are liable to spontaneous combustion would take a fairly high priority?-- And mines as well that have high quantities of methane gas present too.

Now, you have mentioned the question of training in your evidence. You have also told us about the proposed legislation. What body is it proposed would attend to the training and, if appropriate, the certification of mining

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officials under the new legislation?-- The issue of certification has been not supported by the representatives of the mine owners, nor the mining unions.

Do you mean by that statutory certification?-- That's what I mean.

I take it there still have to be standards that people's levels of competency have to be assessed by somebody?-- That's part of the National competency system.

What's the body to do that?-- There isn't a body at this particular point in time which has established that.

What's proposed would be the body?-- I can't answer that, Mr Harrison.

It hasn't been thought through to that extent?-- It may have been. Who sets those standards - I'm aware that the industry has set standards, but as for the assessment of that, I have not - that hasn't come to my attention.

By the same token, has the funding of that come to your attention, in other words, who is going to pay for it?-- No, it hasn't.

I would like you to have a look at this document?-- Yes.

Is this the most recent discussion draft of the proposed legislation?-- I believe so.

Dated 16 March 1995?-- Yes.

This has been put out by the committee of which you are the Chairman?-- That's true.

You mentioned to Mr MacSporran earlier that there is provision there for the setting up of a Coal Mining Health and Safety Council?-- That's true.

Is it proposed that that body would have some input in terms of training or in terms of ensuring that people do have the requisite level of competency to hold certain positions?-- Yes.

And what role is it proposed that that body would have?-- Basically that they would set the standards under which people would be able to operate.

Your Worship, I tender that document at this stage. Unfortunately I don't have copies for everyone. I just didn't have the time to get that done, but we will see that it is done.

WARDEN: Yes, thank you. Exhibit 278.

ADMITTED AND MARKED "EXHIBIT 278"

XXN: MR HARRISON

WIT: LYNE B J

MR HARRISON: Can it be left with the witness just for some time, Your Worship?

WARDEN: Yes.

MR HARRISON: Now, you agreed yesterday with Mr Clair that the general thrust of the proposed legislation is more towards self regulation?-- That's right.

Would it be fair to say that you personally now have some reservations as to whether or not that is the way to go?-- I believe that there are many benefits in going in that direction still. I believe that there is - we need to review some of the - some of the positions that are put in this proposal.

When you say "some", are you talking about the concept you spoke of this morning whereby you see responsibilities perhaps going upwards beyond a statutory manager to the coal operator itself; is that -----?-- I believe that's very worthwhile.

And the converse of that, would you also see responsibility going down the line?-- Yes, I do.

I think you made that point earlier also?-- Yes, I do.

Can I just ask you about the structure of the industry as it stands at the moment and in particular the position of the deputies? Do you see deputies, as the system now operates, as forming part of management?-- Whether they form part of management - I don't see that management - I see them forming an integral part of a safety system at a mine.

I'm going further than that. Do you see them, for instance, in certain circumstances, as deputising for the manager and exercising managerial responsibility over men under their immediate control?-- Yes, I do. They do it now.

And do you see any conflict of interest stemming from the fact that they have that role when they and the men immediately under their control are members of the same union?-- I've seen some difficulties and I've seen some benefits in that system, which is different from New South Wales.

I was going to ask you about New South Wales. It's the case there, is it not, that most of the deputies are members of their own association whilst some are members of the union?-- I don't know what the figures are now. I know it has changed since I have been there.

Have I described it accurately, do you know?-- It's along the lines of my understanding still.

What difficulties do you perceive in the current situation here?-- I don't see the difficulties any greater than what the Queensland industry has had for quite a number of years.

I believe that the process of having what's called safe operating procedures is going to actually break down even further those barriers between management and employees and to become the mine safety system, not the management safety system, and that's what we tried to do, is change the attitude.

Try and break down what might be referred to as a them and us attitude?-- Very much so.

The proposed procedures, I think you said. Are you talking about procedures set up under this legislation, proposed legislation?-- The safe operating procedures, yes.

In terms of spelling out at every level a person's duty of care in relation to matters of safety?-- It will be - not everyone's duty of care, everyone's duty within a particular activity. Everyone's duty of care is to ensure that you don't affect somebody else's health and safety.

As the system is structured in Queensland at the moment, do you see difficulties for a deputy to play his proper role in matters of safety, bearing in mind that connection I referred to earlier, being in the same union as the people under his immediate control?-- I don't know that - it can make it difficult, but it's not an unworkable situation.

Do you see it difficult in the sense of having to take any necessary disciplinary action, for instance, in matters stemming from safety?-- My experience has been in regard to this that I have seen more positive results in that where there are matters of safety, that the union people have been quite aggressive with their own members.

You mentioned earlier, or I mentioned what I referred to as a them and us attitude; that you have indicated that the proposed new legislation, or one of the theories behind it was to try and break that down. Are you concerned that with the structure at the moment, that when serious safety issues can arise you tend to have a very clear division of what I might term the workers on one side, being deputies and miners, and management on the other side, being people from undermanager upwards?-- I'm not sure I understand the question.

Well, in the sense that there seems to be a view within the industry that all responsibility starts with the second group and that there is no responsibility with the first group?-- I have not drawn that opinion out of this Inquiry or my knowledge of Moura prior to this.

You haven't seen that approach implicit in the way a number of people have been treated at this Inquiry?-- I'm not - would you give me an example of such things.

The way, for instance, people from undermanager level upwards have been questioned as opposed to those at lower levels?-- I've seen what - I think I know what you are talking about, but I don't see that as being a result of the them and us position. I think that might be due to other matters.

I see. See, when we talk of this them and us attitude, you have already told us that you see the need to break that down?-- Yes.

Now, that need, does that stem, in part, from ensuring safety within underground coal mines?-- Yes.

How?-- By removing the thought that everything is responsible to somebody above in some senior position and that people are competent - trained and are competent in fulfilling their tasks that they are allotted and know the risks and work within those parameters and so that the fountain of all knowledge doesn't come from the person who sits as a supervisor but the supervisor would be looking to see that persons who are doing the various tasks are indeed doing them to the standard that the mine has.

Now, "supervisor" is a term that appears right throughout this proposed draft, isn't it?-- That's true.

And did I understand you correctly before to say that basically there is going to be one entity, if I can call it that, called "supervisors", which is basically the position of deputy, as we now understand it?-- It is not limited to that.

But everyone from deputy level upwards would come within this definition of "supervisor" within the proposed new legislation?-- The issue of supervisor is defined basically - I'm not looking at it right now, but it covers anyone who gives an instruction to another person in the course of their duty, but, in essence, what you are saying is, in the main, correct.

Certainly a deputy in the normal course of events would be a person who gave instructions to other persons?-- He does.

So, you are going to have this level of supervisor which will - again, correct me if I am wrong - include everyone from what we now know as the deputy, right through to everyone immediately below the manager of the mine; is that the way it is proposed?-- No, that's not right.

Tell me where I'm wrong, then?-- There will be deputies as part of the structure. There will be many other people who will have particular competencies and skills right up to the level of a manager who will be part of the management system of the mine; one of those, for instance, may well be a ventilation officer, another one may well be someone looking after roadway support systems, which are particular skills; another one might be production cycle people, but they'll have particular skills.

Just on this proposed legislation, I take it that you will be welcoming any input that the panel from this inquiry may have in that regard?-- Yes.

And whilst it has been an ongoing program, it is certainly not something that you intend to go ahead with, regardless of what happens here?-- There has been a commitment given and I totally endorse it, and that is that whatever recommendations come out of this Inquiry will be endorsed and adopted and supported in the new legislation, and that commitment has been given as high as the Minister.

With the proposed legislation at the moment, you, I take it, prior to the incident at Moura No 2, were fairly supportive of the concept of a move towards self-regulation?-- Yes.

You have now got your reservations; would that be a fair comment?-- To a degree.

See, you made a comment to this effect this morning - and again I'm going on my scrawled note - "if it is not spelt out in chapter in verse, then it's not happening"; do you recall that?-- Yes.

Is that your experience - in something such as this, if you don't spell out what needs to be done in chapter and verse, then there is the real risk it won't happen?-- That is true in many cases.

Do you see a need, stemming from this inquiry, for a number of matters in relation to safety to be spelt out clearly in chapter and verse?-- I think where it is appropriate there needs to be things spelt out in chapter and verse. I would very much hesitate to suggest that the chapter and verse should say we adopt 10 lpm or 20 lpm carte blanche across - in all circumstances.

I am not getting down to technical matters. I'll leave that for the panel. But in terms of procedures that may need to apply in terms of gas monitoring, sealing procedures or the like, do you see a need for that to be spelt out in chapter and verse?-- I believe that much of that can be done by a requirement of managing - identifying and managing the risk at the mine as it relates to a particular mine.

See, I've taken you through an area that I described before as a lack of knowledge on the part of certain people. Would you agree that it would be naive to think that this situation was confined to just one mine in Queensland?-- It would be naive.

So, the need is there right across the board to ensure that people do have the requisite training and the requisite knowledge in relation to matters of safety?-- I would add that it is current knowledge of safety.

It infers that knowledge must be updated from time to time as more and more systems are developed and more and more tools are proven to be useful?-- I would use a term stronger than "infers".

What I'm interested in is your proposals in relation to training. As you see it, do you see a need for there to be one body to be responsible for the training of all mining officials? I'm talking about people coming into the industry now?-- Are you talking about this issue of the National Competency System particularly?

Be it part of that or be it something else, but a need to have it done by a body so that we have got consistency in training throughout the industry?-- I do.

And do you see that body, whatever that body is, also being responsible for the retraining of people who hold - I'll say certificates, but it might be - qualifications might be a better way of putting it?-- We had better make it a little clearer.

Yes?-- I'm not suggesting that this body does the training. I believe the body should set what the standards are.

Well, I'll go one step further: should there be another body that does the training?-- I believe that once the standards are set and established, that there may be numerous groups

that might provide that training.

Do you then run the risk of inconsistency in terms of how this body might approach the training as opposed to that body, where the emphasis is here as opposed to where the emphasis is there?-- Maybe we are talking a little separate here. The idea of a - a national system is that you have a nationally accredited assessment of that system, which is to a standard, and that is what I'm talking about.

You are saying certain teaching institutions get that accreditation?-- And they themselves are audited that they are providing that training to the right standard.

You don't see the need for there to be one body, for instance, and one body alone to do the training?-- No.

Now, if I can turn to retraining; would you see that first body, the one that sets the standards, as being involved in that also?-- Where there is a change, for instance - in seeing the appropriate curriculum - I see it as their responsibility to advise the training providers of these changes, and persons with those current competencies who are acting in the industry would need to be retrained and upgraded in those areas.

Would you see that that retraining should take the form of structured courses with a set-out curriculum?-- Pretty well. I'm not going to be as rigid as to say it is one curriculum and that the outcomes have to be the same. There are different ways of training. That's why I make mention of that.

Do you see a need in the future for having some sort of scheme of what I might term re-accreditation; in other words, forcing people to go before a body and be assessed in terms of their knowledge to see whether or not they should continue to have their accreditation?-- I'd have to think about that further, but I don't feel uncomfortable with what you are saying.

You see, under the system at the moment, if I could just quote an example given to me recently, someone told me that he got a First Class Certificate in 1979, and that permits him to manage an underground coal mine, and he has never worked in one in his life. Is that an example of how loose the system can be at the moment?-- And that's why I mention - and quite clearly I believe the issue of making sure the competency is current - that can happen. I think I gave an answer to Mr MacSporran that I don't believe that you should get a certificate for life.

And how do you ensure that the competency is current? Do you have a regulating body, examining body, or such like that people have to go before?-- We don't at present. We have a regulating body at the present time for establishing the original competency, which is called the Board of Examiners in Queensland. Its resources don't extend to retraining and reassessing the competency of persons after a period of time.

With the proposed legislation, is there still a role for the Board of Examiners?-- No. In the long-term, no. If you see in the transitional arrangements - and the copies of the document that you have does make mention of a National Competency System, and that is one of the reasons why it was entered into evidence here today. Whilst the typing doesn't show it in capitals, it should have been in capitals in the transitional arrangements.

I am not being critical of the setting out of the title, but the substance-----?-- I am making the point that there are difficulties with what's being proposed, yes.

So, would the role currently assumed by the Board of Examiners be absorbed in part by the Health and Safety Council?-- Yes.

What I'm interested in in the future is how do you see or what steps do you see need to be put in place to ensure people do have this current competency, as you call it?-- There needs to be a system which defines what the competencies are, and that a person is assessed again as to their competency after a period of time, and, indeed, undergo each year a - certainly an amount of refresher training as a minimum.

And when we talk about "refresher training", do we leave it up to the company to have something done, or are you suggesting it should form part of some structured program run by a particular body?-- If I look at the - some of the models around the place - whether it is through accountants, pilots - there is a degree of requirement there that people have to be given so much training per year, and the subject matter of that type of training in many cases is determined by members of their own organisations, but it may well be two or three days per year, and whether it covers, in our particular case, spontaneous combustion, roof control, or geotechnical matters, or whatever, that would be something which would be determined as a need for the industry at that particular time.

Subject to what comes out of this Inquiry, is may be, of course, that we don't go down that road of self-regulation?-- I'm not into predicting.

All right. But assuming we don't, do you see advantages under the current system, if that's maintained with some current legislation - if that's maintained with some modification - of having the ventilation officer made a statutory official?-- That could be one option. You need a person trained. Now, whether he is a ventilation officer or an undermanager with those skills - I wouldn't say to you that I don't believe that an undermanager should not have the skills of a ventilation officer, but I would also add and hasten to add that if the legislation doesn't change, it will be to me a very dark day, because our current legislation is in desperate need of bringing into the real world.

Do you see any advantages in having a statutory position of ventilation officer whereby the duties are clearly spelt out?-- Under the current way in which people have thought, that would be an appropriate response. As I indicated

earlier, and I think I have throughout my evidence, the requirement is that the skill is available, and whether it is a ventilation officer or an undermanager or a manager or a deputy, providing that skill is available and current and competent, I don't have any comment to make that a ventilation officer should necessarily be appointed.

With your experience in New South Wales, it is the case there, is it not, that the ventilation officer is a statutory official?-- Often the undermanager.

In other words, there is specific provision in the New South Wales legislation, is there not-----?-- Yes, there is.

-----for a ventilation officer, and the duties are spelt out?-- Yes. Once you establish duties like that - and I can take you to New South Wales legislation, and again poke significant holes in that legislation, where there are things that it doesn't cover.

I'm not saying adopt the New South Wales legislation, I'm merely inquiring as to whether or not you see advantages in having that person made a statutory appointee with a clear spelling out of the duty?-- Well, I've worked in New South Wales, as you are aware, for quite a period of time, and I haven't seen any advantage in doing so - in having a ventilation officer. I would say that, you know, the skill - the competency of that person should be, I believe, within - certainly within an undermanager's range of skills.

Yes, and some deputies?-- And some deputies.

One matter that seems to have arisen here is that - what I might term a poor communication within the system at No 2 - are you familiar with what I'm talking about - in the sense that-----?-- You had better be more specific about that.

I thought you had been here long enough to know?-- I have heard many things, Mr Harrison.

All right. In the sense that information was not passed on, people may or may not have read reports, and that things happened that other people didn't know about, and I can talk about ventilation changes-----?-- I'm with you.

-----reports of smells, for instance - there are just a few examples. Now, in view of what you heard here, is your proposed audit going to try and cater for that type of situation to see that there is better communication than what appeared to have been the case here?-- I believe something else has to be done other than audit. An inspection system or an audit system is not necessarily going to uncover and determine that information, and there has to be something different put in place to achieve the objectives that you are talking about.

You think it should be laid down in this Inquiry, for instance, what should or shouldn't be recorded in relation to any changes to ventilation?-- I would suggest to you - and

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I'm now talking from a position without having a well-structured answer for you - but I would say that you need to have a process where matters of exception or change are recorded in a very visible way - that aren't hidden or difficult to recover.

One way to be recorded in a specific document, and perhaps also included in a computer data base?-- I prefer written documents in many ways. Computers, in my experience, have a habit of getting gremlins in them and data being lost or altered.

One matter I raised with one witness, and he was a bit shell shocked at the time and didn't answer me, was the question of whether or not there would be advantages in having a separate safety report by deputies as distinct from a production report in which all matters which in any way could impinge on safety could be recorded. Do you see any advantages in that?-- No.

You don't?-- No.

Where do you see would be the best place to record any safety concern that, say, a deputy may have?-- That's a separate question. I see mine production and mine safety being absolutely integral to the operation of the mine. The difficulty is going to be in how to recover and put in place a system that identifies where the areas of concern are of safety risk that have been identified and have it available for persons on oncoming shifts, not just a piece of paper that records it and gets buried in succeeding shifts.

I suppose the first point I was asking you is this: you don't necessarily see an advantage in separating safety information from production information?-- Can I - it could be we are on a similar wave length, but not answering the same question.

All right, take your time?-- If the information that you are suggesting is that where ventilation changes have been made or where matters of safety have been identified as - such as a smell, haze, maybe a goaf fall, maybe some other damaged rib, something that's specific in a particular area, then I accept that that's worthwhile separating out from the main report on the basis that it becomes easily and readily recoverable. If there is a problem, what I've seen so far at Moura has been - and it's not uncommon, I'm not suggesting Moura is at all unusual in this, is the difficulty that once it gets put on a report that it doesn't get highlighted for the oncoming shifts and that's common through a number of mines.

So you are suggesting in effect that that information should be recorded elsewhere as well as on the deputies' reports; do I get that correctly?-- That's what I'm saying.

It goes into the normal report and goes where else?-- Well, I haven't thought that through. I think it needs to be recoverable and it's the sort of thing, for instance, if an inspector was coming out there is no way that I can expect an inspector to go through deputy reports of three or four shifts per day for seven days a week every month looking for some small note saying a smell or rib failure or whatever. That to me is something that is not practical, and nor is it practical for a person to come in after being away on holidays as a deputy might come in and have to go through the previous month's reports for whenever he left on holidays to sort of see whether that information is - whether there has been some

problems in an area.

I would just like to turn to something that you touched on earlier this morning. You spoke about events on Tuesday at the time of the second explosion. Would you agree that there was a risk on that Tuesday that the people at the surface could have been placed at risk at the time of that second explosion?-- Yes.

There could have been a fireball, for instance, with all of that coal dust in the air?-- I was directly concerned about that.

Now, from the point of view of the future would you see it advisable that places such as workshops and offices and buildings generally have to be situated away from the portal so that there is not any such risk?-- I have actually addressed that in my matters of consideration.

I had a look through that and I couldn't find something as specific as that, but I take it that that's what you meant when you spoke about, I think, the gun barrel effect at Oaky Creek; is that right?-- I didn't mention any mine.

Well, I've just shafted Oaky Creek. Most unlike me. I was going to suggest this to you: a number of the more recent ones in Queensland have been outlined where that potential problem exists?-- I have spoken to a couple of organisations, but the problems that occurred at Moura under normal circumstances would have been a very appropriate mine layout. The problems that occurred there were simply due to atmospheric conditions and a prevailing wind. Now if the wind has been coming from a different direction there would not have been a problem, and that's why I am mentioning here that there needs to be - you need to have an ability to be able to relocate the gas monitoring equipment. You will need to have the ability to relocate your Mines Rescue facilities. Now, it doesn't matter which mine you have, if the products of combustion are coming out in quite large volumes out of a tunnel and the prevailing wind is blowing it your way you have a problem, and you can't shift an office block and you can't shift a gas monitoring system that's got all the bells and whistles. You have to do something about where those people are.

Outside of the obvious risk to life and limb there was a real risk that all of the control room facilities could have been lost and the monitoring facilities lost?-- Yes.

That's of itself quite crucial also, isn't it?-- When you are sitting in the area of the dust you are not worrying about the control room.

What role if any does the Inspectorate play in relation to the newer mines in terms of pointing out these potential problems to the operators?-- Well, all of the new mines don't have - that I'm aware of, and I've been to them all, don't have equipment in direct line of these tunnel entries, though we do have an input in that area to a limited degree.

It goes a bit further than just direct line, doesn't it, this risk?-- Well, I don't know how far you can take it for atmospheric conditions for wind blowing.

Like at Moura we didn't have direct line, but we were fairly close; would that be -----?-- I think Moura under normal circumstances would have been an appropriate - and still think it's an appropriate place for the facilities to be constructed. The fact that there was a south easterly wind blowing that day is a matter that I have no, nor anybody else has control over.

It's a pretty common wind in Queensland, isn't it, the south easterly? Isn't it the one we have most of the time?-- It happens on the coast, I'm not so sure that's necessarily right in the inland.

That might be an appropriate time for me to leave the weather alone.

WARDEN: We will retire from the forecasting game. Thank you, gentlemen. One hour.

THE COURT ADJOURNED AT 12.31 P.M. UNTIL 1.30 P.M.

THE COURT RESUMED AT 1.33 P.M.

BRIAN JOHN LYNE, CONTINUING:

WARDEN: Could I just mention Monday? I believe most parties are going to be back in on Sunday sometime, most of the panel is coming back in Sunday night. If there is any problems, just let me know. We might have an earlier start Monday instead of the 11 o'clock one if parties are back in Sunday night. Thank you.

MR HARRISON: Mr Lyne, just to finish off that point before lunch, Oaky Creek was the one that you were referring to, wasn't it?-- No.

It wasn't?-- There are numbers of mines of that design.

Well, is it one that fits that category, is it? Does Oaky Creek fit that category?-- Oaky Creek does have an entry similar to that, yes.

And potentially there could also be problems with North Goonyella and Gordonstone in view of the positioning of structures there; is that right?-- Again, depending upon the wind. I haven't actually looked at them from the point of view of their - whether it's a south-easter or a nor'-easter which would affect them.

It's not the case that Gordonstone is being looked at at the moment with a view to perhaps changing things?-- I doubt if we are going to get very far trying to remove the building to some other place now.

Is this a matter that's going to have some priority into the future as far as the Inspectorate is concerned?-- How it's intended - how I'm looking at it is to raise the issue of what people might do and have a plan prepared that would accommodate for such an eventuality that atmospheric conditions did require the relocation of the emergency procedure rooms and incident room and Mines Rescue facilities.

You have spoken about the wind. It's the case that it's too dangerous just to leave it which way the wind is blowing, isn't it? You have got to be aware where that of itself doesn't present a problem in any contingency?-- That is one way of managing the risk; it is not necessarily the only way. If you were suggesting that we relocate the pit top surface facilities so far away from the entrances to the mine, they would never be affected under any circumstances from what's happening out at the mine. That would require quite a considerable change in philosophy of mine surface layouts.

If I could just go on to something else? You have advocated the reopening of the mine?-- I have.

The re-entry I should have said. That would be a better way of putting it, wouldn't it?-- I have said that there may be benefits in re-entering the mine, yes.

Is one of those perceived benefits the fact that you may get some evidence as to what happened?-- That is the reason why I would want to re-enter.

Now, in wanting to get that information, would I be fairly drawing the conclusion that you have doubts as to whether or not the first explosion was in the 512 Panel?-- I have - I cannot say that I am 100 per cent confident that it did occur in the 512 Panel.

You have reasonable doubts that it could have occurred elsewhere?-- I believe the potential was that it could have occurred elsewhere.

And you couldn't reasonably, as you see it, from your experience, rule out other possibilities?-- I cannot.

Even if 512 may be the more likely cause?-- That's correct.

Now, I would just like to talk to you about staffing levels in the Inspectorate, something that I have no doubt surprises you?-- I'm shocked. I was not aware that you were representing the Mines Inspectorate staff, sir.

Well, I won't come back with the obvious retort that someone should. I am more interested in the safety of the mining area, Mr Lyne, particularly in so far as it affects the members of the association that I represent. What are the current levels for mines inspectors throughout Queensland?-- The current levels?

Like how many have we got and where are they?-- Are you talking about Central Queensland only?

No, Queensland. We have got - do we have inspectors based in Brisbane, Ipswich, Rockhampton and Mackay; is that the way it still is, or is it just Brisbane, Rockhampton and Mackay?-- Brisbane, Rockhampton and Mackay.

How many do we have in each place?-- We have - you are now talking about mining inspectors?

Mining inspectors firstly, then I will deal with the specialist inspectors such as mechanical and electrical?-- Okay. We have in Brisbane, including myself, three mining inspectors, in Rockhampton one mining inspector and in Mackay one mining inspector, currently.

So, outside of yourself we have four mining inspectors at the moment?-- That's correct.

Now, you may recall that when Mr Walker gave evidence he spoke about the situation as it was in February of 1988 when he first started?-- Yes.

Do you recall that?-- Yes.

And then he basically gave us a bit of a run through in terms of what happened in his Division in terms of the numbers of inspectors since then. Was it not the case that back in February of 1988 there were seven mining inspectors?-- I wasn't here in February '88.

Well, you would have a fair idea, wouldn't you? You started at the end of '89; is that right?-- That's right.

Well, you would have made yourself familiar, would you not, with what the position was?-- I have an idea you could be correct but I can't answer that in the affirmative because I haven't specifically gone back looking at that time.

Although you had a fair idea before you got in the witness box here that that line would be pursued with you, didn't you?-- I have not anticipated your questions.

All right. Well, at end of '89 how many did we have?-- We had six.

What I am suggesting to you is that back in February of 1988 there were two in Brisbane, two in Ipswich, two in Rockhampton and one in Mackay. Does that sound right?-- That's probably about right.

And what was the break-up when you arrived on the scene at the end of 1989?-- There was one less in Brisbane. There was actually - no, there was two in - there were two in Brisbane, two in Ipswich, two in Rockhampton and one in Mackay.

I take it that's seven?-- That's seven.

When you arrived. We have got four now?-- Yes.

Are there any vacant positions at the moment?-- Yes, there are.

How many?-- We have two positions vacant in our structure.

So, even if they were filled, we would still have one less than what we had just over five years ago?-- Yes.

Has the number of mines increased throughout Queensland in that time?-- Yes.

Has coal output increased in Queensland throughout that time?-- Not a great deal but there's been a slight increase.

It certainly hasn't decreased?-- No.

Since then would it be fair to say that there have been increasing demands on the mining inspectors particularly through their involvement in committees relating to the proposed new legislation?-- Certainly the new legislation has placed extra demands on the Inspectorate.

Would it also be fair to say that bearing in mind those extra demands, bearing in mind this slight increase in coal production and the number of mines, that it would not be possible now to give the coverage that was being given back at the end of 1989?-- The department has always been involved in committees of one form or another. I don't know that I could sustain that argument that you put to me.

Well, you disagree with me?-- Yes.

Well, you disagree with that suggestion, I should say?-- I disagree.

You think the coverage is just as good as it was then?-- At the present moment, because of our staffing numbers being down, I don't suggest it's as good.

Well, perhaps I should phrase it this way: if you filled those two vacancies, if you had your six, you would think the coverage now would be just as good?-- I think the coverage is what is required.

See, Mr Clair questioned you yesterday about the position within the Central Division and the replacement for Mr Walker's old position before he became a senior inspector; do you remember that?-- Yes, I do.

You said that that position was filled by Mr Stay; is that right, S-T-A-Y?-- That's correct.

He is the man from Western Australia?-- Yes.

But he chose to live in Mackay?-- That's correct.

Now, wasn't it the case that when Mr Stay was - sorry, I should say immediately before Mr Stay was appointed the department was advertising two positions, one in Mackay and one in Rockhampton?-- Yes, that's true.

Because there were two positions to be filled, isn't that the case?-- We have an establishment number of extra inspectors and so we did advertise two.

With the view to filling two?-- If the people had been made available - at that particular time there was funding available for one position and the reason for advertising the other one was to see if they were available, and if persons were available, then it would be considered - seriously considered - to put that extra person on.

Because there was a perceived need for that extra person to be there; is that the case?-- Well, there was a degree of need, not necessarily a full person need, but if we are going to - the future of the coal industry was moving away and has moved away from Ipswich and it's going into Central Queensland.

More into the Bowen basin?-- That's correct.

In fact, while we are on that subject, the trend within the

basin is more towards underground mining?-- That is true.

And you expect that trend to continue?-- The indications are that.

There are quite a few planned underground mines in the pipeline, aren't there?-- Yes, there are a number.

Would you agree with the proposition that from the point of view of an inspector who is carrying out his duties in relation to safety, an underground mine would probably require more attention than an open-cut mine?-- Yes.

The risks are greater, aren't they?-- Yes.

And, as we have unfortunately seen, the consequences are usually far more severe when something goes wrong?-- That is true.

Mr Walker suggested in his evidence, as you may recall, that an ideal coverage for mines, he felt, was a routine visit once per month for underground and once per quarter for open-cut?-- I heard that.

What would you say of that as an ideal?-- I tend to not align myself directly with that so much as slavishly arriving in a mine once per month. I take it that persons may be in attendance at a mine on an average maybe - whether it's 10 times per year, but some number is an appropriate response. You have to sort of address a particular mine. The concept of once per month on a large mine that's producing 20,000 tonnes of coal a day and many people working underground in a gassy condition is going to need a different response to a very small mine with one, maybe two units producing that does very slow development work.

See, I'm not talking about a religious visit in January, one in February, one in March; I'm talking about a reasonable average?-- Okay.

Would you say that that's a good starting point in terms of how often roughly that there should be the routine visits to the mine?-- It's a way of budgeting a certain workload, yes. All right, I'll work with that.

Would you say that it is important that there be that amount of coverage to ensure that safety procedures are being followed in the underground mines and to ensure that the mining officials at those mines have an appropriate level of understanding of safety matters?-- No, I don't.

You don't think you need that sort of coverage for that?-- No.

See, you heard Mr Walker say that that's what he strived to do, that's the coverage he strived to give; do you recall that?-- Yes.

He indicated there were times when he couldn't do that?-- Yes.

It's been the case, has it not, that budgetary restraints within the Department of Minerals and Energy have made it difficult for the inspectors to give the mines in their area - sorry, in all areas of Queensland, I'm not confining myself to the central division - the same coverage that they had previously?-- I don't agree with that.

You don't? In real terms is the budget to the Inspectorate decreasing?-- Yes.

Do you have any control over your own budget to the Inspectorate?-- Any control in what regard?

Am I correct in saying it's not simply the case that X dollars is given to you as an Inspectorate and that it's the Inspectorate itself which then allocates how its spent; it's not that simple, is it?-- It's not far off that.

You see, take the central division, for example?-- Mmm.

The budgetary decisions for the central division are made, are they not, by regional managers for the Department?-- They are now, yes.

And they are not part of the Inspectorate?-- That's true.

So we have got non-mining people, I take it, determining the budgets within their particular region; is that right?-- That's right.

How many regions are there in Queensland? Is it six?-- Yes.

Now, that region that deals with the central division, that's an office based in Emerald, isn't it?-- Yes.

Do you have any say as to - firstly as to how much of the overall allocation for the Inspectorate is allocated to the central division, for example?-- I don't have any say over how much is actually allocated to the central division. Now, I don't know -----

Do you have any say in terms of how what is allocate to the central division is spent?-- In setting up the budget I have had talks with the regional manager about some specific

matters such as training in the budget and some travelling expenses for professional growth with the Inspectorate and he has told me he has catered for that.

Is there a figure allocated to the Inspectorate each year State-wide?-- Not directly to the Inspectorate, no.

Is it the case that what goes to the Inspectorate depends on the decisions made at those regional levels, at each of those six regions?-- Not entirely. Are you talking about with the coal Inspectorate now?

I'm interested only in the coal Inspectorate, that's right?-- The budget for the Central Queensland is administered through the Emerald office and I have direct involvement with the Southern Queensland office.

So you as Chief Inspector don't have any input in any of the regions outside of Brisbane?-- That's been a very recent change to that position.

Does that concern you?-- It doesn't give me any joy, but that's a decision of my employer.

Does that put you in the situation where your capacity as Chief Inspector to see that the inspectors under your control can properly carry out their functions in relation to safety is affected in some way?-- It hasn't yet.

But you see the potential?-- The potential could be seen as being there. I'm not the quiet sort of person that would stand by and let that happen.

Like Mr Walker you would stand up for yourself?-- We make - most inspectors do make themselves - their presence felt.

You see, at the moment does the amount allocated to the central division, for example, decrease by 1 per cent each year? Is that basically the way it works?-- That happens across not just the Inspectorate, that happens across all areas of the public service. It's called a productivity dividend.

The situation as explained by Mr Walker was basically this: with 80 per cent of the funds automatically allocated to wages it amounts to a 5 per cent reduction in the operating budget each year. Would you agree with that?-- It does multiply out to some figure close to that, yes.

You said before this operates right throughout the public service; does this go back to the bean counters in Treasury, this decision?-- I understand -----

Quite obviously these bean counters haven't placed the safety in coal mines in any different situation to any other Government department or any other section of a Government department?-- You would have to ask them that question.

It's pretty obvious, isn't it? You would agree with that,

wouldn't you?-- The results would appear that way.

Now, would you agree that the safety in coal mines is far too important to be caught up in an across the board practice such as that?-- In my eyes it is.

Have you let your superiors know that that's the way you feel?-- I haven't said to you that I'm under-resourced to achieve the results that I want to achieve.

You don't think you are under-resourced?-- No. I have at times past when I have been under-resourced made my presence felt and we did change things so we got more money.

See, as things go with this productivity system or whatever it's called the amounts available in real terms are going to decrease 5 per cent each year for the operations, are they not?-- In real terms to the Department what's happened is that within the Department, within the Inspectorate, allocations have actually not suffered the 5 per cent drop as what you are intimating. They have actually had other, if I can use the term, subsidies from other sections. The department has restructured in many areas and some of those savings from those areas have been reallocated to the Inspectorate.

Do you see the position in the future as being potentially more serious?-- The situation is something which requires ongoing monitoring and awareness.

You see, with more and more underground mines coming online that's going to place greater demands on the Inspectorate, isn't it?-- Potentially.

Well, in reality, I suggest?-- It depends upon how the Inspectorate functions. If the Inspectorate's role changes or in the way in which it carries out its functions, if it can be made more efficient and make the systems at the mines more effective then I would suggest to you that the net effect will still remain an efficient and safe coal mining industry.

I take it that as Chief Inspector you would welcome any guidance from the panel here in terms of the role that the Inspectorate should play in the future in relation to matters of mine safety?-- I have never - yes, I would.

Now, if for instance the panel here was to take the view and to set out in its report that it should be a pro-active role, would you see in those circumstances the need for greater funding and for an increase in staff numbers in relation to inspectors?-- I believe that the Inspectorate right now is in the main very pro-active. I would welcome having more staff numbers, then I might not have to work so many long hours.

Here is your chance, Mr Lyne. You've heard, have you not - and I read it in The Courier Mail so it must be true - that Mr McGrady has come out and said he will abide by whatever recommendations are made in this Inquiry?-- He has.

Now, if you think you need any further funding or any further increase in staff levels, the ball is at your feet. Do you want to kick it?-- There are more things than balls would get kicked.

I wasn't talking about reaction from the Government. You are a bit worried about your own position, are you?-- Mr Harrison, whilst it might sound strange to you, I believe in making things very efficient and it's in my interests, and I suggest everybody's interests that the role of safety, the role of Government is most efficiently handled, and what I'm suggesting to you is that the traditional role of the mines inspector is not an efficient way of administering safety in the State, and I'm taking part in a very direct and purposeful role in changing that process so that it does deliver a more efficient and safer coal mining industry, and much of that is - very much a part of that is the pro-active part, and whilst you might have heard me being critical or somewhat - as to comments of issues of things like Quality Assurance, it's that sort of process that's going to make a difference, I believe, in the future, and the ownership of safety has got to go right to the top of the company.

I'm not, and don't get me wrong, suggesting that safety is purely the ambit of the Inspectorate. Would you agree with me that the Inspectorate does play something of a monitoring role in relation to matters of safety?-- It certainly does.

And should continue to do so?-- It has to.

Getting back to what we discussed before lunch, would you agree that if the Inspectorate wasn't there, didn't have a presence, that there is a real risk that operators may give lip service to matters such as training, improving the knowledge in relation to safety and such like, but not really go far enough to ensure that the safety of miners generally is fully catered for or catered for as good as it could be?-- There are companies indeed that would go path. There are other companies that virtually don't need much overseeing at all. It depends upon the company themselves. For instance, we have mines, particularly open-cut mines, who have had zero accidents for years - or maybe one or two, and I'm going to say to you that - they are open-cut mines, but there is a limit to how much effect a mines inspector is going to have at such of those organisations, and that's why I'm hesitant about agreeing with you on the numbers of inspections. The numbers of the inspections should relate to the risk that's presented.

Do you see the role of the Inspectorate under the proposed legislation, assuming something along the lines of the draft came into force, as being one whereby they wouldn't have as much contact with the mines which they have under the current system?-- That may be true.

Do you see that as desirable?-- It's the end result that I am concerned about and that is that the mines are safe and the responsibility of a safe mine is the operator. It is up to them to do the training and have the systems in place. Whether it's once a month or once every three months

attendance at the mine by an inspector does not make major changes in that direction. It is the systems - it's the management system which has to be brought into line.

Do you think that had there been a more pro-active role on the part of the Inspectorate here that matters such as the lack of knowledge of different people at No 2 that I had discussed with you before lunch may, and I stress only may, may have surfaced some time before 7 August 1994?-- It's possible, but it's also possible if they had been any more often that they might have not seen that as well.

You've been here and you've witnessed a number of people, and I'm referring in particular to members of the association that I represent, attacked quite strongly over their lack of knowledge in those areas I mentioned?-- Yes.

Different people pointed to the SIMTARS conference in 1989; do you remember that?-- Yes.

Different people pointed to those couple of lines about CO make in the Mackenzie-Wood and Strang book?-- Yes.

Don't you think it's a sad indictment on the industry generally that no-one could point to any more recent documentation than that?-- There are other documentations if you are talking about the SIMTARS publications.

I meant recent, and I think "recent" was the key word in that question?-- They are fairly recent.

Would you not have thought that if the whole industry, and I'm going across the board here, was functioning efficiently you would expect to see in print far more information in relation to those points over which these people were attacked?-- You are talking about -----

Just as an industry generally. Would you not expect there to be a lot more written material about matters relating to spontaneous combustion, about matters relating to CO make which have been the ones which we have heard of time and time again here?-- There aren't many industry publications other than, say, the Queensland Mining Journal or the SIMTARS journal.

One thing you would expect to come out of all of this is it's going to be hammered and hammered, that type of information, in any structured retraining courses in the future, isn't it?-- Yes, but that's not going to necessarily come out of publications that people wait to get in the post, is it? The information that was back in 1989 has been available at every mine, I would suggest, and indeed the inspectors in both - senior inspectors both in Rockhampton and Mackay had both attended that conference, so they were aware of that and had that information, and the training programs don't change from week to week. The training programs and retraining programs are certainly based on a bigger ground work.

Do you see the need for the Inspectorate to be involved in any training programs in the future?-- I believe the Inspectorate need to be aware what the training program contains and the fact that the training and retraining is being done, but not necessarily to deliver that training. Caesar can't judge Caesar.

Not unless you have got enough Caesars?-- We have got enough.

You still maintain that, do you?-- I do.

How does coverage of inspectors compare as between Queensland and New South Wales?-- It is far less.

Would you have a look at this document? It is headed up "Comparison, Queensland and New South Wales Coal Mines Inspectorate". Have you seen that before?-- I've seen something like this, yes.

Just have a browse through it. Tell me if the information in there accords roughly with your knowledge of the situation of Queensland vis a vis New South Wales?-- Yes.

It was a quick browse. Have you seen all the information?-- Quick. Yes.

I have some copies of that, Your Worship, I could hand out for the panel and for the parties. I think you have already agreed with the proposition that from that, there appears to be certainly, in terms of numbers per mine, a greater coverage in New South Wales of inspectors than there is in Queensland?-- A greater number.

A greater number, yes. And when we look at overall output - the overall output of mines from New South Wales as compared to Queensland - there is a very substantial difference?-- That's true.

Do they overdo it in New South Wales?-- I might have my own comment about that, but-----

Feel free to tell us?-- Well, I was an inspector in New South Wales and I do believe that they - if I use the term "over service" the industry down there, that would be a fair statement, and indeed I can tell you that when people leave down there, it is my understanding that they are not being replaced currently, too.

A bit like up here?-- For different reasons.

The pay structure appears to be a lot different; do you see that - second last line?-- I'm well aware of that.

Now, quite obviously, is that a problem in terms of attracting experienced people?-- It certainly doesn't help.

Is that something that's being addressed within the Department?-- We have tried to address that, but we have what's called a Public Service Management Commission who have

fixed levels of salaries that are unassailable.

See, it is crucial that you get experienced people, isn't it?-- Experienced and competent people are more important than numbers.

And you just can't get them on the current pay structure, can you?-- It is proving extremely difficult.

And it has been an ongoing problem for years?-- It has.

And you think that perhaps any recommendation from this particular panel might help?-- I doubt if it would do any harm.

Put the Minister to test on what he said, wouldn't it?-- They are your words.

At least you didn't disagree with me. I tender that document, Your Worship. Just for the record, if it could be recorded as per the heading on the top might be the best description of it.

WARDEN: Exhibit 279.

ADMITTED AND MARKED "EXHIBIT 279"

MR HARRISON: I mentioned before mining inspectors. What were the levels in relation to electrical inspectors and mechanical inspectors when you arrived at the end of 1989?-- Same as what they are right now.

So, they have basically been maintained?-- Yes.

In the short-term, am I correct in saying you don't see any need at all to increase the number of inspectors above the allocated six that you have got at the moment - that you have got allocation for at the moment?-- I can see that there is going to be in the intermediate future - and I am assuming the underground mines do commence - there may be the requirement of an additional inspector.

Is there any advantage, as you see it, of having different tiers of inspectors, perhaps people with Second Class certificates to handle some of the more mundane duties of the Inspectorate, leaving the ones with First Class qualifications to do the more serious work?-- There is some potential of change in that area - in that the main area of risk, as you identified earlier, is the underground mine, but Queensland has a predominant open-cut industry, and it is certainly one of the areas that has been looked at, as to where there are not persons of different competencies and background might be able to equally visit the open-cut mines or surface mines and allow the underground experienced inspectors to focus clearly on the underground coal industry.

Just going to something else - could the witness be shown Exhibit 214, thank you? You may recall this is the memorandum from Mr Walker to you of 20 August 1993 to which are annexed his memorandum of the previous year and your reply. You have no doubt seen those documents?-- Yes, I have.

You may recall I went through them in some detail with Mr Walker when he gave evidence a few weeks ago?-- Yes.

If you can just turn to what should be the last one in the bundle, the memorandum from you to him of 6 July 1992? See that memorandum? I would like you to turn more particularly to the second last paragraph on page 2. There is a sentence there, "Should these new mine developments commence before staff is appointed and consequently your work load becomes onerous, we will review our priorities at that time."?-- Yes.

Now, the work load did become more onerous, did it not, in terms of mine numbers?-- Yes.

And there was no such review; is that right?-- No, that's not right.

Well, if there was a review, there was no increase in Inspectorate numbers for the division?-- No.

The position of two inspectors for the division was not restored?-- That's true.

Why was that?-- As I mentioned earlier, we have the Ipswich area mines reduced in numbers and what happened was - and has continued to happen as well - was that I was able to allocate an inspector from the Ipswich office to come up and assist Mr Walker in the regional area in Central Queensland.

You didn't perceive a need to restore the Central Division to its former level of two mining inspectors?-- That is correct.

Is that still your view?-- It is still my view.

If you turn to the memorandum of 20 August - you may recall we couldn't find a reply out of your file - the Departmental file. Was there one?-- No.

Would you agree that Mr Walker went to a lot of trouble with this letter, in terms of going into matters in depth?-- Yes.

Matters for which he had considerable concern or over which he had considerable concern?-- Yes.

Why did you not reply and deal with the various matters that he set out in that letter?-- I have spoken to Mr Walker on numerous times about this matter and Mr Walker - I made mention yesterday - was in a meeting with Mr Biggam and myself when the extra inspector was put into Mackay, and it was Mr Walker who requested to keep the additional mines of Gregory and Gordonstone in his area and at no stage do I read - and so that was a decision on his part to keep those numbers

- and at no stage do I read through here that he is unable to fulfil his duties as an inspector.

Why did you not, in the good old Public Service tradition of protecting your own back, commit yourself to writing and answer all of the matters that he raised with you?-- I answered in another way, Mr Harrison. Part of what you haven't been told, as well, is that in November of this - of the same year-----

Are we talking about '93?-- '93 - the division - I'm just trying to look for the section now - if you look on page 4, what is said there about this - this philosophy - is under the section 4 - "Department change in philosophy towards safety in coal mines together with a diminishing budget allocation.", and the second dot point is changing "'from the policeman style'...to something else, perhaps auditors", and he has made a comment there about, "Unfortunately this was condoned by some in our ranks and indeed the idea was planted in the minds of the PSMC reviewers." We did have in November - I may stand corrected on the exact date on that - a meeting in Brisbane with all inspectors, including Mr Walker, and all the mechanical and electrical inspectors and, indeed, the metalliferous inspectors, and we had a two day workshop on our future role, and the potential role of auditing, and at the end of that - and whilst there was quite strong resistance to that idea at that time - and included in that is Mr Walker - at the beginning of that two day workshop, at the end of that period of time, there was unanimous agreement that this was the path which we would follow. In April of 1994, the first training sessions were put in place - training our inspectors in the art of - the skill of Quality Assurance auditing. Indeed, Mr Walker was part of that, and completed a course, and was destined to be in the first audit team that were to go to Gregory mine - I think that was on the 9th of August - and he was part of that new approach. So, I did reply, but I replied in action and words, rather than simply writing letters.

At the top of page 2 of his memorandum, under the heading "The Central Division has always had two mining inspectors.", he makes this comment: "It is only seven years since the Moura No 4 disaster when the need for a strong and professional Inspectorate was highlighted." Was that your understanding that that need was highlighted at that stage?-- I don't remember seeing anything highlighted in that regard.

Well, that wasn't a need that you perceived as coming from the No 4 Inquiry?-- I didn't see the No 4 Inquiry saying that we needed two inspectors in the Central Division.

Well, did you see that need arising after the Inquiry - whether or not the formal report said it or otherwise?-- I'm sorry?

Did you see that need arising - a need for a strong and professional Inspectorate after No 4?-- I see a need for a strong Inspectorate regardless of No 4 or No 2 or any other major incident.

On page 5 of that memorandum, he suggests that, "The Inspectorate must be independent of the industry and to a certain degree needs to be independent of the Public Service System."; see that?-- Yes.

Did you ever address that issue with them or anyone else?-- I would be amazed if it could ever be privatised.

Would you agree that, at the very least, it should be given control of its own budget? Just so I'm clear on that with you-----?-- The - go on.

-----what I'm suggesting is that we shouldn't have this role played with the regional managers of the DME?-- The role being played by the district - or the Regional Manager, I think you actually mean.

Yes?-- Has yet to be shown to be ineffective or restrictive to the Inspectorate. The decision has been a management decision by our Department - by the senior people in our Department, and if it fails to perform, then it will no doubt be changed.

You see the potential for failure there, don't you?-- There is a potential for failure, but most failures need to be responsive - are when things aren't responsive from a management position.

Wouldn't you agree that people with coal mining experience should be the ones to decide how the resources available to the coal mining Inspectorate are allocated?-- That would be my preference, but that is not my decision.

Getting back to that memorandum on page 2 at that paragraph I referred you to earlier at the top, Mr Walker in August of 1993 said to you, "If another serious incident were to occur under the present circumstances, there would be serious ramifications."?-- Where is this again, please?

Page 2?-- Yes.

That paragraph under the heading, "The Central Division has always had two mining inspectors.", second sentence?-- Oh, right.

Now, at the time did you understand that to mean serious ramifications for the department?-- I don't exactly know what he meant by that.

Well, when you got it what did you think, just dismiss it out of hand?-- It is possible he meant that the department could be embarrassed by something because there wasn't an extra inspector in the Rockhampton office.

As it turned out, were you embarrassed?-- No.

Are you confident that up until 7 August the Inspectorate in the Central Division provided all that needed to be provided in terms of monitoring the safety of the mines in the area?-- I believe that the Inspectorate provided a proper and reasonable service to the Moura Mine.

Not in the slightest adversely affected by the budgetary matters that I have discussed with you today?-- Not in the slightest, and I do not read anywhere in this memo, nor has Mr Walker ever stated he has been restricted from attending to Moura or any other mine due to lack of budget.

He expressed his concerns, did he not, to the effect that it could have on his capacity to conduct his duties relative to safety in the mines in his area?-- Where is this?

Well, generally. Would you agree with that, that that was a general complaint on his part, that safety was a concern, safety for the mines in his area was a concern when he raised these matters?-- Safety is his concern, but he hasn't identified where he wasn't able to fulfil those duties.

Didn't you ask him?-- Yes.

Did you?-- Yes.

What, you are saying you didn't identify any areas?-- No.

When did you ask him?-- I've asked him numerous times about whether - if there are any areas where he cannot perform his duties.

Would you agree with this proposition -----?-- And if he couldn't he would have written to me, let me tell you, he would have written to me.

Would you agree with this proposition: that if there is a problem, you don't invariably find out about the problem until it's too late, do you?-- I've - as I said earlier, I'm not into fortune-telling.

Well, let's get to the issue. It took what happened at Moura No 2 for the Inspectorate to find out a number of matters relative to lack of knowledge, relative to communication, relative to gas monitoring. It actually took this disaster for these things to be detected, didn't it?-- It's come out through that, yes.

Isn't it the case that if you wait for something to happen, if you wait for someone to identify the specific area, then it's too late?-- The reason why we are going down the path of doing auditing is to do exactly what you're suggesting was the problem, is to make sure that the parts that people walk past and don't observe so readily are addressed in detail and on a systematic and thorough basis, and that is why the system is changing. It's what should change.

Sorry, are you finished? You were being invited by one of your senior inspectors a year before this incident to look at staffing levels and budget in so far as they could impact on safety, weren't you?-- I haven't read anything here to suggest that safety was being put in jeopardy as such. Can you point that out to me?

He talks, does he not, at the bottom of page 4, of feeling exposed himself should there be another serious incident?-- That's not an issue of safety to the mines.

Wouldn't you interpret that to mean that he was concerned that it could be seen that he wasn't doing enough in relation to safety and he could be the poor person who copped the blame if something happened? Did you read it that way?-- No, that's not the way I read it.

Is it the case that he had to spell out a particular area of safety concern before it would have worried you?-- It's up - it would be up to him to identify where he wasn't able to perform his duty as an inspector and then I would address that matter. He was given a task to do, responsibilities, the funding and he did it.

He was telling you he couldn't attend to all of those duties, wasn't he? That's, in effect, what he was telling you?-- The record shows that he did attend to it.

You heard him when I questioned him about the contents of this letter. You listened closely to that, I take it?-- To what part are you talking about now?

I took him through the letter, you may recall, almost

paragraph by paragraph?-- Right.

Did he not say on a number of occasions - I don't particularly want to get bogged down on this point - but did he not say his concerns were safety concerns?-- Yes. Did he identify what the safety concern was?

You see -----?-- No.

What would you have to identify in the case of Moura No 2? Would you have to say, "Look, I don't think the mining officials at Moura No 2 have sufficient experience or sufficient training to properly identify a problem. I can't get out there and assess this."?-- He would -----

He would have to come out with something like that, would he? Is that what you are saying?-- If he felt that, he would have said it.

The only way we would find out those things, if in fact they are true, was to have the unfortunate incident that we had?-- No, it's not the only way at all.

That's how these matters did surface, isn't it?-- That's how they have come to light, yes, but this Inquiry has put things under such a very fine scrutiny that you could not possibly expect an inspector to come up with a results that this Inquiry has uncovered and that would be an impossible task - or an unreasonable position to expect of any Inspectorate.

Applying that same logic, you could not expect an inspector who is complaining about insufficient staffing levels and insufficient budgetary levels to accurately foretell - foresee what was going to happen here either, could you?-- I don't think the two are related.

He wasn't the only one that complained about staffing levels, was he?-- To which are you referring now?

A simple question, he wasn't the only one that was complaining about staffing levels, was he?-- We have had other areas of staffing concerns.

I would just like to go to something you said yesterday when Mr Clair was questioning you yesterday afternoon. He was raising with you the question of whether or not there was sufficient staff to properly attend to safety matters; do you recall that? He touched on that fairly generally with you yesterday afternoon?-- I don't specifically recall that, but -----

I'm looking at a passage of the evidence at page 4,951. He asked you at about line 15 about there being insufficient resources at least in Central Queensland for inspectors to carry out their job properly, and I will just read the transcript from there. The answer is, "I haven't seen any information or letter that says that the inspectors weren't able to do their job." Question, "The documentation certainly raised the prospect of matters of safety -----", and then you said, "May occur." Just to take you back there, the documentation he was talking about was what we are dealing with now. The question goes on, "Yes, being not properly attended to because there were insufficient staff." Answer, "That's the view of a person and there is more to that story that I guess will come out." Now just finishing that off, I thought you said "...then I guess will come out.", but can you recall what you did say?-- "...that I guess..." I think it was.

All right. That's a view of a person; are you talking about Mr Walker?-- That's true.

On page 4,952 Mr Clair was questioning you again and he said this to you at about line 35: "Now, again it seems that Mr Walker at least raised with you concerns that really their staffing levels weren't enough to allow them to do their job properly. Was he the only one or were there others who raised their concerns with you?" Answer, "No, Mr Walker. It doesn't

make any difference. There were no other requests for electrical or mechanical inspectors." Now, correct me if I am wrong there, but were you saying there that Mr Walker was the only one that had complained about staffing levels impacting on the capacity of inspectors to do their job properly?-- I think I understood that was talking about this correspondence that you placed in front of me here.

I see. You weren't trying to give the impression yesterday that the only person to complain about staffing levels and the possible impact it could have on being able to do the job properly was Mr Walker?-- There was another occasion where when we were short of a mechanical inspector that there were concerns raised. That has since been filled.

Have a look at this document and tell me if this relates to those concerns?-- Right.

Is that what you are talking about?-- Yes.

You will see that that document has got a number of names on the second page?-- Yes.

Were they basically all of the mining, mechanical and electrical inspectors?-- Yes.

Do you know when that was that that document came into being?-- I think it was early last year. I don't know exactly when. You will note that it wasn't sent to me.

We will clear that up. You knew of its existence, didn't you?-- I was aware of it.

You had seen it before, before today?-- Yes.

Your Worship, I've got some copies of this I can hand out. Just while it's doing the rounds, the one that actually went to the Director General ended up with all of the signatures of those people, didn't it, as far as you can recall?-- It's my understanding that it wasn't, but -----

Well, there were a number of signatures, certainly more than just appear on the copy that fell off the truck that I got?-- It must be a rough road somewhere, but I understand that they weren't - not all signatories signed that.

Would you agree that the bulk of the inspectors under your immediate control signed it?-- I have no way of knowing. I did not see the final letter.

But you know, don't you?-- I don't actually, no.

You know it went, in any event, signed by some of them at least to the Director General; is that right?-- I am told it went. I never saw the letter that actually was received by the Director General if indeed there was one.

That was Mr Paul Breslin at that stage?-- That's correct.

He has since parted company with the Department, hasn't he?-- That's true.

Who is the Director General now?-- A Mr Willims.

What are his mining qualifications?-- He doesn't have any.

He's got the bureaucratic background also?-- He has got a public service background.

I won't argue with it. Did the Director General bring to your attention that inspectors under your control had these concerns last year?-- No.

So really in terms of -----?-- Not that I can recall at all.

See you've told me today, and I don't want to rehash the evidence, but basically you had no real concerns that the Inspectorate was not able to properly carry out its functions in relation to safety before 7 August last year?-- I've said that numerous times.

I just need you to say it again to set up the next question. Is it the case that in that regard you were at odds with the bulk of the inspectors who worked for you?-- If you read that letter the concern that we are talking about was the fact that we were one mechanical and one mining inspector down. We have since replaced that mining inspector. We have advertised and are soon to interview again for the mining inspector's position. They are not talking of manning levels above what I have been talking to you about. That then does not constitute a difference of position.

From your own dealings with the men under your control you would know that many of them have concerns in terms of the Inspectorate's capacity to properly carry out its role in relation to safety and that they had those concerns before 7 August last year, I suggest. You would know that. Isn't that right?-- No.

See, Mr Walker was not alone in his views, was he?-- In relation to the Inspectorate numbers at Mackay - at Rockhampton?

Yes?-- I never took a consensus view of that, but I think he might have been alone there.

I suggest to you that not one of the inspectors under your control as at 7 August last year shared your view that the Inspectorate with its staffing level and with its budgetary constraints could properly attend to safety matters?-- I don't agree.

Can you point to any? Can you name any that agreed with you - that held the same view as you?-- Whenever you have a position which remains vacant, such as the mechanical inspector's position, that required - that put additional work load on the situation, which was seen as being not sustainable and may not have been attended to, and we are still in the process, as I say, of trying to attend to the remaining position, which, might I say, had been offered to a person of the right calibre, however he has decided not to accept the position, and so we had to re-advertise the vacancy again.

Can you not name one person within the Inspectorate who shared your view?-- Which view now are you talking about, please? Just be specific?

I can't be more specific than that - that shared your view that the Inspectorate, with its staffing levels and with its budgetary constraints, could properly carry out its role in relation to mine safety as at 7 August last year. I am asking you to point to anyone within the Inspectorate that shared your view in that regard?-- The question you are asking me is whether at that time the Inspectorate collectively felt that they had sufficient resources at the 7th of August. I would be part of the group that says no, we didn't have sufficient resources because we were two people down. If you are talking about if those positions were filled and the budget was available to fill those positions, then I would say that I could name people who would be satisfied with that level.

All right, I won't waste any more time with that. I tender that document, Your Worship.

WARDEN: Exhibit 280.

ADMITTED AND MARKED "EXHIBIT 280"

MR HARRISON: I would like you to look at this document: it is headed up "Injury Frequency Rates 93/94". Is that an Inspectorate document?-- Yes, it is.

And you said yesterday that Moura, in terms of injury frequency rates, compared favourably with the other underground mines; remember that?-- Yes, I did.

And is that, in fact, reflected in this document?-- Yes, it does.

Again, I have copies I can hand out, Your Worship. There are quite a few underground mines with much higher injury frequency rates for '93/'94 as depicted on there, aren't there?-- Yes.

In fairness, some of them would be small mines, so figures can be distorted by one incident?-- That's true.

XXN: MR HARRISON

WIT: LYNE B J

But some of them aren't, are they?-- That's true.

Gordonstone is a fairly big one?-- Yes.

450 people, or something, hasn't it?-- That sort of range.

Oaky Creek - fairly substantial?-- Yes.

What's being done in terms of addressing those rates at an Inspectorate level?-- Similar to what originally occurred in the Moura No 2 Mine, and that is that concentration is put on the attention by the Inspectorate on the mines that are performing poorly. That occurred at Moura; that's occurred at a number of other mines, and that includes talking with the general managers of those mines as well.

Now, that's done mainly by, I take it, the mine inspector?-- Very often.

I mean, he would do the bulk of the work in that regard, I take it?-- Yes, he would.

Do you think that your levels are such that you will be able to address those matters adequately?-- With our present levels we have achieved that result, both in the Northern and the Central Division of the Inspectorate.

I tender that document, Your Worship.

WARDEN: Exhibit 281.

ADMITTED AND MARKED "EXHIBIT 281"

MR HARRISON: Just for the record, there are a number of documents, in there, aren't there, relative to the same issue?-- There are.

I only referred you to the first page. Could the witness have another look at Exhibit 280, Your Worship? Getting back to what you were saying before, would you agree that the issues raised in that particular memorandum go way beyond just any mechanical inspector's position?-- Yes, they include filling the mining inspector's position.

All right. See, that was a matter of concern across the board within the Inspectorate, wasn't it?-- It is a matter of concern to me.

Just put that to one side. There is one further matter: you have been present when counsel representing the Inspectorate and the Department has cross-examined different people in these proceedings?-- Yes.

300395 D.53 Turn 17 sbd (Warden's Crt)

In particular, you have seen undermanagers,
undermanagers-in-charge questioned in the course of these
proceedings by your counsel?-- Yes.

Would you agree that people at that level have been

cross-examined by your counsel quite aggressively in relation to their knowledge of matters particularly in relation to spontaneous combustion and CO make?-- I have noticed how it's been - how they have been questioned.

Yes, and in fact not only in relation to those matters but in relation to their performance of their duties generally they have been quite vigorously cross-examined by your counsel?-- You might say that.

You would agree with that, wouldn't you?-- In some areas it's been vigorous.

Did you give instructions to proceed on that basis?-- No, I did not.

In fact, in your role as Chief Inspector you have not been involved in the giving of instructions to the legal representatives for the Department?-- That's not true either.

Not involved to the extent of instructions as to how the matter should be conducted?-- The instructions that I have given as Chief Inspector have been focused on achieving what the facts of the matter are, and that has been my total, and remains my total, focus.

Thank you, Mr Lyne, I have nothing further. Thank you, Your Worship.

WARDEN: Thank you, gentlemen. It will be an appropriate time to adjourn. Concerning Monday morning, Mr Parkin is due in Monday morning but he will try and get here as early as possible so we can start as early as possible, so be prepared. About 10-ish, work towards 10-ish. Thank you, gentlemen. Witness, you will be stood down and required again Monday morning. Thank you.

THE COURT ADJOURNED AT 3.02 P.M. TILL 10 A.M. ON MONDAY,
3 APRIL 1995

WARDEN'S COURT

MR F W WINDRIDGE, Warden and Coroner
MR R J PARKIN, General Manager, Capricorn Coal Pty Ltd
MR P J NEILSON, District Secretary, United Mine Workers' Union
MR C ELLICOTT, Training and Development Officer, Department of
Mineral Resources, New South Wales
PROF F F ROXBOROUGH, Professor of Mining Engineering, School
of Mines, University of New South Wales

IN THE MATTER OF A CORONIAL INQUIRY IN CONJUNCTION WITH
AN INQUIRY (PURSUANT TO SECTION 74 OF THE COAL MINING
ACT 1925) INTO THE NATURE AND CAUSE OF AN ACCIDENT AT
MOURA UNDERGROUND MINE NO 2 ON SUNDAY-MONDAY, 7-8 AUGUST
1994

GLADSTONE

..DATE 03/04/95

..DAY 54

THE COURT RESUMED AT 10.12 A.M.

BRIAN JOHN LYNE, CONTINUING:

WARDEN: Mr Lyne, you are on the former oath you took at the start of your evidence. Mr Martin?

MR MARTIN: Before I start I should formally tender the Coal Mining Act 1925 as amended, together with the various rules made under that Act. It's not necessary for me to do so, but I do have a complete set of the Act and the rules of the various amendments. If you wish to have it you are welcome to it.

WARDEN: Exhibit 282.

ADMITTED AND MARKED "EXHIBIT 282"

MR MARTIN: Mr Lyne, can I just ask you, please, where the push for deregulation came from? Whose idea was it?-- It wasn't - the initial move wasn't a push for deregulation. The decision was made after a meeting that Mr Allison, a Mr Isles and myself went to with an organisation called the Australian Coal Industry Council where we saw evidence that other mining systems, and particularly systems of organising an attitude of people - changing the attitudes of people was of more - was a more efficient way of improving mine safety rather than the very prescriptive regulatory approach. When we came back to Brisbane - and most of those meetings were in Sydney - when we came back to Brisbane we had a discussion among ourselves as a small nuclear group realising that there were many problems with our existing legislation in Queensland and that changes were required, and the changes were in many areas, and rather than try and modify the old system which had been in force since about 1925 it was seen as more appropriate to take it as a new approach on a risk management basis aimed at changing the emphasis and indeed the culture of the industry to be more safety conscious.

Can you just give us an idea, please, of the duration of time over which this process has been going on, how long?-- It's in excess of three years. I don't really recall the initial date.

Has there been any scientific input into it?-- To a limited degree there has been, more particularly in the latter stages as the regulations have been developed and some of the suggestions for changes for regulations have been made.

Who has been providing that input?-- Principally those areas have been addressed through SIMTARS.

XXN: MR MARTIN

WIT: LYNE B J

Do you see a role for SIMTARS in the future in relation to scientific input into any new legislation?-- I've always involved SIMTARS in that area, yes.

I think you have probably partly answered this last week, but I take it you've modified your views at least somewhat in relation to the self regulation as such things as the monitoring process, the gas detection process?-- I wouldn't limit it to that extent, but, yes, there will be some -----

Rethinking?-- Rethinking about some of those matters, certainly.

Who was on this committee with you? I know you've mentioned Mr Allison for one?-- Yes, we have - Mr Isles represents the open-cut operators and Mr Roger Marshall represents the underground operators, and Mr Allison represents the principal mining union, and we have one other position on the panel who represents the single bargaining unit. Due to difficulties in achieving one voice in that area we have had sometimes two people representing that voice on the panel. Mr Bell is also representing the engineering inspectorate, and, of course, myself.

You've told us of the Minister's commitment to implement recommendations and I don't want to labour this, but we have heard here, and no doubt you've heard, about the long time frame that it has taken for such things as SIMTARS to be implemented after Kianga and after the inertisation investigation, if you like, to be followed up after the 1986 inquiry. What time frame are we looking at for the future in relation to whatever recommendations this Inquiry makes? What degree of urgency is going to be adopted in relation to it?-- Mr Martin, I can only speak for myself in relation to the recommendation No 8 which is the one that I had to address when I took on the role of Chief Inspector -----

I'm not criticising you in relation to the past?-- I'm pointing out that I can only give things a high priority to clear that work. I cannot give a commitment or a timing on behalf of somebody else, Minister included.

I'm sorry, I didn't mean to cut you off. Are you finished?-- I'm finished.

See, the thing that concerns me most at the moment is that there are men underground right now, and there will be men underground whilst the Inquiry writes its recommendations, and we are most concerned as to the future and the quick implementation as of the recommendations for the future. Can you not give us any idea of a time frame?-- I don't think that's possible for anyone to give that. I don't even know what the recommendations ultimately are going to be.

You see, I'm just concerned with the past history which I have outlined to you in relation to Kianga and the inertisation program which was ignored indeed, as you've told us. Who can give us some idea apart from you?-- Well, if I might just

spend in answering that question a moment or two, you will see from the matters of consideration that's in my report there are a number of things which actually interrelate and you can not put in, for instance, the issue of inertisation without having a process that will adopt that technology at the mines, people trained who can actually use that equipment, systems in place which can actually move it from one mine to another, and fourthly, have it part of the training and emergency response at the mine. So all of those things are going to take time and some mines will adopt them sooner and some mines will take more urging. It is very difficult, and I am now assuming that the requirement of inertisation is going to be one that is a recommendation now out of the Inquiry. So this issue of time is very difficult to come up with a specific date of one month or three months or one year.

Has any rush regulation or legislation been considered in relation to the men being present whilst a panel goes through an explosive range to protect those who are underground, for instance, at this minute?-- No, there hasn't.

Do you think that would be a good idea given what we have heard about some doubts as to traditional things such as CO make or CO background or the Graham's Ratio?-- The question is again, please?

The question is, given those things has any consideration been given to rushing through some legislation requiring mine operators not to have men underground whilst a panel goes through the explosive range?-- The requirement of that hasn't been considered, no. I don't - I would not suggest that to achieve that would necessarily require legislation to be passed. If there was a risk seen as being there and it was brought to the attention of the management, people wouldn't be there.

Brought to the attention of management?-- Mmm, yes.

Do you seriously suggest for the future that coal mining management should be left with a discretion about such things as placing of monitors and gas detection systems and men being underground at crucial - critical times? You don't suggest it be left with them entirely?-- Not all flammable mixtures of gas in a sealed area are necessarily representative of the - of a problem in a sealed area.

Yes, but what I'm talking about is the fact that this Inquiry has been about the deaths of 11 men and on the evidence it's been a misunderstanding or a lack of knowledge. We don't know what knowledge is in the mining community, and I, on behalf of my several clients, are most concerned to see that there is not a repetition while we go through this process of implementing some recommendations. That's what I'm directing my inquiry to?-- It's not something that I have - I've certainly considered it, but it's not something I personally have made a decision on if that's what you are asking.

Well, are you going to?-- I will be bringing that matter up to talk with the - all industry partners to discuss our approach to this matter.

Why is it necessary to consult industry? You, after all, are the Inspectorate arm of the Government. Don't you see a need for protection right at this moment?-- I see a need for protection even before this moment, but that protection may be the use of inert - use of inert gas equipment.

And apart from that it just may be as simple as saying, "Blow your mine up if you want to but don't see men go with it.", and compel the withdrawal of the men after sealing until it's inert; simple as that, isn't it?-- That would be quite a simple part of it.

Do you intend to see that your own officials get retrained in critical areas such as gas detection and so forth?-- Well, most of my Inspectors have been retrained in that field.

You say their level of knowledge is sufficient?-- I believe their level of knowledge has been sufficient, but I don't pretend that it won't need to be continually refreshed in the future.

Thank you.

CROSS-EXAMINATION:

MR MORRISON: Thank you, Your Worship. Mr Lyne, can I take your attention, please, to the use of the gas chromatograph? As we understand the evidence from SIMTARS and yourself of a few days ago, the audits that you asked to be conducted in relation to gas monitoring systems - and here can I just talk about two: the Unor and the chromatograph - were to be carried out by SIMTARS at your request?-- That's correct.

And they in fact conducted those audits of, let's assume, every mine in the State?-- Yes, they did.

And you received those audits back. What was done with them? Are they filed in relation to each particular mine or kept in an audit file, gas monitoring system audit file?-- A report was made, a complete compendium of all of the results was made and sent to me.

It looked like a general summary of the State?-- The actual results of each mine.

But not a summary of the overall position?-- No.

Did you do such a summary yourself?-- No.

Did anyone else do such a summary within the Inspectorate?-- No.

So, in order to see the industry position, one would have to in fact review all the audits afresh to see what the position was?-- Yes, you would. I, each time, spent time with Mr Bell when he delivered his report and got an overview of each of those - each mine in the State and in the areas where he had concerns.

Now, in so far as the gas chromatograph is concerned, when we requested documents from the Inspectorate during the course of this Inquiry in a number of categories, we got a response on 29 February this year from the Crown Solicitor which, amongst other things, had this to say on page 2: "No documents regarding the use in Queensland of the gas chromatograph are held by the Department." Is that an accurate statement? Two things: is it accurate as at 29 February 1995? I will read it again if you like?-- I know what you are saying.

"No documents regarding the use in Queensland of the gas chromatograph are held by the Department."?-- The interpretation I understood was being requested is whether the Department had issued instructions on how the gas chromatograph was to be used.

I see. So, the response is in that context?-- Yes, it is.

Do I understand from your answer then that there are in fact documents regarding the use of the chromatograph or gas chromatograph in Queensland beyond the audit forms, or are they basically it?-- No, the audit forms are the only documents that relate to that.

All right. Can we then understand from what you say, firstly, that consistent with that response, the Inspectorate has not issued either a letter or instruction or direction in relation to the use of the chromatograph in a particular way?-- I believe that is correct.

Or in relation to the use of it by persons other than those who are presently trained?-- Say that again, I'm sorry.

Or in relation to the use of a gas chromatograph by persons other than those that are currently trained?-- No, we have not made any instructions that way.

Or that more people at any particular mine - or, generally speaking, more people should be trained on it?-- Part of the audit from Mr Bell was to establish the fact that there were an adequate number of people able to use and respond to - competently with that equipment, and we took the view that if there were sufficient people available, whether they had to be brought back out from town to operate the equipment late at night, that was a sufficient response.

Can I just pause there to note a couple of things? In a town like Moura which is only - if we took an average - say, 10 minutes from the mine site at No 2, the Inspectorate's view is, as I understand your evidence, that it's reasonable to have access to trained persons, albeit that they might be

10 minutes away at home?-- Yes.

So that the absence on the mine site itself of a trained gas chromatograph operator is something that was not - if we take the date as at 7 August - of particular concern to the Inspectorate?-- No.

And might the same be said, if I can broaden the question, in relation to the other areas of particular skill, perhaps interpretation of gas or, indeed, resetting of alarm levels and the like, access within, say, 10 minutes to relevant personnel is reasonable, isn't it?-- That is correct.

And, indeed, if we could take it even further, we have heard some evidence at the Inquiry about how in the past at this mine there were periods when the mine was effectively what one might call unattended or short-staffed and there was a system of automatic dialling if an alarm came up to locate persons?-- That is right.

And then how over time that changed so that there were in fact staff on site 24 hours a day every day. You can recall those two categories of time?-- Basically, yes.

Having access to those trained and skilled persons, the same position would apply with, for instance, managers, wouldn't it? You wouldn't expect managers to be on site 24 hours a day, as long as they are within 10 minutes, say, in this case?-- That is true.

So, in all of those categories where there may not have been a trained or skilled person actually on site at any relevant time, nonetheless from the Inspectorate's point of view it is sufficient for those persons to be available within a relatively short time frame, and in this case we are talking about something like 10 minutes?-- Providing they are available by telephone and can get ready access back to the mine, that is acceptable.

Now, can I come back to the chromatograph for a minute? Consistent with the answer you gave me about SIMTARS checking out that there were adequate numbers of people trained, it is the fact, isn't it, that the Inspectorate itself didn't issue any document by way of direction or instruction or letter requiring that more people be trained than had been trained?-- That is correct.

I have asked a number of questions there in a number of categories relating to written documents, but the same thing applies to verbal instructions, doesn't it? To your knowledge, the Inspectors haven't issued any verbal instructions, directions or whatever requiring either more people be trained or, alternatively, that the gas chromatograph be used in a different way or by other people?-- I'm not aware of any verbal instructions.

And you yourself haven't issued any instruction to your Inspectors, either verbal or otherwise, requiring them to do any of those things?-- I have not.

Now, in relation to the chromatograph, if I can stay with that for the moment, does it not follow from what you say that with those audits you, likewise, haven't instructed the Inspectors to follow the audits up particularly, to keep an eye on them?-- The audits were sent to the Inspectors for their information and that was to be part of whether they needed to follow things up, to ensure that they are aware of the situation as seen by expert people at the mine that they were to be inspecting.

There is a difference, you concede, between providing something for information and issuing your own instruction about a course of action to be followed?-- There is a difference.

And, in essence, what you were doing was providing the information and then leaving it to the individual Inspector to make a judgment about the use of that information?-- Yes.

And those individual judgments might differ?-- If I saw something that specifically needed attention, then I would bring that to people's attention.

You can't remember any such occasion in relation to the gas chromatograph, can you?-- No, I don't.

Now, can you see that there might be some difficulties in relation to the continued use of that system within the Inspectorate; that is to say, a fairly informal provision of information - I am not talking about the gathering like SIMTARS, I am talking about the provision within the Inspectorate - fairly informal provision of information and then leaving it to Inspectors to make individual decisions? Let me explain what I mean perhaps if it's a little vague in one sense. We heard from the SIMTARS people, Mr Hester in particular, that SIMTARS do not regard themselves as being in an enforcement role in relation to the things that they have looked at, the Unor system, the gas chromatograph. They do not see their role as being enforcement, so they do not see their role as being one which requires them to recommend more people be trained or recommend uses in different ways. So, there is a gap, isn't there, in that the people you have used to conduct the audits don't see it as their role to enforce the sort of suggestions they are raising and what you do is provide the information to Inspectors without any governing instruction about what to do?-- Well, there isn't any one standard, if that's what you are saying, that we need to say that there would be a person or two people on shift at all times that could operate a chromatograph and - or indeed the Unor system.

So -----?-- That would be the standard that you would have to establish again to manage a particular risk, and under such circumstances a SIMTARS audit again would bring that - would identify that as a problem, if there was one.

The difficulty, though, is that SIMTARS audits certainly do refer to the numbers trained and their adequacy of training

but then it's two more years till you get the next batch of information and anything could happen in the two years?-- It could happen within a week.

And so far as we can understand from their evidence and the evidence of the Inspectors, there is no system in place in the Inspectorate which would compel the Inspectors to follow up those audits by ensuring those numbers do not decrease or that training does not diminish or that that use is not eroded. There seems to be no system for that, would you agree?-- If I understand what you are actually asking, it is probably compressed into saying that there is no prescriptive regulation requiring the attendance of a certain number of persons at a mine to be available for operating gas chromatograph equipment.

Well, that's one layer of it. Now, what you are about to say is true, there is no prescriptive regulation?-- That is true.

But the second layer of it, there is equally no system within the Inspectorate to compel Inspectors to follow that up or to require them to enforce certain standards, whatever those standards might be; is that not true?-- That is true.

So, would you agree then that if that's been the system in the past, it's certainly one that's haphazard and might need some attention for the future?-- I have already given evidence at this Inquiry that the Inspectors have in recent times been trained in Quality Assurance auditing and that is the purpose of doing such a training role.

Are you saying that under the QA auditing system one of the questions that might be addressed is use otherwise of the gas chromatograph; in other words, otherwise from the way in which it is being used?-- The gas chromatograph would be one of the matters which would be audited as to its effectiveness.

Well, we are only discussing the chromatograph at the moment. What I am asking you is whether you envisage the QA audit would in fact deal with the question of whether it should be used otherwise than the way in which it is being used. I would suggest to you that QA won't do that?-- The QA system only addresses the issue of systems - management systems.

Management addressing what is happening now or happening at the time of the audit?-- That's right.

Looks to see whether what has been happening has been happening in accordance with whatever rule is laid down?-- That's right.

Is does not address whether something more should be done or different; isn't that right?-- An audit doesn't do that.

No?-- But a review of the system would do that.

Well, under the QA audit system - that envisages the inspectors will fulfil - when will the review occur and who will do it?-- The reason we did the QA audit was not to quality assure people, it was to learn the skill of auditing, and how to better manage it.

I understand that. So, getting back to my question then: when would the review occur and who would do it? Would it be you or individual inspectors?-- The audit of the systems and review of the systems would be done by a group of inspectors.

And is this something that has happened in the past, or is this a notion for the future?-- This is our future direction.

Have these future directions received some sort of - not statutory enforcement, but some sort of formulation in writing?-- We are still in the process of doing that and, in fact, we are developing that in conjunction with the metalliferous Inspectorate whom our joint inspectors have trained with.

Now, if one had a system of self-regulation, but simply required that mine managers put in a gas management plan, that would be one easy way of accomplishing what otherwise might be done through the audit system; in other words, you might require in a gas management plan such details of those currently trained, use to which equipment is put, routine use, non-routine use, circumstances in which the routine might change, that sort of thing?-- That's true.

We could, in fact, live quite adequately with simply a few more requirements in the self-regulation field?-- It would be achievable.

And, as I understand it, basically your general thrust is for that rather than prescriptive regulation overall - some tightening up in the self-regulation department?-- Particularly if the self-regulation mode - or management system to which you refer - also recorded and reported and reviewed the fact that people were available not just once a year when an audit might occur, but continually throughout the year, which ensures that the system functions not just at the time of audit.

Indeed. That's part of the problem, isn't it, under the current system, or the system that's operated for a while now? Your information is two years out of date each time, as it were?-- I appreciate that.

Now, to perform that role - that is to say, if one had that

tightening up in the self-regulation area - you would obviously require consistent coverage from your point of view of all mines - in other words, from the Inspectorate's point of view - to make that work; you would have to have consistent coverage of mines?-- I don't understand what you are meaning by the word "consistent" there.

Well, I'll pick another word - "regular". "Regular" coverage of mines by inspectors, not haphazard?-- There are a number of different ways in which the Inspectorate may function in this regard. It may do major audits at one time through a year, or it may do sections of - audit sections of the management system on regular attendances at the mine. It is not necessary to do it in one visit, which is the normal way of gaining accreditation for quality assurance, for instance.

All right. Well, would you agree with the proposition that really an audit to ensure the best coverage - the coverage by the Inspectorate - should be regular, firstly, not irregular or haphazard? You agree with that proposition, I'm sure?-- The idea of auditing is to take the haphazard part out so that the total mine system is audited. Whether it is regular, once a month, or whatever - which has been floated as an idea - is something which needs further consideration.

All right. But you would agree, surely, that a haphazard system is one that shouldn't be tolerated?-- It isn't being tolerated and that's exactly why we are changing.

And one which leaves an inspector in a position of having to ration his visits according to pressures of work is not a recommended system, is it? You wouldn't think that that was the appropriate way to go about it, surely?-- I think we may be getting a couple of things confused here.

All right?-- I have not at any stage agreed that it would be only - and necessarily - the local inspector who does the audit of their mine - of a mine. It may well be - and I think there is probably very good reason why the audit of a mine is done by a person who is not the normal inspector of that mine.

Do you mean nonetheless an inspector, though not the normal inspector; that is, being someone like an independent consultant?-- No, I am talking about maybe another inspector from a different area coming in and doing those inspections and looking at a mine with fresh eyes, and I think that I've seen evidence at this Inquiry to prove the value of using that philosophy.

Now, do I understand from what you say that that's something you are presently minded to carry on to in the future; that is to say, whether it is by rotation or otherwise, conducting the inspections of mines by differing inspectors in order to achieve that fresh approach?-- The inspections I see will probably continue in its present form in - but not the audit section. I think the audit section will be a separate matter, and it may well depend upon whether we just simply audit the principal risks at the mine.

Let's get back to my original question for the moment. If we can deal with, then, the inspections rather than the audits, would you not agree with the proposition that it is not a recommended way to go to have an inspector in the position where he feels he has to ration his inspections to particular mines because of the pressures of work, and so forth; in other words, where he has to go less to one mine than he thinks desirable because of pressures of work, exigencies of his position? That is not very desirable, is it?-- It is not a desirable, but there is a - you have to establish what is required to be achieved.

But surely you have to be proactive, not reactive. You can't wait for things to happen, which was the point being made by someone. You can't wait for events to happen and then do something about it; you have to be proactive, even in the Inspectorate?-- We do and we are, but what we are doing is the ownership of the safety at the mine clearly belongs with the mining company, and it is the mining company's system - management systems - which are the things that are going to be there every day and are going to be used by the company every day - and whether or not other people wish - it is not - a mines inspector cannot be there at a mine every day overseeing that those things are being complied with.

Let's not argue in extremes. One could argue in extremes all day and have inspectors there every day on one extreme and inspectors there once a year on the other. Let's talk about the real world where inspectors go to the mines with some regularity. Would you not agree with the proposition - I think you probably do - that it is an undesirable thing to have inspectors who conduct inspections in the position where they feel they have to ration their visits because of the exigencies of their work; in other words, visit mines less often than they would desire to; is that not an undesirable thing? I think you agree it is?-- It is undesirable and it is not acceptable that a person cannot have sufficient visits to a mine that allows them to be fully aware or reasonably aware of the activities of the mine and conduct a reasonable number of inspections.

And in this area - which I might term "coverage by inspections" - you would agree, would you not, that this is one particular area where the Inspectorate are really required to be proactive; in other words, to make sure that inspectors cover the mines as frequently as they think is necessary?-- I don't argue with that.

So that if we can see in the evidence a time or a period or an area in which inspectors have felt that their coverage is not at the desirable levels, or they have been compelled by the exigencies of their work to ration their visits, that is something that should not be tolerated into the future; would you agree?-- I don't recall evidence of that nature being brought before the Inquiry.

That's not answering my question, Mr Lyne. If we can discern that from the evidence, wouldn't you agree it should not be tolerated into the future? I'm not asking you to give me a

review of the evidence, I am simply saying assuming that is so, assuming we can detect that from the evidence, it is a situation that should not be tolerated into the future, isn't it?-- I am having a little difficulty grasping the scope of your question, Mr Morrison.

Which part is giving you difficulty? Whether there is evidence or not? Is that the part that's giving you trouble?-- No, the purpose of the - or the-----

The purpose of the question?-- Yes.

Well, don't worry about the purpose. I would like you just to answer it?-- Well, just repeat it for me, please?

If we can detect from the evidence that there has been a time or a situation where inspectors have felt compelled to ration their visits, their inspections of mines, due to the exigencies of their work, then that is something that should not be tolerated into the future?-- I would agree with that.

All right. Now, can I turn to a slightly different area, but aligned, and that is the Unor system? Now, as with the gas chromatograph, as I understand it, there is no document that emanates or has emanated from the Inspectorate requiring the location of monitor points at particular places?-- That duty is given under legislation to the manager of the mine.

I understand that may be so, but the fact that I have asked - the fact about which I have asked is so, isn't it? There has been no direction or document from the Inspectorate requiring-----?-- No, there has not.

In fact, the Inspectorate could do so if it considered the safety of the operation required it?-- That's true.

Likewise, the same applies to the mapping of monitor points; is that not right? There has been no document emanating from the Inspectorate?-- No, there has not.

And the same thing applies if the Inspectorate considered the safe operation of the mine required that you have the power to do it?-- That's correct.

The same applies to calibration of equipment that relates to monitoring under a Unor system?-- The calibration requirements are set out under the Australian Standards, as I recall.

Yeah, but in terms of frequency?-- That's part of the Standard.

Has any document emanated from the Inspectorate requiring or directing that calibration be carried out either more often, alternatively in a different way?-- No, it has not.

And as with the gas chromatograph, the same position applies in relation to how many approved persons operate the system; nothing has come from the Inspectorate?-- No, it has not.

Likewise, the use of it in particular ways as opposed to the ways in which it is being used, same thing applies?-- That's true.

Likewise, the level of training for those persons who are to operate such a system, same thing applies?-- That is true.

And in all those areas, if the Inspectorate discerned that safe operation of a mine depends upon any of those things, there is no question about the power to make such a direction?-- That is true.

Now, when we put together - sorry, I'll - as with the gas chromatograph, so with the Unor system in relation to SIMTARS. Now, we have heard from SIMTARS that they do not regard their role as being an enforcement role in relation to numbers of persons, their training, or the use of the system, and so forth; they simply record events. Can you see there that there is a gap that might arise between what you perceive their role to be and what they perceive their role to be? They are not going to make recommendations to you in the audit that more people be trained or that they be trained in different ways or that the use be different; whereas you might expect them to make that or have expected them in the past to make that?-- What I asked them to do and what they have done was to establish the fact that there were people available at the mine and sufficient numbers to be able to respond and operate this equipment.

Well, you didn't ask for and never got a recommendation that, for instance, the use of the system be different from its current use?-- I didn't ask for anything different, no.

So that in that particular area, which applies to the gas chromatograph, but equally the Unor system, there is a gap that can develop in what you regard as the auditing system - that is, up to this point, where SIMTARS are sent out to do the audit and you review simply their results?-- I don't see a gap there. I don't agree with that. The gap would be if there were - the equipment was at the mine and no-one was available who could use it.

Well, let me ask this: how would you detect, given the current system, whether the equipment should be used in a different way? How are you going to make that discovery? It couldn't come from SIMTARS. They are not about to do it. It is not their role. It is not going to come from yourself. Your visits are too infrequent. How is it going to happen by an inspector? Being on site and discerning it?-- If the inspector determined that the equipment needed to be used in a different way, then he can make that determination and enter it into the record book.

Right. Well, what system was in place to direct inspectors to follow up these audits in that fashion? The answer is there was none; isn't that right?-- No, there wasn't, that's true.

There was no direction to your inspectors to - quite apart

from a written one, there is no oral direction to your inspectors to follow up these audits with a view to seeing whether anything should be done differently from the way in which it was being done; is that right?-- That is right.

Now, in relation to these two areas that we have been discussing, let me just ask this: that is, the gas monitoring system and the gas chromatograph, in so far as those pieces of equipment exist at other mines, is it your view that what we - a standard of use at Moura reflects the standard of use at other mines that have them?-- For those who have tube bundle systems, yes.

And the chromatograph as well?-- Yes.

So, can we understand, then, that what we have heard about - the way in which this system was used at No 2 - in your view, certainly - that standard reflected or was the same as, in a general sense, the standard of use at other mines?-- Yes.

That underlies much of what we have heard about this mine, doesn't it? Standard of reporting as well is much the same?-- Standard of reporting is much the same.

Format of the reports themselves much the same?-- I specifically haven't addressed that. I understand that is true.

Standard of communication, likewise, much the same?-- That I cannot answer. I have not compared Moura with every other underground coal mine.

Standard of training much the same?-- No, I can't answer that. I know that there are mines - considerable mines that have a better documented system, more structured system.

Better documented is one thing, I'm talking about the actual standard of training. It's one thing to have training and it's another thing to document it. They are two different things. They may be better documented, but what I'm suggesting to you is the standard of training is much the same across the board?-- I can't answer that because we haven't done an audit and had a comparative audit between Moura and other mines.

See one of the things about this Inquiry is - and it's reflected in a comment you made towards the end of the last session, last year, that is - you desire, as it were, to move the goal posts of the industry through this Inquiry?-- That's true.

That's only feasible or even approachable if what we are investigating here, and have been investigating here, is pretty much reflective of the industry, isn't it?-- It gives one view of the industry, an important view of the industry in very good detail.

But the approach that you wish to adopt is only possible if what we have heard is reflective of the industry, isn't it? To the extent that it's not then we can hardly shift the goal posts?-- Well, the point that I was making, and I continue to make, is that there are other organisations who have already shifted the goal posts further, and I think as an industry we need to shift them at least to those standards.

Well, that may be a slightly different point, but your desire is still there to shift the goal posts through what we have heard; is that right?-- Unquestionably.

And that really depends to a large extent upon your view, which I think you hold, that what we have heard about this mine is reflective of the industry?-- Overall I would suggest that that's a reasonable position that you put.

Can I go on to something slightly different? Prior to 7 August had you given any consideration to what use should be made in Queensland of gas chromatograph at a mine?-- The use of the gas chromatograph was - its principal use was to detect on occasions when it was possible that there was a heating or a fire, that the presence of hydrogen and other hydrocarbons was present.

So to the extent that you turned your mind to it prior to 7 August that was the only use that you had in mind?-- That was its principal use, in addition to the Unor type systems.

I accept that. Now, on a slightly different question, but the same sort of thing, prior to 7 August had you turned your mind to when the chromatograph should be used, in what circumstances?-- In my mind it was whenever there was a potential risk of a heating.

You are saying you had in fact turned your mind to that question?-- Yes.

Having determined in your own mind prior to 7 August that that was when it should be used, did you take any steps to send out a directive or letter of instruction or ordinary letter to all mines saying, "Now you've got gas chromatographs, this is when I think you should be using it."?-- No, I haven't, but as I mentioned earlier in this Inquiry there is not a legislative requirement of having gas chromatographs.

I understand that, but -----?-- And that each of the inspectors have taken the issue to each of the companies, including Moura, and pointing out the reasons why it is of value and that includes precisely what I've just said, is the detection of the higher hydrocarbons and hydrogen.

That's a use question, and we know that's the use that the chromatograph can be put to. What I'm talking about is the occasions on when it's used, when. You are not going to suggest, are you, that the inspectors have taken to the mines an Inspectorate view of when the chromatograph should be used?-- No, they haven't.

Now, as at 7 August -----?-- Can I just add one thing? I have not also sent any instruction out as to when they shouldn't be used either.

I can well appreciate that. In fact there has just been silence, hasn't there, from the Inspectorate on when to use the gas chromatograph, hasn't there?-- That's true.

And your answer before that there is no legislative requirement is hardly an answer at all, is it? You don't -----?-- Well, I think - I argue on that particular issue because I don't see it being that you have to legislate everything that a person does at a mine.

No, but you don't enforce some of the regulations anyway; the 340 kPa on seals, just not enforced at all. So the fact that there is either a legislative requirement or not is hardly to the point, is there? Let me go, on if you perceived that the chromatograph should be used on this sort of occasion then you would hardly refrain from writing just because there wasn't a legislative requirement?-- That is right.

So the response that you gave me was really not to the point, is it? It's got nothing to do with the fact that there is no legislative requirement. That's not the reason why you haven't written this, that's the short and long of it?-- No, there is not because there is no legislative requirement. I don't wait for that, nor do my inspectors.

Let's go back then to 7 August. What was your view at that time, if you had a view - tell me that first, if you had a view as to how many people should be trained on, say, a gas chromatograph at a particular mine. Did you have any view at all about that?-- I have a view that - and had a view, that

there would need to be a minimum of two persons.

Did anything emanate from the Inspectorate to any mines saying, "Look don't drop lower than two."?-- No, it has not.

Did you have any view as to how many people should be trained on the Unor system as to 7 August 1994? Did you have a view about that?-- I would say an absolute minimum again would be the number of two.

Was that your view at 7 August or is that your view now?-- No, it's always been a view.

Did anything emanate from the Inspectorate saying that, "Don't let the numbers drop below two."?-- No.

Does the same thing necessarily apply to those who might be authorised to operate those machines? You may have had that view, but nothing has emanated from the Inspectorate about it?-- There has been nothing come out of the Inspectorate.

Likewise as we have discussed, the particular use of the equipment, same thing?-- That's right.

Now, does the same thing apply to this question: as at 7 August 1994 did you have a view as to whether CO make should be calculated on the Unor system?-- Automatically calculated are you suggesting?

Yes?-- No, I didn't have any view that it should be automatically calculated.

And we can therefore expect that nothing has emanated from the Inspectorate about that, about calculating CO make on the Unor system; is that right?-- That is correct.

Now, as at 7 August 1994 what was your view about CO make in terms of the use of it at a mine? Was it your view that it was something that had to be used?-- I believe it was one of the best indicators that you could get.

Did anything emanate from the Inspectorate to all mines saying, "In the Inspectorate's view CO make is one of the best indicators and therefore you should use it."?-- No, it did not.

What about the graphing of CO make? Did you have a view as at 7 August 1994 about whether CO make should be graphed at a particular mine and how it should be graphed?-- No, I did not.

So nothing consistent with that absence of a view, nothing would have emanated from the Inspectorate about those matters?-- That is correct.

Did you have a view, and if so what was it, at 7 August 1994 about the posting of the results of a CO make calculation at a mine? In other words, should the results of CO make be posted? Did you have a view about that, at 7 August 1994?-- Specifically on CO make, no.

I'm sorry, can you say that again?-- Specifically on CO make I did not have a view.

Can we accept then that with the absence of that view nothing has emanated from the Inspectorate about that matter, about the posting of the results?-- That's true.

Did you have a view as at 7 August 1994 as to the extent to which deputies and miners should understand CO make?-- No, I did not.

We then accept in the same way with the other matters, that nothing has emanated from the Inspectorate about those matters either?-- That is correct.

Did you have a view, and if so what was it, at 7 August 1994 about the utility of the levels of 10 and 20 lpm?-- I was aware of the - those figures at 7 August. I was not of the view that they were necessarily proven for Australian conditions.

So certainly nothing would this emanated from the Inspectorate recommending the use of those levels; is that correct?-- It had not.

Do you say it's for that reason that they were not proven for Australia?-- It's because they are not proven for all circumstances.

And that is entirely consistent with the view you took in 1992 when you participated in the MineRisk and review, isn't it?-- That's true.

Can you explain to me this then: we have sat through any number of days of this Inquiry hearing your counsel question people about why they didn't have regard to 10 and 20 lpm as appropriate standards on 7 August 1994 or about then, and you've sat here while that has gone on, and yet your view two years prior to this event was that they were not appropriate standards because they hadn't been proved for Australia. All of that is so, isn't it? Is it not?-- Partly.

You didn't recommend the use of 10 and 20, as I understand, at least partly if not specifically because those levels have not been proved for Australia?-- That's my view.

And two years prior to that you participated in a MineRisk review which effectively dumped the levels preferring instead a more general rule about sustained rise above a background make?-- That's right.

Well, can you explain to me then how it comes about that the Inspectorate have sat here for all those days that we have heard people grilled about their regard or otherwise to the use of 10 and 20 when it was obviously your view as Chief Inspector that that wasn't appropriate?-- The questions that our counsel takes and the information that he uses just doesn't all emanate from the Chief Inspector. It also -----

Did you think you might tug his shirt at any stage of this long Inquiry and say to him, "Excuse me, I resolved two years prior to this event with others that this wasn't really right." Did you ever say that to him? Did you ever give those instructions?-- He was made aware of that.

I see. When? Towards the start of this Inquiry or before it?-- When the Inquiry was started.

You say the instructions effectively don't come from you; is that right?-- Not all instructions come from me.

Well, none in relation to that area by the sound of it; is that right? It's all right, I withdraw it. I will move on. Let's go back to CO make. You had a view that it was the best indicator in relation to a mine generating CO?-- I've answered that yes.

Can you tell me what steps did you take to compel the use of CO make in Queensland mines?-- I have taken no such steps.

Notwithstanding your view, no steps; is that right?-- That's correct.

And likewise none of your inspectors have taken any such step either, have they?-- No.

I'm sorry, you agree with that?-- I agree with that.

And none of your inspectors were required by you to check the CO make levels at any mine?-- That is true.

And so far as you can tell none of your inspectors did; isn't that true?-- That is true.

And so we arrive at this position here: with CO make being in your view the most important indicator, and critical in one view of things, to what happened on 7 August 1994, but the position is that the Inspectorate has done nothing to compel its use or to check its use; isn't that true?-- I can't answer the issue - there has been no specific issue to compel its use and we have established that. The use of CO make has been known to the industry and used by the industry including Moura, and it was identified in the 1989 SIMTARS seminar which also my senior inspectors attended.

Could you answer the question? That's the position, isn't it? The Inspectorate has done nothing to compel its use or check its use; isn't that right?-- That's right. I can't answer about checking its use.

You've told us that you check and read every record book entry that your inspectors make?-- I have said that.

There is nothing in those that suggests that any inspector has checked CO make levels at any mine; isn't that true? You can't -----?-- I can't recall ever finding that on any of their reports.

And that's entirely consistent with the fact that you never directed them to do so; isn't that right?-- That's true.

In relation to that area of CO make let me just ask you this: you gave an answer on a previous day about CO make. You were asked a question and you answered in parts per million. That is reflective of one of the industry facts which you would have heard from Mr Kerr, namely that notwithstanding that CO make is something that might be recommended for use or seen as having utility, nonetheless there are many people in the industry who continue to think in parts and operate in parts?-- One cannot function without parts per million. CO make needs parts per million to function.

Well, that may be so. That's answering a slightly different question. I asked you was it not an industry fact, as you heard from Mr Kerr, that there are plenty of people who continue to think in parts and operate in parts and not CO make?-- I believe that is probably a correct statement.

We have heard at the Inquiry reference to the change in emphasis having come about in either '87, or variously '87, '88 or '89, but in truth it seems that whilst there may have been a change of emphasis in some minds, in reality that change of emphasis may be cosmetic and this there are plenty of operators at all levels considering parts, thinking parts and making decisions on parts; isn't that so?-- You can not have a CO make and not work without parts per million. You have to have that. In particular parts per million will be very important where areas are sealed, for instance, and there isn't a flow of air.

Once again you've answered a slightly different question. I just ask you whether you agree with me that the change in emphasis may well have been more cosmetic than real and that there are in fact substantial numbers of operators at all levels in the industry who think, consider and make decisions in relation to parts, not make?-- The people that I've spoken to, and I can only recall two other mines who I have spoken to about this, CO make in the mine, has been the criterior under which they have made their determinations. As for the other mines I cannot say.

Well, you disagree with Mr Kerr or you just don't know it's an industry fact?-- I can't - I don't know.

Well, certainly since the time that it became - I was going to say in vogue but I won't say that. From the time it became known as an indicator or accepted by anyone as an indicator, nothing has been done to introduce it into the Rules for Underground Mining?-- That is true.

The only requirement of such an indicator in the Rules was and continues to be use of the Graham's Ratio; is that right?-- That is true.

Now, can we stay with CO make for a moment? Do I understand correctly from the documents that I have seen or we have seen that in fact the Inspectorate has not made any directive or requirement for the training of miners in CO make?-- It has not.

Nor, necessarily it follows, would you agree, has it required any refresher training in CO make?-- That's true.

What steps, if any, were taken by the Inspectorate - no, I am sorry, I will start again. What steps did you take after 1989 to bring CO make to the attention of miners generally or the industry? What steps did you take?-- I haven't taken any specific steps to do that.

What steps has the Inspectorate taken that you know of to do that?-- I'm not aware of any steps that the Inspectorate has taken to do that.

After the '89 seminar did you call together the senior inspectors who attended the seminar for a review or debrief session to see what they got out of the seminar and what use might be made of it?-- The seminar was done before I commenced duty.

Nonetheless, after you came into this position did you call together the senior inspectors that attended to see what use might have come out of it?-- I did not. It was some time after that I actually was reading the seminar material and my normal system would be to discuss such matters as they arose on instances at the mines.

Did you take any steps, or did the Inspectorate take any steps to repeat the seminar in a different form or the same form or to make use of the videos which were taken of the seminar?-- I'm not aware of any videos at all that were taken. In fact, the thought - the suggestion at this Inquiry was the first time that I had ever -----

Heard of it?-- ----- heard of them, and in fact I have been unable to even find where a copy might even exist today.

Well, you can't help us on that then at all. Obviously it's a SIMTARS run seminar, maybe they are there. Have you made inquiries since you have found out about them to find out where they are?-- Yes, I have, and SIMTARS couldn't tell me

where they are either.

Are you actively looking for them now to make use of them in the future?-- I've asked that they be - if they are found, that they be brought to my attention so I can see what's actually on them. They haven't come to me yet.

Now, in 1992 when you participated in the Minerisk seminar - I'm sorry, Minerisk review - we have seen the results of that in terms of the discarding of the levels of 10 and 20. What steps did you take after 1992 to bring those results to the attention of the industry?-- I didn't bring those attention - those results to the industry, and as I have said here before, those results were not final decisions, they were a typed up version of whiteboard information.

Let's not try to minimise their impact, Mr Lyne. Dr Cliff felt they were important enough to publish them himself in the SIMTARS Review Magazine?-- He did.

In so far as they consisted of a review of those rules, that section was complete. There may have been other rules to look at and other sections yet to do, but that job was finished, isn't that right?-- Well, you would have to ask Dr Cliff for his view on that issue.

Did you take any steps to tell your Inspectors of the results of that review?-- That I can't recall. One of my Inspectors, Mr Biggam, for instance, was one of the participants at that seminar.

I understand that, but the others weren't?-- That is right.

So far as you know, no steps were taken to tell the other Inspectors of the results of that review?-- I can't recall the details back that far.

And in so far as that Minerisk review shows us the review of certain rules, that certainly expresses your view, doesn't it?-- Yeah, I agreed with what was put out in that review.

And you have seen no reason to change it since?-- In general I would agree with that. I can't remember every specific dot point. There were many, many of those.

I accept you haven't been sort of taken to an exhaustive review of dot point by dot point, I accept that, but generally speaking you see no reason to change your view?-- No. Can I just add that when I said I can't remember, it is my normal management style to - if getting things from Minerisk or from SIMTARS, that is a document to circulate among the Inspectorate, but that would be simply sent with a very small covernote on it "for information purposes" and circulated.

"For your information"?-- That sort of thing, yes, so I wouldn't remember to what degree that's been circulated.

Now, can I come to one other point? We have heard evidence that Mr Kerr telephoned you on about 25 July?-- Yes, we

have.

That's so, isn't it?-- I cannot remember that conversation at all.

Are you saying you can't even remember the fact that it occurred?-- That is true. I can't remember that specifically on that date.

Or any of the elements of the conversation as Mr Kerr has told us about?-- No, I cannot. Mr Kerr and I would talk very regularly and a specific conversation I would not recall on a date.

Well, have you any recollection, even vague, of Mr Kerr having raised with you at some time a mine with higher than normal CO make levels?-- No, I don't.

And a few days later we know Mr Walker visited the mine?-- Yes.

Did you ask him to look at anything specific when he went on that occasion?-- No, but if I had heard of a problem of a mine with a heating, for instance, Mr Walker would have been out there the next day and not a few days later.

But it seems from what you say about CO make, though, that you would not have asked your Inspector to check out CO make levels because you hadn't asked any Inspector to do that, isn't that right?-- That's if CO make was even brought up.

Assuming it was, consistent with your view, you probably wouldn't have asked your Inspector to check it out?-- It depends on what the CO make figure was. If the CO make figure was in the order of - you know, in the - well, if it was a very low figure I may not, but if it was a - I believe anything in excess of 10, regardless of whether you want to be specific, you have to identify whether there is a problem or not.

We are here in the realms of speculation because you have no memory of the conversation, the details or even the fact that it occurred?-- I've said that, that's right.

Now, can I go back to a slightly different point? In relation to the system of reporting, statutory reports, as at 7 August 1994, had you turned your mind to the format and content of the statutory reports in use in Queensland?-- No.

Now, in relation to refresher training for miners, there seems, would you agree, to have been no systematic review of whether the refresher training was in compliance with your requirements?-- If you emphasise the word "systematic review" I would suggest that's correct.

And -----?-- There were mines which had had reviews of their refresher training.

But not all mines?-- All mines had been reviewed, refresher

training was in progress, yes.

What system was there in place to conduct that review in the first place and then to collate the results?-- Okay. That's where I come to the issue of there wasn't a specific report being prepared in relation to the - those results. It was a matter brought to the attention of the Inspectors that as part of their inspection system that they review the activities, that there were records and that people were in fact being given refresher training.

But there was no report back on that to you in a way that could be collated and held somewhere for checking?-- No. The own place that report would have been was where there was a review, for instance, and it would be recorded in the record book after talking with the training officer or whatever.

It would only be on those occasions, if they occurred, where it would happen to get in the record book, not otherwise?-- Most events are recorded in the record book entries. If an Inspector goes to the mine and does a review, it is recorded in the record book; whether it has been done, if there is something that needs to be looked at further or whether it's found to be satisfactory, it's all recorded.

But the source of that is in the record book itself?-- Yes.

And that reflects, I take it, your view that the record book is the most important record at the mine?-- Very important.

Now, we have seen in the scheme of retraining that you promulgated - it's Exhibit 170 and you can have it for yourself if you need to, you may not - that spontaneous combustion didn't get its own heading. It's part of a much more broad topic, is that right, "Potential Hazards of Spontaneous Combustion, Mine Gases, Dust and Other Ignition Sources"?-- All right. I think that's correct.

And if it was so significant in relation to refresher training, why not give it some prominence? Why have it down there with a bunch of other stuff?-- There is no specific reason why it couldn't have been given another separate line at all.

Why wasn't it is the question? Why wasn't it given greater prominence if in fact it deserved greater prominence?-- I don't know that there is any reason why it wasn't given greater prominence.

You can see the potential for difficulty, can't you, when you lump that topic in with a number of other topics in the sense that -----?-- I think that - what's the date on that, can you tell me?

May '91, 1 May '91. I think it's the -----?-- That was -----

The only approved scheme for retraining under your hand?-- Yes.

Can you see that there is a potential for difficulty if you lump one retraining topic in with a bunch of other topics? People may get retrained on the other ones before they get around to spon com?-- It is possible.

Now, I think I am right in saying, aren't I, that there was - that scheme, which was 1 May '91, is the only one to emanate from the Inspectorate about retraining, refresher training?-- I can't answer what went on earlier, but as far as I'm aware that's right.

I am sorry, I don't mean to go back before your time. I mean in your time?-- That's right.

And it's the only guidance that's come from the Department in relation to retraining, isn't it?-- That form that you see there was the result of a tripartite committee reviewing the systems and that included unions and companies and Inspectorate reviewing the process.

But it's the only guidance that comes from the Department, isn't it, about the refresher training?-- That's right, because it needs to be an approved scheme.

There is no further documents that have emanated from the Inspectorate saying, "Re the approved scheme, look at this, look at that, do this, do that.", or anything like that?-- That's true.

Now, as at 7 August last year had you given any consideration to requiring - or had you given any consideration to the appropriate refresher training for managers?-- I had given thought to it, yes.

You hadn't implemented anything about it?-- No.

Is that for fear of individual managers, is it, or something more broad than that, futility of training then perhaps?-- No. The point that I had a concern with was not just managers but all persons for certificates of competency, not just managers, need to have a structured re-education system or updating system, and that was something which currently is not available.

Is it something on the agenda for the future?-- That is very much on the agenda for the future. In fact, it's commonly called "current competencies".

Now, can I go back to spon com for a moment, not to deliberately dance around it, but if you can stay with me for a moment. We know that the red and the blue book have been issued and then there is some SIMTARS material which - these documents fall into two categories. The red and blue book have had a fairly wide distribution, subject to it being out of print?-- Yes.

SIMTARS volumes haven't had a wide distribution and may have been taken back by individuals to mines, but they have

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certainly not been promulgated down the line to individual miners?-- That is true.

In one sense you would agree, I think, that individual miners are unlikely to troll through the three volumes of the SIMTARS material or even one?-- That is true.

So, there may not be much point in doing all of that, but did you as at 7 August '94 turn your mind to the adequacy of the materials available for spon com training or retraining?-- Yes, I had.

And what had resulted from turning your mind to it?-- I believe that the data that was available from the SIMTARS manuals which had gone back to each of the mines provided adequate information, more than adequate information, for training programs for whatever level people wished to use.

Did you take any step yourself, or did the Inspectorate take any step to write to mines saying, "We think you ought to promulgate that material to miners."?-- No, we did not.

Now, as chief examiner, you are in a position to have some knowledge of the - or some view about the extent of knowledge of the industry of spontaneous combustion; would that be fair?-- Yes.

Would you agree that the general standards in the industry are poor in relation to the interpretation of gas levels?-- Yes.

Not just this mine; generally, we are talking about; that's true, isn't it?-- Yes.

And, generally speaking, the knowledge in the industry is poor in relation to the use that might be made of Graham's Ratio?-- When you say - we had better define more of the issue of the general knowledge in the industry. There are - the industry is a very broad body of people, so maybe we need to define which group of those people you are focusing on. The people who have been qualified for a certain number of years? Those who are presenting themselves for examination? Just who are you particularly talking about?

Well, which section of the industry or sections - plural - would you consider exhibit, generally speaking, poor standards of knowledge about the use of the Graham's Ratio? It would certainly be miners?-- Mmm. I would suggest that most miners would probably not have any understanding at all of Graham's Ratio.

And a lot of deputies as well?-- They wouldn't have a great understanding of Graham's Ratio.

And quite a degree of undermanagers and managers too?-- Most of the undermanagers and managers - in Graham's Ratio, particularly, you are talking about now?

Yes?-- That information may not be well known. It would be - the specifics would be not well known, but the issue of what Graham's Ratio was would be well known.

So, you may well find reflected industry position where people know of things but don't precisely know, for instance, how to interpret it and how to apply it?-- That is true.

And the same could even more be said of things like the Morris Ratio, Jones-Trickett ratio, and so forth, without denigrating then the more obscure ratios?-- I think they are matters probably not for the general usage of persons. It is an awareness that they are indicators, but not necessarily how to do the calculations for them.

And the same is to be said of the use of CO make as against parts per million; isn't that true?-- I believe that most undermanagers - in more recent times, managers - would be aware of CO make. Certainly the earlier people who had their certificates before - you know, in the 1980s, would not have

been aware of that.

No. You could well find what I might call a class of undermanager or manager who have been certificated prior to the early 1980s and don't have that degree of knowledge of CO make?-- That is where I have my concerns, not just with CO make or gas management; that is where I have my concerns of the retraining of the managers and undermanagers, and-----

Certainly - sorry, I didn't mean to interrupt. And that fact is even more so the case when it comes to not just knowledge of CO make, or what it is, but knowledge of the significance of the levels of CO make - the point is even more the case, isn't it?-- I'm not with you on your question, I'm sorry.

Well, there are two things one can know about CO make as a fact; just like with the Graham's Ratio. You can know of it, but not know the finer points of how to apply it?-- You could know that, that's true.

The same with CO make?-- That's true.

And the same may well be said of the identification of spontaneous combustion and the control of it?-- I think the identification of spon com is quite well known, including deputies.

The events that might cause it?-- Most of the events which might cause it.

Okay. Would you agree with Mr Kerr who says that - or has told us that it was a fact of life in the industry that many deputies have received no training on spontaneous combustion?-- Well, I don't know where he got that information from. I have trouble believing that that's the case.

Why? Because of their Mines Rescue training, in particular?-- Well, those who have had Mines Rescue training, I would suggest, would have had training in that, but similarly their deputies' courses would have also covered those particular matters. I cannot comment on people who have been trained for many, many years, because I'm not aware of what their training scheme was.

You were aware, prior to 7 August, were you not, that the red and blue book were out of print?-- Yes, I was.

Had you taken any step at that date to get them reissued in any form?-- No, I had not.

Would you mind telling us why?-- The red and blue book were in print some time before my time. I was not aware of its background, and there were some copies in my office, among other numerous books, that I found when I moved into the office in Brisbane.

Yes. You are going to tell us why you didn't get it reprinted or reissued?-- In about 1991, I think it was - might have

been 1990 - I can't recall - probably early 1991 - I was asked whether we wanted to get these things reprinted, as such, and I had a quick look through them, and felt that the information that was - we were at that stage financially troubled in the Inspectorate, and so the information that was in those books was not a great deal different to what was in the SIMTARS manuals, and so that being more updated information, I thought that was quite adequate for the - you know, for people to do training with.

Well, we have discussed the fact that the SIMTARS volumes are hardly likely to be disseminated all the way down the line to individual miners, but at the same time it can't be said of the red and blue book?-- I wasn't aware that the red and blue book were to be given to each of the people until this Inquiry. In history, I was not aware of that.

Have you ever taken any steps to ascertain from your existing inspectors or from historical records just what the position with the red and blue book was? Who had got it and in what circumstances? When I say "who", I don't mean individuals, but categories?-- When the issue of the reprinting of this article - of these booklets came up, it was my understanding that the booklets were made available; that if people wanted them, they could write to the Department and get copies of this information. That was my understanding, but I did not understand them to be distributed to the mines for issuing to miners and deputies or staff.

When you turned your mind in 1991 to the question of having them reissued, you obviously-----?-- Reprinted, it was.

Reprinted, I'm sorry. You obviously had in mind that it might be a useful tool, otherwise you wouldn't bother going to the trouble?-- I had in mind that the - it was a useful tool, but that the information wasn't - was available in other forms.

Well, you have only mentioned the SIMTARS volumes?-- That's the one I was meaning to relate to.

But you must have realised in 1991, as you do now, that the SIMTARS material wasn't available to - or in a usable form or readily accessible form to ordinary miners, for instance?-- No, I don't argue with that. It was not as readily accessible, but I had not understood it to be anything other than an information document printed by the Department.

Well, if you had had the form - the books reprinted - what were you going to do with them? Give them to new inductees?-- I wasn't going to do anything with them. As far as I was aware, the Government printed them, and when people asked for them, then they would be sent out to the person who wanted them.

Well, as useful a tool it might have been in 1991, did the budgetary constraints that applied in 1991 continue right through to the present time? You said you were strapped for cash back then, and that obviously was a factor that prevented the reprinting?-- Right - well, it was never brought back up

again. There was never any further requests for these books.

I see. I understand. You didn't consider that it might be a good thing when the budgetary restraints eased off to reprint them anyway, they being, in your view, a useful tool? You were content to sit back and-----?-- It never crossed my mind at all. It never came to my attention. There was never a need brought to my attention.

Another case of the Inspectorate being reactive rather than proactive. No complaint, no request, therefore no action, rather than taking the front foot and saying, "Let's reprint these. We can send these out. These will be useful." That's a fair comment, isn't it?-- We could be - if the role of the Inspectorate was seen as being trainers of the industry, then that would be true.

All right. Now, when you came to Queensland from New South Wales, you said you looked at the legislation and made yourself familiar with that?-- Yes.

And you obviously then saw that section that deals with final seals being required to be capable of withstanding 345 kPa?-- As I said earlier, I cannot - I don't even remember even addressing the issue of the final seals when I did my review of the legislation, but-----

You must have done at some stage. Perhaps I can ask a different question and you can answer that. When did you first become aware of the requirement that a final seal was to be capable of withstanding 345 kPa? During this Inquiry?-- Around this Inquiry, yes.

That's a rather extraordinary position, would you agree, that as Chief Inspector for the last however many years your first knowledge of this requirement comes during the context of this Inquiry?-- That's true.

Would you consider the same applies to your inspectors generally?-- I haven't asked that question of them.

Having become aware of it, you then must have turned your mind to what it signifies?-- Yes.

Have you made any efforts to get any data to understand from where it comes, what it means?-- Yes, I did.

What did you find out?-- I actually found out that the information came out of the - or was included in the - those red and blue books that you mentioned a moment ago.

The useful tools?-- The "useful tools", you use.

Well, it has been a legislative requirement for some time, hasn't it?-- Yes, that's right.

When did you first find out that seals were not complied with? In this Inquiry?-- Around this Inquiry.

Well, that seems not to be the case from what you said the other day, Mr Lyne - page 4939. You said that that was something that had been recognised in 1989 at the conference in SIMTARS as something which wasn't being addressed; is that not so?-- Yes, but I wasn't at that conference, Mr Morrison.

Are you saying that it was raised but not in the material that arose out of the seminar; is that what you are saying?-- It was in the seminar - I remember reading - after becoming aware of this, I went and had a look for whether that information was in the SIMTARS material, which I then found to have been raised, and it wasn't being addressed in Queensland.

Sorry, let me understand this correctly: you are saying you reviewed that material again during the course of this Inquiry to discover that?-- That's right.

Right. So that when you said in the evidence that it was something that mention was made of in 1989 at a conference in SIMTARS as being something which wasn't addressed, that's some knowledge that you have discovered just recently?-- That's true.

But you had a couple of senior inspectors there during that seminar?-- That's true.

And the point could hardly have been missed, could it - it being so central to the Inspectorate's enforcement of statute?-- I'm sure they were aware of it.

And you made the comment that now it has been brought to your attention, it won't be readily accepted; in other words, for the future?-- That's correct.

But it has been known for years, hasn't it?-- Well, obviously some people have known it for years.

Do you think it might evidence quite severe breakdowns in the system of communication within the Inspectorate - that its Chief Inspector only finds out in the course of this Inquiry of such a requirement?-- It offers me no joy to admit that to you.

That wasn't the question. Does it evidence a severe breakdown in the communication systems in the Inspectorate that we have that situation?-- No, I don't think that.

How is it six years in the job that you only become aware of of it now?-- It is not an industry practice at all, both in New South Wales nor in Queensland, and hasn't been - it is not a matter or the subject of normal communications.

All right. Now, can I deal with one other aspect of seals while we are on this topic? Mention has been made about a proposal by Mr Schaus to have swing-down steel doors?-- Yes.

We have heard that. And you made some comments about that - about the fact - that the only ones you had seen were in 1990 on a trip to the USA and they were only to 20 psi?-- Yes.

Which translates to about 140 kPa?-- That's right.

But the point about such a proposal was speed, wasn't it - that's the point of it?-- That's right.

It means you could have instant sealing on a panel if the doors were in place over the drives?-- But not to 345 kPa.

I understand that. That's a separate issue?-- Yes.

Would you agree it may be a figure that won't exist in the new legislation, or you can't comment?-- I can't comment on that. As I say, the approach now in legislation processes is to work on risk management rather than necessarily specific numbers, otherwise you are always managing a risk.

There may not be a particular requirement that it withstand a particular force in the future?-- There may not be. There may not be.

Harking back to the swing down steel doors, I'm not sure that it's on your list of matters for consideration but should it be. If one could have such a system that achieves near instant sealing of a panel, in other words you just have to swing them down and fix them in place somehow, attach them to the prep seal, you could have a panel effectively sealed in a very short space of time, and then with that comfort you might turn your attention to something more substantial?-- 7.1.6 says, "The use of explosion proof doors in the ventilation district should be investigated."

Comprehended within that?-- Yes.

Can I turn to something else, and that is more generally those matters for consideration? Can we understand the context in which you raise them? I think I'm right in saying that these are matters that you put forward for operators to consider including in their development of a mine safety plan?-- Yes.

You are not saying -----?-- In the development of a design of a mine as well.

I accept that. You are not saying that mines should do all these things. Some mines may do some of them, some may do others, but they should be matters considered?-- I have put it forward again in the context of saying that there is a risk there that needs to be addressed and these may be some ways of addressing that risk.

I just want to understand the way in which they are put forward. They are not being put forward as recommendations as such, are they, for this Inquiry, they are being put forward as more general than that?-- Some would be - I would suggest would be more recommendations.

But we are discussing all of them as a section of your report, not suggesting these are all matters that should be recommended, but simply they all require consideration, discussion, fine tuning?-- That's right.

In other words it's a - compendious or otherwise, it's a list for the industry and the unions to consider?-- Yes.

If I can turn back to another topic for a moment, that is the subject of ventilation. We have heard some questions about ventilation plans, and I think you may have been here for part of it. There is no industry standard for a ventilation plan, is there?-- No, there is not.

And nor is there any requirement that has come from your Department for such a standard ventilation plan?-- No.

And there is no requirement that has issued out of the Inspectorate for a ventilation plan that details all regulator changes, for instance?-- No, there hasn't.

Likewise there is no requirement that's issued out of the Inspectorate for a ventilation plan that reflects, for instance, all the pressure drops across regulators?-- No.

When you are talking about a ventilation plan you are talking the global mine ventilation plan.

And the Department's position, I think I'm correct in saying, is that the monthly ventilation survey is sufficient in terms of its frequency and the information it gives?-- Yes.

Now, you mentioned inertisation previously, and I think you in fact produced and there was tendered the committee report in relation to inertisation?-- Yes.

Now as I read the report, tell me if I am wrong, the report did not purport to compel or indeed recommend any particular system. It was a report the design of which was simply to make people aware of available systems?-- There were letters as well which recommended that that be - that was an appropriate technology, but that wasn't part of that report.

I think you are agreeing with the point I made. Both the letters and the report identify the technology, but they neither recommend nor compel any particular one?-- There is no compulsion for it, no.

And I think I'm right in saying that since the committee report and the letters have gone out no step has been taken by the Inspectorate to recommend or compel any particular one?-- No.

Now, can I move to a slightly different topic, and that is the evacuation of a mine which is a topic that Mr Martin took you to this morning. There are no requirements in the rules for evacuation of a mine, are there?-- No, there are not.

And that is a matter which the Inspectorate has historically left to management?-- That is true.

One of the reasons that that might be so is that the Inspectorate has been conscious of the statutory obligations on all miners at every level to report dangers on deputies to withdraw the men if there is a situation of danger?-- That's actually covered in the legislation, yes.

That's what I'm saying, and you've been conscious of that?-- Yes.

Because it is the case, isn't it, that under the statutes, under the general rules, all miners have an obligation in relation to reporting dangerous matters and taking steps?-- Yes.

Rule 15.12 for everybody, "Any person who becomes aware of a likely source of danger shall forthwith inform the manager of the mine, and if the danger appears to be imminent, warn all persons in the part of the mine likely to be affected and take all such measures and precautions as are practicable to prevent any accident likely to result." You are familiar with that rule?-- Yes.

That's one which in your appreciation impacts on every miner

in the mine?-- That's true.

Not just management?-- No.

Likewise for deputies, general rules 5.14 and 5.15 impose mandatory obligation to suspend work if there is danger and report dangerous matters?-- Yes.

So that if people observed those obligations in relation to evacuation would you not consider that it is a matter that might be left for a case-by-case assessment?-- I agree with that.

Rather than prescriptive regulation?-- Risks can occur in many different combinations, and to prescribe each one is not necessarily going to improve the safety management at the mine.

You mentioned a point the other day with I really wish to deal with now and finalise it, about the sealing of the particular shaft at No 2 after the first explosion and you mentioned that in two ways, I think, over two sessions. Effectively you said that you weren't aware that they were going to seal the shaft first, but then I think you clarified that by saying you weren't aware they were going to continue it to the surface from C seam?-- I was aware they were going to seal the shaft. I have never said that they weren't, and if the record shows I would correct that.

I'm sorry?-- I was aware right from the start that they were going to seal the shaft up to the level of the overlying seam.

If you indicated that you didn't mean to indicate that?-- I did not mean to indicate that at all.

It's the truth, isn't it, that during discussions about sealing the mine consideration was given to installing steel airlock doors on the portals?-- That's true.

That wasn't possible for essentially two reasons. One you couldn't send men into that position to do it because of the dangers?-- That's right, and that's why my recommendation of access has been brought forward.

I accept that, but secondly consideration was given to lowering them down over the highwall?-- Yes.

And that proved impossible too?-- Yes, that did.

So consideration was also given to putting a lid on the shaft?-- Yes.

But that there would be a time delay in relation to that, it would take time to manufacture, albeit perhaps 24 hours, that was an unacceptable hour?-- I don't know that the time delay was the factor in the matter.

There wasn't a lid put on it anyway?-- There wasn't a lid put on it.

All those people in the incident control team participated in the discussion and were unanimous that the shaft be filled, weren't they? I don't -----?-- As I understand filled to the level of the C seam.

But just bear with me for the first points. We will come back to that. There might have been some discussion about whether the shaft should be filled, but in terms of the shaft being filled - we will discuss just to what extent in a moment - the team were unanimous, weren't they?-- After -----

After discussion?-- The team - the meeting was actually, that I recall, was over at the open-cut mine conference room or training room at the back of the office over there, and it was accepted that that was - that that would be an appropriate way of sealing the mine bearing in mind that it would - re-entry would need - to ventilate it would need to come from the surface tunnels again.

Let me read to you from the incident control team log at the time. "Discussion on sealing. Steel plate over No 4 shaft. Options: steel plate over shaft or filling in shaft. Consideration of all factors. Incident team unanimous that if it were possible to recover victims it should be done." That was a unanimous view?-- Mmm.

Obviously everybody would desire that. "However, all evidence, particularly second explosion, there was no hope of recovering victims or finding any evidence of cause."?-- Well, I don't know who wrote that at all.

Senior Inspector Bancroft as the incident control team log notes?-- He might have done that. I don't remember reading that at all.

These are the minutes of the meeting, and I'm suggesting to you they accurately reflect the discussion at the time. "... all evidence, particularly second explosion. No hope of recovering victims or finding any evidence of cause." Let me read on: "Incident team unanimous that shaft and tunnel should be permanently sealed." That's correct, isn't it?-- No, that's not direct.

That's what the incident team log minutes show. Do you disagree -----?-- Permanently sealed was not permanently like never to be re-opened. It was to be sealed.

I tender separately the relevant page from the incident control team log which is Item 2 in the Inspectorate documents currently tendered?-- If I might just add to that, if it had been agreed to permanently seal it then there would be no purpose in reviewing whether or not we could get down into the portal entry an airlock chamber.

What I'm suggesting to you is that the airlock was considered and was impossible to do, the lid was considered and it couldn't be done, and therefore sealing of the shaft was the only viable options; isn't that so?-- No, that's not right.

Well, we will see what follows from the log. You participated in those suggestions, and as you say, you agreed that the shaft be filled. Now, you say it's to C seam?-- True.

In fact it was C seam plus about 10 metres, I think, because of one fact. The No 4 mine had potential access to the shaft, did it not?-- Yes, but there were, as was explained to me, doors that were governed by a rope to the surface which could be closed which would - and there are two separate seals, and in between those two seals could be filled with a light cement which would effectively create the sealed plug.

There was concern about whether you could plug off the low access way to the shaft in No 4 mine and that would require someone to go into No 4 and close to the shaft at a time when the incident control team was very concerned about the atmosphere in No 2; isn't that right?-- That was one of the concerns then.

And in the discussions that ensued not only was it just the company, it's not just the company involved, there were company representatives, Inspectorate representatives, yourself, Mr Bancroft, and union representatives as well, Mr Allison here?-- Yes.

I will show you the page just to make sure we are agreed on the page. You will see the entry I've been referring to, "Discussion on sealing" on the page, I think it's designated page 23, top left corner in the terms that I've read out to you?-- Yes, about half-way down the page.

Yes. If you wish to read it, please do so. The second last word in its scrawl reads "permanently"?-- I see that.

Do you see that?-- Yes.

I tender page 23 of the incident control team log. You can keep that with you to one side, Mr Lyne. We have another copy.

WARDEN: Exhibit 283.

ADMITTED AND MARKED "EXHIBIT 283"

MR MORRISON: Now, another matter that was raised or mentioned by you, I think a couple of days ago, about one feature in the report was that you were asked the question why had not samples been put through the gas chromatograph prior to SIMTARS arriving on site. Do you remember that, and you said you didn't know why that was the case?-- Yes, that's right.

We can also see from Item 2, which is the incident control team log, that in fact samples weren't organised until about 3.30 in the morning and then weren't actually available until

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some time after 5.30 in the morning. If that's what the log shows the reason may simply be that samples weren't there, hadn't been obtained?-- It may be. I don't know the answer to that.

Can I just ask you to look at these two entries, please, in Item 2? I've highlighted them. I don't have in mind tendering it at the moment, but you might just agree with me once you've seen them. There is one entry on that page, and then two over is another highlighted one which I think might answer the question?-- As I say, I can't - that says 5.30, report of readings at the mine were taken. It doesn't show me that that's when the samples were taken and I don't know when they were taken.

No, but it tends to show, doesn't it, that the answer might lie in the fact that certainly by 3.30 there hadn't been any samples taken and they were taken some time after that?-- Yes, it does, but again I don't know how long it has taken to get the samples from the shaft.

I accept that, but by the look of it the second entry suggests that it might have been some time shortly before 5.30?-- Yes, yeah, that was a report from Jacques of the readings at the main fan. I would imagine that would be done with hand-held instruments. I imagine that.

I assume so. You can hand those back. Now, can I ask you something else? You mentioned last time also that - in answer to Mr Clair that there had been an ongoing problem with one of the monitor points at the mine, and he asked some questions about whether there was a system to take care of that and follow it up. You identified the monitor point as being one that was reading low. Do you recall that?-- Yeah, I remember - I can remember a number of these things, but there is so much information and data, to try and recall the specifics of what data point will really test my memory there.

Well, now, I won't take you back to the transcript. You can take it from me that when you identified the one that was an ongoing problem you identified it as being the one that was reading low rather than the one with an extra lag time. Now, that accords with your memory of it?-- No, I don't recall all the details now. There have been a lot of questions thrown at me.

Now, in terms of coping with such a problem, you would see it as reasonable that the Inspector would keep an eye on that and he may well strike an arrangement that that matter was to be fixed subject to manpower availability and so forth?-- That would be our normal process.

And you wouldn't expect to be consulted on every item such as that, that's a matter for the individual Inspectors?-- Certainly.

Though it seems from what you said last time and today that in reality there is no formalised system of the inspection of mines by Inspectors in the sense that there is no timetable to which they must adhere even reasonably, there is no schedule or agenda which they must take forward, and the reports back are only of those things that they feel are worthy of note in the record book. All of those features are so, aren't they?-- That's the norm. We do have numbers of times when the Inspectors will have a campaign at a particular mine on a number of matters and that might involve specific areas of the mine and senior executives, for instance.

I accept that it's the norm. The point I'm trying to make to you is two things perhaps, and I think you can probably agree with each of these: one, there is no formalised system as such; notwithstanding that, it works well?-- There is no formalised system. I would hope that the system in the future will work better.

I accept that counsels of perfection can be given, but the fact of the matter is that notwithstanding its lack of formality, it's a system that's worked well?-- I think it's worked reasonably well.

Now, can I ask you one last thing, if I may? There were at this mine, and no doubt there are at other mines as well, a number of personnel who had received Mines Rescue training and participated regularly in Mines Rescue activities?-- Yes.

One such person was John Blyton?-- Yes.

And he in fact relieved on occasions when Mr Kerr was not available?-- Yes.

And I think I am correct in saying that you had a very high regard for the competency of Mr Blyton?-- Yes, I did.

A very capable, very experienced, very sensible deputy?-- Yes.

And very knowledgeable in matters of Mines Rescue?-- The

areas that I had spoken to him on, he had shown a good degree of knowledge.

And highly trained?-- Yes.

And this has been reflected by yourself, or at least one of your inspectors, Mr Walker, in a memorandum of a meeting at Moura No 2 on 23 March '94 which considered, amongst other things, whether the arrangements in Mr Kerr's absence were satisfactory, and a specific note was made of a matter discussed at that meeting, which included yourself, that there was complete confidence in the competence of John Blyton to perform the trainer functions?-- That's true.

And that accurately reflects your view of Mr Blyton, doesn't it, at that time?-- I especially went to Moura to meet John Blyton and get a feel for that myself.

Now, lastly, can I ask you to have a quick look at - perhaps I don't need to ask you to look at it. Have you had occasion to look at a consultancy report by the Space Centre for Satellite Navigation at the QUT?-- No, I have not.

Well, it's been circulated and I will provide a copy to you now. I am going to tender the original and I will provide five copies for the panel. So that it's easily understood, the reason for tendering the original is that it has the only - the best quality photos. The reproductions in all the photocopies suffer accordingly. Mr Lyne, can I take you to the first page of text and can I just ask you to accept this for the time being: what was done was that some experts were given the videos, borehole videos, in order to see if they could do a 3-D enhancement and get better definition on which way things might have moved. The consequence is this report which, in the third paragraph on that first page of text, reveals that it was possible to produce 3-D restitution for three of the eight bolts in the seal area which can be seen in the video images and of those three it could be detected that two were bent strongly outbye?-- Yes.

And the third they couldn't actually resolve much about, perhaps a product of the videos in the first place, but you will see their conclusions as a result of the 3-D enhancement is that two of the bolts in the 512 area were bent strongly outbye. Now, would you accept that that's some evidence - whatever its true weight is at the end of the day - some evidence that would tend to suggest that 512 was the site of the explosion?-- Well, it certainly supports that. It certainly supports that there has been a force from inbye coming out.

I tender the report by Messrs Kubik and Maeder.

WARDEN: Exhibit 284.

ADMITTED AND MARKED "EXHIBIT 284"

MR MORRISON: I should perhaps indicate not just for Mr Lyne but generally: we didn't intend to call those gentlemen but let the report speak for itself, and I don't know whether a contrary view is held by anyone. We circulated the report last week. We haven't made, as I understand it - I don't know the availability of those gentlemen, but I don't intend to call them.

WARDEN: Thank you.

MR MORRISON: Lastly, though I don't need to bother you about it -----?-- This is a third last.

----- can I tender also a bundle - again I don't intend to photocopy them all for everybody as I imagine there might only be one or two persons who are interested in it. Mr Ellicott requested some seam gas analyses from C, D and E seam. They are these. May I tender the bundle of borehole natural gas analysis? I have nothing further of Mr Lyne.

WARDEN: The last document is Exhibit 285.

ADMITTED AND MARKED "EXHIBIT 285"

WARDEN: The witness has been in the box for quite a while. I would like to give him a break and we might take advantage of the lunch adjournment at the same time. The panel have some questions, no doubt, plus remainder of the Bar table.

MR MORRISON: I apologise to Your Worship. I deliberately ran on because I thought we might be able to finish him. That's the reason I didn't pause.

WARDEN: That's okay, thank you. Resume at 1.45.

THE COURT ADJOURNED AT 12.30 P.M. TILL 1.45 A.M.

030495 D.54 Turn 9 sbd (Warden's Crt)

THE COURT RESUMED AT 1.54 P.M.

BRIAN JOHN LYNE, CONTINUING:

MR MORRISON: There are a couple of matters I would like to put to Mr Lyne before I finally finish.

WARDEN: Yes.

MR MORRISON: Mr Lyne, under the current general rules, there is no rule which governs placement of a monitor point after sealing, is there?-- No.

There is certainly a rule which governs in a very general way placement prior to sealing - rule 8.4?-- In the return airways?

Yes?-- Yes.

Nothing more specific than that. Although there is power under 8.5 for an inspector to, by placement of requisition, position monitor points?-- That's correct.

If we are going to learn lessons from the American experience - there is some suggestion we should look at some of the American experience to see if they can give us some - we would have to be fairly cautious about that; you would agree with that, wouldn't you?-- Yes, I would.

Can I ask you to look at Exhibit 270? I just want to perhaps see a couple of reasons why we might be cautious about that. There are a number of documents in 270. I'll try and identify them for you as best I can. The second one in the bundle, it might be easier if - without losing it - the Mine Safety and Health Administration Statute?-- Yes.

If we go about five or six pages in, you will see a page headed on the top left, "75.335"?-- Yes.

If you look in the right-hand column of that page, I think we will see the American statute makes some provision for the position of a monitor point after sealing, and you will see down - about two-thirds of the way down the page?-- Yes.

In (b), "A sampling pipe or pipes shall be installed in each set of seals for a worked-out area. Each pipe shall - (1) Extend into the sealed area a sufficient distance.", defined as "at least 15 feet"?-- That's right.

And you say that's for the purpose of obtaining "a representative sample behind the seal". Only 15 feet. You would be a bit wary of applying that figure here?-- 15 feet wouldn't be an appropriate figure.

Would be or-----?-- Wouldn't.

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It is what's under the statute in America, isn't it?-- That's correct.

If we look again just for an example of the way - if you go to the next document, the way in which we might apply or not apply the American comparison, the next one should be the ventilation division report of the Pittsburgh Safety and Health Technology Centre. Sorry, I'm perhaps going too fast for you. Do you see that one? It will be easier if you take the clip off, I think?-- The next one has actually just got "Summary of Committee Recommendations", Ventilation Division.

You have got a different order to me, but if you can find this document here that I'm holding up?-- Yes, I have got that.

From the Pittsburgh Safety and Health Technology Centre - it is a report from October 1993, Ventilation Division?-- Yes.

Can I ask you to go over to page 2 - numbered page 2 - it is actually the fourth physical page - and what we can see there is Table 2 on that page?-- Yes.

And then under that they reveal some statistics about the percentage of mines using what's called an AMS system?-- Yes.

Which, in their definition, is an atmospheric monitoring system?-- That's correct.

Like a Unor system. It says, "In 1984, only 2.0 per cent of active underground coal mines used AMS systems. By 1992, the percentage had increased to 6.9 per cent." Even in 1992, it is a very small percentage of mines using our sort of monitoring systems?-- That's true.

And the report tells us on the previous page that 115 mines had monitoring systems - that is, atmospheric monitoring systems?-- Yes.

So, if we do the simple multiplication, we will arrive at this result of 1,667 mines, only that - just under 7 per cent were using systems like ours. And if we go over - if you go over about four more pages, you should come to Figure 1?-- Yes.

If we have a look at Figure 1, we can see a number of parameters set out there for mines - of all those mines. You will see the second column, number of systems totalling 115?-- Yes.

That's 115 mines using automatic monitoring systems, and then three more columns over, we will see under "Parameters", "VEL"; in other words a velocity meter?-- Yes.

Only 12 mines?-- Yes.

Only 12 mines in the US were using velocity meters?-- Yes.

Well, that is not much of a representative sample to apply directly to Australia, is it? You would have to apply some

caution in importing the American experience?-- I don't deny that there are some things which we do better than the Americans. It seems to me we do better than the Americans as far as numbers go.

I am pausing to think. There are no Americans present at the moment?-- Nothing that wasn't stated last week when they were here.

I have nothing further from Mr Lyne.

RE-EXAMINATION:

MR CLAIR: Mr Lyne, since I was last questioning you, some further documents have come into evidence; one of those was the - was the audit or the document relating to the audit that was done. It is Exhibit 272. I don't know that it is still in front of you?-- No, it is not.

It is the report of the audit done in 1992 by SIMTARS; is that right?-- That's right.

And you were referred also to the earlier audit, and that was a document that formed part of Exhibit 155 - that was the one done in 1990?-- Yes.

By Mr Bell, I think it was?-- Both were done by Mr Bell.

Sorry, both by Mr Bell?-- Yes.

Okay. Now, I'm just trying to ascertain the status of this document. In so far as the earlier one was concerned, it seems clear that that was forwarded to the mine under cover of a letter from yourself, in fact?-- That's true.

The purpose of your forwarding it to the mine was what?-- For their records, as such. It was not originally - it was originally a report to me. I felt there was a value in providing that information back to the mines direct. In fact, the second one was asked to be sent directly to the mines as it was done by Mr Bell.

Can I come to the second one in a moment? You say that you saw some value in the first one being sent to the mine and you sent that yourself; what value did you see in that?-- In sending it back out to the mine?

Yes?-- As I saw it, the information - we had asked for their co-operation in doing the audit and I felt that it was worthwhile for the management to see the results of that audit and disclose it, and if there was a matter that they wanted to address independently or improve upon, but mainly for their records and actually if they needed it.

You say if there was a matter that arose out of the audit that indicated some shortcoming, perhaps then it was at the option of the mine to do something about it; is that so?-- If there was a system that basically - if there was a system that was showing that there was not sufficient persons for it to be done that that - attention would be drawn to that to do something about it. So if the equipment wasn't operative or unserviceable or there weren't people who could do it then there would be action taken. That was the purpose of it.

Was the purpose in your sending it back, you say?-- No, no. The purpose of sending it back was to give them a copy of our audit of the mine. If there had been action or matters that were outstanding out of that then it would have been brought to their attention to take particular action in that area.

But if the report itself indicated that there were some areas of shortcoming did you expect that the company might do something about it?-- I would expect so.

Can I come to this one exhibit, 272?-- Yes.

You say that there was a request that that be sent directly to the mine; what do you mean that? A request by you to Mr Bell that he send it directly to the mine or a request from the mine?-- No, a request by me to Mr Bell.

Do you know if that was sent to the mine?-- I don't know. I haven't any records to prove that it was.

It seems at least that you are able to say that the first one was sent to the mine and in fact that has been produced by the mine in the course of the hearing?-- Yes.

That's how it came to be Exhibit 155?-- Yes.

Do you know if a copy of the second document was part of the documents found by the Inspectorate after this - when I say the second document, Exhibit 272, was part of the documentation found by the Inspectorate when they investigated after this incident?-- I don't think that the -----

Have you seen it as part of that documentation at all?-- I produced this document - this record of the second audit. I was aware of it and had it.

Yes, but I mean have you seen it as a document that was taken

into possession by the Inspectorate from the mine -----?-- No, I haven't.

----- after the explosion and during the investigation?-- No.

I just pause a moment, Your Worship. Perhaps I should make a formal request for the production of any copy of that document that might be held by the mine and any correspondence or notes of conversations with Mr Bell if there are any such notes. Now, Mr Lyne, if I can ask you about some of the details of that document, you read it at the time; is that right? It came back to you shortly after the audit was completed?-- I didn't read it at the time. I was given the compendium of report in a booklet form and I went through each with Mr Bell and he gave me a verbal report on each of those - on each of the mines and any particular concerns that he might have had with each of them.

This report, did this come into your possession at about that time?-- That was part of the book that I got.

Can I come back to my question? Did you read this after you received it?-- I remember as we were going through, scanning through, as we were covering each of the different mines - I didn't read it separately while Mr Bell was there. We went through each of the mines and just went through the sections just quickly.

Are you saying you read some parts of it?-- Yes.

And not others; is that what I understand you to say?-- That's basically what I'm saying, yes.

Now, there is a reference on the second page of that document to - at the top of the page to level of training?-- Yes.

And under that heading three points are made, inhouse training for new personnel, and the second one is no formal refresher training?-- Yes.

Do you recall that coming to your attention at the time?-- No, I don't.

Would that be a matter that would concern you or interest you as a Chief Inspector that there was no formal refresher training for the monitoring systems - or monitoring system personnel perhaps I should say?-- To a degree it would have - it should concern me, yes, but the prime criterior that I was looking for was there were persons who were competent and able to use the equipment and that was what I was given to understand were available.

You see, back on the first page under "Monitoring System Personnel" it's mentioned in the first item that every undermanager -----?-- Yes.

----- is one of the monitoring system personnel?-- It says that.

And then it says in the next line the manager and the undermanager-in-charge?-- Yes.

Monitoring system personnel, and that seems to suggest that those persons at least were aware of what they are needed to be aware of in respect of the monitoring system that was in place?-- That's true.

In that context you might expect that there would need to be formal refresher training from time to time; is that right?-- If the equipment wasn't in regular use that would be the case, but the equipment, as I understood it, and I still believe it was in regular use.

By all of those persons?-- I would expect it to be regularly used by all of those persons.

That's the impression that this report created in your mind; is that so?-- That's the impression I had to now, yes.

That's the impression that Mr Bell reported after he had carried out his audit; is that so? He didn't tell you anything different at the time?-- I don't recall him bringing to my attention anything different.

Back on page 2, "Level of Training", the third part, "There is no Miahak training offered." Do you see that?-- Yes.

Again that is a matter that would concern you, that there wasn't any Maihak training offered? I mean obviously Mr Bell has noted that for some reason. He has specifically put it into his audit report. There must be some purpose in his doing so?-- That was part of an assessment of what support was being given by various companies at that particular time. There are a number of other companies also in this gas monitoring market and it was - one of the matters that was looked at as to what support various companies were giving to the mining companies, particularly in relation to training, and this was a report, that Maihak didn't have a structured or a training service on offer.

Can I take you down to the last item on that page, "Alarm Procedure"?-- Yes.

That notes as follows: "The procedures is as follows: at alarm level 1 any available personnel accepts the alarm and follows up with an underground supervisor." Just pausing there for a moment, this seems to represent what Mr Bell was told was the system that was in place at the mine at the time?-- This is his report.

Now, by the term "underground supervisor" what would you understand yourself?-- At least a deputy possibly, and probably an undermanager.

Probably an undermanager you say. Okay. It goes on, "If alarm level 2 occurs the manager is contacted and mine emergency procedures come into play."?-- Yes.

"During working hours the lamproom attendant can accept. On weekends an autodial system is activated." It goes on, "The status of the system can be checked externally. The system maintains a complete audit trail of all events."?-- Yes.

Now, in so far as the response to alarms was concerned, do you recall first of all whether Mr Bell expressly conveyed his satisfaction with what he had been told and reported in that regard?-- No, I don't recall that.

He made no particular point about it at the time that you remember?-- No.

What would be your view if in fact the procedure then set out there was followed? Would you be satisfied with that procedure, that is that any available personnel accepts the alarm but with the proviso then that he follows up with an underground supervisor. Would you find that satisfactory?-- Well, that would be a practical response in most circumstances.

If you had adverted to this you would have felt quite happy with that procedure that was set out there; is that so?-- Yes.

You would expect that that would be the procedure that would be followed at the mine?-- That's as I understand how the system was to follow.

Now, there is a reference to a complete audit trail of all events being maintained by the system. Do you recall whether there was any express discussion with Mr Bell about whether or not the identity of the person who accepted the alarm was registered by the system?-- I don't recall that detail, but I do - somewhere before this Inquiry I had understood that the lamp numbers for people who actually accepted alarms was in use, but even on that I can't even say that it was necessarily for Moura. It might have been for one of the other mines. I can't recall that.

Well, your familiarity with the Unor system at least would take you to the point where you would appreciate that the system was geared so that the person who accepted the alarm could identify himself in some way by the use of a cap lamp number or some particular number, assigned number; is that so?-- I knew there was some system of entering into it or doing something.

You would see that as part of the system, part of the alarm procedure; is that right?-- That would be part of the alarm system.

Again that's the sort of thing you would expect, if you read this report, you would expect would be followed at the mine; is that right?-- Yes, I would.

Can I take you over to page 4?-- My copy hasn't got a number on it.

The third item is one that's headed "Personnel Trained for Above"; do you see that? Have you got the right page?-- Yes.

That reads, "Management available for interpretation, but all other personnel trained on the system can produce trends. Test data supplied by SIMTARS was run through the interpretive software. The correct results were obtained but operators were not confident." Did you discern in that statement by Mr Bell that he may have been a bit concerned about the degree of training that the operators had had, "... but the operators were not confident."?-- No, I felt that what he was saying there was that they felt as though they were being put under a test by an independent person and there was some nervousness about producing results which they - that might be incorrect, for instance, and they will be seen as being incompetent to do their task.

Did he explain that to you at the time or do you read all of that into that statement there?-- No, I've come across this before with persons - where persons have been somewhat nervous about being given a test of finding and putting results through.

But he doesn't say that there, all he says is that operators were not confident, "...but the operators were not confident." He doesn't say, "He appeared nervous and under stress because of my presence.", or anything. He says -----?-- No, he doesn't say otherwise either. I don't remember quizzing him to any great detail on those matters.

The interpretation you put on it is yours, not his; is that so?-- That's right.

Do you think when this report went to the mine somebody reading that might think that that did indicate that there might need to be a bit more training in that area, operators were not confident?-- It could mean that. It also might be well that people might do it more regularly to get - become more practised in it.

Can you go over to the next page? This is under the general section headed "Comment". Mr Bell there makes this comment - I take it when Mr Bell took you through these things that the area that he might well have gone to were the - in each of the reports he took you to was the area headed "Comment", would I be right there or have you no particular memory of it?-- That was generally what would happen with each of these reports that he gave me. Have a look at that page. The first entry on that page is to this effect, "There was no written gas alarm emergency procedure available in the control room."?-- Yes.

"The procedure was known by personnel but a written procedure avoids any mistakes or critical omissions with regard to an emergency response." Do you see that?-- Yes.

Obviously Mr Bell is pointing out there some shortcoming with the system; isn't that so?-- Yes, it is.

He makes it absolutely plain there, whatever interpretation you might seek to put on it, it's plain that he is expressing concern?-- Yes.

Do you remember if he discussed that specifically with you?-- No, I don't.

Did you ask him whether he had discussed it with anybody at the mine?-- No, I didn't. I don't remember doing so?-- But I notice also that the procedure was known.

Yes, but he goes on to say, "...but a written procedure avoids any mistakes or critical omissions with regard to an emergency response.", doesn't he?-- Yes, it does.

I mean you are familiar with the evidence in this matter. Do you think that - I think you agreed in fact earlier in your evidence that if there had been some - whether or not you agree with this proposition, listen to what I have to say now: you are familiar with the evidence. Do you think that if there had been some written procedure a for response to alarms in the control room for Unor that we might have seen something in the way of a more positive and recorded response to these alarms that occurred during the week leading up to the explosion?-- It could well have done that.

I mean, you heard witness after witness asked about whether they were aware of those alarms during the week of the top return in 512, CO levels?-- That's right.

And nobody, as I recall, spoke of being aware of them, let alone being told of them later or even reading any particular record of them other than the fact that they popped up in the alarm log?-- That's true.

In any event, that sort of comment is a comment that you might well expect could prompt some response when this report was sent back to the mine; is that right?-- Yes.

You will see the next item says, "The methane monitor read 7,000 ppm instead of 5,000 ppm. This should be checked and adjusted if required. The carbon monoxide monitor was accurate."?-- Yes.

Do you recall having any specific conversation with Mr Bell about that?-- No, I didn't.

Again, that's the sort of thing that you would think he has put in there as a comment so that, in effect, some action can be taken when the report goes back to the mine?-- Each of these areas where the instruments were found to be out of calibration, I was told that they were addressed there and then on the job rather than wait for a report to go back at some later date.

You see what Mr Bell says in his report, "This should be checked and adjusted if required."; is that right?-- That's right.

So, it seems that he wrote that into his report in the expectation that somebody would act on it; is that right?-- I would assume so.

The next item is to the effect, "Personnel involved in the system were unsure of the equipment ranges." Again, he seems to be highlighting what he sees as a shortcoming in the system; is that right?-- Yes.

Go down to the third last of the dot points there, "The data interpretation software needs to be used regularly to ensure operators are familiar with the system. During this inspection the operators achieved the correct test result but took some time to do so." Do you see that?-- Yes, I do.

Again, he seems to be highlighting something that needs attention; is that right?-- Yes.

The next dot point: "No formal fixed system refresher training was available." This seems to echo something that he said earlier?-- Yes.

Is that right?-- That's right.

So, again, highlighting something that appears to require action and couldn't possibly have been redressed on the spot

when he was there at the mine, isn't that right?-- Well, it identifies what he saw as a problem, yes.

But he is not just identifying it for fun, is he? He seems to be identifying it so that some action can be taken about it, isn't that right? You see, I am really at the bottom of this trying to establish what these audit reports are designed to do. If they are sent back to the mine, it would seem that they are sent back with a view to somebody reading it and taking some notice of it and acting on it?-- Yes.

But if they are just produced for you to read and be aware of and mention it casually at the next occasion you visit the mine, well then you say so?-- It's not for that purpose.

Okay. Then the last point there is to this effect: "Emergency trial alarms on the fixed system should be carried out on a regular basis." Now, he has noted that point. Again, that seems to be noted so that somebody can take action on it; is that so?-- That's true.

Well now -----?-- To complete the picture, though, to be fair, the system hardware had a rating and so did the personnel.

Yes, down below there?-- Yes.

I can see that, but I'm not in any way putting suggestions to you inconsistent with that, but I am indicating these things that have been highlighted by Mr Bell seemingly with a view to somebody taking action on them, you see? I think you have agreed that that appears to be the way in which they have been noted there. They haven't been noted to be put into departmental records?-- That's true.

Well, now, do you have any confidence that that document did find its way back to the mine?-- No, I don't, and after - I went and had a look through our file and I couldn't find any reference where it had gone back to the mine either.

Okay. Well, now, that's a problem, isn't it, with this system that you established about an audit? Here it is, it's a document put together with helpful suggestions in it - not just helpful suggestions, some of them quite critical suggestions as to improvements that can be made?-- I don't -----

And you can't give us an assurance that it actually got back to the mine for people to act on it?-- I can't.

Okay. Well, now, first of all, does that say something about the audit system that was in place, this sort of two yearly audit system that was in place for the monitoring systems; that is, that it might well have been designed to achieve something in the end but you can't actually say that it did?-- Well, I agree that the audit process has to be more systematic and better documented.

Doesn't it say something too about the dangers of moving over

to what you have described as more an audit-based approach in the future rather than one that involves more an enforcement of regulations, as it were, and enforcement of safety from the Inspectorate's side as we have at the moment?-- I think that it identifies that there is a greater need to conduct an audit process as part of the review system of the safety processes and safety management systems of a mine.

Now, that's certainly - what should I say - useful in terms of a statement but let's look at it in practice. Earlier in your evidence you said with this move towards deregulation an inspector would audit and request changes and would check on the changes in the future. Now, the kind of audit you have in mind is something of an expanded version of this sort of audit, an example of which we have seen in that document there, Exhibit 272; is that right?-- Yes.

You say that the inspector would request changes. Does that adequately express what he would be able to do, that is, request the changes?-- If it was - in Quality Insurance terms - and I am not suggesting we will be doing a Quality Assurance audit as such, it's called a Corrective Action Request. In other words, it's actually spelt out where the failure to comply with a system is in place and that there will be a report sent back addressing each of those matters where there has been a non-compliance identified with the procedure that is stated as the quality procedure for the mine, and this is what the audit would determine.

Whose procedure would it be? Who would establish that procedure under this proposed system that you have envisaged? Is it a procedure established locally by that mine?-- Yes.

By the owner?-- Yes.

So, the inspector would come in and he would be auditing the owner's system?-- That's correct.

And he would then request changes to the system, if he saw some shortcomings?-- If he saw some shortcomings he would.

I take it from what you say, if we are talking about deregulation, that this audit system would be something that would be seen to replace existing regulations that can be enforced by inspectors; is that right?-- No, I didn't ever say that.

Or is it in addition to the regulations?-- They are in addition. There is going to be - well, it's proposed that there will be regulations both prescriptive and enabling, as they call them, and safe operating procedures and those procedures will be owned and identified to address the risks at the mine themselves.

Who establishes the procedures? Are they established centrally or are they established locally at each mine?-- Locally at each mine.

And what force - as a body of rules what force does that set

of procedures have?-- It will, in effect, be legislation relating to that mine.

It would, in effect, be legislation -----?-- Yes.

----- relating to that mine?-- Yes.

And what powers of compulsion would there be to ensure that mine owners complied with their own procedures?-- The same force of law that we have now for our existing regulations.

Well, let me go back to the position where the inspector audits this set of local procedures?-- Yes.

Set up by the mine?-- Yes.

He has to determine whether or not those procedures are being complied with and then he requests that there be changes. He does so formally, I take it?-- Yes.

And what happens if those requests aren't complied with?-- Well, that then brings into effect that the mine is not complying with the legislation itself.

So, what can the inspector do about that?-- Well, there may be - it might be serious enough to precipitate a prosecution.

A prosecution. What else?-- It may, and probably would, more likely, involve cessation of that particular activity and any activity that was associated with that from the point of view of safety, so that it might require the cessation of production in that area or the mine.

Now, what you are suggesting then in the end result is really a situation where the inspector then is expected to do - to still enforce what would appear to be quite detailed rules and regulations, if I can call them that, but there are actually rules and regulations that are set up at a local level, you say, for each mine; there would be different procedures?-- Yes.

And you say that this is a move towards deregulation rather than towards regulation?-- I didn't say deregulation. I have said self regulation.

Self regulation, sorry?-- There is a difference.

I think at one stage the word "deregulation" might have been used. You say towards self regulation?-- That's what I said.

But, in effect, it's not self regulation if that's what you envisage. If, in fact, the inspector is going to come in and treat the local system as being tantamount to a body of legislation and issue orders to stop work and cause prosecutions to be instigated if there is no compliance with the local procedures, that's not self regulation at all, is it?-- In my terms it is.

Look, tell me: these local procedures would be established by whom?-- By a partite committee between the employees and the management at the mine.

Employees and management?-- At the mine.

At the mine?-- Yes.

What about the Inspectorate?-- The Inspectorate's role would be to review those processes.

And approve them?-- No.

Or disapprove them?-- No.

So that the Inspectorate may well be expected to go in there and enforce this local procedure even to the point of starting prosecutions on the basis of them but the local procedure is one into which the Inspectorate has had no input; is that so?-- The Inspectorate's role would be to review the process of what's being proposed, a safe operating procedure, and it's done in a risk management format and if the - and the inspector in his review of that, if he was able to determine that a particular risk was not identified or that the control measures were, in his view, inadequate, or it could be that at a later stage further information from an incident at another mine might have a bearing on some of the other mines within the State, then they would bring that to the attention of the individual mines and say, "This is what the" - "There is a risk here which hasn't been identified in your scheme.", or, "There has been an accident, just check that your scheme adequately identifies and covers this risk.", and that is what they would have - it would be their responsibility to do that.

Whose responsibility?-- The mining companies.

Well, what can the inspector do about it, though, to ensure that steps are taken to redress those matters?-- Well, we talked about proposals in our legislation, remember.

Yes?-- It would be a requirement that there be - that the matter would be addressed.

But I am just asking you, in practical terms, under the proposed legislation, what can the inspector do about it to ensure that those matters are addressed? Some matter of safety that doesn't seem to be covered by the existing procedures or some factor that's arisen out of some other accident that seems to require a change to the procedures, what can the inspector do to ensure that there is a change to procedures that addresses that particular problem?-- I don't know that that's actually currently addressed of how you enforce such an issue if a mining company decided they weren't going to do that.

I see. So, really what you say is that the notion that this is self regulation is because it's the company with some input from employees that, as it were, comes up with the local set of rules and at this stage there doesn't seem to be any

particular system in place, as far as you are aware, for the inspector to have some positive input, that is compulsory input, into that local system of rules. Is that what I understand you to say?-- That's true.

And what's expected then is that inspectors will go to a mine and at each mine there will in fact be a procedure specific to that mine; is that right?-- Yes.

And the inspector would be expected to audit that procedure that's specific to that mine; is that right?-- Yes.

And then if there wasn't - he could make a request that that procedure be changed in some way?-- Yes.

If he sees it as having some sort of shortcoming?-- That's right.

And if that request wasn't complied with, then his method of ensuring that the change is made is to resort to perhaps prosecution; is that right, or stopping work?-- That would be assuming that particular risk was at the mine.

Yes, I'm just saying if he saw a shortcoming, the first step he can take is to request that it be changed, the system be changed, to overcome the shortcoming?-- That's right.

And if that request is not complied with or not adequately complied with, his next step is either to stop work at the mine or to launch a prosecution. I am just basing this on what you have told us this afternoon?-- Yes, that's right. The mechanism of compulsion has not been written into our legislation.

Do you see any difficulty with inspectors having to go to different mines and being confronted with a different set of procedures at each mine?-- Yes, I do.

I mean, if anything, that's going to put a very heavy burden, isn't it, on inspectors rather than lighten the workload requirements for inspectors?-- In the early stages I would see that putting a - certainly a greater burden on the inspectors.

But it is not likely to change, because as new mines come on stream, they will have a new set of working procedures; isn't that right?-- But there is not that many new mines come on stream that that is a regular problem.

Do you see any difficulty in establishing what would be a good, basic set of guidelines for inspectors to work to when, in fact, they are enforcing a different set of work procedures at each mine?-- Well, what we have in the developing of our legislation is a document which covers the activities and the risks and suggested control measures, and that is available - will be available for the total industry, so that each of the risks that are identified, and, indeed, the safety of the operating procedures, have already got the various risks identified.

By the company?-- No, actually identified by these working groups that we have on our legislation review, and that will be from the Inspectorate's point of view - the reference document that we will be looking at to confirm that those particular matters are managed at the mine. Now, if there happens to be new technology or new systems at work, the risks will still be there, but the way of controlling those risks may well be mine specific.

I gather from what you say that the way of controlling the risks is going to be regarded as being very much something that is done by the company that operates the mine?-- That's true, but if we are going to go down the path of a duty of care type regulation legislation, then it is the duty of that employer to ensure that those processes are put in place.

You see, you said earlier today, "ownership of safety at the mines belongs to the company". Now, that seems to reflect what you are saying, really; that in devising systems to achieve a safe working system, then it is primarily the responsibility of the company; is that right?-- Yes.

Now, do you agree, perhaps in light of evidence here - or in light of your general experience throughout your career - do you agree that really ownership of safety belongs also to the community? Do you think the community has an obligation to ensure that people work in safe systems?-- Yes, I do.

And that companies have a particular viewpoint - I mean, the company is there to operate the mine, but in the end result the company is there also to make a profit; isn't that so?-- That's true.

A community, of course, has an interest to ensure that - not that the company ultimately makes profits, but its interest is to ensure that whatever mining is carried out is carried out safely so the members of the community are protected; is that so?-- That is true.

And, of course, the community's interest is represented through government agencies; isn't that right?-- That's not necessarily the only venue. What we are saying is that the people who are most at risk are going to be the people who are

implementing the systems, and this legislation is putting in place a mechanism where the persons who are going to be put at risk are going to be party to the way in which that risk is managed, and that is different to setting about having a prescriptive regulatory system.

Coming back to the directions from which the various parties come, I think you have already accepted, of course, that at the end of the day the company has to look at coal production at conferences; isn't that so? At the end of the day, that's what it is there for?-- That's one of the things they have got to look at.

Isn't it the case that the government regulatory agency, whatever it might be, in situations like this, comes from the point of view of the community? That's what the government is there for - to represent the community in these types of things; isn't that true?-- That's true.

It shouldn't come with any other interest, other than the way things are carried out should be the best way things can be carried out, from the community's point of view?-- That's correct.

The most productive, certainly, but also the safest possible way; is that right?-- Yes, but it is also in the company's interest to have the safest operation, too. I wouldn't suggest anything other than that.

Okay. Now, I want to ask you about something else in respect of proposed legislation, and that is the way in which people gained their - what I'll call broadly - "qualifications". The proposal that you have raised, as I gather it, is that there wouldn't be certificates issued by examiners as there is at the moment; is that right?-- That is true.

There would be what you call a National Competency Standard?-- That is true.

And how would that be established?-- The National Competency Standard has not been completed at this time, but the competency - matters of competency have been identified by having combined meetings in both New South Wales and Queensland as being key matters of interest.

Now, if there is no central examining body, then obviously somebody has to take the role of ensuring that a person occupying a particular position complies with the National Competency Standard in respect of that position; is that so?-- Yes.

I gather from your evidence, your answer to that is that the company would be the body that would assume that responsibility - the operator of the mine?-- That is what is proposed.

I think you said in your evidence that mining companies, as you saw it, would develop a training and development structure which would require certain qualifications and that they would

ensure training for a particular role at a particular mine; is that so?-- That is true.

All right. And, again, what you are doing with that is putting - I'll call it ownership again - that's the "in" word - ownership of the training aspect into the hands of the operator; is that right?-- Not entirely. I did say that there will be positions - which are the deputy position and the manager of production and manager, engineering - which would be competencies determined by the Council - that's the Mining Council we are talking about here.

Other than that? Other than those positions, it is in the hands of the company to ensure that whoever's in the job is not only well qualified when he takes it on, but continuously trained while he is in the job?-- That is correct.

Can I ask you this, Mr Lyne: is your experience in the industry, whether you take into account evidence here or the whole of your experience in the industry - has that experience given you confidence that there will be ongoing refresher training and insistence of an adequate level of qualifications on the part of the operator of mines, or is it your feeling in a particularly rosy mood when you look at the proposed legislation?-- I haven't seen evidence to suggest that the mining companies will collectively train people to be - and maintain them at a level of competency in the - over a long-term, if that's the question you were asking?

You say that you haven't seen evidence that they will, or you haven't seen evidence that they won't?-- I haven't seen evidence that they will. What has been - and this National Competency Standard to which has been referred is a totally new concept for the industry.

Yes?-- And, indeed, it was upon my insistence at the last meeting that such a provision was put in, purely as - as a transitional arrangement to ensure that the standards that we have at the present time aren't lost, and that the National Competency Standards will be in place and functioning before the Board-of-Examiners-type certification systems would be phased out.

What steps would be taken to ensure that there is compliance, as it were - compliance by operators, first of all - with insistence on adequate qualifications on appointment, and, secondly, with requirements ongoing for refresher training in positions at the mines?-- The issue of retraining again would be part of the decision-making requirements of the Health and Safety Council, which will be for keeping people in key responsibilities currently competent - sorry, I have forgotten the second part-----

My question, though, was this: what steps could be taken under the proposed system to ensure that operators comply with the - first of all, the requirements of - the qualifications of appointment necessary for position; secondly, with requirements for ongoing refresher training? What steps can be taken to, as it were, enforce this notion that there would

be - that the company would develop a training and management structure that would ensure suitable qualifications?-- Well, a training management structure - firstly, the management structure is something which has to be determined at the - right from the outset of the mine's operation under this legislation, and, under that - which would determine the scope and the type of machinery, type of activity, whether it is bord and pillar, long wall mining, high wall mining, whatever - is identified - and then the management structure would reflect the degree of supervision and the type of risk that was trying to be - that was to be managed, and that would be the basis under which the mining company would set about having that type of person with those skills employed, and, indeed, any person who might replace them on a temporary basis and succeed them would need to have those current competencies.

Right. And the ongoing refresher training?-- The ongoing refresher training would be, again - come from - whether it is a subcommittee or directly from the Health and Safety Council - would be to keep people operating in the various key positions competent - or aware of current and latest trends.

That's the system you envisage. Can I come back to my question: what steps would be available to ensure compliance with that system under the proposed legislation? What can be done by the Inspectorate or by anybody else to ensure that people with adequate qualifications are being employed and being employed to replace those that leave, and to ensure that there is also this refresher training to keep people up to speed from month to month or year to year or whatever?-- Okay.

What steps can be taken to enforce it, or ensure compliance?-- If the people who were employed to be a position at the mine requiring certain skills and it could not be demonstrated as part of the audit that the person had been trained in those skills, then that person would not be able to continue to function, or be responsible for those activities at the mine.

Well, how is he prevented from doing so?-- There would be an instruction to the company to provide somebody with that skill to do that, or desist from exposing the mine to those risks.

And if that doesn't happen? If the construction is not complied with?-- That operation - whatever section is affected by that particular type of risk - would stop - cease.

So, in the end result, you say that you come back again to this sanction by way of stopping operations or prosecution?-- If there is a risk - yes.

If there hasn't been adequate refresher training? I mean, that's effectively what you are saying. If the refresher training is not adequate, then there will be a request to the company to either get the person up to speed or, ultimately, if the company doesn't do that, work will be stopped and there - or there will be a prosecution?-- That's as I see it.

Do you have any confidence that that would happen? I mean, the evidence we see indicates that refresher training at Moura No 2 was, at least as far as the records go, a haphazard thing; not only that, we don't see any evidence that the Inspectorate made any close checks to ensure that people were kept up to date, even with the regulations - or the rules in respect of refresher training. Do you have any confidence that this proposed system would be successful?-- I believe that the proposed system can be successful providing the audit process goes into confirming that in detail.

I gather, given that you and other people have obviously been putting a lot of effort into proposed new legislation, that you do see some problems in the current legislation?-- That's true.

Now, can you briefly enumerate on that?-- The current legislation was written back in about 1925 when roof support systems were timber and not permanent roadway supports with roof bolts, when rib support systems were, at best, very temporary, a time when haulage of coal was possibly with horses, and ultimately it came into conveyor belts of various standards, and the legislation has continued to be modified and modified and modified. There are numbers of various - that have a flow-on that do not necessarily assist the practical and safe operation at the mine - and that doesn't reflect the current concept of managing the risk. In other words, it turns around and specifies - or prescribes certain levels or certain figures of clearances, which are engineering tolerance type matters, which don't have a direct bearing on the issue of direct safety, and those matters - it might - it does include even some of the inspection processes on the outbye roadways, which might be part of that - the electrical engineering design criteria, which in many cases have been overtaken in the passage of time by Australian Standards. There are numbers of times when the requirements are there that with new technology is difficult to actually apply because of previously prescriptive rules and regulations. Now, what we are trying to do is to take-away from the idea that the legislation necessarily - if you comply with the legislation, which is a minimum standard, then you are necessarily going to be safe. We are saying, "Well, you identify the risks and come up and work to a safe system of mining."

What you are saying, in effect, is that it has really been - or it has become out-dated in some respects and it is too inflexible?-- Very inflexible, yes.

Now, tell me, with this move towards new legislation, do you see a benefit in there being some attention paid to the prospect of uniform legislation; that is, nation-wide - uniform legislation?-- I do.

You mentioned before that there are some matters being addressed on a Queensland and New South Wales basis, particularly in respect of competency; is that so?-- That's true.

And obviously there have been - or are under the existing different bodies of State legislation, there are inconsistencies which can give rise to problems; is that so? When I say problems, problems with people transferring from one jurisdiction to another?-- It does cause some confusion.

One example may well be yourself. You came up from New South Wales and laboured for some considerable time as Chief Inspector unaware of the strict requirement in relation to the strength of final seals; is that right?-- That is true.

It didn't exist in New South Wales?-- No, it doesn't.

That in itself didn't cause any problems, but there are other differences at that cause problems; isn't that so? Could I suggest some: in New South Wales a piece of machinery doesn't have to be explosion proof if it's not to be used within a certain distance from the coal face, is that right, from the work face. Am I right there - flame proof, I should say, so it doesn't produce ignition sparks?-- No, that's not exactly correct. The differences are in Queensland that if a mine is determined to be gassy such as Moura has a determination of being a gassy mine, then the equipment, I say outbye, needs to be flameproof. New South Wales doesn't require that. There is a difference there.

So somebody who works in Queensland may well assume that all equipment in the mine - if he has been working in a gassy mine, that all equipment is flameproof; is that right?-- Yes, if they went from Queensland to New South Wales they might be -----

Went to New South Wales and just may assume that something that's normally used as outbye equipment is going to be flame proof and he brings it up into the working area; is that so? I mean that's just one situation that I throw up as a difference between the two?-- Yes, that would happen if a person came from New South Wales up, yes.

There are these differences, so given first of all the increased mobility of people interstate over what it might have been 50 years ago?-- There is a lot of mobility between us.

And perhaps even more so given the effects of the mutual recognition act which would require bodies in Queensland to recognise New South Wales qualifications or certifications and vice versa, and the same in respect of other States. You could find that people who have qualifications in one State are getting their qualifications recognised in another State without specifically having to pass tests on local legislation and local practices; is that so?-- That is true.

So that's one feature that could very well enhance the need to

come to some uniformity?-- Yes.

Now, I want to ask you some questions about your understanding of certain practices, and states of learning. When you were being questioned by Mr Morrison you were asked about the utility of the 10 and 20 lpm levels in respect of CO make; do you remember that?-- Yes.

I think, if I can just take-up what appears to be your final position at that stage of the questioning, that you said you were aware of those figures on or before 7 August of last year. The way you put it was that you were not of the view that they were necessarily proven for Australian conditions; is that right?-- That's true.

But it's not that you didn't attach some significance to those figures, is it?-- No, no, they are the indicators, 10 and 20 litres and 30.

In fact you said later in your evidence this morning that if the CO make figure was very low at one point you said you wouldn't worry, but anything above 10 requires some investigation I think is the way you put it?-- Yes, that's the essence.

That reflects not only your point of view now but your point of view back in August of last year and before that?-- That is true.

If somebody had spoken with you in August last year and said, "Look, we have got a CO make of 19 lpm." , You wouldn't have said, "Don't worry about it, go back to bed.", would you?-- I certainly wouldn't have.

Because - well, can I ask you: why wouldn't you?-- Because wherever you have a make of carbon monoxide there has to be a source, and it's important to the best of your knowledge and abilities to determine what that source is, and as you would have read in my CV I have had to go and seal many mines and I'm aware of the impact of carbon monoxide and certainly the risk associated with fires. So I don't toy with that type of information.

You were asked about your attitude to the review in 1992 which suggested that each individual situation had to be looked at in terms of what the CO make might mean, but did you in any way regard that review as having the effect that you wouldn't worry about the particular figures of 10 lpm or 20 lpm or figures in that order in terms of CO make? I mean it doesn't wipe out any concern about those figures, does it?-- No, it doesn't wipe out any concern.

To the extent that they were figures established and then figures which became to some extent currency within the industry as, as it were, benchmark levels, they still remained in the background, didn't they, after that review?-- Yes, I had never read or actually heard about the particular paper that these figures were brought from from Germany. In fact my memory of those figures coming from Germany was that it

related to experimental work that had been done and they were the figures that came from experimental work of a fire in a fire gallery, but obviously my memory was incorrect on that.

Can I ask you this: you were asked some questions about your actions after the '89 seminar and particularly you were asked did you call the inspectors together to see what use might be made of that information that had been produced by SIMTARS at the '89 seminar. Do you remember being asked that?-- Yes, I do.

Did you see the question of the measurement of CO make as being part of the methods or part of the knowledge relating to the detection of spontaneous combustion, the detection of heatings in a mine?-- I was not at that seminar in '89 as I have repeated now, and indeed in '89 I was aware of CO make. Again I was not aware that - or had not made any determination in my mind that CO make and 10 lpm was to be a criterior on which to base all decisions and assessments on. It was a tool for accurately determining what was happening on a trend basis rather than a specific figure.

So it wasn't so much relating to the 10 lpm or 20 lpm or specific items, but rather more the notion that was very much part of the '89 seminar material that CO make was a method of measuring or ascertaining whether there was some heating problem in a mine; is that the way that you saw it?-- Yes.

It was a measurement, a means of measurement as it were?-- I just remember that CO make was made mention of in the '89 seminar as I went through the book.

You were asked, you see, whether you instructed your inspectors at that time or whether you called them together to see whether you might take some steps to get them to promote the notion of CO make throughout the industry. Do you remember being asked that question?-- Yes.

Tell me this: in respect of that seminar did you understand that industry members had attended the seminar too? It wasn't just one run by SIMTARS for inspectors, was it?-- Not at all.

Did you understand that in fact members of the industry returned to their mines armed with the SIMTARS material?-- Yes, I was.

Did you see it as part of the Inspectorate's role to, as it were, reveal this to the industry or did you think that the notion of CO make as being a way of checking for the existence of spontaneous combustion was something that was out there and abroad in the industry already?-- I saw the information that had been distributed to the industry through that seminar.

You were asked some questions also about whether you changed the requirements in respect of refresher training to incorporate something about CO make. You will remember your attention was drawn to the fact that refresher training only mentioned spontaneous combustion, and even then spontaneous combustion was wrapped up with other things; do you remember

that?-- Yes, I do.

In relation to the requirements for refresher training was it your practice to amend the topics for refresher training so as to incorporate new ways of measuring things? I mean I'm just -----?-- No, it wasn't.

----- trying to ascertain what the practices were. The topics for refresher training were fairly broadly stated; is that right?-- That's correct. You would use the term generic statements. They identified a subject, not the detail.

You were asked some questions also in relation to the Inspectorate's role in encouraging the use of the gas chromatograph; do you remember that?-- Yes.

I think what you said in that connection was that you did - you were aware of the fact that the - first of all that inspectors encouraged the use of gas chromatographs; is that so?-- That's true.

I think that's the way you put it, but the question you were asked was "Well, did the inspectors not only encourage people to use it, but did they encourage people as to when to use it?", I think that's the best way to sum up the line of questioning, and you said no, that they haven't, but that as you understood they did ensure that there were people there that could use it?-- That's right.

And that they were used without instructing them - without inspectors instructing operators as to when to use it. Do you remember that?-- That's right.

Can I ask you this: did you think it was necessary for your inspectors to instruct mine operators as to when they might make use of the gas chromatograph?-- I can't believe that a mining company would need to be told when to go and use their equipment.

Another matter you were asked about is whether you regarded Moura mine as being comparative - or comparable might have been the question, comparable with other mines in various respects, and in particular you were asked in relation to communications and I think you said that you hadn't had a comparative audit between Moura and other mines in that regard, but then you were asked this question, overall, you were asked, was this mine reflective of the industry. Do you remember being asked that question?-- Yes.

You agreed with that. Well, can you explain what you mean by "overall" in that context? I mean it's a very broad question and the answer doesn't mean much unless we know what you mean by the word "overall" or what you understood by the word "overall"?-- I had spoken with Mr Walker about the operations at Moura and its approach to safety, and reporting systems and that comment reflected his advice to me.

That what, I'm sorry?-- That comment reflected his advice to me.

Overall?-- Through the Central Queensland division.

But in what respect? When you say "overall", in what respects?-- That the practices of reporting or operating the mine were not remarkably different from what might be occurring at other mining operations in the Bowen Basin.

In so far as it might appear to Inspector Walker?-- That's right.

Because you were relying on what he told you in order to form that opinion; is that what you are saying?-- I felt he would be the best person in a position to do that.

Finally I want to have a look at a document - before there is another document I want you to see first. You recall being asked some questions, it was by Mr Harrison, I think, on Thursday. You were asked some questions about the documents - Exhibit 214, Your Worship - and he was asking you at one point about the first of the documents that appears there, the one dated 20 August 1993, and he asked you some questions about - generally along the lines of whether you were embarrassed by what was contained in that document there and whether you felt that the document in some way exposed some problems with a shortage of men and the Inspectorate, and the answer that you made was that you couldn't see where Mr Walker was saying that safety was being jeopardised, and I think you said on another occasion it was up to him to inform where he was unable to perform his duties as an inspector; do you remember that? Do you remember saying that?-- I don't think I said it was up to him, I said I don't remember him bringing that to my attention that he was unable to -----

I'm just reading the note that I have, of what you said. On another occasion you said, "Well, he never identified where he had insufficient ability to perform his duties.", and it was on that basis that you were saying that you really didn't regard this document as showing that as at least being a complaint that Mr Walker was making that the Inspectorate was being left without adequate manpower. Do you remember that? That's basically what you were saying, that you didn't regard this document, 20 August 1993, as being a complaint by Mr Walker about there being problems created - perhaps I should put it a bit more widely, being problems created by there being inadequate manpower?-- I did not read and have not seen that he was not able to fulfil his duties under the legislation in this document.

Did you see that the document was, in effect, a complaint by Mr Walker that manpower was inadequate in the Inspectorate, inadequate for the Inspectorate to carry out its duties?-- No, I didn't see it that way.

When you say that, were you regarding the document as being a document that followed on from the earlier course of correspondence, that is, his memo to you of 22 June and your reply of 6 July, the two documents behind it in the exhibit there?-- No, I don't think so.

I mean, it's one course of correspondence, isn't it?-- They have got a relationship, yes.

They have got a very direct relationship because if you read the first paragraph of his memo of 20 August '93 he says, "I wrote to you on 22 June 1992 expressing my concerns about the lack of Inspectorial Resources in the Central Division and you replied in a memorandum dated 6 July 1992."?-- Yes.

"Copies of these two documents are attached."?-- Yes.

Now, can I take you to his document of 22 June '92?-- Yes.

Where in the first paragraph he refers to concerns regarding the effective inspectorial monitoring of coal mines in the Central Division?-- Sorry, which -----

This is his document of 22 June '92, the second document there?-- Yes.

In the first paragraph he says, "We have discussed, on a number of occasions, my concerns regarding the effective inspectorial monitoring of coal mines in the Central Division. Concerns are principally related to understaffing."?-- Yes.

Isn't that the basis on which the whole course of correspondence got underway, that he was expressing concerns about the effective inspectorial monitoring and that those concerns were principally related to understaffing?-- That was his perception, yes.

But I'm saying that was also the basis on which this whole course of correspondence got underway, isn't that right?-- Yes.

And when you read his memo of 20 August 1993, whether when you read it now or when you read it initially, you could only read it against that background, that that's what the whole course of correspondence was about, concerns arising out of that - well, concerns about the effective inspectorial monitoring arising out of understaffing?-- The concern being that he wanted an extra Inspector in Central Queensland.

Anyway, that document I referred you to, 22 June '92, in the second paragraph he speaks of being the only coal mining Inspector for the Central Division since that date when Mr John Hammet died?-- Yes, and let me add Mr Dave Wilson had, over a long period of time, been very involved with the Mines

Rescue organisation.

Okay, but just to - so you can appreciate the tenor of the document, in the next paragraph he talks about his being effectively the only Inspector active in the field, so he is talking about the weight of duties and the understaffing aspect. Over the page, top of page 2, he says, "To be effective, an Inspector must remain 'in touch' with the people and activities at the mines and be involved as much as possible." He goes on at the end of that paragraph to say, "This has become increasingly more difficult and I now feel I must commit my concerns to paper."?-- Yes.

And then in the next paragraph, four lines up from the bottom he says, "Those few of us who are available are committed to 'muddle on' and my concern is that time spent on the Review and other matters will be to the further detriment of the monitoring of safety at the mines."?-- It says that, yes.

And then in the last line he says - he refers to, "Our limited resources can only be stretched so far."?-- Yes.

So, is there any mistake that this later memo is expressing to you concerns about not being - the Inspectorate in Rockhampton not being able to effectively carry out its duties because of the shortage of staff? There is no question about it, is there?-- No.

So, when you told Mr Harrison that you couldn't see where he was saying that he was unable to perform his duties as an Inspector or that safety was being jeopardised or that he had insufficient ability to perform his duties, that really wasn't correct, was it?-- You are taking another implication that's not there. One is - the fact is you just established that he has said to me that the Central Queensland Division needs another inspector and that he felt that they were under-resourced. I have said on record here that the matters were raised with Mr Walker and Senior Inspector Biggam on the division of the mines and that I wanted to take other mines out of his portfolio and put them into the Central Queensland - to the Mackay office.

Okay, Mr Lyne, you have run through all that previously. I know that you have put all that on the record. I am addressing the question only to what you told Mr Harrison. What you said to Mr Harrison was that you were unable to - my note is it was up to Mr - what you said, it was up to Mr Walker to identify where he was unable to perform his duties as an Inspector. Are you saying even in light of that earlier memorandum that you didn't regard him as having done that?-- I haven't -----

If you can just give me a "yes" or "no" answer to that, I would be quite content?-- I don't see that this says that.

Are you saying that Mr Walker didn't at any time say that safety was being jeopardised as a result of the shortage of staff in spite of what's contained in that earlier memorandum? Again just "yes" or "no" would be sufficient?-- I think at

this particular time he was concerned about the issue of doing the additional work in relation to the Coal Mine Review.

You don't think there is any significance in his reference to the further detriment of the monitoring of safety at the mines? You don't think there is any significance in his reference to his concerns regarding effective inspectorial monitoring of coal mines, those concerns being principally related to understaffing? Those things don't have a bearing on your answer? Again, a "yes" or "no" would be sufficient?-- I'm pointing out to you that the point that's being made here - and to read it in the full context - the words are, "Those few of us who are available are committed to 'muddle on' and my concern is that time spent on the Review" - and the review is the Coal Mines Review Workshop - "and other matters will be to the further detriment of the monitoring of safety at the mines." That does not mean to say that it's not being complied with - not complying with what the legislation requires.

Yes, okay, Mr Lyne. I want to turn to another matter in respect of the way in which matters are moving with the legislation. This notion of deregulation - I am sorry, self regulation - self regulation that you have referred to and the push in that direction, is that something that you instigated?-- It was instigated from a meeting which I mentioned earlier between three people who had been to a ACIC conference in Sydney.

Who were those people?-- Mr Peter Isles, Mr Bill Allison and myself.

Mr Peter Isles is a BHP employee?-- Correct.

Mr Bill Allison, of course, is the District Union Inspector; is that right?-- That's true.

And from the meeting of those three people did it then move into a more formalised structure involving the Review Committee that you have spoken of?-- That is true.

On that Review Committee you are the Chairman?-- That is true.

There is Mel Bell on that committee?-- That is true.

Is he the Inspectorate representative; is that right?-- He is representing the engineering sections of the Inspectorate.

Mr Peter Isles in fact is a member of that committee too; is that right?-- That is true.

Again, he is employed by BHP?-- That's true.

Mr Roger Marshall?-- Yes.

From MIM - ex general manager of MIM Coal?-- That is true.

And Bill Allison is on that committee too?-- Yes.

And you have mentioned previously Mr Gary Norris, I think, of the Colliery Staff Association?-- I don't think I mentioned his name, but he has -----

You said he was a representative of the Single Bargaining Unit; is that right?-- Yes.

Does that vary from time to time?-- It does.

Mr Norris is one of them?-- That is true.

Now, there are also some committees that deal with regulations; is that right?-- That is true.

There is a Surface Regulation Committee?-- Yes.

And the Chairman of that committee is Mr Alex Campbell who is a BHP employee?-- That is true.

The members of that committee are Mr Roger Bancroft representing the engineering side; is that right?-- That is true.

From the Department of Mines and Energy. Mr Rodney Golding from the Department of Mines and Energy; is that right?-- Yes.

Is he only from time to time, is he?-- I think Mr Golding and Mr Waters often interrelate. There is another Electrical Inspector in Brisbane.

And Mr Allison is also on that regulation committee; is that right?-- That is right.

Then there is an Underground Regulation Committee. That's convened by Mel Bell; is that right?-- Yes.

And on that there is a representative of the Department, that's Mike Waters?-- Right.

And Mr John Sleeman?-- Yes.

Is he a person recently retired from BHP?-- That is correct.

And is there also another fellow named Roger Marshall?-- Yes.

He is the ex MIM chap; is that right?-- That's right, and also Mr Matt Best is on that committee.

As a Union representative?-- Representing the Union, yes.

The composition of those committees, is that something that you had some hand in or did they just come together, as it were, with those people that were available?-- They didn't just sort of pop out of the air.

No, no, no, but, I mean, to some extent we gather from the

correspondence we have seen that there is some - there was some difficulty at least in getting the departmental representatives available to sit on one or other of the committees, the subcommittees; is that right?-- Originally when we first developed the concept of a risk management legislation, we didn't have any model or any experience, indeed any reference that we could make to any previous group that had done this, and we anticipated that we would be able to set up numerous committees throughout the State to look at various areas of the legislation, and we were at that stage looking to involve many of the regional people in that, and indeed this is where - this letter of 22 June '92 was one part of that process - that's right, yeah - and that's what - we were looking to involve that. Now, what happened is that we found it become - it's a very, very difficult - takes a lot of time, these tasks, and it becomes almost unworkable to have so many different committees all doing different issues and we found that there was quite a bit of overlap and different approaches on it, so it become quite confusing and so that the proposals and reviews put up by one group did not mesh with another fairly closely parallel group, and so that's where ultimately the people that you see before you, those names there, became the eventual Regulation Review teams. The Surface Mining one didn't change very much. It was the Underground one which has the greatest area of number of risks. We had a number of different teams looking at that, and that's where we had to - we didn't have the resources of people to sort of do all of that work and so that's where it was refined down to a nuclear group, and I will say it's principally been Mr John Sleeman doing most of this work, and the objectives of that are that when - this work has now been completed, it's quite a large amount of work that has been done, and it is in the process now of being condensed down to some regulations and it will actually go out to people for review at the completion of that work and that initial group for review will be the persons that were on the original Underground Legislation Review panel.

I see?-- It become a management tool to improve its efficiency and make it so we could actually make some progress.

Was it the idea that the Department should have sort of lead agency role in the whole thing?-- Yes.

Was there some concern at one stage that given difficulties, particularly when Mr Walker indicated that he couldn't continue in the role that he had in respect of the review committee that he was on that was the Underground one - some concern that in fact the Department might be losing that lead agency role, in fact it would end up with more BHP representatives than departmental representatives over these committees?-- Yes, that has been expressed.

Well, Mr Mackie going onto that committee in place of Mr Walker at least maintained a fairly substantial profile for the Department; is that right?-- That is right.

Now, one further matter then I will take you to. I am going to call on your experience in professional reading in this

connection, Mr Lyne. Have you been familiar in the course of your career with a journal known as the Australian Coal Journal?-- Yes.

Just have a look at this document here, if you would. If you can have a look at this photocopy too while you have taken the original document and while Mr Barker is on his feet. It's a photocopy of certain pages of that, and I have copies of that for the panel and for the parties at the Bar table too, Your Worship. You will see, sadly enough, that that has on the front page of that issue down in the bottom right-hand corner "Final Issue". Do you see that?-- Yes, I do.

It's issue No 44, 1994?-- Yes.

Are you familiar with the history of that journal to any extent?-- Yes, to a limited degree, yes.

Can I just go back a little bit in the history before I deal specifically with the journal? We have heard reference in this Inquiry to NERDDC; is that right?-- Yes.

That's a body that was funded, in effect, by the industry by way of a five cent levy per tonne on coal produced; is that right?-- I understand so, yes.

And the idea was that those funds would be made available for research and I suppose development too; is that right, given the name of the body, Research and Development?-- Yes.

Sometime in the early 70's - early 80's, I should say - was there a proposal that NERDDC funds be made available to fund the establishment of this journal; are you familiar with that?-- I'm not familiar with where the funding came from, no.

Well, just to cut short the history of funding, NERDDC was subsequently replaced with ACARP; is that so?-- Yes.

ACARP is funded on the same basis. It is an industry based funding, 5 cents per tonne?-- I understand so.

And given the Australian tonnage, that produces somewhere in the order of \$10 million per annum for research and development; is that right, or are you not able-----?-- I'm not aware of the figure, to be truthful. I would have thought it would be less than that.

Now, do you have any knowledge as to how those funds under ACARP are assigned?-- I'm aware of a - that it does go before a panel after receiving submissions.

And is there a list published as to where the money has gone, from time to time?-- From time to time, yes.

Published to the industry?-- Yes, there is.

Do you get a look at that list yourself?-- I get to see what - I don't get a copy sent directly to me, but I do get to see it through SIMTARS - my involvement with SIMTARS.

Have you formed any impression as to whether there is perhaps a bit of a bias more towards the funding going to the development area rather than the research area in recent years, or are you unable to make any comment on that?-- I've heard it expressed that that's been a bias.

And has that been particularly so since NERDDC was replaced by ACARP, which was really an industry-based organisation? Has it been any more noticeable perhaps since then?-- I'm not in a position to make that sort of comment.

You haven't made those sorts of comparisons. Can I just turn your attention to that document there? If you go over to the page, which is third in on the photocopy - I think it is probably the third page of the document there - which is headed up "From The technical Editor", this page gives a little bit of history, and in the second paragraph it says, "The Australian Coal Journal was first published in 1982, following a recommendation by Judge Goran. This arose from the inquiry into the Appin mine disaster, and his observation as to the need for wide industry circulation of state-of-the-art technology and developments and research from Australia and overseas."?-- Yes.

The following paragraph goes on: "I believe the Australian Coal Journal has fulfilled a vital role in the Australian coal industry over the last 12 years. It has been the only publication dedicated to coal technology and issues, and has become accepted as a valuable reference on developments within, or of relevance to the Australian coal industry."?-- Yes.

You will see towards the bottom of that paragraph there is a reference to "a final and complete subject index at the

back"?-- Yes.

In fact, if you go over to page 56, you will see that, in fact, the rest of the bundle of photocopied pages is, in fact, a copy of that subject index?-- Yes.

I don't want to dwell on the subject index, but just on areas that might leap to mind out of the evidence in this matter. At the bottom of page 62 you will see a reference to "Monitoring" as a subject heading, and over the top of the next page there is a list of papers there, some of which may strike a cord in the light of recent evidence here?-- Yes, mmm.

And then if you go over to page 64, you will see a section on spontaneous combustion, again a list of papers there, and then over on page 66, under the "Underground Mining" section there is a reference to a paper on "Coal Bed Methane Extraction and Utilisation", so just by reference to those few areas of papers, you can no doubt appreciate that it was a journal that published papers that were of interest to the Australian coal industry and with the specific bias towards Australian activities and Australian coal, perhaps I could even say; is that right?-- That's true.

Now, was it a journal that you read regularly yourself?-- I have read quite a number of these journals. I don't ever remember receiving in my life 44 or 43 of them.

Would it be fair to say that it was the only journal - as is said by Mr Hebblewhite in that editorial - the only journal that dealt with the sorts of issues that I've just mentioned?-- Yes, I would say that would be a fair comment.

And do you see the passing of that journal as being a problem for the industry?-- Yeah, I would agree with you there, particularly in that it relates to putting on paper the progress of many of the research matters that were being conducted by NERDDC.

Going to the evidence we have heard in this matter about the extent to which - perhaps I should say the limited extent to which useful information seems to be disseminated through the industry; do you think that there is a good case for the continuation of a journal of this kind in which information can be published and be published with some confidence that people will read it?-- I'm not aware of the audience this was focused on. I think it went to all the mine managers, as such, of the mine. Yeah, it is a very worthwhile document.

And do you think that given that we are talking about an amount of about - or you may not agree with the figure, but let's assume that there is a figure approaching somewhere near \$10 million per annum for research within the coal industry, or development and research in the coal industry, do you think that this sort of project - to ensure that results of research and relevant papers are published to the industry - are the sort of things that might properly be funded out of those sorts of moneys?-- I would agree with you there, but there is

no point in doing research if people don't have access to the results.

That's right. Now, Your Worship, I will tender that bundle of photocopies there being excerpts from the Australian Coal Journal No 44, 1994.

WARDEN: Exhibit 286.

ADMITTED AND MARKED "EXHIBIT 286"

MR CLAIR: Could the witness see these two journals here? There are two international journals there, Mr Lyne; one being called the "International Journal of Mining Engineering" - are you familiar with that?-- Yes.

The other is called the - you will have to read it?-- "Mining Science and Technology".

Are you familiar with that one?-- I have never seen "Mining Science and Technology" before.

You have certainly seen the first one? Perhaps not that issue?-- No, I haven't seen that one either.

Perhaps not that issue - I'm not asking about the issue, but the series; is that something that you are familiar with?-- No, it is not something that I've been exposed to previously.

Okay. Well, you wouldn't know, then, whether those two international journals have ceased publication in the last three or four years; is that right?-- I would not, no.

Thank you, Mr Lyne. Thank you, Your Worship. I'll have those two journals back, please.

WARDEN: Thank you, gentlemen. Can we take a five minute adjournment before we go to the panel? I hope to finish about 5 o'clock this afternoon. Just a bit of housekeeping: the premises here are required by the hotel for a function on Wednesday, so perhaps at the close of business today, or early tomorrow, you can make sure that all your material and gear is removed. I anticipate on Thursday for submissions we will need a lot of it to be reinstalled. Certainly the computers are to come out, microphones can stay in. Sitting times for Thursday and Friday: I would like an early start - 8.45 - if we can, and run through Thursday as much as we can. It may change subject to the length of time it takes you with your submissions. If we take a five minute break now? We will resume shortly.

THE COURT ADJOURNED AT 3.51 P.M.

THE COURT RESUMED AT 4.06 P.M.

BRIAN JOHN LYNE, CONTINUING:

EXAMINATION:

MR PARKIN: Mr Lyne, I promise not to ask you any questions regarding Mr Walker's letter?-- Everyone else has.

What is your view on the Quality Assurance program as practised at Moura No 2?-- I'm sorry?

What's your view on the Quality Assurance program as practised at Moura No 2 Mine?-- That's a very broad statement.

Okay, let me make it easier for you to answer then. The undermanager-in-charge had not seen or was not given the opportunity to review the documents that represented his statutory responsibilities; what is your views on that?-- There is no doubt that he should have been required to do that. Maybe I can shortcut some of the questioning here, a little. It's something that I will be following through further from an information position, and that is that a quality assurance system requires that persons are trained, and it would seem to me, and I will be, as I say, confirming this, it would seem to me that much of the difficulty has arisen over the fact that the previous manager of the mine has written the Quality document and assumed that that was still the circumstance and that that may have caused some of the problem in that he was going from prior knowledge, not on what the situation was at the mine at the time.

You would agree with me that the people concerned should at least be involved in the process?-- That's correct.

One would hope that when you complete your Quality Assurance with your inspectors that at least they are involved in that process?-- Yes, but our process is not going to be a Quality Assured process. It would be parallel to it, but not necessarily Quality Assured. To put a Quality Assurance process in place requires quite an amount of personnel to manage and we haven't got that numbers of personnel to assist us in that regard.

Let me ask you a question regarding the senior inspector. Did the shortage of inspectors create a situation such that the senior inspector was unable to carry out his duties consistent with the requirements of the Coal Mining Act with reference to underground coal mines?-- That's exactly the point I've been trying to make now for quite a while. I don't believe that he was unable to do that, and in fact his evidence to this Inquiry was that he was able to achieve that.

You've stated that you were familiar with the 10 and 20 lpm CO make?-- Yes.

Were you aware of the monthly graphs of CO make that Phil Reed had had instituted at Moura No 2?-- No.

You weren't aware of that?-- No. I was aware that Mr Reed organised the sealing of the 5 North panel after having an increase - a very small increase in carbon monoxide in the panel, but I don't recall ever being told a CO make figure for that panel.

During your visits to the mine you had never seen any graphs of CO make?-- No. I visited the mine once a year, and whether there was a panel being - there was a panel being extracted on one occasion I recall, but I don't remember ever seeing a CO make graph at that time.

The question was in no way to try and apportion any blame saying that you should know, I'm trying to ascertain. There was there a system implemented at Moura No 2 that was certainly beyond its time in Queensland though, it seems, and you didn't know about it?-- No, I wasn't aware of that.

What is your view when a manager who has CO make graphs on his noticeboard and yet does not fully understand the significance of the 10 and 20 litres, what does it say to you as Chief Inspector?-- That would be an area where I would believe - and I would be hopeful that the audit system would identify, and that would be an area that would require further training of the manager, undermanager, whoever was determined as not understanding what the information represented.

Do you think that audit process will do just that?-- I believe it should because it should focus the mine on taking the particular subject matter right to the final point in confirming that that particular subject is in place.

When that audit is conducted will that involve mechanical and electrical inspectors as well as the mining inspector?-- The whole of the mining system will have an audit applied to it.

During cross-examination by Mr Clair, post explosion you stated that when the mine manager and superintendent left the mine Joe Barraclough who could not make any decisions was in charge at that time and you found this to be a problem. Could you elaborate a bit more on what that was?-- It wasn't a problem as it turned out. I saw it as potentially being a problem, and again that is part of those matters for consideration, that part of the emergency planning needs to have people available that can make decisions without referring back to somebody who is away from the operation.

But in this particular case that wasn't a problem in that regard?-- As it turned out it was not a problem.

Turning to another subject, who is the current chairman of the Board of Examiners?-- Mr Colin Taylor.

Does he have any mining qualifications?-- No, he hasn't.

Is that a bit strange? It's a fair question?-- It's a departure from custom and it could be considered to be unusual.

One would think it's highly unusual if it's a board of examiners and you've got a chairman that has absolutely - practically no knowledge of the coal mining industry; is that logical?-- He obviously relies upon people on the panel considerably, Mr Parkin.

Who was the previous chairman?-- Mr Cox, Bernard Cox.

In terms of the Board of Examiners looking to the future, was the new legislation intending to do away with the Board of Examiners?-- Yes.

Why is that?-- That has been a preferred position of a large proportion of the members on the legislation review panel, and it has not been without its contentious periods, but things have been put in place, I believe, to adequately address that the standard will continue into the future. That is why the national competency standards is now specifically mentioned in the draft.

But what is your own personal view? Is the abolition of this Board of Examiners going to improve mine safety in your opinion?-- The abolition of the Board of Examiners won't improve mine safety. I believe that the Board of Examiners' process needs significant upgrading in that I have made mention that I don't believe that a person's certificate should be a certificate of competency for life, and to change from that would require resources above and beyond what is currently available in the Board of Examiners.

But -----?-- The idea of having an independent assessment of competency is one that strikes favour with me.

But couldn't that be done through the Board of Examiners still retaining that function?-- Yes, it could be.

Well, why was that path not chosen?-- The industry is in the process of major change in restructuring, particularly with the work model and the introduction of the national standards, and what has been assessed is that this is the new way in which people in the industry will be going and that the Board of Examiners will be phased out as not being part of the new process.

How does that align with what they do in New South Wales?-- Well, we have aligned the Queensland Board of Examiners' requirements and the New South Wales Coal Mines Qualifications Board requirements reasonably well, although not perfectly, and we have had meetings in that regard. Positions such as undermanager and other positions within the industry will have considerable difficulty in moving from one state to another under the proposed system.

Looking at the legislation review committee, I think you've been asked this question once before, and if you don't mind I will reiterate it: who is the driving force behind the new legislation review?-- I guess I was the - I precipitated that driving force because I believe that the legislation we currently have needed major review.

I don't think anybody would argue that the legislation needs major review, but is it true to state that under the new legislation, and we will just deal with undergrounds at the moment, that there will be a manager and a deputy?-- That is true.

Well, can you tell me why we don't need an undermanager or indeed a mine electrician, particularly in view of these proceedings here, this past few weeks - months?-- The proposal was drawn up not in light of the proceedings out of this Inquiry, it was developed prior to Moura, and the current Act does not necessarily require an undermanager. It does have the position of an undermanager's certificate of competency, but there is no mandatory requirement for that position to be in place. What has been determined by the council or this review committee has been that persons operating in technical positions between the deputy and the production manager would be - have specific competencies in - could be ventilation, geotechnical work, systems of mining, but not necessarily an undermanager's certificate.

But if I could say this: you made a comment regarding

training programs and you said if they are not spelt out in chapter and verse, they are not carried out, as was the case at Moura, and here we are talking about a new legislation that's departing away from that. What's your views on that?-- Much of that issue that was going to be changed away from being spelt out in chapter and verse would become part of the - there will be quite a few prescriptive regulations still spelt out in chapter and verse, and indeed the safe operating procedures will have the issues of concern identified as part of this review process that has been completed, so in that aspect the mining companies will need to address those things, in effect, chapter and verse. It is going to place a greater emphasis on the quality of the Inspector when he is assessing whether those matters have been addressed in the safe operating procedures as part of his review.

Well, can I return to the other question, the former question then, and ask you why in the underground that we can have a manager and a deputy but we are still not going to have an undermanager or a mining electrician?-- Both of those issues and in particular the issue of the undermanager, very particularly in relation to the undermanager, I would go on record saying that that was not my preferred position and I took it to the underground industry and tried to get that issue resolved and supported from the underground representative on the panel and I got no such support from the industry that an undermanager was the required or preferred option, and, therefore, not having the industry supporting that role, it hasn't come forward in the legislation draft.

So you understand the position, Mr Lyne, the reason for the line of questioning is purely so that we, the panel, can make some recommendations that will put safety where it should be. I guess if you look at the open-cut scenario, was it at one stage that people, when they looked at new legislation, they looked at the open-cut and not the underground in terms of removal of statutory authority?-- That's certainly part of that, yes.

And was that a good thing, do you think?-- I'm sorry, what is particularly a good thing?

Well, the open-cut - as I understand it, there is still going to be a manager there, isn't there?-- No.

Is there going to be an OC?-- Yes, there will be.

So, there will be an OC in the open-cut?-- There will be - you are talking about a statutory manager?

I am talking about a statutory manager?-- There will be people required to have - to manage these various areas, but it won't necessarily be a specific competency in that area.

I guess it's the underground that we are concerned about and I think you partly answered that question regarding statutory authority, but if - let's assume that the manager and the deputy at this moment in time is retained from a statutory

point of view, how is their competency going to be examined if there is no Board of Examiners?-- That comes about through this process called the National Competency System which is an educational system which is determined by the - which has been determined at this stage by the communicating system with the industry and the assessment of that has not been finalised, to my knowledge, other than it will be probably done through an accredited person or persons or organisation as accredited, for instance, by VTEC.

Mr Lyne, can I ask you this question: if the current legislation follows its intended path, what do you think is going to happen to standards within our industry?-- To which - I would like to know which standards you are particularly relating to.

Standards of good mining practice in underground coal mines?-- I would hope that the standards for each individual mine become more specified and documented as part of a management system, and that's its intention.

Well, let me ask you this: over the past 10 years do you agree that Australian coal production has improved dramatically?-- Yes.

I guess some people say it's got to improve even more if we are going to compare ourselves to international standards?-- That's right.

And over the same period safety has also improved substantially, do you agree with that?-- The lost time injury frequency rate has improved substantially.

Yes. The other criteria, has that improved, the management of first-aid, the management of medical treatment cases?-- That has improved.

Well, would you agree that safety has improved across the board over the past 10 years, the same period?-- That area has improved. I'm still concerned about the management of principal risk areas borne out by this Inquiry.

Well, I would agree with that, but I guess the question I'm coming to - or the statement I'm coming to is this: if we are going to move away from something that has been reasonably successful, then we really have to understand where we are going to go to; would you agree with that?-- Yes, I'd agree with that.

Can you answer this question: why does New South Wales and Queensland not work together on this issue?-- In relation to developing new legislation?

Well, what I was intending to say here was in order to develop one legislation and one set of safety standards for the Australian coal mining industry?-- Both the Chief Inspector in New South Wales and myself have spoken about this and very clearly support that concept. Queensland has a relatively simple task in getting the bodies together that - to try and

develop legislation. New South Wales has a more difficult task in that regard, and in fact they have what's called a Joint Consultative Review Committee and it's been meeting now for a number of years and its progress has been minimal that I have seen, and to get agreement among the parties that are down there has been far harder than what we have been able to achieve in Queensland.

Mr Lyne, can we move to another subject? During cross-examination by Mr Martin you were asked what your position on sealed areas going through the explosive range is; do you remember that?-- Yes, I do.

What is your view on an area which is sealed and the sealed area is being monitored for gas levels? What's your view on that situation?-- You have to know more of the background and history of the place than simply relying upon monitoring at the point of sealing - at the time of sealing.

But, indeed, we do know that at some stage the panel - whatever panel it is - will go through the explosive range?-- In many mines - not all mines - but many mines that is true.

And in some mines, or most mines, if there is not an initiator that's not a problem, is it?-- Well, that's been the history. It is my - I guess that's why I have got it written in the matters of consideration. I would much prefer the system to be in place that where a panel is sealed that it is inerted as a matter of course rather than take the reliance upon interpretive data of the gas behind the stopping because of the fact it's been clearly established in my mind at this conference - at this Inquiry that you are monitoring one point, not the total environment behind a stopping.

Well, it may be that people have to monitor - we have to have more than one monitoring point behind a seal?-- Yes.

Many, many points?-- That's true.

But if we were able to monitor what's going on behind the stopping, do you still see a need? I mean, it's going to go through the explosive range at some stage?-- Under the present circumstances in many mines the gases will go through the explosive range and they have gone through the explosive ranges for many years. I believe that - a preference that I have is that where it's possible that it be inerted as part of the sealing process and remove that risk.

Because we have to be careful about that because at most longwalls in the world you would be able to find a periphery where you have got an explosive situation?-- That is true.

So, we have to be very, very careful how we proceed on that one?-- That is true. That is why putting in prescriptive regulations and rules is fraught with many dangers of the practicality of how the words are applied.

Provided when we do that we monitor standards and ensure that standards don't decline instead of improve because what

-----?-- Standards of management systems. I prefer to use the term "management systems".

From what we have heard at this Inquiry in terms of communication, do you believe that communications at Moura No 2 were representative of the industry?-- I have no way of confirming or denying yes or no on that answer. I believe that it is worthwhile, as an Inspectorate, reviewing that issue.

Use of the gas chromatograph: when a panel is sealed, is it not good mining practice to use the equipment in order to monitor what is going on behind those seals?-- I would have thought so.

I mean, why have such sophisticated equipment if you are not going to use it?-- As I said, I agree, I would have thought that was a normal function.

Do you agree that Dr Van Dolah is a well respected technical expert?-- I hadn't heard of him before this Inquiry.

Do you agree now that he is a technical expert, a valued technical expert?-- If you say do I agree with what he said or think that what he said was worthwhile, the answer is yes.

Well, in terms of re-entry, do you disagree with what he had to say in his evidence?-- It depends which part you are talking about. I seem to remember he spoke about the benefit analysis.

Well, Mr Lyne, if I may, I will just take the liberty of reading a passage here that really matters. It's on 4831 - page 4831 - and in answer to a question he says, "Well, I believe that the risk benefit ratio is very bad; that there is a very high risk to the re-entry and the benefits to be derived from the intelligence that one might get on exploration of the mine would not really be very good, so that one could go in and end up with no more intelligence than what we have at present." Do you agree with that statement?-- No, I don't.

Because I think on Exhibit 283 - and I think Mr Morrison handed this to you - it was the view of the - did he call them the Mine Review Team at Moura No 2?-- The Incident Review Team.

I am sorry, the Incident Review Team?-- Yes.

It was their stated view here - I don't need to go through that, Mr Morrison took you through that earlier?-- Yes.

Well, has your view changed since this period of time? I don't know what date it was?-- Well, my position has never changed and I did not write, nor confirm those incident log notes you have there. The position that I had taken, and indeed is borne out by the fact that the review was looked at, was whether we could get an airlock chamber down into the mine, the position of sealing the mine off with a lid on the

surface, that's the shaft; that they were consistent with a potential for re-entry into the mine. The other part that I would add to that, Mr Parkin, is that the risk benefit that you - has been alluded to by Dr Van Dolah is that we are talking about operating mines in gassy seams below 250 - further than 250 metres of depth. There are many mines in the Bowen Basin who are mining that now or about to mine it in the near future, and it is important to everybody in the industry that all of those risks are properly identified and that we just don't assume that we know all of the answers because the future is going to include more and more of that type of mining.

Thank you. One final point, Mr Lyne: do you agree that the fundamental objective of the coal mining industry should be to concentrate on prevention rather than cure?-- Yes.

Thank you.

EXAMINATION:

MR NEILSON: Mr Lyne, on page 18 of your report, 7.1.8, you speak about the provision to inert underground workings?-- Yes.

First of all, could you tell the Inquiry how you would envisage such a system to be funded?-- I believe that - the issue of funding is not something that I directly addressed. I believe that you set the objectives first, and the others can fight out the funding part, but if you ask me, the matter is a management of a business risk and therefore it should relate directly to the mine operators.

You wouldn't consider at all the amount of money that the government derives from the industry as being substantial enough for them to look at the overall question of safety in the industry, albeit that without any doubt that we may have some mines in Queensland who could fund such an arrangement? We also have a lot of small mines that would not be able to do so?-- I agree there. I'm not suggesting that each mine gets its own system of inertisation. I would see that it would be more appropriate with industry type of equipment that could be moved from mine to mine and, in fact, I think it would be the appropriate way of ensuring that it was kept in good repair and that mining companies and staff were familiar with the use of that equipment underground.

Well, do you make that observation on the basis that the government is not very good at providing funds at the moment for necessary areas within the industry, such as the Inspectorate?-- I make it on the basis that it is managing of a business risk and that's appropriately the responsibility of the mine owner and operator, and if the government owned coal mines, as such, then I would expect them to participate in the sharing of those costs.

Still, on the question of inertisation, you say in that point in your report that, "All underground atmospheres which are either sealed or in the process of being sealed and which may pass through the explosive range of gases should be inerted prior to such happening." Can you clarify for me what you mean by "such happening"? Do you mean before sealing, or-----?-- No, before it goes through the explosive range, as much as you possibly can.

Okay. In answer to a question put to you by Mr Parkin in relation to, I take it, that particular point-----?-- Yes.

-----where he drew to your attention that almost every long wall mine - not only in this country, but throughout the world - more often than not will have an atmosphere at some stage in the goaf which will pass through the explosive range, and he said to you - he put it to you - that we need to be very, very careful. What did you take it he meant when he said you need to be very careful?-- Sitting behind a long wall or indeed a board and pillar panel in the goaf area, there will - and even

in the particular case at Moura, which was a partial pillar extraction system - where if - you might have a methane layer, there will be a fringe where there is an explosive mixture of gases. In behind a long wall, it is not uncommon to find methane in excess of 5 per cent, and the same goes for pillar extraction - bord and pillar mining systems. So, if we were to take a simplistic view of saying you can't have anywhere in the mine an explosive mixture of gas, then you would not be able to extract long wall blocks of coal, nor pillar extraction through bord and pillar systems.

Why?-- Because there will be an area in behind that - the goaf line - within the goaf line - that will have that zone which we-----

No, I accept that. I accept that. But why can't something be done about it? You are saying here that you should inertise. Why can't those areas be inertised?-- I'm not aware of any place that's been able to inertise that type of process in any country of the world. I have seen reports of the liquid nitrogen inertisation systems that are put into some of the goaf areas of the long wall advancing systems - any of the long wall retreating systems like we have - and the bottoms of air that we put through, I haven't seen any evidence that that's a success at all.

Are you telling me that with technology, through inertisation or improved ventilation systems, that we can't overcome that problem if we really wanted to?-- Well, it would need to be the subject of an extensive amount of study. I'm not aware of any studies that have been able to achieve and prove that capability.

Okay. Let me ask you this: in the mean time, do you think it is competent for us to continue to allow people - mine workers - to work underground in coal mines when we know we have got this phenomenon and, whether we can do something about it or not, is it competent for us to continue to send people down coal mines while we have these circumstances existing?-- Are you talking particularly about long wall extraction systems?

I'm talking about any underground coal mine or any underground extraction system at all?-- I believe it is still safe to do that.

On what basis can you say that, please?-- Because the - I guess the experience of this whole process is what I'm deriving that from - in that the goaf is going - has had sealed areas - sorry, has had explosive mixtures of gas in many, many mines across Australia and, indeed, throughout the world, and they don't regularly have explosions.

It only takes one, doesn't it? It only takes one?-- I agree it only takes one explosion.

You say here, and I'm really getting at what you say in your own words - you say: "All underground atmospheres" - and then you say nothing about whether there is a heating or an ignition source or whatever - you say: "All underground

atmospheres which are either sealed or in the process of being sealed and which may pass through the explosive range of gases should be made inert prior to such happening." Now, if all we are worrying about is the fact that we are going to have an explosive range, then what's it matter whether it is behind a seal or in a goaf area that is continuing to work? I mean, what's the difference?-- The difference is that when you have a dynamic panel, you are able to monitor the products of any combustion or ignition sources by virtue of the transmission of the products of that combustion to a place where it can be monitored. It becomes somewhat more difficult when you start to seal and alter things.

Yes, but we had an area in No 2 Mine that was monitored as well, and it was telling a story. What's the difference? It is a simple question that I'm asking you. If we can have a situation in No 2 Mine where everybody thought everything was all right, then why can't we have that in any other mine if we are going to allow people to enter a mine when some part is going to go through the explosive range?-- Well, No 2 had an open goaf system, or a large volume of atmosphere in its panel, and when it got sealed - what I'm suggesting is that when it sealed - that is, inerted as part of the sealing process - rather than let it go through the explosive range-----

That's not the question I'm asking. I know what you are saying. The question I'm asking you is it seems to me that we are saying one thing on one hand but another on another - that it is not competent to have men - sorry, it is not competent to have an atmosphere underground in certain circumstances going through the explosive range, yet it is in another set of circumstances. My question is if that's the case, then why have men down the mine? There has been no suggestion at all in the questions I have been putting to you that if it is not possible to inertise an area, then men should be withdrawn from the mine?-- I must be tired, Mr Neilson, to be missing your point.

You have had a lot of questions today?-- I'm making my point that the products of combustion, or any activity within a goaf area - for instance No 2 - whilst ever the mine was operative, were - there should have been and there should be a mechanism of determining what - if there is any products of combustion in that mine whilst a panel is being ventilated. When you seal the panel off and it is going to go through the explosive range - and indeed much of the panel at 512 was - I don't believe was in the explosive range - there could have been some parts of it in poorly ventilated areas - is not a major risk at that time whilst it is being ventilated because you are able to determine if you have got control of the ventilation or the products of combustion - then you have equipment at the mine, and, in particular, a gas chromatograph, which is available to determine those gases. Now, when you seal in - somewhere in a volume of 189,000 cubic metres, that's when the accuracy becomes somewhat suspect - it would seem to me that is the way.

Yes, unless it was strategically monitored - I mean, by having

monitor points in strategic places?-- Well, yes.

It becomes a lot more accurate then?-- Well, it does, but I've sealed many panels; in particular, thick seams, and in partial extraction systems, and to actually get the spot where heating might be would be very fortuitous. There are many places it could occur.

Let me, for the sake of not taking up any more time on the subject, even though it is probably a very important one - I'll put it to you this way - and I'm once again trying to derive what it is you're really saying - I'm not sure that we are on the same wavelength - if it was not possible for one reason or another to inertise an area, be it behind a sealed area or in an area that's about to be sealed or in a goaf - on a long wall face - if it was not possible for any reason to inertise that particular atmosphere, what do we do with the men? Do we send them down the mine or do we hold them out until it does what it wants to do, even if it wants to blow up?-- Are you talking of an active face that's producing coal, or are you talking of a sealed panel? You are talking about a number of different scenarios, you see. If you are talking about an active face, you can determine whether - with reasonable accuracy whether there is an ignition source by virtue of the gases you have got monitoring.

My question relates to any area in an underground coal mine that's going to go through an explosive range. That's my question. I understand the difficulties in answering it, but I'm asking for an answer?-- Well, please, give me the courtesy of that question again, please?

Okay. I'll take you back to your question - sorry - your provision to inert underground workings. Do you say that - I'll go through the whole thing so we get it all in perspective. "Total mine ventilation systems should be able to be inerted from a secure position on the surface. All underground atmospheres which are either sealed or in the process of being sealed and which may pass through the explosive range of gases should be made inert prior to such happening."?-- Right.

Now, first of all, let me ask you this: why do you say they should be made inert?-- So that you cannot have an explosion.

Okay. So-----?-- Or fire.

So, you are referring to either sealed - areas which are either sealed or in the process of being sealed?-- That is true.

That's what you are referring to?-- That is right.

That may explode? I mean, that's the danger?-- That's right.

The danger is maybe there will be an explosion?-- That's the risk.

Let me ask you this question, then, in relation to that: a

sealed area or an area that's in the process of being sealed, if it can't be inertised, then what do we do with the men?-- Under those circumstances, I would see that there is reason to either - if you can't then have substantial reason to suggest that there is no possible mechanism of ignition, then people could be - should be withdrawn until it is inert.

Can you just say that again for me, please? If it can't be-----?-- Proven that there is no possible method of ignition. For instance, there may be a long tunnel that may have solid workings in it or a large area of the mine which is accessible and not required for use at some stage - for quite a period of time - and it is being able to be travelled and observed and it is quite stable and clean and first workings, for instance, and you want to seal that off, at some stage it may go through the explosive range, but if you would be able to determine with quite a high degree of accuracy that there is no risk of ignition in those roadways, then I would not see that as being a requirement to remove, you know, people from the mine in those circumstances, but other than that, if you can't do that, and there could be some heating somewhere, then you would either inert it or people come out until it goes through that explosive range. See, explosive ranges can also be found behind sealed areas, even by virtue of the timing of when you actually sample the seal. For instance, if it has been breathing in and oxygen has just entered - just in behind the seal - you may well find an explosive mixture of gas, even 20 metres in behind the seal, and the rest of the panel is absolutely inert.

Is it necessary to go and prove that there isn't a problem, and I'm talking about in areas where there is some element of doubt? If there is some element of doubt, is it necessary to go and prove that there is no problem first, or take the men out of the mine and then do something about it? I mean, prevention rather than cure?-- Yeah.

Do you subscribe to that?-- I subscribe to the practice that you - you remove people from the danger until - unless you were able to demonstrate very clearly that there is no danger, and that is - that is - not assuming there is no danger - is actually being able to demonstrate that there is no danger of ignition.

And does this happen? Sorry, I will put it to you another way. There are many occasions when men are withdrawn from the mine because of some question of whether or not there is - I don't say matter in the mine - I'm not asking you to agree with all of those-----?-- Yeah.

In such cases have you ever known mine management to withdraw the men from a mine?-- Yes.

In Queensland?-- Yes.

Can you tell the Inquiry when and where?-- It happened - one happened down at, I think it was Rhonda Colliery in about '91, '92, and the management down there had found CO in their return and investigated it and at a very early stage decided to seal the panel off, and as part of that process they withdrew people out of the mine.

So management took that decision?-- Yes.

Do you know of any other occasions?-- In recent times I'm aware that people were withdrawn out of the mine at Gordonstone mine.

That's subsequent to -----?-- During this Inquiry.

Any other occasion? There are certainly not many anyway?-- I can't remember, no. I'm not saying there aren't any, but none come to my mind now.

Are you aware of any occasion when men have been withdrawn from a mine by an order of the Inspectorate?-- In normal working type conditions?

No, because of an unsafe or a potentially unsafe situation in the mine?-- No, I'm aware that the Inspectorate has stopped operations at different times, not withdrawn persons from the mine which would mean that that was an uncontrolled risk. That would be the time when you would withdraw persons, but I am aware of numbers of times, for instance, that production systems in the face areas of continuous miners have been stopped, numbers of times when belt conveyors have been stopped because they haven't been of adequate cleanliness, for instance, or maintenance. That equipment has been withdrawn from service because it hasn't been properly maintained.

In an answer to Mr Harrison you were talking about the funding of the Inspectorate and the demands that are placed on people and the fact that the numbers have been difficult to be brought up to scratch because of the - I think related to wages and conditions of the Inspectorate and it's been difficult to get people. I'm not sure whether you agreed, but there was a suggestion from Mr Harrison that maybe there was some scope for inspectors in the underground - sorry, the open-cut areas to only require a second class certificate. Do you remember him suggesting that?-- I don't remember him actually saying a second class certificate, I don't - my memory of it is that he said something that they might have a lesser certificate. In other words, they would not necessarily be qualified to do underground inspections.

Just a question to you, do you support that sort of theory?-- It is one of the matters that we are looking and have looked at and, yes, I can subscribe to saying to you that you don't have to have an underground qualification to investigate and

inspect a surface coal mine. There is no difference in my mind to a surface coal mine in the risks that are portrayed to a metalliferous open-cut coal mine, for instance.

I don't think he mentioned the fact of somebody just not having underground qualifications, I think what he was alluding to is somebody having lesser qualifications to be able to inspect open-cuts?-- I didn't take it as that. I was looking at whether - I understood his question related to a person, for instance, a limited mine manager's certificate which is all that's required to be a manager of a large open-cut coal mine might be a certificate which could be appropriate and that could be well the case. We have a principal industry in Queensland which is related to open-cut coal mines.

There is no second class certificate in the open-cut area, is there?-- No, there is not, but a second class certificate can operate an open-cut mine to a certain size.

Yes, I understand that. In an answer to Mr Morrison I think they were your words you used when you said that the ownership of safety of a mine clearly belongs with the mining company?-- Yes.

Can you just clarify what you mean there for me, please?-- It's a philosophical matter and that is under the duty of care, and that's the principle on which our legislation is being based, that the creator of the risk provides the control of the risk. That's very simply put.

Yes, but don't they do that by employing people with the necessary statutory responsibilities to manage that risk?-- That's been the approach to date. The difficulty has been that there has been some argument that the resources for safety management might not have been all they could have been by virtue of the fact that the company said, "Well, if we employ that particular manager then that's all we are required to do in our area of responsibility and our duty of care is met by the employment of a single person."

Yes, and that exactly leads me into my next question. That's always been the case, hasn't it, where some companies have actually taken that attitude, and isn't that the reason why we have an Inspectorate and why we have regulations? Isn't that the very reason?-- It has been the case, but the regulations set the minimum standards, not necessarily the best standards.

They do set some standards, don't they?-- They set standards, I don't argue about that.

I mean in some areas of the coal mining industry in this country management get very, very fearful when they hear that the Government inspector is about to come and inspect their mines?-- There are numbers where their standards also are well in excess of those minimum legislative standards.

But it's funny now that we are talking about self regulation. I mean do you think that after sitting through all of this

Inquiry, which you have, that it's still appropriate to look at this question of self regulation?-- In most areas I still believe it is still appropriate.

Well, you've also indicated that you support the abolition of the Board of Examiners. Now, in answer to a question of Mr Morrison you agreed with him - I don't know whether he asked you the question or he told you the question, but you certainly agreed that statutory people in the industry, and you were talking about deputies and undermanagers and managers, would not have a great knowledge about interpreting the Graham's Ratio?-- True.

Do you remember saying that?-- Yes.

Is it not in fact a requirement of the Act - I take you to general rules, 4.6, where it says, "A manager of an underground coal mine in which a seam liable to spontaneous combustion is being mined shall: (a) ensure that the CO/O₂ deficiency ratio is determined in respect of each district return airway at least once in each calendar month."?-- Yes.

Now, I assume that that provision in the Act requires the manager not only to undertake that task but to know exactly what it is that he is looking for?-- You would expect so.

Well, as Chief Examiner on the board how do you reconcile sitting here and saying that in your view statutory people, including mine managers, don't have much knowledge about Graham's Ratio?-- No, I said that I expected that they would know what the Graham's Ratio was. I said I could not give any undertaking on the people who had certificates now for quite a period of time, but I certainly expected persons with a second class and a first class certificate to know about Graham's Ratio, and indeed I would expect them to know even more - be aware that there are more than just Graham's Ratio for determination of fires.

So what you are saying is you believe people who in recent times, and it doesn't mean yesterday, but in recent times have obtained a second class certificate of competency or maybe a first class certificate of competency, that they would have full knowledge on Graham's Ratio, and what it means. I mean that's what you just said?-- I would say to you that they are aware of Graham's Ratio and that they would have access and knowledge of where they would get the information to remind them about Graham's Ratio should they need to have that, yes.

Well, I mean after listening to the evidence that's been given to this Inquiry you would not now consider that to be the case, would you? It's very questionable about just how much people do know about Graham's Ratio and how to interpret what it is that they are reading?-- Yes, I would agree with that statement.

The point I'm trying to get to is that once again after listening to all the evidence that's been brought out by this Inquiry is it competent to leave here with a view that it's still satisfactory to abolish the Board of Examiners when

quite clearly one could say that not only shall we retain the Board of Examiners, but they should do something about uplifting their game to ensure that people are tested absolutely thoroughly on these issues before they are issued with a certificate of competency, not go the other way. Wouldn't that be a fair thing to derive from all of this?-- Mr Neilson, I've been seen as being, for quite a period of time in this panel - of this review committee, to have been a supporter of the independent assessment system which is ostensibly the Board of Examiners process. There has been a major push by virtually all the other parties that has put my position at - sometimes to be very difficult in that they haven't supported the concept of the Board of Examiners, and it has been that which has driven me to say, and I make no claim for fame over it, but to ensure that at our last meeting that the process which has been agreed to is committed to writing, that the national competency standard is the mechanism where peoples competency will be determined and that that competency, before the minister disbands the process of the Board of Examiners, that process will be putting forward persons of equivalent or better competency than what is currently being done by the Board of Examiners. Now, as to - so that we don't go backwards. So there has to be a defined standard and it has to be proven that it is not less than but must be at least equal to or better than. So there has to be a process put in place for that. Now, as to whether or not the standard should get better, again I would agree with that and it's been one of the issued of current competency, to use the terminology, that has been of an ongoing concern in trying to get persons to be updated not unlike commercial airline pilots, even accountants, to make sure that their competencies are current to not just the legislation but the practices within the industry.

I mean - I understand. My question was not directed to you personally from where you may sit with this situation, but I understand you to say now that if the Board of Examiners is going to be abolished then it should be replaced and - should not happen, sorry, unless it's replaced with something that's better for the industry?-- That's what I'm saying. It has to prove itself and be determined that it's better, equal to or better than.

Thanks, Mr Lyne.

EXAMINATION:

WARDEN: What is your situation in the Department? Are you an SES officer on contract?-- Not on contract, I'm an SES1 officer.

I will just hand this around, one for you and the Bar table. That's taken out of a Departmental publication. Could you just indicate exactly on that where the Inspectorate sits?-- It comes under the division of energy.

XN: PANEL

WIT: LYNE B J

Do you see the Warden's Court in there anywhere?-- No, I don't.

Perhaps I'm lost in there with you. Section 63 of the Act outlines all your powers, doesn't it?-- That's right.

The powers of any inspector actually?-- Yes.

You don't need authority to prosecute, you have that power yourself?-- Yes.

You don't need a ministerial direction. Would you initiate a prosecution without ministerial direction or approval?-- That would - no, I haven't asked for ministerial approval to do that previously.

Would you take this document? It's headed up "Draft Coal Mining Bill 1994 - issued 17 March 1994." Just read the letter on the preface, thanks. Tell us who it's from and who it's to?-- It's from the minister, Tony McGrady, to coal industry workers.

The last two paragraphs, thanks, could you read them into the record?-- I'm sorry. "The bill which reflects the opinions of industry groups is a foundation for the particular improvement in health and safety in coal mines. This, I believe, will lead us to a position where Queensland coal miners will be among the world's safest operators."

We have heard a little bit about the Inspector at Rockhampton

being down one Inspector. Would you look at this position description? I will just read it into the record. "Purpose of position: to audit, monitor and advise the coal mining industry to ensure its activities are in accordance with acceptable standards of safety, health and environmental management and that the Department's resources are best utilised to achieving this end." "Major duties" - just a couple I have noted - "provide advice to industry on safety and health related matters; actively encourage and promote safe working practices at coal mines; provide Departmental officers with authoritative, professional and timely advice with regard to coal mine operations and inspections." Go over the page to page 2: "Carry out, as required, such training as is necessary to improve skills and benefit to the division." Skipping one: "Formulate proposals and regulations and/or provide constructive input for the introduction or revision of legislation and safety codes and practices; represent the department on committees and industry bodies or at conferences as required." Do you understand all of that?-- Yes.

The bloke who fills that out is more qualified than the Director General, isn't he, as far as mining goes, more qualified than the Chairman of the Board of Examiners?-- Yes, he has a different role.

Thank you. You probably still have Exhibit 214 with you?-- Yes, I do.

Inspector Walker's letter. Go over to page 4. Sorry, that's a letter dated 20 August. There is a paragraph there: "I have consistently protested against this incorrect perception. Although presented with positive evidence from a number of reviews and with the Inspectors in the field strongly asserting that our close professional liaison with each and every mine results in our being extremely proactive and preventative in effect, we appear to be following a course of changing the role of the Inspectorate. The value of the Inspectorate is not understood and perhaps a cheap Inspectorate for the future is seen in a small group of 'auditors' (who eventually will indeed play the role of policeman)." Would you look at this document, please? It's headed up "Corporate Plan 1995 Year 2000", issued by the Department of Minerals and Energy. Go over the page, page 18, down to strategies, the fifth strategy there. Could you read it for us, please?-- "The Inspector is to focus on an audit rather than inspection role."

Thank you. That's exactly what Mike Walker was talking about in that letter, isn't it, inspections - being reduced from inspections to audits?-- Not reduced. It's to incorporate the use of auditing as part of their inspection process.

Okay. I will just come off that for a minute. You have got a number of mines in Queensland and more mines are opening, the tonnages are going to go up. It appears to me that your staffing levels are going down - trending downwards one might say; is that correct?-- The trending is - we are having difficulty filling the extra position in Central Queensland.

The position that we have reduced in the Brisbane office has been a direct result of the reduction in the operations of coal mines in the Ipswich area, if that's what you were asking me.

There was some comment about the industry some years ago - you might not have heard it - that as a underground mine closed down, an open-cut opened up and the industry was losing all that underground experience. Are you aware of that? Do you think that's had some effect? Do you think that's happened, in effect?-- I think that may have some effect on it.

You are aware that there is a Chief Inspector of Mines in England to whom Inspector Walker wrote concerning the problem of recruiting adequately experienced staff?-- Yes.

Not so much the letter that I'm talking about, that speaks for itself, it's more the reply. The reply is on the back. The reply wasn't exactly that helpful. I am interested in the heading, "HSE, Health & Safety Executive"?-- Yes.

Is that an independent or semi-autonomous Inspectorate in England?-- No.

What's the situation?-- It's a Government organisation not unlike, as I understand, the Division of Workplace Health and Safety in Queensland of which the Inspectorate is part of that.

Thank you. Communications was raised, and at page 4947 you referred to communications and, in effect, a PED system and you were advising that such a system is possible but not normally commercially available, as far as I recall reading your evidence, and, in effect, once it was drawn to your attention you stated that Cook Colliery had the system for about three years?-- No, you have misunderstood what I was saying. What I said was a PED system was available which transmits a digital signal from the surface to underground operators. What doesn't exist commercially is a process where underground operators can transmit a message through back to the surface, and that is what I was looking for from the point of view of a two-way communication system which would be effectively explosion-proof.

Thank you. Perhaps one way is better than no way at all. Another subject that I know is near and dear to your heart, refuge chambers? There are a couple in Queensland, perhaps one in Cook Colliery; is that correct?-- I'm not aware of any portable refuge chambers anywhere.

Forget the portables, a refuge?-- The only refuge chamber that I am aware has been installed has been at Gordonstone Mine.

And metalliferous? I suggest there is one in Mt Isa?-- I think there could be one in Mt Isa. I have seen them in South Australia at the Roxby Downs Project.

Has the Department seriously assessed them or looked at

them?-- Yes, we have. We did that when we did it for Gordonstone.

There's currently a project in New South Wales involving portable refuge chambers. Are we aware of it or are we just sitting back and watching it?-- I'm not aware there is a project in New South Wales in that regard.

If there was one, wouldn't Mines Rescue and the Department be interested in studying it or following it through a little bit?-- We would be. I think there is a proposal to have that put as an ACARP project. That's my information.

Subject to funding, no doubt?-- All ACARP matters are subject to funding.

I think we have heard enough about the Board of Examiners, except to say that they are also a disciplinary body, aren't they?-- That is true.

The Chairman, we have heard, does not hold any certificates of competency in relation to mining?-- That is true.

How then is it able to function as a disciplinary body?-- It is.

Previously the Chairman was called the State Mining Engineer?-- Yes.

He no longer occupies that position?-- No.

But the State Mining Engineer would be expected to have all the necessary certificates of competency?-- I don't know if he's got to have all the certificates of competency. He has to have a certificate of competency. For instance, the Board issues electrical certificates, surveying certificates - mine surveying certificates that is - as well as deputies, undermanagers and managers' certificates of competency. Now, one person doesn't have all of those certificates.

I am interested in budget allocations and I feel that previously it used to go on the situation of, "We need this much money to do the job.", and I get a feeling it's changed to, "Here is some money, you go out and do what you can." Is that the attitude you seem to get these days, "Here is a budget, you work within it."?-- That's right.

Not strictly necessarily what you need but what you have to work within?-- That is true.

What happens if MSHA or somebody is putting on a course vital to mine safety, mine operations and you say to - who is your budget controller, by the way? You have got a regional manager?-- We have a regional manager in Brisbane, but I get my budget independent of him.

And you say to him, "I need to send two men over to do this course, it's vital for their education, it's vital for the industry.", and this person, so far unnamed, says, "No, you

can't have it." What do you do then?-- We are talking now of something which is in its infancy. Any overseas travel goes through the Minister and he approves or disapproves such activity, and that budget has to be met from within our own allocation of funding.

Thank you. We were talking about national standards. I was wondering how we can agree on the rules for background CO make when we can't agree on daylight saving. Any solution to that one? Perhaps one is a political question and one is for persons of competency. Sorry, I will withdraw the question. Response times of your staff to emergencies out at mines, do you see any problem there?-- I don't believe that we could improve the response time other than domiciling the Inspectorate closer to the mines themselves.

There is some suggestion that the Inspectorates could be amalgamated, metalliferous with the coal Inspectorate. Is that going to have any effect on your operations?-- That may have an effect in that the open-cut mines might be ultimately inspected by a metalliferous Inspector and vice versa, coal Inspectors may well inspect some small metalliferous open-cut mines.

At the moment there are 88 quarries that come under the Mines Regulation Act because a quarry - a substance which is deemed to be a mineral or used for its mineral qualities. What's going to be the situation if they throw in about another 2,400 quarries to the Inspectorates to look after? I mean, you can't possibly cover the whole lot?-- That, of course, if that comes about, would require resourcing with staff.

Mines Rescue Brigade, what's your position in that organisation?-- I'm on the management committee.

What's -----?-- And I'm also a rescue trainee.

And they are highly motivated and greatly involved in working with miners and situations that we find underground particularly?-- Yes.

What's their budget situation? How are they funded?-- In the first instance under the legislation the Minister funds their activities and at the end of each year one-third is recovered from the Workers' Compensation Board and another third is recovered from the coal operators.

Do you see any advantage in those senior staff there broadening their experience with overseas seminars or meeting with people involved in mining overseas, assessing rescue attempts, re-entry attempts, all of that?-- I think most people can benefit from overseas travel on specific subjects.

The situation is they are in the same boat as you regarding recruitment of staff, aren't they? What's offered there salary-wise is below industry standards - comparable?-- Yes, it is.

And they are having trouble getting staff and holding staff

for the same reasons?-- They are having less trouble getting staff than what the Inspectorate is of getting staff.

Is it a fact that some rescue stations are now offering their services to outside agencies for the purpose of raising funds to survive?-- No, that's not a correct statement for that reason. It is - fee for service work is going to - or likely to be part of the new structure but there are skills within the Mines Rescue organisation that are seen as potentially being a resource to the very small and isolated areas of some of the metalliferous mines that could be of value to them and that's why their service is being sought by the metalliferous industry, not necessarily sought by the Mines Rescue organisation to support its funding system.

Thank you. I think that's all I have.

EXAMINATION:

PROF ROXBOROUGH: Mr Lyne, you may or may not be pleased to know that many of the questions that I was planning to ask you have already been thoroughly covered, but there are a couple of things that I would like to get your opinion on. Firstly, in this brave new world that we are contemplating that's being visited upon us where the proprietors and, from what I gather, Government is leading to self regulation and abandonment of certificates of competency -----?-- And Unions.

Okay. The question, I guess, is: are we still talking about a future where mines will continue to be managed by engineers and technologists?-- I believe so.

Are you confident that there is not a hidden agenda? Would you like me to amplify on that?-- I would like you to amplify on that, sir.

Is there a thrust by mining companies, for example, to get corporate management moving down to pit level, with the implication of business performance being the highest priority?-- I haven't seen evidence of that, but it is not impossible.

Are you confident that we can't contemplate the fact that mines will be run by business managers, accountants and, God forbid, even lawyers?-- I've known - and being a practical mine manager for quite a number of years - I'm aware of the long-term standing of accountants running - effectively running the mines.

Has there not been a general tendency over the past, what, 10 or 20 years for such people to be moving down - downwards in the mining company structures towards the mine level?-- I don't know if I'm in a position to make a categorical statement of that nature.

If the industry moves down the road of self-regulation, and given that many of the big mining companies are involved in metal mining as well as coal mining, do you see it as likely that all mining will be treated the same - self-regulation?-- Yes, there is a move to make the legislation processes in both metals and coal to have quite an amount of similarity.

And ultimately towards a single Inspectorate, which I think the wardens mooted?-- Yes, a single Inspectorate may well emerge, but I would see that certainly in its having specific competencies, for instance, of underground coal mining to underground metalliferous mining, but a common one for surface mining.

Do you see it as an inevitable and natural progression of the sort of scenario that you are contemplating?-- I see it being a reasonably workable scenario.

As one that has no fears for you in terms of the security and safety of the coal mining industry and the special requirements and needs of the coal mining industry?-- Providing the people who are able to provide the underground industry, which is the highest risk, with competent underground advice, I don't have a difficulty with believing that a - the people doing surface mining can equally do a good job in either coal or metalliferous mines.

In a question of comparisons and relationships between the coal mining sector and the metalliferous mining sector, would you agree that coal mining has lagged behind the metalliferous sector in terms of its basic educational requirements?-- In relation to their staffing standards?

In relation to the qualifications that are essentially required for positions of responsibility in mines?-- I think that the - in Queensland, the metalliferous lagged behind the

coal industry.

Are you aware of any sector of the mining industry in Australia that requires mine managers to be graduate mining engineers?-- Maybe in New South Wales that might be the case. That's not necessary in Queensland.

What, in your view, are the pros and cons of having the same requirement in coal mining - having mine managers to have at least a degree or an equivalent qualification before being appointed mine manager?-- I don't necessarily agree that - and I've got a degree, as you are aware - I don't necessarily agree that a degree is a primary requirement to be a mine manager, no.

We have heard evidence of the relatively - in my experience, surprisingly low level of academic input, if you like, in courses for people leading to manager's certificates of competency, in comparison, let us say, to a period of education - of academic education of four years full-time study; don't you see that as a problem?-- A mine manager has to have a very practical aspect in his operation, and many times that doesn't come from a degree. In fact, there are numerous people that I'm aware of with degrees that simply would never make mine management material. It is still a - very much a practically orientated type of industry.

I've no doubt that there are people who are graduates who won't make a mine manager in a pink fit - I accept that - and I'm sure that there are other people - in fact, I know many who have come, if you like, through the ranks and made outstanding managers and gone well beyond, but the point that I'm getting at, and I'm not wishing to stress the question of degrees, but the length of training - you might make a commitment as to fundamental studies on science and engineering and related matters concerned with mining operations - we are talking about basic training. I have no doubt - or don't question the fact that the practical dimension is tremendously important, but you must accept, I would have thought, that the basic science and engineering education is a fundamental basis for the development of a competent person to operate as a mine manager?-- That's right. I don't argue with that.

So, you still maintain that irrespective of whether it is a degree or diploma or whatever, that lesser courses are satisfactory from the point of view of certificates of competency and operating as mine manager?-- Well, in Queensland we have a requirement that a person would be - have an equivalent to an associate diploma standard in education through the TAFE, or a degree, plus practical experience.

Well, that's the same for whatever route is taken towards certificates of competency, whether it be a degree or diploma or whatever?-- Yes, a deputy's certificate requires a certificate of coal mining. It doesn't require an associate diploma.

Well, with regard to the question of training - and

particularly, as you have emphasised, the importance of practical experience for mine managers - are you talking about the prospect of the abolition of the position of undermanager? The position of undermanager has proved to be a very important training ground for most, if not all, mine managers; would you agree with that?-- Yes, I agree with that.

So, where is the mine manager going to get that grounding before he steps into the important position of mine manager if we abolish the position of undermanager?-- Well, that's yet to be determined by the Coal Mining Health and Safety Council as to those competencies and experience - standards that will be required to achieve these various levels of positions within the industry.

It is not going to be easy, is it? You made the comparison - I can't recall whether it was in answer to a question by the Warden or Mr Neilson - about the competency of airline pilots, and I think before becoming a captain of a Qantas jumbo jet or 767, you first have to spend a lot of years as a first officer - that's a parallel - first officer to captain is the same as undermanager to manager?-- Yes, and likewise if a person moves from a 707 to a 767, they are retrained in the new process and new machinery.

Exactly?-- Before piloting it.

Exactly, and continuously so?-- Exactly.

And that's what we don't do?-- Exactly.

Which gets us to the question of statutory certificates, which you have said and you have agreed, and indeed you promulgated, should not be for life. What arrangement would you like to see in place to ensure the competencies of persons in charge of a mine is maintained and kept current?-- I would like to see that a certificate of competency requires currency in its tenure and that within a period of - or in a maximum of five years that key areas of the certificate would have been subject to a review of further study and/or information transfer and awareness courses on a formal basis.

Five years; you think that's good enough?-- Obviously the shorter the better, but there are some subjects that you might not want to - might not need to review in an extremely short time.

Are you aware that to maintain corporate membership of the institution of engineers you have to demonstrate that you have undertaken such training or self-education every year before your currency is continued?-- I am aware that that's the - yes, I am aware of that, but I was not suggesting that we cover all subjects every year. I'm suggesting that within a period, the whole of the subject criteria would be revised.

Okay. I understand. Just clear up a matter for me, if you would, Mr Lyne: I believe in Queensland you have a single Board of Examiners for both coal and metalliferous mining?-- That is true.

Has this presented any problems? I suppose looking at it - coming at it from a different direction, would you have benefited from having separate Boards of Examiners - independent Boards of Examiners?-- We actually operate to a fair degree independently anyway. Within the Board we have separate sections on the agenda. If there was one area that I believe probably should be improved - and we did attempt to improve this - was that - and I believe that it would have been more appropriate that we had representation of persons from the mine deputies on that panel. We have made that offer, but it has been declined by the union.

I think you have confirmed with the feeling of regret in your voice, as I recall, that there is no Coal Mine Managers' Association in Queensland?-- That is true.

In other words, there is no forum at all for managers to get together?-- That is true.

However, there is a thriving and an active Mine Managers' Association in New South Wales?-- Yes.

Do you see any advantages in the association being a national one? Do you see anything that's preventing that happening?-- It is my understanding that the initiation of the - a Queensland branch of the Coal Mine Managers' Association equivalent to New South Wales has been actively discouraged by the coal operators in Queensland.

Say that again. It has been actively discouraged?-- Yes.

Do you have any knowledge why that may be the case?-- You would need to ask a number of other persons - one member in this room here was a previous mine manager in Queensland and would attest to this information. I think that there may well be some concern that it might prove itself to be another negotiating body in the process of change to what New South Wales mine managers have become.

You are alluding to - presumably alluding to the fact that the association has something of a trade union aspect to it?-- Yes.

Rather than that of a learned society?-- That's my understanding. I could be wrong there, but that is my understanding.

If one can set aside the union aspect - collective bargaining, if you like, aspect of it, in deference to the learned society aspect, you would see there being merit, I would hope, in New South Wales and Queensland mine managers being able to get together under some aegis to have the opportunity to interact on technical matters?-- There is no doubt that there would be a benefit. I'm not aware whether there has been any issue of collective bargaining in New South Wales, as such.

Okay. If I can just change tack on to a couple of technical matters, Mr Lyne. I take it from your comments on the NUMBAT,

I think which you made on Thursday of last week, that you believe there are easier ways of achieving the same objective by adapting existing mine vehicles?-- There are none of these vehicles in Queensland or Australia to the best of my knowledge, but the answer to that question is yes.

I presume from that that you wouldn't support further funding of the NUMBAT project?-- No.

What's that mean? That one can't presume or that you don't support it?-- No, I don't support the NUMBAT project.

Do you have a belief that there is a need for the development of a robotic type vehicle for recovery work?-- Yes, there could well be a need for recovery of equipment by robotics, but I would hasten to add it would be appropriate to utilise mining technology which is currently available rather than re-invent the wheel.

Where would it be in your priority of things? Priority A, priority B, priority C?-- I would like to see it incorporated in part of the total mine support system and I'm suggesting it would be appropriate to go - to be included with Mines Rescue.

Essential part or desirable part?-- A desirable part.

So, that means, really, priority B? I take it you mean priority B?-- Well, let me put it this way: if it could be incorporated with the inertisation, which I put as priority A, under your classification, it might be a B plus.

Again, from your evidence on Thursday, you seem still to have some lingering doubt about the location and cause of the first explosion?-- Yes.

And that's the basis of your argument, which I think most people are getting the message on, for re-entry?-- Yes.

Now, in the Fault Tree Analysis, which you were involved in, I think again in evidence you stressed that the probabilities that were proposed in that exercise were not absent?-- That's true.

And they were developed simply to rank the possible scenarios in order of probability?-- Yes.

So, the probability figures in table 7.2.1 of SIMTARS report - and I don't think there is any need to go to it - you know what I'm talking about - are relative?-- Yes.

But they have a relationship to each other?-- Yes.

Now, on that basis it's possible to assess the probability of the explosion occurring in 512?-- Yes.

We can start off on the basis that there was an explosion, that's a certainty?-- Yes.

So we have a probability of one or 100 per cent, if you like?-- Yes.

We know also that the explosion was on the south side of the mine?-- Yes.

And so we still have a probability of one. It's a 100 per cent probability that it was on the south side of the mine, and you've identified, your team of which you were a member, five locations as possible sources of the explosion?-- Yes.

And the sum of the probabilities of the explosion occurring at the different places considered must add up to one, must add up to 100 per cent?-- Yes.

So if we take the relative probabilities that are in Table 7.2.1 on the basis of that, and evidently you spent a good deal of time looking at it, it looks as if the probability of the explosion happening in 512 was 99.491 per cent or 200 to 1 on if you prefer it in that parlance. Would you accept my figures?-- Yes, I do.

The probability in 5 South is 200 to 1 against or a probability of .497?-- Bearing in mind that that was not made with any knowledge of methane layering or any source of methane down in that area.

This analysis was undertaken post explosion?-- Yes, but that information wasn't brought forward until this Inquiry.

So we might change the order a little bit?-- Yes, and the fact that the risk analysis is made on the available information, not necessarily on all the information that is down in that mine. So we are saying the probability is related to the available information. It is not anything else other than that.

If we are going down this road of self regulation we better get a lot better at our risk assessment and risk management than we are at present on known events, hadn't we? Because if you are talking about risk management as a management tool of unknown events we better perform better than you've been doing on the post explosion situation at Moura?-- I might be losing you a little bit there.

Never mind. The point that I want to make is that 510 and 520, just as a matter of interest and for the record, have odds of 20,000 to 1 against; 4 South, 67,000 to 1 against; 511, a million to one against, pretty long odds. What I'm wanting to get at is do we need any stronger or greater certainty that the explosion occurred in 512? Do you think we will get any greater certainty if we re-entered the mine?-- Yes, I do.

Do you need any greater certainty than that?-- There are two issues that really need to be established, and a third which is quite - is important as well. The first one is what caused the explosion in the first place, and the second issue is why did the people not survive. Now, the third is where was the source of the second explosion, and that might have been caused through some other initiator such as which has been brought forward before the Inquiry, the fact that the methane drainage bore holes, for instance, didn't have any cutoff valve system on them. So that might have been the flame which initiated things. It could have reoccurred at some other place from its original fire source. The other thing about it is that that Fault Tree Analysis did not have any information from MSHA at that point in time as to the relative size of the explosion, and that if the MSHA evaluation of the size of the explosion is correct then it makes you wonder how such a large body of gas which was, if my memory serves me correctly, it was about 14,000 cubic metres when it detonates, creates such a relatively small effect. So that was information that wasn't available to be assessed at the time.

No further questions, thank you.

EXAMINATION:

MR ELLICOTT: I realise that I'm one of the few things that stands you between this and something more pleasant, so I will try and be brief. As a quick and dirty definition of an audit how would you accept that an audit is a comparison of what is supposed to happen as opposed to what is happening?-- That's dirty enough.

Is it quick enough?-- Quick enough.

So would you accept that an inspection is in fact a form of audit?-- It certainly is.

Could you say that an inspection is in fact a relatively unstructured audit?-- Yes.

And could you also say that an audit is a relatively structured form of inspection?-- Yes.

An exception to that general approach may well be that an inspection may contain a significant consultancy component; would you agree with that?-- And an audit can too.

We have heard a great degree of discussion about the possible future audit role of the Inspectorate. I have taken it that that would be the role of an external auditor; would that be correct?-- Yes.

Would you also agree that there is a need for an internal audit role as well as the functions of an external auditor?--

There would be an internal audit by the mining company or on behalf of the mining company.

Internally, is that what you are referring to?-- That's what I'm getting to?-- Yes.

I don't think we have heard the concept of internal audit mentioned, have we?-- No, not yet.

So would you say that an external audit provides an external entity with some assurance that things that are supposed to happen are in fact happening?-- That's right, an independent view.

An internal audit may well provide mine management with some assurance that things that are supposed to be happening are in fact happening?-- That's correct.

So would you see internal audit as a powerful tool for a mine manager to be prevented some of the nasty surprises they may find when things go wrong?-- I think that an internal audit is going to be an extremely valuable tool for mine owners.

Would you say that internal audits should be at least as rigorous as external audits, if not more so?-- Yes.

Do your legislative proposals incorporate any provision for internal audit?-- No, they don't.

Do you see that as a weakness?-- That has been discussed and that's been seen as a matter of duty of care on behalf of the owner/operator.

Do you think that worthy of some re-evaluation perhaps?-- I don't have a problem putting it before the committee again as such, but it has been discussed previously about that, and the response of the committee has been that it was seen as being part of the duty of care of the operator to ensure that that happens.

What do you say the response might be to this scenario, and this is when an inspector goes to a mine and says to the mine manager, "Mr Manager, please show me objective evidence that this mine is operating in accordance with all relevant legislation and that any management systems in effect at the mine are being complied with." What do you think the manager would say?-- It depends upon the genuineness of the manager, I would imagine. He might say, "Go and find it yourself."

Would you see that scenario as evidence of a very mature and self-capable industry in terms of self regulation?-- Yes, I would, and in fact I would see some great benefits in having that established.

For about the past 100 years, I guess tradition or custom and practice or whatever you call, it has been to approach or respond to mining disasters with more regulation?-- That's true.

Bearing in mind evidence you've heard before this Inquiry do you think that the coal industry is of sufficient maturity such that there is a viable alternative to that former legislative response?-- I would have liked to have thought so, but there are - one does question whether it's at that level of maturity at this point.

I think in response to Mr Neilson you indicated that you had perhaps some personal reservations about self regulation with regard to certain things. I think you put it in terms of there being exceptions. Can you elaborate on that?-- I don't remember the context that that was raised in.

Might those exceptions have been what you might call the big ticket items of underground mining safety, that is things like fires, explosions, inundations?-- The key risk matters?

What you may term key risks and others may term core risks?-- Core risks, yes.

Depending on which side of the border you live. Perhaps there is common ground?-- I would hope so.

What in your opinion can, in five or seven or eight or 10 years time, prevent what might be termed a form of collective amnesia taking over and allowing people to forget the outcomes of this Inquiry?-- Well, as our current proposed legislation is being drafted it is capturing the matters that are seen as being a risk and how they should be addressed in the future, and I would see that those particular matters would be captured by the activity com risk com control proposal, and that would be part of the review system that a mining company would undertake when doing safe operating procedures, if it's a more prescriptive type or enabling type regulation or requirement it would be part of that legislative process.

Do you see that as sufficiently rigid and durable?-- It would need as well to be put into the training programs in some circumstances or the - establishes a competency requirement that knowledge of that information in some circumstances.

But it is very serious that it is both rigid and durable, isn't it, that the lessons aren't forgot?-- That is true.

Can the witness have Exhibit 279, please? I don't think you have it?-- No.

This exhibit was kindly provided by Mr Harrison and represents, I guess, a form of score card, Queensland v. New South Wales. Would you agree that in New South Wales approximately 67 per cent of mines are underground mines, approximately?-- Yeah, I take your calculation on that. I can't do it mentally in my own mind just now.

Trust me?-- I trust you.

Would you agree that in Queensland only 36 per cent of mines or operating coal mines are underground mines?-- Yes, I would.

Would you agree that New South Wales and Queensland are different jurisdictions for the present time?-- Yes, I would.

Would you agree that as a result of that they operate under different statutes?-- They do.

And that there are different inspectoral duties arising from those statutes?-- That is for certain.

Would you further agree that the respective industries have to deal with different issues?-- Yes.

In New South Wales many coal mines are close to population centres leading to land use conflicts?-- That's true.

And concern about the effects of mining on structures through mine subsidence?-- That's true.

Would you agree that Queensland doesn't have these problems?-- We do have them to a limited degree, but it's a very, very minor part of our concerns.

To your knowledge, apart from statutory duties, are a different set of demands placed on inspectors in New South Wales as opposed to Queensland?-- Many of them are similar in their range of requirements other than these external matters to which you've just recently referred.

Would you agree that all the factors we have covered may well impact on decisions regarding appropriate Inspectorate manning levels?-- Yes, but they also have a different legislative base which also requires different demands on the inspectors' time as well.

Would you agree that the issue is far more complex than Exhibit 29 would indicate?-- Yes, it's far broader than what you are talking of there.

With regard to training, it is my understanding that personnel training is the subject of Part 59 of the general rules for underground mines which took effect on 1 September 1988?-- Yes.

That took effect some time before you did?-- Yes.

Have you nonetheless had experience in the bedding in of those requirements?-- The actual system was in place when I came here and needed some modification soon after which the committee was reassembled to do, and that's the result you see before you now.

How, in your opinion, have these training requirements been received by industry?-- It's been varied across the State. It's been accepted some operators took more encouragement than others to actually conduct their training programs and numbers of them left things to the last minute.

What form did encouragement take?-- The Inspectorate simply

going to some of the operators - in particular I would mention some of the open-cut operators did not put training officers on until they were told that if the people weren't retrained within the five year period that the mine will stop until the people are retrained.

What level of training do you think the statute represents?-- The absolute basic level.

Absolute bare minimum?-- Yes.

What proportion of mines in Queensland do you think go beyond that bare minimum?-- A very small proportion.

How do you see that in terms of industry maturity?-- It doesn't reflect well for that purpose.

I have formed the firm impression that Mines Rescue in Queensland, and I would accept that this is the case in New South Wales too, is in effect a de facto industry trainer and they have certainly trained far more people than they have rescued. Do you think that's an appropriate role for Mines Rescue?-- Yes, I do.

Given that do you think that Mines Rescue is adequately resourced and structured for that role in terms of both people and equipment?-- Its adequately structured for the purposes which it fulfils now. If it's going to take on greater roles that would depend upon to what extent that role might be changed to.

Might that mean that somebody actually accepts that Mines

Rescue are not the de facto industry trainer but a valid industry trainer?-- Yes, that could be part of it.

We heard that personnel from SIMTARS don't consider themselves as policemen and, therefore, are not empowered to actually tell people to do things. Is that your understanding? They thought they couldn't tell people to use GC's, for instance?-- They can't enforce the use of GC's. They certainly are confident and capable of telling people where they should - could be used.

Is it within their capability and perfectly proper for them to perhaps offer some advice?-- I understand they do.

I take it you have often had occasions to send material to mines of an informational nature?-- Normally how it's structured is that I will send the information to the regional senior inspectors and they will distribute it to their mines.

How is the material that goes to mines addressed, do you know?-- Yes, it goes to the Mine Manager.

To the Registered Mine Manager?-- Registered Mine Manager.

There is some faith that the Registered Mine Manager will take appropriate steps to pass that information on?-- In some instances - in fact, the record book entries will show that significant incidents might have occurred at one of the other mines, whether it's interstate or within Queensland, will be raised with the appropriate mine staff in detail and looking at its appropriateness for their mine.

But it's common accepted practice that information is supplied to a Mine Manager with the expectation that it will be appropriately distributed?-- That is correct. If it relates to an engineering issue, whether it's mechanical or electrical, the electrical or mechanical inspector will raise that with the appropriate staff at the mine as well.

Part 8 of the General Rules for Underground Mines relates to gas monitoring. I gather you can accept that?-- At this time of the day -----

At this time of the day it's hard to say it too. Clause 8.4 subclause 3 says, "The location of each monitoring point shall be indicated on the ventilation plan of the mine."?-- Yes.

In that context, what is your understanding of the ventilation plan of the mine?-- It's simply a plan showing the intake - there is no definition of such a plan in the Act, but what I expect it to be is a plan showing the underground workings indicating intake and return airways.

So, the ventilation plan of the mine doesn't exist as such?-- The ventilation plan of the mine does exist but it's not a defined plan under those terms, if I can - I don't recall it's a defined plan.

So, it could be a plan of the mine?-- Yes.

Could the witness have Exhibit 284, please? I think you will find that's the consultancy report regarding bent roof bolts in the vicinity of the 512 seals?-- Yes, it is.

And I think it was indicated earlier that two bolts were bent strongly outbye?-- Yes.

Is it your understanding that these bolts were used to anchor the reinforcing structure of a Tecrete seal?-- As I say, I haven't actually read this report.

Accepting that the bolts were used to anchor the reinforcing structure of the seal?-- Yes.

Would you expect a primary explosion force to bend those bolts as they are attached to that seal structure?-- I would expect an explosion force to bend those bolts.

Would you not expect a secondary explosion force or, for that matter, a subsequent explosion to similarly bend those bolts since the structure is now removed, presumably?-- Yes, once the structured was removed it would be more difficult to bend those bolts.

In fact, the surface for the application of explosive pressure would be vastly reduced?-- That's true.

So, could you see those bolts as an indication of the direction of a primary explosive force that in fact removed the seal?-- I would expect that.

And I think there was an implication that that was a primary explosion force from 512?-- Yes. Of course - and I'm not denying -----

I am going to cover some caveats, if you would like to hear them?-- Okay.

Would you agree, however, that the cautions expressed by Mr Stephan re the possibility of an explosion outside 512 going in one heading and out the seal heading would still apply?-- Yes.

Would you agree that the roof bolt evidence provides no indication of the point of initiation and that point of initiation may still have been outside 512 seals?-- It may have.

Would you agree that the roof bolt evidence provides no chronology, there is no indication as to whether it was the first or the second explosion?-- That's true.

Can the witness have Exhibit 283, please? That is the photocopy of page 23 of the - I think it's the incident log?-- Yes.

And there has been reference to an observation before that

says, I think, there was no hope of recovery of victims or finding any evidence of cause?-- Yes.

Do you think evidence at this Inquiry has modified that position?-- I believe so.

Mr Clair mentioned an entity called the community. It was in the context, I think, that perhaps mining companies may be sullied by profit motives but an entity called the community may not be. Would in fact you agree that the community, as a whole, derives considerable benefit and income from mining activity?-- Yes, it does.

So, the broader community may in fact not be devoid of profit motive?-- That is true.

In addition to our industrial relations I think we have inherited a great deal of our coal mining legislation from the UK; is that true?-- Yes.

Mr Ken Twist, the Chief Inspector of Mines from the UK, has been a fairly recent visitor to these shores?-- That is true.

Did you have opportunity to talk with him during that time?-- Yes, I did.

Are you aware of directions in the UK regarding their mining legislation?-- We did have some discussions about that.

Are you aware of their revised arrangements regarding statutory qualifications?-- No, I'm not.

Were you aware that a more hands-off approach by the Inspectorate was being promoted in the UK?-- No, I was not.

Were you aware that, in effect, it was designed to let industry reach its own conclusions?-- This is the new or the old original system?

The new, current trends in the UK?-- No, I wasn't. I remember speaking to Mr Twist about the effects of the duty of care type legislation on the coal mines in England, or throughout Britain, and he expressed that his concern was that the small operators had trouble setting the standards in his experience under duty of care, whereas the large operator, which was British Coal, effectively set the standard for the industry.

Things are not staying the same in the UK, though, are they?-- No.

And perhaps it may provide an interesting model to keep an eye on?-- Yes, it would.

I have nothing further?-- Thank you.

WARDEN: Before we go on, witness, do you feel like a break? It's entirely up to you. There may be a few more minutes to

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go and the option is yours. I am convinced we should have a short break. Thank you. Five minutes.

THE COURT ADJOURNED AT 6.33 P.M.

XN: PANEL

WIT: LYNE B J

THE COURT RESUMED AT 6.43 P.M.

BRIAN JOHN LYNE, CONTINUING:

MR CLAIR: Your Worship, might I first tender some documents that Your Worship showed to this witness? There is a document headed "Organisational Structure". I tender that.

WARDEN: Exhibit 287.

ADMITTED AND MARKED "EXHIBIT 287"

MR CLAIR: Another headed "Position Description, Department of Minerals and Energy." I tender that.

WARDEN: 288.

ADMITTED AND MARKED "EXHIBIT 288"

MR CLAIR: Another one, which is a letter from the Minister for Minerals and Energy to coal industry workers. I tender that.

WARDEN: Exhibit 289.

ADMITTED AND MARKED "EXHIBIT 289"

MR CLAIR: Another one, which on the front page has "Corporate Plan, 1995-2000, Department of Minerals and Energy".

WARDEN: Exhibit 290.

ADMITTED AND MARKED "EXHIBIT 290"

MR CLAIR: And, finally, a series of two letters, the one on the front being from - being to Mr Twist from Mr Walker, dated 20 January 1995, and the reply to Mr Walker from Mr Twist of the Health and Safety Executive, Her Majesty's Inspectorate of Mines, dated 7 February 1995.

WIT: LYNE B J

WARDEN: Exhibit 291.

ADMITTED AND MARKED "EXHIBIT 291"

FURTHER RE-EXAMINATION:

MR CLAIR: Just two matters, Mr Lyne: I know you have made reference to inerting panels; I simply want to ask you about a matter on which you may be able to give us some technical assistance: is it feasible after a panel has been sealed to inert the sealed area by virtue of a borehole access?-- Yes.

Is there any physical reason why that can't be done that you're aware of?-- No, there is no reason why it can't be done. You have to look - you would have to look into the period of time that it would take - the volume that you are actually able to transmit down a borehole.

Yes?-- But certainly boreholes and introducing inert gas into a sealed area through a borehole is a common practice.

Okay. The other matter relates to this question of the number of inspectors. You mention at one point in your evidence with six inspectors, I think you said you consider the position to be adequate?-- Adequate in our current modus operandi.

Are there six inspectors at the moment, or are there five, or at least six inspector positions at the moment, or are there five positions, one of which is being advertised?-- We have currently four mining inspectors and we are advertising one position vacant.

So, that's five positions in all?-- That's correct, yes.

So, when you referred to six positions, in fact you were taking a rosier view?-- No, there are six in our establishment numbers. See, in the Public Service we have what we call "establishment number", and originally we had - when one of the inspectors from the southern division left us to return to industry, then his position wasn't filled again in the Brisbane area.

Right. So, there are four inspectors, one position being advertised. What about this final position that's on the establishment? Is it intended to fill that position?-- It would be filled were the - again it depends upon the workload that the inspectors find themselves under. We have had great difficulty of just maintaining the lesser number, but the development of new underground mines and expansion of those duties is causing us to revisit our manning structure, and, indeed, that's where a review of looking at where persons are - whether metalliferous inspectors might do some of the

FRXN: MR CLAIR

WIT: LYNE B J

open-cut mines is being considered.

I don't want to complicate it by looking at it in terms of amalgamating it with metalliferous or otherwise, but the question I asked you is: is it intended to fill that sixth position that's on your establishment?-- At the present time the answer to that is no, we do not have any funding to do that.

I'm just intrigued, then, by what you said in answer to a question at some stage in your evidence that with six inspectors, you consider the position to be adequate, because, in fact, you don't have six inspectors, you have got four inspectors and a position being advertised?-- But I'm nominated as the mining inspector as well.

So, what, now you are including yourself in that position of six?-- Yeah.

You are?-- Yeah.

Then your establishment is seven?-- Okay, my establishment is seven, yes.

I took you to be referring to having six inspectors?-- That's true.

But you don't; is that so?-- Hang on, it is late in the day. We have an establishment of six mining inspectors plus myself.

Right?-- We have currently employed four mining inspectors plus myself, of course. We are advertising one vacancy at this time.

Right. Well, can I just establish this: what position do you consider adequate, having - if you filled the vacancy, five inspectors and yourself, or is it you consider that you need the six inspectors on your establishment plus yourself?-- We have been able to cater for the requirements of the legislation with the five inspectors plus myself.

That's in your assessment of things?-- And confirmed by Mr Walker.

Okay, thank you.

RE-EXAMINATION:

MR MacSPORRAN: Mr Lyne, just a couple of matters: could the witness see Exhibits 155 and 272. Mr Lyne, while they are being obtained for you-----?-- I have 272.

Well, just 155, thank you. You said, I think, that your view prior to 7 August last year was that CO make was the most appropriate way to monitor for spon com; is that so?-- I'm

RXN: MR MacSPORRAN

WIT: LYNE B J

sorry?

CO make was the most appropriate way to monitor spon com?--
It is one of the most appropriate indicators of spon com.

Now, the exhibits in front of you are 155 and 172 which relate to the Coal Mine Analysis Audits done in 1990 and 1992 with respect to Moura No 2; is that so?-- Yes.

If you look at them briefly, do they identify Moura No 2 as using the CO make method of monitoring? Do you see that in the documents? If you look at the 1990, one, Exhibit 155, page 2, air velocity, CO make?-- Yes.

And if you look at the 1992 one, Exhibit 272, on page 3, again, air velocity, CO make?-- Yes.

So, did you become aware through these documents the results of those audits in 1990 and 1992 that Moura No 2 was, in fact, using CO make to monitor the situation at their mine? Do you recall-----?-- I don't recall being aware of that.

You don't recall that specifically?-- No, I don't.

I think you have told us that you did receive these audit reports after each audit?-- That's correct.

And on one occasion at least you were sure that the 1990 one went back to the mine?-- Yes.

And you are unsure about the 1992 one?-- That's true.

All right. Now, I think it was Mr Martin asked you some questions about what action you had taken since the 7th of August in relation to safety matters, and, in particular, in relation to having the men stay out of the mine after panels were sealed; do you recall those questions?-- I remember discussing that somewhere today.

All right. Well, do you recall during the course of the last session of this Inquiry, last October/November, having discussions about these topics with Mr Walker - about what, if any, action should be taken before this Inquiry concluded and handed down its report and recommendations?-- Yes.

Do you recall there being a memorandum put together by Mr Walker about matters that had been identified in the evidence here - matters of concern?-- Yes, there has been, yes.

Would you look at this document, please? It was the case, wasn't it, that such a document was given to the - all the parties here before it was distributed?-- Yes, that's true.

Is that a memo from Mr Walker to all undermanagers raising matters that had been flagged, if you like, on the evidence here?-- Yes.

But making it clear that it wasn't any attempt to pre-empt

this Inquiry's findings; it was simply to alert the undermanagers and others of matters of potential concern?-- Yes.

All right. I'll tender that memorandum.

WARDEN: Exhibit 292.

ADMITTED AND MARKED "EXHIBIT 292"

MR MacSPORRAN: I have copies for the panel. The parties themselves have seen the document, and that was distributed last November.

Mr Lyne, you were asked by Mr Parkin, I think it was, this evening whether you agreed with Dr Van Dolah's opinion about the benefit risk ratio with respect to re-entering this mine; do you recall that?-- Yes, I do.

I think your response was that you didn't agree with Dr Van Dolah's assessment of that situation?-- That is correct.

In forming your opinion that re-entry is a worthwhile exercise with respect to this mine, have you had regard to all of the evidence at this Inquiry as well as other matters?-- Yes, I have.

And, in particular, have you had regard to other expert evidence at this Inquiry?-- Yes, I have.

And has part of that evidence been the evidence from the MSHA experts, Mr Stephan and Mr Urosek?-- Yes, it has.

And, indeed, the evidence of Mr Mitchell?-- Yes, that's true.

Thank you. Thank you, Your Worship.

WARDEN: Anything arising?

MR MORRISON: Your Worship, not arising, but I think Mr Lyne had better stay there for the moment. I have no questions for you, but it may be that some will arise. Mr Clair made a request earlier this afternoon in relation to the - a copy of the 1992 audit, which is Exhibit 272, and any correspondence relating to it, including a letter from Mr Bell. I'm rising solely to respond to that, but I'll produce a document in the course of that. Your Worship, we have said before on a number of occasions - from this end of the Bar table, at least - that if parties wish documents, they should come and ask us, and we will go and search for them. Nothing has changed about that. But we wonder now the practicality - the practical utility of searching for that particular document, given that we do wish to conclude this Inquiry at some stage before the 7.15 news, perhaps - whatever. If we have to go and look for it, no doubt we will have to go back to at least Mr Reed, the manager

at the time, probably Mr McCamley, who was the acting manager at the time, and we will have to go to Moura and search the records there as well. We're not in a position to produce it now. We are not even in a position to ascertain if it exists now. The 1990 document was in the mine records. The 1992 document was not. We obtained our copy of that document from the Inspectorate when we gave them a letter saying could they produce a number of documents over a whole range of categories. It has been here for some weeks now, and it has now been tendered - it was tendered last week, not today. We have caused some inquiries to be made and in the course of that we have received some communication from SIMTARS, and I will tender a copy of the letter - it is a facsimile letter - and provide copies for the panel and for members of the Bar table. The letter says it is from Dr Cliff. They have been unable to locate any reference to the despatch of that report direct to Moura No 2. "A telephone conversation from Mr Stewart Bell this afternoon suggests that maybe the report was sent to Mr Lyne for him to send it on, asking for any comments of his own." The SIMTARS search of their records does not reveal that they sent it direct to the mine. I tender that letter, dated 3 April 1995 from Dr Cliff directed to Dr Peter Golledge and others.

WARDEN: Exhibit 293.

ADMITTED AND MARKED "EXHIBIT 293"

MR MORRISON: And to proceed with the response that I can make to the request, in the light of that letter, we really wonder whether, in fact, the request is - should be persisted with, quite apart from the other events that I mentioned a moment ago, and can I end on this note by saying: if it is viewed as being really necessary that we go and do the search, and if people insist on it, then we will do the search and we will just have to provide whatever document we turn up in due course to Mr Boiston - if we find any, which I frankly doubt - but, you know, I don't wish to give a time-frame for that either, but in the light of the document from SIMTARS, we really rather think that it might be of no practical utility to do it, so we would rather draw the evidence to a close.

WIT: LYNE B J

WARDEN: Thank you.

MR CLAIR: Your Worship, I must say that my request for the document to be produced was prompted by the fact that at least the 1990 document, as I understood it, had been produced from the mine records. Now, that's the one that had the covering letter, and I was optimistic enough to think that if the records were good enough to produce a copy of that report then they may well have been good enough to produce a copy of the other. I must say that in light of the Inquiry that has been made of SIMTARS and the fax that Mr Morrison has tendered then it may well be that any further search could well be time consuming but nevertheless a fruitless exercise.

What I would seek to do, however, Your Worship, is to ask Mr Lyne some further brief questions against the background of the message that's contained in the fax that's just been tendered. Has Your Worship marked that?

WARDEN: Yes, Exhibit 293.

MR CLAIR: Perhaps before I proceed I should ask Mr Morrison if he has finished.

MR MORRISON: Yes, I have.

FURTHER RE-EXAMINATION:

MR CLAIR: Mr Lyne, I know that it's late in the day and I know that there is always a tendency for people to be pointing in some other direction generally away from themselves, but you will see that Mr Bell has, via a telephone conversation that in turn has been related back in that facsimile message, suggested that the report that he made was - or at least may well have been sent to yourself for you to send on after adding some comments of your own. That is, I take it from that, to send on to the mine. Does that prompt any recollection on your part?-- No, it doesn't. As I said earlier, I can recall talking with Mr Bell about the report, and I actually felt that I had asked him to communicate directly with the mines about it, but that's the best of my recollection.

That's the best of your recollection, and I think you said to me earlier today that you couldn't really state with confidence that the document had been sent back to the mine?-- That's true.

I think you also had some comment to make about the effectiveness of the audit system against that background at that time; is that so?-- I don't recall that.

I won't pursue it further. Thank you, Your Worship.

WARDEN: Thank you, gentlemen. Nothing further arising out of

FRXN: MR CLAIR

WIT: LYNE B J

that? Thank you, witness. You may stand down. You are excused. Thank you for sitting on and allowing us to finish the evidence today.

WITNESS EXCUSED

WARDEN: Thank you also, gentlemen, for that effort. Can we adjourn for two days while you prepare your submissions, and you might indicate to Mr Barker when you've finalised them, not that we will get a chance at an earlier start, but we would just like to know that everybody is ready.

MR CLAIR: Can we indicate to Mr Barker if we haven't finalised them, Your Worship.

WARDEN: Yes, early start on Thursday, 8.45.

THE COURT ADJOURNED AT 7.04 P.M. UNTIL 8.45 A.M., THURSDAY,
6 APRIL 1995

