



Royal Commission on the Pike River Coal Mine Tragedy
Te Komihana a te Karauna mōte Parekura Ana Waro o te Awa o Pike

UNDER

THE COMMISSIONS OF INQUIRY ACT 1908

IN THE MATTER OF

**THE ROYAL COMMISSION ON THE PIKE RIVER COAL
MINE TRAGEDY**

Before:

The Honourable Justice G K Panckhurst
Judge of the High Court of New Zealand

Commissioner D R Henry

Commissioner S L Bell

Commissioner for Mine Safety and Health, Queensland

Appearances:

K Beaton, S Mount and J Wilding as Counsel Assisting

S Moore SC, K Anderson and K Lummis for the New Zealand Police

N Davidson QC, R Raymond and J Mills for the Families of the Deceased

S Shortall, D MacKenzie, R Schmidt-McCleave and P Radich for certain
managers, directors and officers of Pike River Coal Limited (in
receivership)

C Stevens and A Holloway for Solid Energy New Zealand

K McDonald QC, C Mander, A Williams and A Boadita-Cormican for the
Department of Labour, Department of Conservation, Ministry of Economic
Development and Ministry for the Environment

G Nicholson and S Stead for McConnell Dowell Constructors

G Gallaway, J Forsey and E Whiteside for NZ Mines Rescue Service

N Hampton QC and R Anderson for Amalgamated Engineering, Printing
and Manufacturing Union Inc

J Haigh QC and B Smith for Douglas White

J Rapley for Neville Rockhouse

T Stephens and N Blomfield for New Zealand Oil and Gas

P Mabey QC for Pieter van Rooyen

**TRANSCRIPT OF PHASE THREE HEARING
HELD ON 10 FEBRUARY 2012 AT GREYMOUTH**

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COMMISSION RESUMES ON FRIDAY 10 FEBRUARY 2012 AT 9.02 AM**DAVID HAROLD REECE (RE-SWORN)****CROSS-EXAMINATION: MR HOLLOWAY**

- 5 Q. Two days ago Mr Murray in one of his answers suggested that you might be able to assist the Commission with when the samples taken from the top of the vent shaft –

THE COMMISSION ADDRESSES MR HOLLOWAY – USE MICROPHONE**10 CROSS-EXAMINATION CONTINUES: MR HOLLOWAY**

- Q. Mr Murray suggested that you might be able to assist the Commission with when the samples from the top of the vent shaft were analysed. So if you can assist us with that could you please tell the Commission when that analysis took place?
- 15 A. In my understanding, it was a sample taken after the first explosion and the analysis happened some time later, and my understanding was it was sent to Mr Ward and I think it was a number of months, around the order of May, I think May-June, somewhere in that period, but I can get the exact date. I don't have it exactly with me, yeah.

20 CROSS-EXAMINATION: MR RAYMOND

- Q. Mr Reece, I just want to go back to your initial involvement with the whole Pike River disaster, and as I understand it you've been involved with the matter from a very early stage, indeed late 2010 or early 2011, engaged by the police?
- 25 A. That's correct, early 2011.
- Q. And that was to advise on matters relating to at that stage, entry into the mine for the purposes of effecting a recovery?
- A. Predominantly yes.
- Q. And also coupled with that whether it should be sealed?

A. No, it wasn't so much whether it was to be sealed. I mean there was subsequent questioning about sealing that was involved with that, but yes.

0905

5 Q. It was an incidental topic effectively wasn't it?

A. Yes.

Q. And you attended a briefing of the families on the 13th of January last year with the Honourable Gerry Brownlee, Commissioner Broad, Mr Morrison the CEO of the Department of Conservation,
10 Superintendent Knowles, do you recall that?

A. That's correct, yes.

Q. And you advised that meeting when invited to do so that there was, in your view, no prospect of re-entry and that the mine should be sealed for a significant period?

15 A. The attempted advice to be given was that at that time there was insufficient information and knowledge of what was happening in the mine to effect a re-entry and at that point it was still not safe to re-enter.

Q. And you went on to say that it should be sealed and that was your advice to the police and the Government of the day?

20 A. I can't remember exactly what I said in my report but it wasn't a case of sealing it, it was a case of bringing it further under control. And one of those mentioned is sealing. It was effecting a better seal. Now that doesn't necessarily mean seal it, close it up, walk away. It means the problem was that there was ineffective sealing that was occurring so
25 there was still leakage into the mine and that was my primary concern.

Q. When you spoke to the families on the 13th of January do you recall conveying the message, whether you intended to or not, that the mine was to be sealed?

A. I don't recall that it was in those terms.

30 Q. Well, do you recall then that there was a reaction from the floor, in particular Mr Neville Rockhouse, to the effect that there was information that very day, the 13th of January, from the mine which indicated that the atmosphere was stabilising and that there had been images taken down

borehole 44 showing intact cement bags, pellets and the like and steel rubbish bins?

A. Yes I do.

Q. Which somewhat painted a different picture.

5 A. As far as I'm concerned that was very late information and that actually doesn't change the degree of confidence at that time. It's a little bit of a case of one swallow doesn't make a summer with gases and gas interpretation in a mine that's been through a trauma like this. There had been a significant period of high gas levels that had been occurring
10 in the mine. A lot of instability in the mine and that was my primary concern. The fact that there was instability. If things were being brought under control, very good, but at that point in time there wasn't enough information as far as I was concerned to make the call that it was stable.

15 Q. But at that time when that information was conveyed there was something of a u-turn in the meeting from what was being conveyed by the authorities and there was a back-away from the suggestion that the mine will be sealed and that was reversed. You recall that?

A. I recall that the new information was put forward and that was fresh
20 information and it would certainly cause at point of reconsidering just what was happening there and whether it was being brought under control.

Q. So as a consequence of all of that and no doubt generally, you would have very closely followed events at the mine site from that time?

25 A. Yes.

Q. In terms of a possible reclamation of at least the drift?

A. Yes.

Q. And the issue of re-entry for the purposes of recovering the remains of the men, the mine workings and recovering potentially what is left of the
30 scene?

A. Yes.

Q. And progress on that, although from the families perspective slow, is now being made? You would agree with that?

A. Yes.

Q. At least to recover the drift so far as the rockfall?

A. Yes.

5 Q. So were you aware that after that meeting on the 13th of January 2011, to at least May 2011, that there was very little, if anything, done by the police, Mines Rescue, Department of Labour, MRS, to actually produce a plan to recover the drift?

A. Look I didn't follow it closely as far as what they were doing, but I take your point. I'm happy to accept it.

10 Q. Well, on what date were you formally engaged by the Department of Labour to provide an expert report?

A. In January.

Q. In January?

A. Yes.

15 0910

Q. So were you aware of the meeting of the families, the Department of Labour, the Police, MRS, the receivers and the Union on the 23rd of May last year in Christchurch on these issues?

A. Not specifically.

20 Q. Ms Basher, if you could put up MRS0100 please?

WITNESS REFERRED TO DOCUMENT MRS0100

Q. I'll just give you a moment to read that document Mr Reece. If you could highlight the first few paragraphs please Ms Basher, so it's easy to read? Have you seen that document before Mr Reece?

25 A. No, I haven't

Q. Has advice ever been sought from you or the expert panel insofar as you're aware on what the Department of Labour could do to assess the process and fulfil what it agreed to in that document?

A. Not from me, no.

30 Q. Are you aware of advice being sought from anyone else in the expert panel that you work with?

A. No, I'm not.

Q. The Department has flagged, from an early stage and again recently just this week, an interest – thank you Ms Basher, that can come down now – an interest in getting to pit bottom in stone?

A. Yes.

5 Q. You're familiar with that, and that is as I understand it is to access electrical equipment which is housed at that location?

A. That's correct.

Q. So, potential access to at least part of the seam?

A. Yes.

10 Q. Can you explain please what it is that the expert panel is hoping to see at that location, which may assist?

A. It's to try and get some confirmation or otherwise of the state of the VSD's in that area because it was presumable that that's potentially a key point as far as the ignition is concerned.

15 Q. So given the time constraints in which the Commission is operating under, you would regard, I take it at least for the purposes of assisting the Commission as well as the Department of Labour in its prosecution, that access to that area is something of a priority?

20 A. It'd certainly be useful information. The precaution or the caution that I would always put on it, is just you're still entering that mine area and I see that area as a lower risk providing that the controls are put in place.

Q. Now, we heard, I think it was in September from Mr Ellis, Steve Ellis the statutory mine manager when we were dealing with Phase Two issues and we were discussing reclamation of the drift and at that stage an
25 MRS preference, or at least a willingness to complete a staged re-entry down the drift to the rockfall –

A. Yes.

Q. – and then ventilate it once the final seal was built. Are you familiar with that?

30 A. Yeah, I haven't seen it in detail, but yes, I'm aware of it.

Q. And Mr Ellis' preference at that stage was rather than take what he perceived to be a risk with that, that he'd prefer Mines Rescue and other

staff to work in a freshly ventilated drift and therefore pursue the rockseal option?

A. That would make a lot of sense to me, yes.

5 Q. And one of his arguments for promoting that as an alternative to the staged re-entry was it could be done within the same timeframe and he indicated to this Commission by Christmas 2011. Did you hear that evidence?

A. No, I didn't.

Q. Well, you'd obviously accept from me that's what it was?

10 A. Quite happy to accept that.

Q. And Christmas has come and gone and we're still not at that stage. With the delays which the families and those interested in the reclamation keep experiencing and with your interest in getting to pit bottom in stone, is planning underway now from the expert panel and the Department of Labour and in particular Mr Reczek, so that when the drift is reclaimed and fully ventilated, we hope within the next month or so, that there will be no delay from your perspective of getting to pit bottom in stone and inspecting the variable speed drives and other electrical equipment which is of interest to this Commission?

20 0915

A. From my perspective we haven't been engaged as such, but I'm certain that there have been conversations that have been conducted and that that has been the upshot of those conversations that if access was able to be granted it would be looked upon favourably that it would be very useful to be able to have a look at that side and to glean any information that's available.

25 Q. Do you accept that it would be beneficial to plan for that re-entry and that inspection and execute the safe operating procedures and so on that you need to do now so that when the drift is reclaimed, as we are hopefully confident it will be, that there's no delay for you gathering that information and making it available to the Commission forthwith?

30 A. I certainly don't see a problem in it. Again, as I come back to it, it's about being fairly conservative and fairly stringent in the way that that's

done with the assurances that need to be provided, but again it's to a large extent out of my hands. I'm happy to work as we're engaged to provide the assistance that's needed.

Q. Well in terms of being beneficial?

5 A. Yes.

Q. That would be something that you would recommend to the Department of Labour?

A. Certainly give a greater deal of confirmation, yes.

Q. And in terms of the early planning to effect a prompt reconnaissance?

10 A. Yes, yeah.

Q. I just want to ask you now a little bit about the goaf and the case 1 scenario and your preference for that. You said in your evidence yesterday I think or the day before that the team looked at the logic of things and then tried to discount a theory by reference to available information. Do you recall your evidence on that?

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A. Yes.

Q. Ms Basher if you could pull it up please, DOL30001500/23.

WITNESS REFERRED TO DOL30001500/23

Q. With that comment in mind, I want to explore with you what was touched on yesterday by Mr Wilding and that is the further borehole which could be drilled in or close to the goaf to discount or otherwise that theory?

20

A. Mmm.

Q. And it was later in the day yesterday when Mr Wilding touched on this and you did give some answers which I wish to explore further. If we could just blow up please Ms Basher the area of panel 1 from the first cross-cut. So we're all familiar with PRDH47, and have you seen the CALS scan images taken down that borehole Mr Reece?

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A. Yes I have.

Q. And you will realise that a lot of valuable information was obtained as a consequence of that CALS scan image?

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A. That's correct, yes I agree.

Q. And another borehole has recently been drilled in the main drift just in front of where the rockseal seal is to be poured?

A. I wasn't aware of that but I'll accept that.

Q. It has been and it broke through with precision right in front of where the proposed rockseal is to be poured and has identified that that is a suitable area to pour the rockseal, and has provided a good visual of that area?

5

A. Mmm.

Q. And we also know that useful images were obtained from PRDH44, that correct?

A. Yes.

10 Q. With that in mind, what I want to put to you is where the hydro-monitor is and the guzzler, which is at the top of the intake return, so that's the B heading, is that right?

A. Yes. Yes.

Q. Could you just indicate please with your light?

15 A. My understanding is that the hydro-monitor would be roughly in that location, the guzzler would be a little bit somewhat further outbye.

Q. And I think you suggested yesterday that one of the problems with sinking a borehole into the goaf was that you may not see far enough or see anything, is that right?

20 A. That's one of the considerations.

0920

Q. What about if the borehole was drilled with the precision which we know can be obtained, virtually on top of, or very close, to where we know the monitor was last and therefore provided a visual down B heading and into the top of the goaf. Would that not be of use to the expert panel and this Commission in working to eliminate or support what you're putting forward as your primary scenario?

25

A. It could be and I say that could be because it's an area that's been designed to fall in so it may well have collapsed it may not have. The expectation is that it probably would of. I certainly wouldn't disagree that you'd get information about B heading and potentially some information on the nature of collapse in that area. It also depends to some extent on the field of vision of the video footage and I don't know

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what that is but I'll accept that you're saying that there's reasonably good field of vision. The other difficulty, and this is not to negate the practice, but it's to put it in perspective, is the drilling into goafs is problematic. It actually doesn't mean that you will break through. It's often the case, it's actually more likely the case that you'd lose the drill stream, so you actually can't fulfil the intent, but that's not to say that it can't happen.

5

Q. No, because we know that it has and does happen and has been useful.

A. Not here. You haven't drilled into a goaf.

10

Q. No sir, but I'm not talking about the goaf, I'm talking about the top of the B heading.

A. Okay, just again, it depends on exactly where you're targeting. If you come up into this area at all encroaching on the goaf you run that risk. It just depends how close you want to be. There will still be strains and this is the problem. The rock actually is under tension in that area so there are actually strains in the rock that will grab the drill as it's drilling into that area. So just have to be careful about where it's positioned at this point.

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Q. The back of the goaf has already collapsed?

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A. Yes.

Q. Had already collapsed?

A. Yes.

Q. As at 19 November is that right?

A. That's correct yes.

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Q. So if a video image was taken at the front of the goaf in the vicinity of the hydro-monitor there is the potential, with lighting which is being developed by Solid Energy and is being used currently to view at least the front end of the goaf which is where it's more likely than not that the collapse would be?

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A. Yes, provided you can get that hole in, yes.

Q. Because it just seems to the families, Mr Reece, that with the, no doubt, millions of dollars which are being spent on a huge investigation and this Commission and more work to come, that for the sake of drilling a

borehole which is less than 500,000 and we get given ballpark figures of two to 300,000 and can be done in a relatively short space of time that it seems very odd that when so much rests on your case 1 scenario and the evidence we've had over the last three days that that wouldn't be done. Can you see from the families' perspective the frustration that they would have at that being omitted?

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A. Yes I do, however again, the point I make is that I would expect that to have collapsed regardless.

Q. If the borehole though showed that there was no collapse at all, that would be the end of your theory wouldn't it?

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A. Yes. That would certainly push us to the third point yes.

Q. And that would clearly be beneficial to your investigation would it not?

A. Yes it would.

Q. And if there has been a collapse, well, we wouldn't know whether that was caused by the first, second, third or fourth explosion?

15

A. Well, potentially it's not caused by explosion anyway, it's a natural caving characteristic but yes.

Q. Can I suggest to you that you in good faith move forward from this point on that issue with the experts for the Commission and the Department of Labour and the families expert assisting us, Mr Harry Bell, to further discuss that issue?

20

A. I'm quite happy to, again, it's not in my mandate but it's really up to the Department of Labour and other interested bodies.

Q. You've just conceded that there's potential merit in it?

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A. Yes.

Q. So it would be something that you'd be happy to recommend to the Department of Labour to explore further because Mr Brett Murray deferred to you on that.

A. Yes.

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0925

Q. I just want to move now to the issue in relation to the explosive force and what could and couldn't be seen from the blast from the portal. You'd know Mr Trevor Watts, Mines Rescue Service?

A. I know of him. I've never met him. I've seen his name, certainly.

Q. Okay, he gave evidence on the 22nd of September last year, during the Phase Two hearings, and he discussed his observations of what he had seen of a little piece of rag which is hanging off the side of the tunnel at the portal?

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A. Yes.

Q. You're no doubt familiar with the same piece of rag?

A. Yes.

Q. Has any analysis been done in relation to what appeared to be the rag reversing or at least dropping in the two minutes prior to the explosion?

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A. Yes, we've watched that repeatedly, yes.

Q. Does it feature in the report? I may have missed it. If I have, I apologise.

A. No, it didn't, but –

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Q. Because Mr Watts at page 2547, Commissioners, of the transcript, refers to this and he talks about, "You can see the indicator rag or a bit of brattice or whatever it is on the side. It's in a different position to what it was in the minutes leading up to what we can see with, it looked like obviously the ventilation kept it at a steady state and my recollection at the time was that it was in a different position and it did seem to be fluctuating slightly." And then the clip was played, which I'm going to play in a moment, and he says again after that clip was played, "I can't speak for Mr Devlin, but for myself that was abnormal and it did appear to be pulsing at that point and that's why I made the comment that it really needed to be looked at quite hard to see what was going on or if it could be determined what was going on before the windblast came out." I suggest that was a signal from Mr Watts to people like yourself and Dr Cliff and others to examine that issue and see whether it was any significance?

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A. Yes.

Q. And you've said that you did give it some analysis?

A. Yes, we did.

Q. And what is the result of that analysis?

A. We actually found that it wasn't an uncommon situation so it actually occurred quite often in the video footage at other times so it was, initially it seems to give some reasonable indication that something's happening, except if you go back to other times at the portal it was
5 doing very similar things, so it was actually dropping away to nothing.

Q. What – does that indicate anything to you in relation to the adequacy or otherwise of the ventilation circuit?

A. No, it actually indicates that that's unreliable. It's right on the edge of the tunnel, which if you compare it to a stream, you get eddy currents and turbulence in those sorts of areas and we tried to connect it with
10 things like vehicles moving in the drift and other ventilation changes and it just appeared to be entirely arbitrary. Probably the only thing that I personally, and nobody else – well, there wasn't a lot of agreement here, the only thing that struck me that potentially there may have been
15 a slight suck back noticed in that, in what we call the tell-tale or an indicator, potentially due to some sort of goaf interruption in the ventilation, but even that was not conclusive, simply because it's right over the side of the tunnel and it seems to be doing quite arbitrary things without being able to tag it to any particular activities in the mine. That
20 was the frustration that we found, was trying to explain it or understand when and why.

Q. So the fact that it happened within two minutes of the explosion, you say, is entirely coincidental?

A. No, no, I'm not saying that. I'm saying that it would certainly seem to be
25 something, but the difficulty was it was also doing that at 15 minutes before, or thereabouts, and hours before as well.

Q. Okay. So Dr Cliff in particular doesn't attribute any weight to it of any significance?

A. Well nothing that we could pursue, I suppose, that's the problem. And
30 may I say there was many, many hours spent by a lot of people trying to – and that was a wide range people within the police, Dr Cliff, myself and quite a number of people, the Department of Labour, trying to attribute that to some other action, something that could explain it.

0930

Q. Is there such a phenomena as reverse suck or reverse ventilation before an expulsion of such a volume in an explosion?

A. Not that I'm aware of, but then...

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MR RAYMOND ADDRESSES THE COMMISSION

CROSS-EXAMINATION CONTINUES: MR RAYMOND

Q. Just moving on to another topic then thank you Mr Reece for that, is in-seam boreholes. If Ms Basher, you could put up DOL.3000.1500/25 and if we could go to the goaf area please Ms Basher.

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WITNESS REFERRED TO DOL.3000.1500/25

Q. You identified in your evidence that the in-seam drilling that we can see going through the top of the goaf, what I think was GBH13?

A. GBH11 I think, the one that's crossing over the top there.

15

Q. Okay. And just to introduce this topic, that intersection one cut going into the goaf creates further methane?

A. Yes.

Q. And you said in your evidence that that was not significant but for the fact of release of methane into the area. It was not significant that it's intersected?

20

A. I don't know that I said it's not significant but it was significant from the point of view that it was intersected by the goaf. It would have been opened up by the goaf area in the mining of that coal, so it becomes a methane feed into that goaf panel yes.

25

Q. I think the thrust of your evidence was as long as it's managed properly it's not in itself a problem and that lines are intersected in goafs and it's not necessarily a problem if there are measures in place to deal with it?

A. Well yes, that and the goaf is designed to fill up with methane anyway, yeah.

30

Q. So it's just adding to what is already there in terms of methane release from the seam?

A. That's correct.

Q. Is it preferable to avoid the intersection of in-seam boreholes or does it not matter?

5 A. Depends on the activity of the boreholes. If there's a lot of gas coming out of there then it's obviously not preferable, but ultimately in mining you will intersect them. It's a case of managing that intersection and getting them at the time that you can manage it. My understanding was that those holes had been drained. There was a decay indicated in the graphs of the emission of methane from those boreholes but nevertheless there is still going to be methane emitting from that borehole.

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Q. And if you do intersect as here, and obviously if this was the first goaf, what management of it other than general release into an already methane rich area should be instigated? You said it's okay to intersect as long as it's properly managed effectively?

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A. Yeah.

Q. What management are you referring to? What more can be done than just letting a release into the cavity?

20

A. Well if it's a high flow then it either needs to be sealed or plumbed up to something else, but in a goaf situation like that you're not going to be able to do it. So the management of it then becomes either the ventilation to manage the gas or, and predominantly it will be that ventilation of it, or tapping of the methane off into some other areas.

Q. So intersection of a borehole drainage line into a goaf?

A. Yep.

25

Q. Is not really able to be managed given that it's, you know, where it is high up in the goaf area and it's releasing already into a methane rich area, there's not much you can do about it?

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A. That's not what I'm saying. I'm saying you can't actually do anything with the hole but you can still manage the methane in the goaf and that's what I'm saying, you've got to manage that either by post-drainage processes or ventilation processes.

0935

Q. In the depiction that we have up at the moment, the intersection seems to be at the very top of the goaf area and in other schematics it seems to go through the middle of the goaf area and we can compare, for example, 3000.15009/1. If you can be clever, Ms Basher, and have them both on the screen at the same time that might be useful, but otherwise you will see, if we can zoom in on the goaf on that one please that the line intersects the goaf more through the middle of it than through the top. Is that just a drawing error or a change in the layout of the goaf or is it of any significance whatsoever?

10 **WITNESS REFERRED TO DIAGRAM DOL300015009/1**

A. I don't know. It was really a case of we were operating with the plans that were supplied to us and I don't know that it makes material difference. I would tend to suspect, and certainly the focus that I put on it, was the diagram or the plan on the right was certainly the one that I focused on but either way it's not going to be much difference.

Q. Just while we've got those up, we can leave them there, the goaf generally and the stability of the goaf once it was mined to an area wider than it was originally planned, it ended up being 30 x 40 metres, or 1200 cubic metres of open area upheld by remnant pillars which were already under stress, I think is how it's described in the report?

A. Yes.

Q. What management of the goaf stability would have you instigated at that point given that it had gone wider than intended?

A. There's a couple of things, and these have been touched on. It's a good question. The issue is you're trying to cave the goaf. In the instance of widening the goaf, and we touched on this yesterday afternoon, it's a case of getting as much understanding and prediction as you could from geotechnical engineers, bearing in mind all the information that they need, but then it becomes, it's not an absolute, it's not like a civil engineering design in the sense that you then need to observe what happens and be quite diligent in how you manage that cave and to be taking note of exactly what's happening. Some other things for me, as I've touched on with the ventilation, I would have expected to see a

greater robustness placed on the ventilation equipment in there, the ventilation devices, because you are intending this to cave. You're just not sure how much is going to cave and what it's going to be like so it's about then putting protection in place for people and the system.

5 Potentially some of the other things that could be done is to put early indication monitoring and measurement in the form of tell-tales particular in the area of people so that you have some indication or some early warning that the weight is increasing so that you can give people an indication that it's not being controlled, so what I'm talking about, and

10 this is something that can happen in this type of mining situation, is that, and this is predicated by having all the other work done, is that now that you've gone wider the aim is to collapse this area but in the process of collapsing we're generating an increase in the stress field due to mining there and that can overrun and cause this roadway to collapse. So

15 that's' what would concern me with people in that area. So, I would be expecting some, what we'd call temporary support, but it's an initial support that would go into that roadway to give some sort of warning and potentially also a tell-tale that's indicating that the roof is converging so that people could quickly get out.

20 0940

A. But what that's doing is protecting the people, which is obviously what you want, at the same time, trying to get an understanding of the behaviour of the goaf, particularly as you've just started to widen this out in that area. The concern I have, and it's perhaps shown a little bit

25 better in this installation, is what was happening is the hydro-monitor was in here and it was mining out this stump. And that's the intent, and you can see that this one that's left is just a small section that's been cut out in the same way with the monitor up in here and cutting that coal out there. As this is progressively being reduced, the issue is, or the

30 concern I've got is that now that you've widened this and you are steadily reducing this, it's in effect like a column on a building and you're slowly sculpting it away and at some point, you know, you get to the stage where if this, the strength and the confinement of that support is

overcome by the load in the roof, that that will fail and hence the goafing characteristic. But it's a case of getting an understanding of when and how that's going to happen and as this was in the early stages of excavation if you like, even though it has taken quite an amount, a long
5 time in, from my experience, to create a panel like this, it has taken an inordinate amount of time, you still want to be very diligent and just to be watching how that behaves and how it collapses. My understanding is that they certainly were expecting it to collapse, but it's a case of being aware of the mechanisms and just how that occurs.

10 Q. So you said that it would be, you sort of have some sort of telltale indicator, what would that be, some sort of fracture analysis, piece of equipment which sits on the face?

A. Yeah, it's a couple of things. It could simply be the first thing I would put in is a couple of timber props. Now that sounds very trite, but what
15 you're actually doing there is giving an early indication of convergence, so the roof coming down and simply at times you can hear it cracking. Now that's not to say that you always can, because I'm aware that mining process is very noisy, but you're not mining all the time and there are times where you do stop. You can actually see it. You can see the
20 timber starting to splinter and to load up, so that's one very simple one.

Q. And that's because of the weight of the roof is beginning to –

A. The convergence of the roof because you're actually starting – because
25 the opening, the removal of the coal, you're starting to cause the mining induced stress to be on the goaf itself and because there's nothing there anymore, it starts to actually throw the weight further back here, so because the load can't be carried by these and by the sides, it actually starts to throw it back, back this way.

Q. Well that seems quite a simple measure?

A. That's one, the other one I would suggest is what we typically call a tell-
30 tale, which is a couple of anchors that are drilled up into the roof of the roadway, at a couple of different horizons, typically two and four or six metres, and that's again a simple device but it gives you more accurate

indication of what we call de-lamination of the roof. The roof is actually starting to part, so it starts to give an indication of those sorts of things.

Q. Are both of those methodologies reasonably widely known in the industry?

5 A. Yes.

Q. And is it a geotechnical discipline –

A. Yes.

Q. Or is it the hydro-monitor operator issue?

A. No, it's a geotechnical issue.

10 Q. So it's not something you'd expect George Mason who was in-charge of the hydro-monitor to know about?

A. Oh, I don't know. I mean it's a mining principle, yeah.

Q. So the technical services department of Pike River management should've been alert to that issue?

15 A. I'd expect so.

Q. And the general manager?

A. Well, I'd expect so, yes.

Q. And in this instance had either one of those options or both been deployed and if there was a rockfall as you surmise or goaf fall just before the explosion on the 19th of November, would that have provided any early warning or benefit to those working in B heading?

20

0945

A. Yeah, and that's the point, it's the reason you want it there is for early warning indication to those men and it's primarily to protect the men because you want this to fall so it's going to fall, it's going to collapse. What you don't want is for it to override and to impact the work area itself.

25

Q. But it would nonetheless still have fallen?

A. Yes.

30 Q. And the plug of methane would have still gone down A Heading or B Heading to the cross-cuts which you've indicated?

A. That's correct.

Q. So in terms of actual protection of life, given the consequences of that plate of methane moving, it wouldn't have made any difference?

A. As far as the methane is concerned, no.

5 Q. And I anticipate that others might suggest that that protection of that area wasn't necessarily for men because the hydro-monitor is the only thing which is at the end of B heading firing into the goaf and men stand well back from it controlling it from down towards the guzzler?

A. Yeah, I don't necessarily hold to that view because it's still a mine in process and it's about maintaining the integrity of your mining operation
10 so you still want to be protecting it, you still want to be controlling that work environment.

Q. Ms Basher, if we could have up please DOL3000150012/1

WITNESS REFERRED TO DOL3000150012/1

Q. This was your gas flow path analysis?

15 A. Yes.

Q. I just want to ask you generally about the location of panel 1 firstly in relation to the pit bottom in coal area and the ventilation shaft area. There's evidence to come from Mr van Rooyen I think, and we have had evidence from other witnesses criticising or, depending on what side of
20 the fence you're sitting on, defending the location of panel 1 adjacent to the life of mine headings that we can see there in B and C. Do you have a view on the suitability or otherwise of the location of the panel 1 commissioning panel, bridging panel I think it was called?

A. Yeah, from a pure mining perspective it's not out of the ordinary, so we
25 would have long wall panels which are quite substantially larger than this within that sort of region. The thing to consider is just how far through this panel comes. It's not unusual for us to have long wall panels in a similar sort of geometry but they wouldn't come any further down in that actual cut-through.

30 Q. You're indicating for the transcript the first cross-cut?

A. First cross-cut is typically where you would stop. So we would have long wall panels quite substantially larger than this that would come as far as that one cross-cut, and what you're looking at protecting really is

you don't want that mining induced stress that I've indicated to come further through an impact on those main headings. So whilst I appreciate what people are saying that it is close to these mains, it's not untoward as far as our operation with much larger panels.

5 Q. And if, as I understood was indicated in earlier hearings, the mining of the panel would go closer than the cross-cut, you wouldn't be recommending that?

A. That's where it gets into a geotechnical, a fairly cautious geotechnical analysis because you cannot risk that roadway.

10 Q. And what sort of distance would there be in metres from the entrance to the C heading return and the first cross-cut where you'd prefer it to stop?

A. That's why I say it's a geotechnical answer. I would –

Q. By reference to that are you able to say?

15 A. But what I would go so far as to say that I haven't seen anything approach an area like this within any less than probably 80 metres, okay? But again, don't take that number out of context. That needs to be determined by a whole range of considerations.

0950

20 Q. And one of the issues is the distance between that panel and the fault.

A. That's certainly been indicated by Dr Lawrence and the impact and the direction that that's working in, that's certainly one of the strong considerations that would come into it, yes.

Q. And was his conclusion that it was within a safe distance from the fault?

25 A. I don't know that he's actually covered that.

Q. And the other issue then related to that is if it is okay to have the panel in, at least in your view, that close to a life of mine roadway, the adequacy of any seal which is to be built to keep that methane at bay for what could be many years?

30 A. Yes.

Q. What's your comment on that?

A. Well, it needs to be substantial, again we're into rated seals of engineering design installation and maintenance as well as monitoring of the area.

5 Q. And have you reviewed or seen anything from the Pike River documentation showing how that seal was to be built?

A. No we haven't but we haven't looked either. That wasn't a focus.

10 Q. If the hydro-trial panel had been as earlier planned, further to the west, towards the escarpment, and had there been an unplanned goaf collapse, would there have been greater potential for dilution of the methane released into the return or is that an analysis you can't do without actually having the reality of a panel there?

15 A. It's a little bit hard to do but if we were to take the panel to the conclusion, and that's probably a reasonable thing to do, it actually depends on when it occurs, but at some point it's still going to approach, the panel is still going to approach this sort of a distance. And again, to put it in perspective, for me some of these things are going to happen and you're actually designing it to happen. It's about having your other controls in place to manage those events. So, potentially a similar type of thing will occur. A goaf will occur, potentially a gas push. You're looking at the robustness of the ventilation. The early indicators and warnings and controls that you can put in place to control power should that occur.

20 Q. So let's assume, as was intended at least early on, the commissioning panel was further to the west?

25 A. Yes.

Q. It would still need, obviously, ventilation in a cross-cut at some point and if it was a similar piece of equipment to AF5, which was in cross-cut three one west main?

A. Yes.

30 Q. You would have the same problem?

A. Absolutely.

Q. If there was not correction of the electrical installation issue?

A. Yes.

Q. So it doesn't matter how far in the AF5 might've been it still had the potential to arc?

A. Yes, that's correct. So if all those things stacked up again you'd be looking at a similar situation.

5 Q. Just moving on again then to the next topic, the ignition location. Ms Basher if we could have up 3000150020/1?

WITNESS REFERRED TO DOCUMENT DOL3000150020/1

Q. Wrong document, that's not what I was looking for Ms Basher. Try DOL3000130007/86?

10 **WITNESS REFERRED TO DOCUMENT DOL3000130007/86**

Q. That will do for now. The point I wish to cover with you hear Mr Reece is the location of AU5, which was very briefly the auxiliary fan we just saw on the previous slide?

A. Yes.

15 Q. And if you can just indicate again, for the purposes of orientation, where that was perhaps on the top diagram. Can you indicate cross-cut three?

A. It was located in there, cross-cut three.

Q. One west main?

A. Yes.

20 0955

Q. So if there was a blast or an explosion at that point, that would have significant potential damage effects in A and B heading going up towards the goaf?

A. Yeah, it depends on the gas and this where it's hard to be definitive.

25 What this is showing is you've got fairly high percentages of methane in there. There's also, it's also a dead-end for, to some extent. One of the perplexing issues for us is that just because there's a lot of methane in that goaf, doesn't necessarily make an explosive mix, so the difficulty is with yes there's a source of methane, but the methane has to be at a
30 percentage where it's between five and 15. That may not necessarily be the case in here because of that event, so what we're looking at is the potential mix of methane through the workings to get to that explosive mix, so potentially that explosive mix is in here rather than in

this area. Now that's not to say that there wouldn't be some effect or ignition, but that's certainly something that we've had to struggle to understand.

5 Q. So the full force of the explosion might not necessarily be in three cross-cut, is that what you're saying?

A. That's correct, that's correct.

Q. It's where it ignites the methane –

A. Yeah.

Q. – but the full force of the explosion could be further outbye?

10 A. Yes, yeah.

Q. Because there is evidence, isn't there, as a consequence of PRDH47 in B heading, panel 1, which indicates not that much damage given that there might've been an explosion at the end of the A heading?

A. Yes, yeah, that's correct.

15 Q. Is that one of the reasons why you think that the force of the explosion might've been further outbye of that?

A. Yes. Well, further inbye actually. We're not absolutely convinced that it's that fan or that electrical enclosure. It's potentially other things that are further inbye.

20 Q. Have you considered, you said before, you have considered the CALS scan images taken down borehole 47?

A. Yes.

Q. And you would've seen the body which is lying at that cross-cut?

A. Yes.

25 Q. And with its head of the body facing towards the cross-cut?

A. Yes.

Q. Towards where the brattice stopping would've been?

A. Yes.

30 Q. Have you analysed at all the implications of the way that body has fallen?

A. Yes. It's, and again not from any great expertise other than to say that one would presume from that orientation that it's not been any degree of

great violence in there. It just simply appears to be relaxation of the body rather than anything else.

Q. So the force of the blast would've gone down A heading and across the first cross-cut, which is effectively where the man lies, so if it had been a significant force, you would expect the body to have been flung back across B heading to where the conveyor belt or the other equipment was along that wall?

A. I think we're talking about two different things. What we're saying is we're not saying the blast was in here.

10 Q. No.

A. Okay? So goaf fall yes, but it's magnitude of goaf fall ejecting gas out of there and what I'm saying with the body, that stopping in one cross-cut of panel 1 had been somewhat reinforced and that would tend to assist in directing that goaf wave, or the wave, the shockwave from the actual goaf fall and we don't suggest that it was a large shockwave, would be down either one or both of these roadways.

15

Q. Just pause there. The force of that shockwave from the collapsing goaf, would that have been sufficient in of itself to damage or destroy as it was the brattice in cross-cut one, the stopping?

20

A. Well, it had done so before but as I say it's been reinforced so potentially not, given that there's an opening here and a much weaker stopping down in three cross-cut.

Q. So we know that the stopping in cross-cut one in the panel was destroyed?

25

A. Yeah. It appears to have been knocked over, yes.

Q. So that would be as a consequence of the explosion, not the expulsion of the methane?

A. Don't know, don't know.

1000

30

Q. Well Mr Matt Coll has filed evidence. Have you read his evidence?

A. No.

Q. He was a contractor with Pike River who had worked at Spring Creek and was assisting with the commissioning of the hydro-panel and he

worked in that area building the flue and assisted with the setting up of the hydro-monitor and the guzzler in that configuration. So he's very familiar, probably more than many, with that particular intersection and in his evidence he discussed the fall of the body, acknowledging he has
5 no expertise in that area. But he also discusses the way the stopping has been blown apart from his observation from Mr Moncrieff's evidence and the CALS scan images and in particular refers to a piece of 4 x 4 timber which he's very familiar with, all timber used in that area that was in that stopping which has been broken and blasted from the cross-cut
10 right across B heading and lay across the flue, and surmises, again without the requisite expertise, that there must have been a significant blast in order to shift a piece of 4 x 4 and break it and leave it landing on the flue on the other side of the header?

A. Mmm.

15 Q. Would you agree with that?

A. It would appear so, but yeah.

Q. Does that add any colour or –

A. Actually, it makes it harder to explain because you've got, in effect we've got the body going one way and the blast coming the other way. So it
20 still makes it perplexing as to how much and what order of events. It potentially actually to me, and this is off the top of my head, and just thinking of the sequence of events it actually doesn't necessarily conflict with what we're saying as far as a blast other than this had some effect coming up into A heading of panel 1, but it's hard to then combine that
25 with the position of the body.

Q. Given that there would have been blast effects also going up B heading as well as A heading and through the cross-cut, are you really able to make any definitive conclusions about the way the body's fallen given that there's percussion force coming from both directions?

30 A. Not really, other than, as I say, we're of the view in that it seemed to be a relaxation or a collapsing of the body rather than any violent movement of...

- Q. The location of the body at that point, the cross-cut, appears on one analysis to be consistent with there being a goaf fall?
- A. Mmm.
- 5 Q. Because he was a hydro-monitor operator. He would have left the hydro-monitor operation area following a goaf fall knowing that the methane plug blast may have damaged that stopping and therefore walked from where he went in to the first cross-cut to see what damage had been done by that rock fall?
- A. Yes. That's consistent with our thinking, yes.
- 10 Q. And then how much longer after the collapse of the goaf was there before the first explosion?
- A. But we've got, we have no way of knowing.
- Q. Well, are we talking seconds or minutes?
- A. Well, we simply have no way of knowing. Yeah that's, I can't say anything, I don't know.
- 15 Q. Because you talked in your evidence about the coincidence of turning on the power?
- A. Yeah.
- Q. Mr Duggan in the control room?
- 20 A. Yeah.
- Q. Being too much of a coincidence to sort of rule out that that wasn't a potential starting point as an ignition source?
- A. Yes.
- Q. Is it not also equally a significant coincidence that at or about the time that's turned on there's a goaf fall?
- 25 A. Yes.
- Q. So you rule out other options as a consequence of it being too coincidental for the power to turn on?
- A. Yep.
- 30 Q. But then rule it in again as not being so much of a coincidence for it to be turned on the minute there's a goaf fall?
- A. I guess the point for us is how many coincidences do you want to line up. So it's from my point of view or from the experts' point of view it's a

case of getting the methane from somewhere, and really we've looked and said that there's two areas that are most likely to provide that. Now we're not saying that it's instantaneous and the sad thing is we don't know how long that has been that that's occurred.

5 1005

A. So we're actually not putting the two exactly together. We're tied a little bit with the measurement of gas around the mine and what the monitoring is saying as far as the timeliness of that, so we're saying that the timing needs to be fairly close.

10 Q. Can we just pause there and think about that?

A. Yes.

Q. Because if it wasn't close isn't it likely that those working underground, if there had been a rock fall, would have indicated such to surface control prior to the explosion?

15 A. Not necessarily but it depends on the requirements of people at the mine. As I say, a goaf fall's not unexpected. It depends if they had indeed communicated that or if they were in the process of looking, so again it depends on the timing and their intent.

Q. There's evidence of a phone call from Malcolm Campbell to
20 Daniel Duggan?

A. Yes.

Q. And some suggestion that the noise that was heard was the explosion?

A. Yes.

Q. Malcolm Campbell was not, as I recall, working in that area, in
25 B heading. Is the noise of a goaf fall such that others working in the mine would have been alert to it no matter where they were working or?

A. It depends on the nature of it, but potentially if they're relatively close they can do. But it would typically be in fairly close proximity, and again, depending on the size of it, so they're not violent events, they tend to be
30 somewhat of a sound wave but more of an air push and particularly if its, as I say, if it's released out through this cross-cut then there would've been noticeable disruption there and eventually, and in a short time further into the mine. If that wasn't disrupted then potentially not

that most of that force or the push would go down the return. So our expectation is that it would've come out of three cross-cut and be noticeable elsewhere.

5 Q. Just a couple of final points, Mr Reece. The ignitions source, obviously we're going to hear from Mr Reczek next week and you've touched on it but also raised in your report and by other counsel was this contraband issue?

A. Yes.

10 Q. And the media have seized on that to some extent because it is a matter, no doubt, of some interest but it also raises questions about how some items of so-called contraband can actually cause an explosion and one of those is a can of Coke, which keeps on getting mentioned?

A. Yes.

Q. How can a can of Coke cause an explosion?

15 A. I'm pleased that you asked the question. Many years ago there have been instances where rusty steel has struck aluminium but it tends to be larger masses of aluminium with some force and the spark that you'll get off that aluminium is quite hot. There has been testing that's been done that suggests that there needs to be a fairly significant degree of pressure applied. It's not a case of just having an aluminium can underground. There is a series of events that need to occur.

20

Q. It's nothing to do with opening an aluminium can?

25 A. It's not opening a can, it's not having it in contact with coal. You actually have to have a fair degree of force and we can potentially dig up information on this and provide it to try and put the Coke can to bed to some extent.

Q. It sounds like the coincidental combination of factors which would have to come together for that to be an ignition source in these circumstances would be remote?

30 A. I wouldn't be worried about a Coke can but, yes.

Q. And a camera, and/or a camera battery. What is the issue there?

A. Now we're getting into different territory. Now we're starting to get into real potential ignition sources. So it's about the capability or the

potential for arcing or small sparks to occur. Now those are real and I wouldn't discount those at all.

1010

5 Q. Again though, in terms of the coincidence factor, it would require someone to be taking a photo at or about the time the goaf collapsed?

10 A. There would be some sort of, and I don't know the mechanism, but there'd need to be some sort of electrical activity that's occurring. It may even be a dislodging. There are people that are far more capable than I within SIMTARS that'd provide that information. The point needs to be made though, that regardless of which coincidences we want to discount, the sad fact of tragedy such as this, a disaster such as this, is there are coincidences that have lined up, so it's a case of finding out which are the most probable ones and that's what we've attempted to do, so we're not discounting contraband at all. And sadly, there was too much evidence of contraband in previous times in this mine.

15 Q. Well, that was my next question. The reports that my learned friend Ms Shortall referred Mr Murray to a couple of days ago, were from memory 2009 reports which tend to suggest, if I could put it colloquially, that they had tidied their act up in terms of contraband issues in 2010 when they'd moved from being in stone into coal?

20 A. Yeah, I would hope so.

Q. Well, that would seem a reasonable inference no doubt from the lack of reports after end of 2009?

25 A. I would hope so, but again, having been around miners for a long time, not always.

Q. Okay. If there was contraband in 2010 and as late as November 2010, and if it was contraband of a sort which unlike a Coke can is more dangerous than others, for example a cigarette lighter –

A. Yeah.

30 Q. – what does that tell you about Pike River's safety culture in mine management systems imposed from the top on the working force?

A. The challenge becomes, just because you've done it once, doesn't mean that it carries over and you have, you do have turnover of people,

so it's got to be constantly reinforced because one-off just is not sufficient, so you need to keep reiterating.

Q. So it would potentially be an ongoing mine management system fault, if there's contraband continuing to be used in 2010?

5 A. Well, there's a combination and again, it comes back to the nature of events. There's generally combinations of personal issues, workplace issues, management issues, so everybody has a part to play in it.

Q. A slightly different topic, but still under ignition source, if there was arcing at the underground motor for the fan which was –

10 A. Auxiliary fan 5?

Q. No, the main underground fan.

A. Oh, okay, yeah.

Q. If there's arcing in that vicinity from electrical installations and the fan always remains on, so it wasn't a question of Mr Duggan starting it up and the pumps at pit bottom in stone having anything to do with it –

15 A. Yes.

Q. It's a fan which has the, it's an installation near the underground motor –

A. Yes.

Q. – which is on and therefore eliminates the coincidence factor we've talked about?

20 A. Yes.

Q. If there's arcing between that installation and the underground fan, is there sufficient methane, is there a sufficient potential methane source in that area to create a problem?

25 A. There certainly could be, yeah.

Q. So is that something where Mr Reczek is more appropriate to discuss with that?

A. Probably not the methane, but certainly the arcing, but again, I don't know that he's put his mind to that. That's certainly something that's come from one of the other electrical experts as far as that particular phenomenon, but it's still, as far as I'm aware it's still tied with the VSD issue.

30 Q. But what it eliminates is the coincidence of the power being turned on –

A. Yeah, potentially, yes.

Q. – and then livening the system from pit bottom in stone, because there's already electricity running for the fan?

A. Yeah, yeah.

5 Q. So you're exploring that further with the Commission's experts, are you?

A. Well, they've looked at that. It's, and my understanding is that that'll be part of the discussion next week.

10 Q. And that methane would have been sourced clearly from the same area on your summary from the goaf, but travelled far enough down C heading and through that last stopping near where the C heading does a circle around the fan?

A. Yes, that's correct. The difficulty we've got with that one is it starts to then complicate the nature of the explosion by the direction of the shockwave and also the heat that's been experienced by the survivors.
15 That's the concern that we have with that one.

1015

20 Q. So just finally, Mr Reece, the significant deficiencies which you've highlighted in your evidence at paragraph 122, page 28 are all significant mine management systems. I just want to touch on those where you have criticised and said there's been significant deficiencies with the management of gas in the seam and the gas drainage system, the gas monitoring system, the ventilation control devices and the main underground fan?

A. Yes.

25 Q. You know, if you were going to rate out of 10 the top mine management systems which need to be run 100% correct, they would feature pretty near the top wouldn't they?

A. Definitely yes.

30 Q. And you'd add to that the electrical apparatus installations, I think that was actually part of the five?

A. Yes, it is, it's certainly control and management of electrical installations. I suppose the thing that's relatively recent is the VSD issue and just

getting in a good understanding of that so that to some extent is a little bit unfair because the whole industry is coming up on that one.

Q. And you could add to those list of four or five, as another significant mine system, strata control?

5 A. Yes.

Q. And from the perspective of the families, safe evacuation of men in an emergency as a mines system?

A. Certainly from an Australian underground coalmining perspective, it's one of the critical items.

10 Q. So within those seven top mine systems, we've struggled to find anything in the report which is positive about them?

A. Our brief again was to look at failures so we weren't doing a full treatment of it but yes.

15 Q. Well, in highlighting the deficiencies and identifying them, is there anything within those mine management systems which is in a general sense positive?

A. Sorry?

20 Q. Is in a general sense positive. Have you found anything within those analysis of those systems which you can say, "Well, yes, this has been well done, that's best practice which can be used and is consistent with Australian practice"?

25 A. Gee that's a very broad question. They had semblances of the system. They had items in place. There was consideration of the items. I suppose the comment goes to the deficiencies in them. Just because you've got the system and it hasn't been finished off doesn't necessarily make it a good system. That's the point. So it's a case of finishing it off and living through it and implementing it.

Q. Thank you Mr Reece for your answers.

CROSS-EXAMINATION: MR HAMPTON

30 Q. I'm glad Mr Raymond summarised the headings of those deficiencies with you because that's really what I was going to do for a start

Mr Reece. And to lead on to this that you've been a mine manager for something like eight years I think or perhaps longer?

A. Yes, thereabouts.

5 Q. Thereabouts and a senior mines inspector in Queensland including acting chief inspector?

A. Yes.

Q. Covering about two and a half, three years?

A. Yes.

10 Q. Can you contemplate a mine in the state that Pike was, the deficiencies you've mentioned, can you contemplate a mine like that in Queensland being developed in that way let alone being put into production?

A. I've pretty much said at the outset that a mine like that wouldn't have existed.

Q. No. Regulators in Queensland wouldn't have allowed it to exist?

15 A. They wouldn't have allowed it from the point of view that the egress potential, primarily, and some of the other installations but predominantly the ventilation installations.

1020

20 Q. I know it's hypothetical but if you'd come into a mine in the state that Pike was with your experience say wearing the hat of a regulator, an inspector?

A. Yeah.

Q. You'd have said, "Shut it down. You've got to sort all of these deficiencies out before you can even think of going into production?"

25 A. If I'd walked in in the condition that it was, I would hope that I would. It's all hindsight so to some extent that's a bit tough, but really my primary concern and the reason I'd say it would be around the ventilation and the ability to escape.

30 Q. And if you came into this mine with your mines' managing experience and taken the role of mines manager, as a prudent manager you'd be saying, "Let's stop production. Let's sort out these matters of egress and of ventilation and of gas monitoring and of gas drainage before we go into production?"

A. I would expect that I would, yes.

Q. Many of the deficiencies that you've described in your report and the headings you touched on with Mr Raymond would be prescribed, prohibited by regulation in Queensland wouldn't they?

5 A. Not specifically and this is a little bit of a curiosity we found and it's prohibited now but it had been. So it was almost a case of there would be little concept of it, so to a large extent we've moved on from it. But by the same token, the regulation now in Queensland would allow you to approach some of these things from a risk-based perspective but it would be with a significant degree of diligence and to some extent proof or substantiation of strong ability to manage such things.

10 Q. But with that knowledge of the prescriptive regulations –

A. Yeah.

Q. - in the background?

15 A. Well it's not, it's prescription but also poor experience or experience of events.

Q. Just listening to you and thinking about the points you have made about topography and so on and the geology of this mine and the difficulties, standing back and I was, a degree of hindsight here but do you think it was ever a viable mine to open in the way it was being developed?

20

A. Well I can't comment on that without seeing a lot of documentation but it's certainly a tough mine from a geological/geotechnical perspective.

Q. So a tough mine requires even more stringent safety requirements doesn't it?

25 A. That's my experience yes.

Q. With great preparation in relation to say strata control, understanding the underlying geology, understanding the methane content, the methane make, putting in place stringent requirements to deal with the methane and dealing adequately with egress issues?

30 A. Yep.

Q. To some extent I'm not going to go then into some of the detail but I was contemplating, but just one issue or one or two discrete issues. You said yesterday in your evidence was it unusual to have the main fan

being unreliable and yet the mine being in production. I think I may be paraphrasing it a bit but it was something to that effect wasn't it?

A. Yep.

5 Q. Can I suggest that it would be even more unusual to go into production especially in hydromining with the ability for that to produce potential to produce large releases of methane, to go into that production before you have your main ventilation system operative?

1025

10 A. Yes, and I suppose that's a fair point, given that the ventilation up until that point had been a much smaller surface fans, so something that I would see is a little bit more appealing. The surface fan installation that couldn't cope with the, was having difficulty coping with the amount of gas in the mine, or the methane in the mine to that point, so it would be about commissioning, and often times you'll find that a mine will ensure
15 that ventilation systems are set up well prior to the bulk of the main production occurring.

Q. Just on the main fan, the stopping between the fan itself and the motor, what was the rating of that stopping?

20 A. Yeah, I don't know we could determine a rating of it and I don't know that that was something we could discover.

Q. That could be a fairly crucial stopping, couldn't it?

A. That's correct, that's correct.

Q. And it's got a hole through it with the driveshaft from the motor to the fan, hasn't it?

25 A. That's correct.

Q. Do you know how that was sealed?

A. Yeah, I believe that at one stage there was a gland arrangement, but that was removed, because of some friction, so I believe that there was a gap there, so there'd be some air passing through, through that.

30 Q. From the – so return air –

A. Intake into return.

Q. Into, yeah –

A. Yeah. And to some extent you actually need it. You actually need some ventilation into that roadway because it's, you've actually got a motor and a dead-end so you need some ventilation to be passing over that motor for cooling and so on.

5 Q. Which raises the issue that you raised yesterday about a non-flameproof, non-intrinsically safe motor being in that position?

A. Well, yeah, it's novel.

Q. Right. Can I just on gas drainage issues, Ms Basher can I have up please DAO.025.32975 please?

10 **WITNESS REFERRED TO DOCUMENT DAO.025.32975**

Q. Can you blow up the body of the document itself as much as we can? It's an email from a Mr Wishart to Mr Corrie. Have you seen this email before, Mr Reece?

A. I think so. I think so.

15 Q. Written in April 2010 and highlighting some of the inadequacies that that man saw with the methane drainage system?

A. Yes.

Q. His point number 1, "The running of the gas drainage system and intake airways is of concern, as any trouble with we have with water traps, which is very regularly, causes methane to vent into our intake roadways. This scenario would not happen in New South Wales or Queensland." First, the running of the gas drainage system and intake airway sort of concern to you?

20

A. Yes, it is and I've expressed that yesterday, yes.

25 Q. And it wouldn't happen in New South Wales or Queensland?

A. As far as possible it would be avoided, yes, yeah.

Q. And he talks in 2 about the positioning of the system in three cross-cut, leaves it to vulnerable damage from juggernauts and so on?

A. Yes, I've actually quoted that.

30 Q. Three, fresh air base with a methane riser in the middle of it?

A. Yes.

Q. Not appropriate?

A. Not at all.

Q. The fresh air base that was spoken of, has a roll down brattice door?

A. Yes.

Q. Your view about that?

A. It's highly inappropriate really, it's...

5 Q. Why?

A. Well, it's not actually doing anything. A brattice, a fresh air base is a, again as I said, it's an unusual term. Fresh air base is actually something that's applied to Mines Rescue in generally. Mines Rescue when they're going into an area and enacting a rescue situation, fresh
10 air base in this instance, I'm presuming they were talking about for people escaping, and it's about degree of confidence that it will remain a refuge if you like in a fresh air area, or an area of safety. So something like a brattice stopping is fairly inconsequential.

1030

15 Q. You're not going to get the air lock you need?

A. No. Now, that's not to say that that hasn't been done or used in escape scenarios in recent times, but the problem is the degree of confidence in that surviving in the first place is concerning.

Q. Just going on down these row of numbers, go down to 5, "On numerous
20 occasions I found methane free venting in the old drill stub while we were drilling there. There's so much pressure in the line that this stub doesn't actually discharge any methane into the system." Highlight the inadequacy of the drainage system generally?

A. Yes.

25 Q. Six, "Water traps are continuously filling with water at a rate faster than they can be drained."

A. Yes.

Q. That means the methane can't flow through?

A. That's right. It's being blocked, hence Mr Brown's comment as far as
30 having automatic water traps.

Q. Seven, "The first trap in the line is that inundated with water while drilling that the trap tube is by boreholes draining straight into the flumes which also surges gas into the return."

A. Yes.

Q. Not desirable?

A. No and the point is there's installations that are designed to separate that water from the water in the gas to be able to get it into the pipelines.

5 Q. And perhaps, just jumping to 9, "This is all due to the line being too small," that's the point you made again yesterday?

A. Yes.

Q. And commented on by Mr Brown in his reports?

A. Yes.

10 Q. Just one short other point before I come to the last topic. In your evidence yesterday you made a comment that you had some concern about lead indicators. Sometimes they measure the wrong things, or people measure them.

A. Yes.

15 Q. What did you mean by that please?

A. I suppose this is potentially tangential but a lead indicator needs to be linked to the lag indicator. You need to be able to have some impact on what you are looking at in the positive instance to have some sort of value in the lag instance. So what I'm saying we're attempting to get away from just focusing on lag indicators such as nebulous things like lost time injury frequency rate and connected to a useful lead indicator. What I'm saying is the lead indicator needs to be, "What's your problem? What is the thing that you're trying to impact here? What are you trying to improve that's going to give real value after the fact?" So
20
25 it's not just about identifying hazards to fix your injury rate. It's identifying what's the actual issue that you need to fix and seeing that flow on to real change. That's the point. It's about being specific.

Q. I want to ask you a couple of specific things about some evidence that Mr Doug White is going to give later in this phase of the hearing.
30 Ms Basher, could I have up please WHI002/9 please?

WITNESS REFERRED TO DOCUMENT WHI002/9 – PARAGRAPH 3.1.24

A. In paragraph 3.1.24 please. Can you highlight that? Drill holes extent, you read it. I'm interested in particular in the last sentence, "The drill

stub was kept free from the build-up of flammable gas by a compressed air driven forcing auxiliary fan delivering approximately six metres cubed per second to the stub.” Have I got it right that in Queensland air-driven fans are now prohibited underground?

5 1035

A. I believe that's the case yes.

Q. Because if the main ventilation system fails and they keep on driving the air-driven fans, they can cause some recirculation?

10 A. Well, potentially the issue you can't stop it. It continues to operate. You don't know what the situation is. You've got bearings, you've got fan blades that are rotating. You've got potential for heat friction as well as the recirculation factor. If the rest of the ventilation's gone off it's just drawing air to it of unknown quality.

Q. How long have they been banned for in Queensland?

15 A. I'd expect it's a number of years.

Q. Ms Basher, please the same document but /18 paragraph 3.1.58. If you could highlight that please. And here Mr White is commenting on new boreholes being coupled to the drainage system. I'll just give you a chance to read it.

20 A. Yep.

Q. Again, taking you to the end of that paragraph. “At this stage the holes were uncoupled from the gas range and allowed to be vented slowly into the mine atmosphere.” That's free venting isn't it?

A. Yes.

25 Q. Continues on. “This is a practice adopted by a number of mines in Australia that practise methane drainage.” Can I suggest, does that in fact happen in Australia?

30 A. It does but you're talking about once you're getting very little gas from it, but the other thing that will typically happen is that you're actually connected up to water. So it will actually re-inject water into it mainly to try and keep the dust under control because what happens with drainage the water will come out of the seam first then gas, makes it very dry dusty coal and that's an issue in itself. So we'll typically once

they're no longer in use, no longer producing gas, then we'll couple them up to water and pump water in there.

5 Q. Given your state of knowledge of the vent holes on the boreholes here in Pike, do you think that they were in such a state that they could be allowed to free vent in the way that you're saying might happen in Australia?

A. It depends where they are. Some of the ones right at pit bottom and it's about really having a strong degree of confidence that they weren't producing a lot of gas, and into the return not intakes.

10 Q. And we don't know from Mr White's brief here as to whether he's talking into intakes or returns, all right. Just then the last topic, I'm trying to keep within my time. Triangular model for mine safety you'd be familiar with the mines management on one leg that the Government inspectorate on the other and workers' representatives on the third?

15 A. Yep.

Q. You in favour of that model?

A. I think that internationally that's becoming a recognised appropriate practice.

20 Q. Having worked in Queensland in various capacities and had experience of, your view about chief inspectors?

1040

A. Yes.

Q. The necessity or otherwise for check inspectors?

25 A. Yes. A couple of comments. Two levels of check inspectors can be local check inspector at a mine or a broader check inspector for the industry.

Q. The local check inspector is someone elected by the workers in the mine themselves?

A. Yes.

30 Q. And the district one is appointed by the union?

A. That's correct.

Q. At a different level of training and expertise I expect?

A. Yes. And that to some extent predicates my answer. To some extent it actually depends on the level of training and competence. There needs to be a reasonable level of competence and also maturity on behalf of the person elected and that's part of the requirements. Given that level of maturity and competence they can be an asset. If it's not there they can be an impediment. There's also the issue of maturity and it's the same with anybody but I've worked in situations where they have been an asset because of the maturity and the competence. I have also worked in mines where they have been an impediment because of the level of maturity and competence. I think sadly it then reflects on maturity that of the overall organisation, if you like, if we're talking at a local sense, but if things are transparent, cooperative and indeed set up the way they should be from mature processes all around then it's almost inconsequential and becomes a consultative role even to the point of assisting in driving good practice. If there are deficiencies on either side, either management or the workers representative, then it can start to be detrimental. So from my perspective, if there's good management practices, good management processes, then there's actually not a lot to be gained and I suppose that this is my comment that my focus has been on good management, sound principles, transparency in involving people. They almost become unnecessary because the relationship can be quite close.

Q. You're saying if the mine is running well?

A. Not only the mine is running well, but if people are fulfilling their obligations and managing as it should be, then it's almost inconsequential, but sadly sometimes that does not happen, and in which case I actually do support it because there needs to be checks and balances. So for me it's not a problem with checks and balances, if things are as they should be and being managed appropriately.

30 1043

Q. And if the mine is not being managed and run well, then a properly trained mature check inspector has a positive and necessary role to play?

- A. Yeah, albeit that it's a tough call because it becomes a conflict situation, but it may well be needed, yes.

**THE COMMISSION ADDRESSES MR HAIGH AND MR MABEY – DISCUSS
5 TIMING**

COMMISSION ADJOURNS: 10.45 AM

COMMISSION RESUMES: 11.05 AM**CROSS-EXAMINATION: MS SHORTALL**

- 5 Q. Mr Reece, the expert panel accepts, doesn't it, that there's very little in the way of absolutes in determining what caused the explosion at Pike River?
- A. Yes, it's – that's true.
- Q. And so the panel has needed to identify possibilities and come up with scenarios, hasn't it?
- A. Yes, that's correct.
- 10 Q. And I'm just going to touch briefly on some of those scenarios because you've answered a lot of questions about them over the last several days, but in your first scenario the panel considers that the fuel source may have been caused by a goaf fall at the extraction panel, right?
- A. Yes.
- 15 Q. And the panel accepts, doesn't it, that the goaf at Pike was intentionally kept full of methane –
- A. Yes.
- Q. – to promote self inertisation, right?
- A. Yes. Fuel rich inertisation, but yes.
- 20 Q. Thank you, and also to prevent spontaneous combustion by reducing the oxygen levels, right?
- A. Yes.
- Q. And the panel accepts, does it, that this is understandable and standard practise in many Australia extraction panel goafs?
- 25 A. Yes, that's correct.
- Q. Now, while Pike River – the panel found, didn't it, that while Pike River Coal is not considered to have a high propensity to spontaneous combustion given the thickness of the seam –
- A. Yes.
- 30 Q. – and the amount of coal left in the goaf, inertisation with methane was a reasonable thing to do?
- A. Yes.

Q. And I think as you've spoken to Mr Raymond about this morning, the panel also accepts, doesn't it, that progressive collapse of the goaf was expected at Pike, wasn't it?

A. That's correct.

5 Q. Now, if I just come back then to this first scenario, we have the possibility of a goaf fall or a series of falls even pushing methane into the return, right?

A. Yes, yes.

10 Q. And just so I'm clear and I think this has been made clear, there's no video graphic, CAL scan, photographic imagery that can confirm that at this point, is there?

A. No, that's correct.

Q. And the nearest location at which there's been a borehole drilled from which some imagery has been able to be gleaned, is at PRDH47, right?

15 A. That's correct, it won't cross-cut.

Q. And as I recall, you said in response to some questions from Mr Mander yesterday, that the visual from that particular borehole doesn't indicate much damage, does it?

A. No, and it's hard to be conclusive there.

20 Q. So while it's possible that there's a goaf fall at the extraction panel, it's equally possible that there isn't, right?

A. Yes, that's true.

25 Q. Now the experts' panel's theory, and its first theory is that the rush of methane whether from one fall or a series of falls knocks over the stopping at three cross-cut one west, right?

A. Yes.

1108

30 Q. And in the interest of time I'm not going to put that back up but I just wanted to confirm that there's no photographic, video graphic, CALS scan imagery from that location either is there that can confirm one way or another whether the stopping has been knocked over?

A. No, that is true.

Q. So the expert panel just doesn't know for sure whether the stopping has been knocked over does it?

A. That's correct.

5 Q. So, while it's possible that the stopping was knocked over its also possible that the stopping remained in tact even if there was a goaf fall, is that right?

A. Yes, we can't say one way or another.

Q. And if the stopping had remained intact, it could've prevented methane from mixing with main intake and return air couldn't it?

10 A. That's correct.

Q. And that would rule out the first scenario that the expert panel has put?

A. Well, it would transfer it potentially to the main fan as an ignition source rather than anything else.

15 Q. Would you accept, Mr Reece, that if the stopping had remained intact, and we just don't know given the evidence and in fairness to you, just don't have the evidence to make that determination, if it had remained intact the scenario in the first case that the expert panel has put together is less likely than it is currently positioned in your report?

A. If that stopping stays intact, yes.

20 Q. Now, the second scenario requires the same goaf collapse doesn't it, and the same stopping knock over, right?

A. Yes.

Q. So again, stopping remains intact, the panel's second possible explosion scenario also could possibly be ruled out couldn't it?

25 A. That's correct. Because we were looking at further interaction and other ignition sources there.

Q. Now even if the stopping had been knocked over, so let's just assume that assumption in your report at the moment, a short circuit would've been created in that second scenario is that right?

30 A. That's correct.

Q. And would you agree, or would it be fair to say, Mr Reece, that in those circumstances of a short circuit you would expect that a deputy may have noticed it?

A. Yes, you'd hope so, given that they were there at the time or relatively shortly after that.

Q. And if a deputy underground became aware of this short circuit, you would expect, wouldn't you, that he might take some action to counter it, right?

5

A. Yes.

Q. Which might include notifying the control room?

A. Yes.

Q. And there's no evidence that the control room was notified on the 19th of November of this type of issue is there?

10

A. That's correct.

Q. Now, the third scenario for what might've caused the explosion requires a gas accumulation in the ABM panel and the associated return area doesn't it?

15

A. That's right.

Q. And so it's the panel's theory, isn't it, that a borehole would need to have been exposed in the ABM panel right?

A. Not exclusively but that's one of the contributors, yes.

Q. Its part of the analysis for the third scenario is that right?

20

A. Yes.

Q. And would I be right to think that you would need a reasonably large flow of methane coming out of that borehole?

A. Well, yes, that's a fair comment.

Q. And again, just in fairness to the information that you have available to you, on the information currently available, the panel can't be certain, can it, that there was any borehole exposed in the ABM panel?

25

A. My understanding from the previous two shifts was that they had exposed the borehole.

Q. Do you recall from the documents or other information that you may have received in your inquiry, Mr Reece, whether it was a practice at Pike for men underground, for men to plug boreholes if they could?

30

A. Yes, as far as I was aware it was.

Q. Do you have any reason to believe that as at the time of the explosion on the 19th of November, that the borehole that may have been exposed in the ABM panel hadn't been plugged?

A. Our understanding is that there had been attempts to plug it, yes.

5 Q. Now, the panel as part of this third scenario has also considered whether the recovery of drill rods in a stub off A heading, six cross-cut one west, might've resulted in gas being exposed right?

A. Yes.

Q. And that's another contributing factor potentially, is that right?

10 A. That's correct.

Q. Now, while the recovery of the drill rods might've resulted and the workers removing the gas separation swivel from the rods such removal may also have been unnecessary, right?

15 A. It depends how they've done it but, yes, it depends what they've had to do, how they've gone about it.

Q. So we just can't know either way, can we, whether or not that needed to happen on this occasion?

1113

20 A. No. My understanding from previous eventualities though, was that that was what they did.

Q. So that's what the assumption is based on, is that right?

A. That's correct.

Q. Now, the next aspect of the panel's third scenario is failure of a auxiliary fan or a ventilation tube, right?

25 A. Yes, yep.

Q. But it's possible that neither of the auxiliary fan or the ventilation tube failed isn't it?

A. Yes, we don't know.

30 Q. The panel, and again just in fairness to the information that you have had available to you, the panel has no evidence that there was a gas build-up on the ABM panel and along six cross-cut does it?

A. Not hard evidence other than some, I suppose some comments from people that weren't particularly confirmed but there's some concern that that may have been the case, but not confirmed.

5 Q. Would it be fair to say that just as it is possible the build-up occurred it's also possible that it didn't?

A. Yes.

10 Q. And in fact you accept that in your written evidence don't you that while there's scope for the ABM panel roadway to contain high gas levels and your words are this has not been corroborated by any information to date has it?

A. That's correct.

Q. Just one clarification question too Mr Reece. Would a very large build up of gas be required in that area for the panel's third scenario?

15 A. Well this is the thing that's predicated the whole thing, was to try and get an understanding of the volume of methane and to tie that back to potential locations. In that particular area it actually depends to some extent on the vigilance of people in there, what they were measuring, what they were monitoring, where they were monitoring and their ability to monitor. So there is a reasonable expanse of roadway, but what we're talking about is the potential for gas to build up in the top of the roadway or indeed all of the roadway but then not to be detected, and that's the point that we've made in that particular scenario and again that's not confirmed or denied. It depends on accuracy of monitors, it depends on diligence of people and in effect having somebody in there
20 with detection apparatus or indeed the detection that was installed in there, working and triggering that. But there's a difference between where gas accumulates and where people naturally carry or where gas detectors are installed, okay? So it's all about being up in the roof or thereabouts in the top portions of the roadway and detecting it.

25
30 Q. Now, as I understand your first three scenarios are going to cause, one requires the goaf fall, three requires an accumulation of gas in the development headings, and two is effectively a combination of those two, is that right?

A. That's correct.

Q. And if I could just bring up your diagram, it's at DR10 or Ms Basher, DOL3000150017/1?

WITNESS REFERRED TO DOL3000150017/1

5 Q. You've spoken about this yesterday and I only want to touch on it briefly Mr Reece, but just so I'm clear, the purple shading - Ms Basher if we could perhaps please just pull up that bottom left-hand part of the diagram. The purple shading or the shading that we see there, Mr Reece, is that the area where the accumulation that's talked about in
10 the panel's third scenario may be?

A. It is, with the addition that it's quite potentially further up into the stub as well, into that -

Q. Up towards the ABM panel?

A. Up towards, well in B heading of two right, yes.

15 Q. And as I understand it, when Mr Wilding put to you yesterday that even if the goaf scenario is correct, that the accumulated methane described in your third scenario which we're looking at now, is likely to have exploded as well. Do you recall those questions?

A. Yes.

20 1118

Q. And you responded yesterday, it was late in the day, you responded yesterday that that could be possible, do you recall that?

A. Yes.

25 Q. I'd just like to explore for a moment the likelihood of that possibility, because you mentioned it to Mr Raymond too. There's been a borehole drilled hasn't there in that bottom corner, which although not reflected on this map – actually Ms Basher, I wonder if we could pull up just beside this, just so it's easier to orientate, the document at DAO.031.0002?

WITNESS REFERRED TO DOCUMENT DAO.031.0002

30 Q. And this map that I'm asking to be pulled up Mr Reece is just one I find a bit easier because it's got the headings, the names on it, and I wonder Ms Basher if this is perhaps going to be very technically difficult, but if we just pull up the same part on the DAO document as you're showing

on the diagram from Mr Reece's evidence? Thank you. So we've got the heading names there. It must just be a bit easier, Mr Reece, for the record. Now, the drillhole, as I understand, PRDH44, has been put in just at the corner by the Valley Longwall drill rig, do you see that? Can you perhaps demonstrate it, thank you, there?

5

A. There, yeah.

Q. Right, now have you seen the imagery from that drillhole as part of your work?

A. Yes, we have.

10

Q. And, am I right that the video and CAL scan imagery from PRDH44 which has been drilled there, they show a largely – well, actually, I think a totally unmoved pallet and there's no signs of an explosion or fire there?

15

A. That's not necessarily my understanding. There's a certain amount of damage that is up in that area but it's hard to be definitive. But one of the things that we're concerned about is there appears, it does appear to be ventilation tubes that have been damaged and moved in that area.

20

Q. Would the, and this is just a clarification question really, would what you've seen in the imagery, just because it may assist the Commission, what you've seen in the imagery from 44, is that consistent with the accumulated methane in the area that you've highlighted with the addition of the B heading in DR10, having exploded?

A. Quite possibly, yes.

25

Q. Thank you, that's all I have on that. So let's turn to the panel's fourth scenario, and that scenario involves a failure of a compressed air pipeline, doesn't it?

A. Yes.

Q. And you accept, don't you in your brief, that this scenario in particular is quite difficult to support?

30

A. Yes.

Q. And that's because among other things the rupture of a compressed air pipeline is generally localised and smaller, is that right?

A. Yes, yep.

Q. So the panel's fourth scenario is less likely than the first three, right, to state the obvious, you'd agree with that? Even unlikely?

A. Oh, for me it is fairly unlikely, because you've got to get it – it's providing compressed air, it's providing fresh air. The concern was that the rupture of the fresh air has moved – the initial concern was that it would flush methane out of the goaf and we'd pretty quickly dispelled that and said it's really not going to move, it wasn't up in that area and it's not going to tend to move it. If it was dumped into the main return airway, materially it's not going to add a, you know, significant percentage that's going to create a strong motive force that's going to, you know, move methane from some place to another one, so fairly unlikely.

Q. Now I'd like to just turn to the second part of the equation here, the ignition aspect of what may've caused the explosion, and the panel accepts, doesn't it, that there are a number of significant potential ignition sources within the mine, none of which can be conclusively discounted out or assured as a likely cause, right?

A. That's correct, yes.

Q. And if we start with harmonics, because that's one of the ignition sources that the expert panel has identified, being harmonic currents in either electrical or metallic installations is causing arcing or sparking, right?

A. Yes, yes.

1123

Q. And the idea is that the harmonic currents may have been flowing in the earth circuits at Pike's mines electrical systems, right?

A. Yes.

Q. And as I recall it you suggested that we should hear from Mr Reczek about that possibility because that topic is very much outside your area of expertise, right?

A. That's correct.

Q. During the course of your work on the Pike investigation, have you come to understand Peter Whittall's qualifications and experience?

A. I haven't looked through them, no.

Q. Well do you have any understanding that potential electrical ignition sources, like the creation of these harmonic currents, would be within an area of expertise he might have?

A. I would suspect not.

5 Q. And why do you say that?

A. Well my earlier recollection is that his qualification is in surveying and mining engineering, similar to myself.

Q. Now do you recognise the name iPower Solutions?

A. I do, yes.

10 Q. And do you understand that iPower Solutions is a well-known electrical engineering, manufacturing and project delivery company?

A. I'm not fully aware of their, of the full range of the business. I know that they certainly consult in electrical engineering design, but as to the full range I'm not fully familiar.

15 Q. Now Mr Murray has given evidence that iPower was the agent for Rockwell Automation in New Zealand, do you recall that?

A. Yes I do. Yes.

Q. And is that consistent with your understanding?

A. Well, I accept that. I don't know any more than that.

20 Q. Do you have any understanding of Rockwell Automation?

A. No I don't.

Q. Now are you aware that among iPower's clients are mining companies such as Rio Tinto and Xstrata and BHB Billiton?

A. I'm not, but I'll take your word for it.

25 Q. You've worked for BHP Billiton haven't you?

A. Yes I have.

Q. And you're aware are you that iPower Solutions designed the electrical system at Pike River?

1125

30 A. I've seen that they, in the deliberations and the work that was done by Tony Reczek, I certainly am aware that he looked at modelling that was done by, okay, yes.

Q. Do you recognise the name Comlek, Mr Reece?

A. Yes I do.

Q. And Comlek is an Australian electrical engineering company, is that right?

A. Yes, as far as I'm aware yes.

5 Q. Have you used Comlek at all in any of your work?

A. I haven't personally but I know that they've certainly been associated with work at mines that I've been at, yes.

Q. Do you have an understanding as to their reputation?

A. No I don't.

10 Q. Would you agree with me, Mr Reece, that it's reasonable for mine management to bring in external consultants and experts to assist?

A. Absolutely, yes.

Q. And as a mine manager you've got an extensive career as a mine manager among other things. Did you engage subject matter experts to assist you?

15

A. Certainly, yes.

Q. Do you consider it reasonable for management to rely on experts?

A. Well you need to because you're getting into technical areas, yes.

Q. Now during the course of your investigation the panel didn't come across any information showing that any of the electrical consultants or experts engaged by Pike regarding its electrical system alerted the company's directors and officers to the types of electrical risks that the panel considers might possibly have provided an ignition source for the explosion, did you?

20

25 A. Not that I'm aware, no.

Q. Now beyond, Mr Reece, like you none of the three other experts on the panel you coordinated have expertise in induced harmonic currents do they?

A. That's correct.

30 Q. But you do understand don't you that the production of currents in the earth circuit from harmonics is not accepted by experts?

A. The level of my understanding is that there's quite an amount of conjecture, there is a lot of research that's been done, there is some

degree of concern both in Queensland and New South Wales, and obviously from the considerations in this report there is a fair amount of conjecture and it's relative recent from what I understand so...

Q. The theory in and of itself is relatively recent?

5 A. I'm not sure. I couldn't comment on that. Certainly Tony Reczek and again as you've pointed out I rely on experts in this. It's not new for him. He's certainly been considering it and the electrical engineers and inspectors have been considering it for some little time though I couldn't say for how long.

10 Q. But you do understand don't you that there's some disagreement between experts about this theory?

A. Yes I do. Yes I do.

Q. Given your vast experience Mr Reece and your background, how many explosions in underground coal mines have you investigated?

15 A. I haven't investigated any.

Q. Have you been brought in as part of an expert to assist other investigations prior to the Pike explosion?

A. Of explosions?

Q. Yes.

20 A. I was involved in parts of the Moura explosion in '94.

Q. Well would it be fair to say then Mr Reece, I only want to touch on this lightly, that none of the investigations that you've been involved and I think we've got one, that induced harmonic currents arcing in electrical or metallic installations provided the ignition source, that wasn't considered?

25

A. That's correct.

Q. Have you heard, just given your experience in the industry, have you heard of other explosion investigations in which there has been the theory that induced harmonic currents arcing in electrical or metallic installations may have provided the ignition source?

30

A. There's one that's been brought to our attention, but it wasn't – it was in relation to a similar sort of event but I really couldn't get into the detail.

It was in a metal mine I believe. But it was mainly to do with tracking of stray currents through metallic objects.

Q. So not an underground coal mine though?

A. It was - no it wasn't, it was an underground metal mine.

5 1130

Q. Would it be fair to say, Mr Reece, that the panel's theory that induced harmonic currents arcing in the electrical or metallic installations providing ignition source for the explosion at Pike is novel?

A. Yes.

10 Q. Now just changing tack just for a moment and I think this is a point that you've given some evidence on but I just want to make sure I'm clear in my mind, it's your evidence isn't it that scenarios, one, two and three are less likely to involve a diesel vehicle as the ignition source because of the status of Pike's electrical equipment and the timing of the plant start-up, right?

15

A. I suppose it was a stronger coincidence I guess and that's the point that we got to but we certainly don't want to rule out the concern with diesel apparatus and that's, I suppose it would be to some extent on similar footing if that coincident nature wasn't there.

20 Q. And that was going to be my question to you, because absence that coincidence then you would actually rank the diesel vehicles equally alongside the possibility of these harmonic currents, is that right?

A. It would certainly be up there, yes.

25 Q. And you would agree with me that it's possible the timing of the start-up of the plant was nothing other than a coincidence isn't it?

A. Yes, that's possible, the thing is we'd need to get a diesel in contact with the methane at that temperature, so.

30 Q. Now, I wonder if we could, just to orientate ourselves a little bit on this next few questions I've got, Mr Reece, bring up your ignitions sources fault trees. And Ms Basher please, that's at DOL3000150022/1.

**WITNESS REFERRED TO DOL3000150022/1 – IGNITION SOURCES
FAULT TREE**

Q. And this is the fault tree that you used as part of the panel's work to identify likely possible and unlikely ignition sources right?

A. Yes.

5 Q. And yesterday you were asked some questions, it's on the right-hand side, about the hot surface category?

A. Yes.

10 Q. And there you gave evidence about these, as I understand it, recent incidents in Australia where diesel mobile equipment has entered or been overcome by high tending to explosive mixes of methane and the engine, I think you described, can run uncontrollably in those circumstances right?

A. Yes.

15 Q. And I just, and that's described in the expert report at page 74, I'd like to ask you about a second point that's outlined in your report, that I don't believe we covered yesterday, just for completeness and I'm reading from page 74 of the report, quote, "There have been some alarming instances at Pike River whereby operators have bypassed machinery mounted gas detectors. Similarly, an instance of an operator not shutting down a loader in near 1% methane, CH₄, as it's said in the report, when the personal detector was alarming but waiting for the machine mounted unit to stop the machine. Diesel powered vehicles were in use throughout the mine on the day. It cannot be ruled out that a diesel vehicle could have been in a return or intake, (of the potential gas transmission events) at the time. Such a vehicle, if it had not been
20 in an explosion protected condition (ie safety systems bypass) could pose an ignition source potential."
25

A. That's correct.

Q. So that's the second aspect of the hot surface potential ignition source isn't it?

30 A. Yes.

Q. And would you agree with me, Mr Reece, that if we take out the coincident nature of the timing of the plant start-up, that this scenario that we've just talked about, the possibility that a vehicle with its

systems bypassed had come in to an area where there was an explosive mix would rank alongside harmonics as a likely source for an explosion?

5 A. Again, it would be the coincident nature of the diesel in that situation in that location, yes.

10 Q. Now, were you provided with information from the Department of Labour in the course of your investigation about statements that were made during interviews conducted following the explosion of underground employees and contractors at Pike, that they had witnessed others using the compressed airline underground to blow fresh air over machine sensors?

A. Yes.

1135

15 Q. And were you informed that several of the interviewed men stated to the Department of Labour and police investigators that they had witnessed one of the men who died on the 19th of November 2010 doing just that, blowing fresh air over a machine-mounted sensor on a prior occasion?

A. I believe so, but it was, when we say “machine-mounted” it was fixed or, fixed machine at the time, but yes.

20 Q. And were you informed that – just one interviewee, I don't want to overstate any of this and I'm being careful with my language – one interviewee stated to the Department of Labour and police investigators that he'd witnessed three of the men who died on the 19th of November 2010 overriding safety features of machines used underground?

25 A. I'm not particularly familiar with that one, but it's obviously been stated.

Q. So, you don't recall being provided with that last piece of information?

A. Oh, it may've been provided, but I don't recall reading, actually reading that one.

30 Q. Well, did the expert panel, Mr Reece, in working up the fault tree that we have displayed at the moment and classifying potential ignition sources between likely, possible and unlikely, did it factor in the types of statements that I've just described to you when doing its classification?

A. Factor in as far as most of these were done before the statements and it was really the assessment of the likelihood that was considered based on the statements, that's why it's still in there, so, yeah.

5 Q. Well would you – let me frame that differently. Given the statements that I've just described to you, and the timing at which the fault tree was put together by the expert panel, does anything in those statements affect or change anything in the fault tree that we have displayed in the courtroom at the moment?

10 A. Not particularly, because we've already got in there that it's, that a diesel running in high methane is a likely incident. It could change the diesel, running without a safety circuit from the possible to the likely as well.

Q. Because at the moment that one is an orange, not green, right?

A. Yeah, that's correct.

15 Q. I just want to touch on that one for a moment, because you'll recall that some of the intrinsically safe machines used at Pike were equipped with scrubber tanks that filled with water, right?

A. Mmm.

20 Q. And the purpose of the water was to surround the exhaust gases in the engine and keep the machine cool, is my understanding correct?

A. Oh, well, the exhaust gas passes through the scrubber, but that's, yeah, that's fine.

25 Q. And do you recall being informed by the Department of Labour that at least one interviewee had told department investigators that he observed the float level on a scrubber tank being bypassed so that the machine would continue to operate even though it contained no water?

A. Yes.

Q. And that behaviour would be of concern to you, wouldn't it?

A. It certainly would.

30 Q. Because there's a possibility that machine could overheat, right?

A. Yes.

Q. And there's the possibility that such overheating could also provide an ignition source, right?

A. That's correct. There's also flame arrestors on this, so it's not the only means of protection, but anyway...

5 Q. I'd just like to turn briefly to contraband because Mr Raymond has asked you several questions already that avoid me needing to go into this so much, and you mentioned yesterday and today that you, the panel does have some concerns with contraband, so it's not been ruled out as a potential ignition source, has it?

A. That's correct.

10 Q. In fact in your written evidence you state don't you that smoking materials underground just can't be ruled out, can they?

A. No.

15 Q. And Mr Raymond asked you, or suggested to you earlier that contraband may have been more of an issue in 2009, not 2010, and I'll come to that separately, but in that connection you were asked whether if anything happened in 2010 what did that tell you about management, and you said, words to the effect that the message around contraband needs to be continually reinforced, do you recall that line of question?

A. Yes, yes, I do.

20 Q. Now were you present in the courtroom when I showed Mr Murray materials that management at Pike had used at the mine to reiterate the management attempts to control contraband going underground?

A. Yes.

25 Q. And do you recall that they, just to take an example, the training presentation that was used was dated May 2010, not 2009, so just months before the explosion?

A. Yes.

1140

Q. And there were contraband searches at the mine weren't there?

A. Yes there were.

30 Q. And in fact as part of the Department of Labour's investigation and your work do you recall that there are recorded instances of 82 contraband searches between April 2010 and the explosion?

A. Yes.

Q. And there were signs around the mine site, in fact right outside the portal weren't there?

A. Yes.

5 Q. Would you agree Mr Reece, that efforts were being made by Pike's management to continually reinforce the danger of taking contraband underground?

A. It certainly would appear so.

10 Q. Now you were asked earlier about the Coke can piece and I appreciate that clarification. I just want to ask you one question. As I understand it, the aluminium drink cans can spark if struck with sufficient force by rusty steel, right?

A. Yes.

Q. Well, in your view would striking by a loader of an aluminium can if it was resting on some rusty steel, would that be sufficient force or not?

15 A. Look I really don't know. I wouldn't like to comment. As I say, there has been laboratory testing done of it.

Q. That's fine. You just don't know one way or another, is that right?

A. Well it's a case of again that needed to be in proximity to methane and having the sufficient force and striking that sort of body.

20 Q. Now, in the expert report there was a finding that even though the company had in place procedures and rules and personnel searches, there were recorded instances where aluminium cans were found in the mine, right?

A. Yes, yes.

25 Q. And you were provided with information from the Department of Labour about men who worked underground at Pike saying in interviews that they had discovered even if just by accident, that contraband items had been taken underground, right?

A. Yes.

30 Q. Do you have any recollection as to when those men worked underground? I'm just trying to deal with the 2009 versus 2010 point. Do you recall that some of the information was provided to you were

from interview statements of men who had worked underground at Pike only in 2010?

A. Yes.

Q. Not 2009?

5 A. Yes.

Q. Now when the panel looked at contraband as a potential ignition source, did the panel consider whether the fact that the machines were not working for several hours before the explosion on the 19th of November and whether that made contraband as an ignition source more or less likely, or is that not part of your analysis?

10

A. Not exactly sure of the thrust of the question. What machines do you mean?

Q. Well as I understand the evidence that's come before the Commission, some of the work that had been planned for the 19th of November was not proceeding for several hours before the explosion because of power issues. Is that consistent with your understanding?

15

A. Yep, yep.

Q. And so my question, and it may be that it didn't form part of any analysis that the expert panel did when looking at potential ignition sources, but my question is just whether in considering whether contraband as a potential possible ignition source was more or less likely, did the panel consider the fact that the work that had otherwise been scheduled for the day had been disrupted and wasn't being done for several hours?

20

A. Not particularly, not in that sense.

25

Q. If I could just ask one more question on this fault tree that we still have up here. There's another potential ignition source and I don't believe you've spoken about yet and that's the one that says, "Work on open electrical enclosures." Do you see that? And perhaps you could just circle it so that we're all orientated. It's at the bottom of the electrics, thank you. What do you mean there?

30

A. There have been instances where people have worked on electrical equipment underground and that being in a live situation. So it was in effect powered by electricity and therefore in a non-flameproof situation.

1145

Q. Is it possible that someone might've been doing, even a routine check, on electrical device on the 19th of November or perhaps in preceding shifts and mistakenly left a door open only for an ignition source to be created when an explosive mix of gas came past?

5

A. It's possible that somebody had enclosures off but up to that point the power had been off and power doesn't naturally re-install itself.

Q. So the type of possibility I'm describing would not be covered by the orange element identified on your fault tree?

10

A. Well, I don't know. It depends exactly what you're driving at. What you're saying is the cover was left off for work to be done on it, am I right?

Q. Yes, I'm asking whether if there was the possibility that someone, just by pure mistake, left the cover off. They'd been doing a routine check and they left the cover off?

15

A. Yes.

Q. Could that have provided potential for ignition source?

A. If there's no power on there, no. If power is re-instated to it, yes but it just depends on determining the nature of the power to that particular installation.

20

Q. Let me just come to a separate topic, Mr Reece, you were asked yesterday about the Department of Labour report finding that there should've been a forcing fan at the entry to Pike's mine, do you recall that?

25

A. Well, that was an option, that's what we were saying.

Q. And you responded yesterday, and really I just wanted to clarify this. You responded yesterday that it's, "A novel approach," those were your words?

A. It is, yes.

30

Q. What do you mean by that?

A. Well, it's not something that's done in coal mines and hasn't been done particularly in coal mines because you're actually trying to contain the

gas and the dust so it actually gives you a different pressure characteristic, so.

Q. Are you aware of any coal mines in Australasia that adopt that practice?

A. I'm aware that they have done for short periods, but not as a mainstay.

5 Nor are we aware of mines that have got fans underground in this installation.

Q. Now, Mr Wilding asked you some questions yesterday about how accurately it should be possible to predict the economic cost of an underground coal mine project, do you recall those questions?

10 A. Mmm.

Q. And you talked about a range of plus or minus 5%, "ideally," that was your word, "ideally," for setting up a mining operation, you recall that?

A. Yes.

15 Q. And how many of the projects that you have handled, setting up a greenfields underground coalmining operation have proved able to predict the cost between 5% either way?

A. It's, how many? They all aim for as accurate as possible but then you actually don't know what you've got until you get there, so that's the difficulty, so.

20 Q. Well, if I just perhaps ask it differently, have any of the projects that you've handled setting up a greenfields underground coalmining operation proved able to predict the cost between that 5% either side range?

25 A. Okay, I haven't worked on a greenfields operation. They've been existing operations but I'm aware of, but have been working on a number of feasibility studies for other operations and really it's a case of, it's a 10% generally, plus or minus 10% aiming to refine it for final operation.

30 Q. So just putting aside that you haven't worked on any greenfields operations, and I appreciate that clarification. In the feasibility studies that you've worked on, have any of those proved able to predict the cost within that 5% range?

A. That's the objective. Most of them don't quite get it.

- Q. So it'd be fair to say that none have Mr Reece?
- A. Not quite to 5% but that's the objective.
- Q. What about 10%, have any of the ones that you've worked on the feasibility studies, have they managed to stay within that 10% range?
- 5 A. Well, that's been closer to the mark, yes.
- Q. So, yes they have, or no they haven't?
- A. Yes they have.
- Q. Thank you. Now you noted yesterday that you don't have any expertise in hydro-mining right?
- 10 A. That's correct.
- Q. Do any of the other four members of the expert panel who have been assisting the department and the police as to possible causes of the explosion at Pike have expertise in hydro-mining?
- A. No we don't.
- 15 Q. Now, you're familiar with the theory of human factors, right?
- A. I am.
- 1150
- Q. In fact you were co-author of an article I think dated in December 2010 about hazard identification and risk management, do you recall that?
- 20 A. Depends what you're talking about, but I work on a number of things, yep.
- Q. Let me see if I can find it, it's a APP Coal Mine Health and Safety Project 4 Report, Hazard Identification and Risk Management and the co-authors are Chang Zu, I apologise if I've got that wrong.
- 25 A. Yeah, yeah, no that's right, yes certainly.
- Q. Yes okay. And there's a section in that article, which I'm not going to go into today just in the interests of time, it involves a discussion of human factors, do you recall that?
- A. Yes, yes.
- 30 Q. Were you involved in authoring that part of the article?
- A. As far as I'm aware I was, but it depends when we get to it.

Q. Well given that I now understand you have some knowledge about it, I just want to put a couple of questions to you because there's been some evidence before this Commission about human factors.

A. Sure.

5 Q. Are you aware that there was a study using the human factors classification system conducted in Queensland through SIMTARS and published in 2009?

A. I am yes.

10 Q. And you're aware that the human factors classification system was actually developed for the aviation industry initially, right?

A. Yes.

Q. And that the classification system applies the Swiss cheese model of human error that was developed by James Reason, is that right?

A. It's a component of it, yes.

15 Q. Would you agree that the human factors classification system has only recently been applied to the mining industry?

A. It's certainly been discussed and available and considered for probably the last 10 years or so. Ten, 12 years.

20 Q. Well do you recall that the 2009 study, conducted through SIMTARS concluded that the results provided, this is the wording of that document, "A starting point for applying a human factors classification system in coalmining?"

25 A. I don't know about a starting point, I mean it's human factors is applies to humans everywhere. So, as long as that model of James Reason's been applicable there's been consideration of human factors and as I say that goes back some period of time. I think our focus is probably more strongly in that 10 years been more to provide a better understanding and what it means to us in managing operations. Yep.

30 Q. Now the expert panel doesn't refer to the application of human factors in preparing its investigation report for the department, does it?

A. Yes it does. It actually, it's listed in as one of the references in the report.

Q. So it was part of the methodology that the investigative panel used?

A. Well it wasn't – it was consideration in the full range of the model. So the human factors and workplace and management issues. So...

5 Q. Mr Reece, are you aware that there have been reports of a keynote address that James Reason gave in 2006 where he suggested that the application of the Swiss cheese model may have resulted in too great a focus on collective responsibility at the expense of assessing personal responsibility?

A. I'm not specifically, but I'll take it as noted.

10 Q. Well have you heard, and I'm just mindful that your article was written in December or at least published in December of 2010, are you aware of a text from 2003 in which James Reason suggests that perhaps we should revisit the role of the individual?

A. No I'm not.

15 Q. Well would you agree with me that it's important when looking at the cause or potential causes of an accident to consider not only the factors in existence, but also the decisions or actions, inactions of individuals involved at the time?

A. Yes.

20 Q. In fact you said earlier to Mr Raymond, didn't you, in connection with I think safety more generally and please don't let me mistake you, clarify this if I've captured this the wrong way, but, everyone has a part to play in it?

A. Yes.

Q. Is that right?

25 A. Yeah.

Q. Is it fair to say that every person working underground in a coal mine and on the surface, bears a degree of personal responsibility for their own safety?

A. Yes they do, yes.

30 Q. Because even if a company's directors and officers have systems in place you've still got people, right, who sometimes make mistakes?

A. And that's the thrust of human factors so it's about their level of understanding and competence and knowledge, yes.

Q. And you actually spoke about that point during a radio interview on Vision Radio Network just a week after the 19th of November 2010, didn't you?

A. Yes.

5 1155

Q. I'd just like to play one snippet of that interview, and just to confirm one point as I conclude, Mr Reece. Ms Basher, if we could just play the snippet of the interview, and just to orientate you Mr Reece, I know it was a longer interview, just ask you Ms Basher to play where the radio interviewer asks you about why coalmining is so dangerous, and then you gave an answer and then the interviewer went into another topic, so I'm just going to take that one piece if we could please?

10

RADIO INTERVIEW PLAYED:

15

"Interviewer: Why is it so dangerous? Why are those kinds of – just give us a bit of background as to why this, those problems can be just so prevalent?"

20

Mr Reece: Yeah, okay, the coal, coal mines and coal seams generally have inherent within them, within the coal, methane. Typically methane. Methane's very similar to the, to the gas used in your barbecue. So it, it just naturally seeps out of the coal seams and there's, there's a lot of work done, a lot of monitoring done to, to manage that, but, but sometimes you've got, you've got people, you've got a lot of expert systems in place. Sometimes people make mistakes, sometimes the systems break down and you can get a number of factors that line up in a normal fire situation. You get an ignition source, a fuel source, and oxygen and you've got, you've got an explosion of fire."

25

Q. Thank you Ms Basher, that's – just stop it there I think Mr Reece, because the interview otherwise goes on, but those were your words at the time, just a week after the explosion, weren't they Mr Reece?

30

A. Yes.

Q. And you would agree with that sentiment even sitting here today?

A. Yes.

CROSS-EXAMINATION: MR MABEY

- 5 Q. Mr Reece I represent Pieter Van Rooyen, who was the technical services manager at the mine from the 3rd of February 2009 until the 3rd of November 2010. Yesterday you made one would think an obvious statement, that ideally a mine should have a forward plan for say five, 10 years?
- A. Yes.
- Q. Medium to long-term planning?
- A. Yes.
- 10 Q. Because if you, as you said today, that you don't know what you're going to get until you get there, but it's always best to be as well advised as you can before you start going, agreed?
- A. That's, yes, I do.
- Q. The mine design criteria would include geological knowledge, obviously?
- 15 A. Yes.
- Q. If a mine is commenced without adequate geological knowledge, then there's unknown barriers, unknown factors that could cause all sorts of disruptions to the future planning?
- 20 A. That's correct, yeah.
- Q. Design changes?
- A. Yes.
- Q. Dr Bell in his report or part of the panel's report in the DOL report, and I won't put it up, it's 11.1, said that it was quite clear the mine geology envisaged prior to intersection with Brunner seam coal resource was over-simplified, given the relatively widely spaced drillhole intersections and the absence of road access over the proposed mining area. Helicopter supported drilling of mostly vertical exploration holes did disclose the extent of the Brunner seam but did not allow its close definition within the Hawera Fault. After intersection of the Brunner seam and the workings PRCL used several innovative exploration tools, in particular, in-seam drilling." He's saying they were only going to find out what was there when they got underground, in any detailed sense?
- 25
- 30

A. Ultimately, that's what you've got.

Q. Yes. The early drillholes or in-seam boreholes that were undertaken were exploratory?

A. Mmm.

5 1200

Q. Given the lack of knowledge of the underground geology that's fair enough?

A. Yes, yes it is.

10 Q. Mr van Rooyen came to the mine at a stage when the development was, as he will put it, completed to 10 metres beyond the A heading breakaway leading to the ventilation shaft. A heading had been completed to the base of the shaft. That's something that you can picture?

A. Yep.

15 Q. And on his first day the mine shaft collapsed?

A. Yep.

Q. He reported in MED, please Ms Basher, 0010070105/4, 2.1 if we can please.

WITNESS REFERRED TO MED0010070.105/4

20 Q. "In-seam drilling commenced in December 2008. The initial phase of exploration was aimed at the development around the pit bottom area and with GBH0002 the second in-seam drillhole, a large unknown geological structure was intersected ahead of the main mine development. This structure had a severe effect on the drill program
25 and resulted in the drilling of a number of holes crossing through approximately 220 metres of stone 'graben' (as the structure was locally termed) to intersect coal on the western side of the structure." That's something that you've obviously become familiar with as part of your work?

30 A. Yes.

MR MABEY ADDRESSES THE COMMISSION – REFERENCE TO GRABEN

CROSS-EXAMINATION CONTINUES: MR MABEY

- 5 Q. The graben was essentially a stone area from pit bottom coal through to where one west mains began, about 220 metres. Something that was unknown up to the point really of when Mr van Rooyen started work there. So as someone responsible for the mine design within the TSD, the technical services team, not only was he faced with a collapsed mine on day 1, his forward development was, to use your words, to see what you're going to get when you got there?
- A. Mmm.
- 10 Q. There's been reference to the need for in-seam drilling for gas drainage purpose isn't it. Dr Bell referred to it as innovative. But coming back to the issue of the use of in-seam drilling. There was complete justification from the beginning to classify in-seam boreholes for exploratory purposes. There was no point in degassing coal you didn't know existed?
- 15 A. Yep.
- Q. You've mentioned to one counsel yesterday, that when you're dealing with unknown quantities, unknown features, unknown geological factors that may cause mine design changes, you tend to be managing on the run or "could be managing on the run," to quote you?
- 20 A. If I haven't got enough information then things change, then yes.
- Q. And in other words or another phrase you used was that "you're behind the game?"
- A. Yes.
- 25 Q. Mr van Rooyen is going to give evidence and will confirm on oath what he said in his statement which has been posted, and will say that it would have been beneficial when he started to have had a documented overarching design plan that integrated mine design, ventilation, gas drainage, outburst management and gas monitoring to take advantage of potential synergies, all of these things being complimentary?
- 30 A. Yes.
- Q. Now ideally that's what should exist?
- A. Definitely.

1205

Q. This is your five to 10 year forward plan so people are working within a framework, they can co-ordinate with each other, they know where they're going?

5 A. Yes.

Q. When Mr van Rooyen started at the mine he said there was no such plan there was the Minarco studies but it was his experience as the person responsible for forward design that the, although the Minarco documents provided an overall concept, they were proven to be
10 inadequate because there was constant changes needed.

A. Mmm.

Q. As information was gathered changes were needed regularly and he says this, and acknowledging it was in his scope to look at mine planning, "I found it difficult to develop an integrated plan for the mine
15 due to the limited and emerging geological knowledge leading to constantly changing mine designs which were made in a piecemeal fashion. In addition these changes had a down-stream effect and required necessary changes to other elements such as ventilation and gas drainage."

20 A. Yes.

Q. And he says this, and I'll ask you to comment on. "I consider that too much of my time and that of consultants was focused on crises management arising from constant design changes." Does that description to you apply to a person who's come into the management
25 structure of a mine with completely inadequate information without a comprehensive overarching plan, forced to do, as you said, manage on the run? Do you agree?

A. Yes.

Q. And without any knowledge of what you were going to say, he will
30 confirm on oath this statement in his brief, "As new geological information was secured at the mine, design changes were required. In many ways I felt that my design was being effected on the run."

A. Mmm.

- 5 Q. "With little by way of co-ordinated overall planning." I've listened to your evidence in the last few days and it seems to me that the description that my client gives of his situation within the management of this mine is consistent with what you've said about the lack of information that was there, the lack of an overarching structure and with the appearance of people almost working independently and on the run, agree?
- A. Yes.
- 10 Q. I don't want to go into the intricacies of the gas drainage with you, but just one issue, free venting. Yesterday you told us that free venting is not common, it's something that, I think to paraphrase used to be avoided but it really depends on the knock-on effect?
- A. Yes.
- 15 Q. There was free venting in this mine and indeed Mr Brown of Drive Mining, recommended it at one point?
- A. Yes.
- 20 Q. He was concerned that to overcome inadequacies of the existing drainage system, free venting would be appropriate?
- A. Yes.
- 25 Q. And he was one of the experts consulted for the obvious reasons you've given. He said, quoting from his July report, "That the holes in question," he was talking about certain holes which were described in the report, "Need to be depressurised by allowing the gas and water to escape to atmosphere." That's just, escape to the atmosphere within the mine?
- A. Yes. My understanding, his concern was that it was going to create later, greater hazards that needed to be addressed by doing that.
- 30 Q. Yes. Well, there's been reference to the inadequacy of the gas drainage setup, system?
- A. Yes.
- Q. And the justification of those criticisms will be determined by others, but are you aware that when Mr Brown returned in September, his report commented on the effectiveness of the free draining?
- A. Yes.

Q. And that there were distinct improvements?

A. Yes.

Q. As a result?

A. Yes.

5 1210

Q. He was able to say that there's no question the system is undergoing improvements in both hole monitoring and management, information regarding this is on a separate issue, information regarding the individual hole gas flows is now able to be measured. This commenced
10 on the 20th of August and in recent weeks measuring sets have been installed both in in-seams, sand pipes in the bottom the gas riser." Now I appreciate that's not directly focussed on free draining but it's a comment that he's made about improvements in the gas management system in the mine?

15 A. Yes, yeah.

Q. He says that the current management of the seven remaining online in-seam gas drainage holes, so there's more controlled state, and is generally complimentary of the improvements in the gas drainage system?

20 A. Yes, I'm aware of that.

Q. The reason I'm asking you, is this. Mr Van Rooyen comes to the mine in a situation where he's faced with pit bottom in coal developed up to the shaft – independent of issues of the collapse on the day he arrived – he then finds out that he's got 220 metres of rock ahead of him. He's
25 using boreholes to find out what's going on. They get to the other side of the graben and there's coal and then perhaps some semblance of a forward plan can be developed. Would you agree that despite the criticisms you may have made of the gas drainage system that when Mr Brown comes back in September, he's actually noticing improvements and developments are positive?

30

A. Yes, yes, he's obviously said that.

Q. In the DOL report at page 85, I notice this comment, concerning the Brown report in September that, and the advice that he had previously

given, "It appears that PRCL was heeding this advice." And then he talks about core samples and compliance with that advice as more holes are being drilled.

A. Mmm.

5 Q. This mine was developing in a, as Mr Van Rooyen says, in a piecemeal way?

A. Yeah.

10 Q. There was no overarching or co-ordinated structures, the geology was unknown and they were struggling with it. Mr Brown was consulted as were other experts. It can't be said, and I don't know if you're saying this, that my client and people in the, in his team, were ignoring that expert advice, it seems to me that they were following it, as Mr Brown confirms. Would you agree with that?

15 A. To a point. There's certainly been uptake of it. My concern is that they're still indicated as issues there simply because the drainage line was blocked.

Q. Yes.

20 A. And also similarly because we're getting things like the ABM panel, intersecting boreholes and having significant gas flows. Now I accept that that's an unfortunate reality, accept that there'd been improvements made, my concern is that there were still improvements that had not been included and that was my main concern, the fact that we've still got the same size gas drainage range, and little else, so, and that actually necessitated the need for free venting.

25 Q. Which was proved to be effective, at least in the short-term, according to Brown?

A. For a short-term solution.

Q. Yes.

A. But the ongoing problem was still there, that's my issue.

30 Q. Yes. It was always the intention to drive towards a second egress and create the, and install and lay the pipe?

A. I accept that, the problem is there's a lack of ventilation and there's an issue with the ventilation to even get there.

Q. I agree with that and I want to come to this. You've made the observation that a ventilation officer is a position that needs to be created at the outset dedicated specific role from woah to go?

A. Mmm, yes.

5 Q. It seemed to me that you were saying that the advantage of that is you've got someone on the ground who's able to focus solely on issues such as ventilation, gas monitoring, take control of VCD's?

A. That's certainly my experience, yes.

10 Q. Rather than have perhaps those roles spread across a team, with different individuals for example checking the quality of the VCD's, someone else doing monitoring checks, someone looking at drainage, someone looking at ventilation design. Better to have someone who's able to focus day-to-day at their desk in the mine on those issues?

1215

15 A. Ideally that's our experience. That doesn't mean that the other people don't do it as well, but there needs to be somebody that's ultimately responsible.

Q. I'm not suggesting that other people don't get involved?

A. Yep.

20 Q. It's always better to have someone who turns up each day at work who can focus on those essential issues?

A. Yes, that's our point.

25 Q. So a lot of the criticism that you and your team have arrived at in this case has focused on such things as ventilation, the adequacy of the ventilation control devices, gas drainage and monitoring?

A. Yep.

30 Q. The list that was given to you by one of my colleagues. Mr van Rooyen came to the mine from his position in South Africa and was appointed as head of the TSD with no ventilation expertise at all. He made that clear when he arrived taking on the position. He's a geologist. But were you aware that on his arrival or very shortly after, he made a specific approach to the company to have a ventilation officer appointed?

A. No I'm not.

Q. And that that approach was denied and he was informed that a ventilation officer is not needed under New Zealand regulations, that the mine was not at the stage where a ventilation officer was needed, and in any event it was someone else's problem not his. Are you not aware of that?

5

A. I certainly don't recall it, but I'll take it as no.

Q. Well that's certainly something that he will say in evidence that on arrival he identified (a) his lack of expertise in ventilation, his knowledge of Australian and South African regulations which require ventilation officers, and irrespective of the lack of a similar regulation here he wanted such a person in his team so on a day-to-day basis there was someone looking at these essential issues which you've identified?

10

A. Mmm.

Q. I'm sure that you would agree that a person in his position accepting from the outset his lack of expertise in ventilation, was acting extremely prudently in the management line, going upstairs and saying, "Look I need someone to do this job. I need the expertise in my team?"

15

A. Yep.

Q. That would be prudent?

20

A. Yes.

Q. What say you to the fact that the request was turned down on the basis that there's no regulation here in this country and that we're not at the stage where we need an officer, a ventilation officer yet?

A. Well it's not for me to say other than the point of pragmatic risk management and identifying your hazards and providing capability to respond to those, regardless of what regulation says.

25

Q. But I think it's your evidence that you need someone in that role from day one?

A. That's what we've said.

30

Q. To your knowledge, was a ventilation officer ever appointed at Pike?

A. We actually ended up going around in circles to find out whether it had or had not, and it would appear that a ventilation officer had not.

Q. The issue of the goaf fall looms large in your first and second scenarios?

A. Mmm.

5 Q. And I'm not here to argue the toss as to whether they should be first, second, third or fourth. They are your scenarios and that's for you and others to look at. But lest there be a perception that a goaf fall is unexpected or should be prohibited or mitigated entirely, that's something that is part of the mining process?

A. It is, yes.

10 Q. But your point yesterday was that what occurred or what may have occurred here was not a plate-like failure that would create what's known as windblast. It's something more progressive and perhaps greater than 10 cubic metres?

A. Yes and I probably should correct that in how it came out. I think I said 15 10 square metres. It should be 10 metres square, but anyway that's... But you're not talking the whole thing failing.

1220

Q. No we're not talking of failure as such that would enter into windblast territory as it's defined?

20 A. No we're not.

Q. In the appendix to the DOL report is this reference. This is appendix number 6, the collaborative expert report. Under 6.3 strata control, it's at page 12 of appendix number 6, when you're talking about strata control.

25 **WITNESS REFERRED TO DOL REPORT – APPENDIX 6 PAGE 12**

Q. "The objective with pillar extraction is to quickly remove the block of de-stressed coal and retreat before the roof falls. Determining the geometry of such a block to provide this control failure and retreat mechanism is based on geotechnical design and validated with trial and error."

30

A. Yes.

Q. I think today that you've said that given the panel number 1 is the trial panel if I could say that, this is the first goaf extraction, the anticipated

dynamics of the goaf fall was something that were just unknown, Have you any precise terms?

A. Yes.

5 Q. There would be trial and error as the mine developed to determine what might be expected as second, third, fourth panels?

A. And indeed with the actual progression of the goafing in that first panel.

10 Q. Later on under strata failure it said on page 18, 7.5, "Strata failure and roof collapse are not undesirable events in an extraction panel. What is desirable though is a controlled and progressive failure of the roof that leads to regular de-stressing of the mining area."

A. That's right.

15 Q. It may be inadvertent that when my friend Mr Raymond was questioning you before he was talking about another scenario, perhaps away from panel 1 and referred to another unplanned goaf collapse. I'm not too sure what he meant by unplanned but the point is that goaf collapses are just part of the process?

A. Yes.

Q. They're planned for and expected?

20 A. To a point, you can create mining situations of which my understanding this is not one but you can create different extraction situations where it actually doesn't cave. You may lose minor, what we call "skin failure" you may lose some small amount of the immediate roof, but by and large you actually aim to keep the roof intact. We still term it a goaf but that's a slightly different mining design than this. So this one was
25 designed to collapse.

Q. And Dr Bell at page 60 of the sixth appendix refers to, "Goaf collapse to the base of the island sand stone would have been expected geotechnically from knowledge of the rock mass properties." So, he's talking about the same thing?

30 A. Yes.

Q. I'm interested to look further what the doctor says concerning island sand stone because it relates to a matter put to you yesterday by

Mr Wilding which I take issue with. I wonder if we could have please, Ms Basher, DOL3000130007/59?

WITNESS REFERRED TO DOL3000130007/59

5 Q. Do we have there a sectional view of the geology of the mine starting from the Paparoa coal measures at the bottom and then into the main seam above that, the interburden below the Rider seam and then the island sand stone? And in the passage I've quoted to you from Dr Bell, "Goaf collapse to the base of the island sand stone would've been expected."

10 A. Mmm.

Q. In other words, taking away the interburden up to the Rider seam?

A. Yes.

1225

15 Q. I think yesterday you said, if I remember correctly, that your scenario of goaf fall to fit into possibilities one and two, for the explosion, may not have involved a collapse up to the island sandstone, may not have involved the fall going up that high. Did I hear you correctly?

20 A. Well, I don't know that we were dependent on just how high it went, but I was alluding to was the wider you make the extraction, the excavation, the higher the potential cave-in characteristic is, so roof rock will naturally cave to a stable, or a more stable shape, so it tends to arch. It tends to, what we call, dome out. If you think about a dome being a fairly stable structure in this situation, so at one width it will dome out, if you expand that it will dome out and it's typically expected to go higher
25 until the point, potentially the point where you reach a massive strata that could bridge over, so...

Q. Well, yesterday in a question from my friend Mr Wilding, you were asked about Dr Bell's comment on his observations of the shaft's failure?

A. Yes.

30 Q. And he says at page 60, and it was quoted to you, this is off the appendix, "Ravelling failure some 30 metres into the island sandstone is consistent with the observed bedding that can be seen in outcrop for example in the so called black hole to the west of the mine workings and

steeply dipping joint sets could act as release surfaces in a 45 metre wide unsupported or recently collapsed panel.” I understood his question to be and I think he put it quite directly, is that observation as to how the island sandstone performed or acted in at the time of the shaft collapse on the day that Mr van Rooyen started work, did that or should that have impacted upon the decision to widen the panel?

A. Yes.

MR WILDING:

10 Sir, could I just clarify for the record that I don't think that that was put, that particular passage.

MR MABEY:

I'll take that back.

15 **CROSS-EXAMINATION CONTINUES: MR MABEY**

Q. I think Mr Wilding that I am correct in saying that what was put to you, Mr Reece, is that the fact that there was ravelling failure 30 metres up into the island sandstone, does that or should that have impacted upon the decision to widen the panel, correct?

20 A. In – I would suggest that that's a piece of information that needs to be considered in the cave-in of that panel.

Q. Yes. But did you go as far yesterday to say that it should be a factor that would prevent the widening of the panel?

A. No, I didn't, no, that wasn't my intent.

25 Q. No. I certainly took the implication from the question that was certainly Mr Wilding's possible view, looking for your comment. I understood you to say that perhaps it should have been something to limit the extension of the panel –

A. No, I was saying it's information that you need to be aware in deciding whether you're going to or not.

30 Q. Right. Well, you're aware of the Strata Engineering report that was carried out for windblast potential in the expanded goaf?

A. Yeah.

Q. And the report, and if we could have it up please Ms Basher, it's INVESTIGATE.03.175381/1 and then at 4?

WITNESS REFERRED TO DOCUMENT INV.03.175381/1

5 1230

Q. We go to the second to bottom heading please, bring that up. "Island sandstone is almost certainly thick and competent enough to bridge indefinitely across the planned 31 metre wide panel 1. In the absence of major low to mid angled structure of wider spans up to 50 metres progressive failure is considered likely." In the concluding remarks which are shown at the bottom, "The available borehole data indicates insufficient readily capable immediate route to choke off a potential windblast. The thickness and competency of the island sandstone above the readily capable strata is such that bridging would be anticipated over a panel width of 30 metres with the potential for large areas of open goaf. However, it would be anticipated that should failure actually occur it would do so gradually over time with structurally controlled block sizes insufficient to result in windblast. This has been the experience in the adjacent Spring Creek Mine," and then they go on to say that in the case of a wider 50 metre panel is progressive structurally controlled goaf formation is considered likely. The reason I'm referring to that is that the report from Strata when it comes to expanding the panel from 31 to possibly up to 50 metres is indicating that any collapse in the island sandstone would be progressive and gradual?

25

A. That's what they're saying.

Q. The company obtained a further report from Mr Lawrence of GeoWorks Engineering Limited on a similar subject, and that is DAO.001.10780 and it's at page 4 please, and if we can go down to the bottom half of that page please?

30

WITNESS REFERRED TO DAO.001.10780

Q. The conclusions of the model outcomes, the results of the modelling. Point 2, "Roof caving occurs to the base of the island sandstone in all

models. Caving of the island sandstone can be expected for the 70 metre wide panel too.” They were looking forward to the second panel. “Minimal caving of the island sandstone is indicated for the 30 metre wide panel. Increased height of island sandstone caving is indicated for the 45 metre wide panel.” That conclusion from the modelling is consistent with what had already been said by Strata, agreed?

5 A. Yes.

1235

10 Q. When Dr Bell was commenting in the appendix about the result, the effect, of widening the panel and had made his observation about what had happened to the sand stone, in the shaft collapse. He said that, “Based,” this is at page 60, “Based on the ventilation shaft collapse model it is considered more probable that a slow ravelling-type failure would occur over days to weeks once break-back had occurred to the top of the Brunner/Rider seam.” All of this information, and I accept that this is after the fact of Mr Bell, all of this information boils down to this doesn’t it. The panel was to be expanded, reports were obtained, Strata said there could be break-back further into the sandstone but progressive?

20 A. Mmm.

Q. GeoWorks said the same thing but said, “Got some reservations about the assumptions we’re making.”

A. Yes.

25 Q. Dr Bell subsequently was of the same view?

A. Yes.

Q. And of course the people on the ground, including my client, would have hands-on visual knowledge of the, what happened when the shaft collapsed, what the sand stone did, what it looked like?

30 A. Yes.

Q. And from a geologists perspective that may have been very useful, would you agree?

A. Yes.

Q. The DOL report says, at page 27, in the summary this, "PRCL went ahead with the extension of the panel with extraction limits to maximise the extraction of coal." And that's correct, the panel was extended, the goaf was extended and one or two of your scenarios relies on the goaf fall and that can't be disputed?

5

A. Yes.

Q. But it says this, "In spite of a lack of specific geotechnical advice and geological data about caving behaviour." Now that's come from the summary in the DOL report. It's been quoted in this week, it's been referred to. The reality is, and I ask for your comment, is that the panel width extraction or the panel was widened, not in spite of a lack of specific geotechnical advice and geotechnical data but with and as a result of that data, would you agree?

10

A. I understand your point. I think the concern that was being made was to some extent based on Dr Lawrence's qualifier that he would like to see more information but I understand your point. The point for me is it was going to cave. The widening factor meant that it's potentially going to cave higher. It's actually not the height that concerns me as much as simply the caving characteristic, the fact that it was going to cave and that would prompt caving and what width, what expanse of cave concerns me more.

15

20

Q. Yes, and of course the wider it is the more caving potential for lack of bridging quality?

A. Yes, but I take your point as far as in spite of, rather than with the information.

25

Q. And my point is that this particular reference in the DOL report, I suggest to you, is completely wrong and misleading to say that the company, and it was my client who signed off the permit to mine on the extension, the company had obtained the strata report, it obtained Dr Lawrence's report which was consistent with strata but he said, "I've got reservations about my assumptions." Dr Bell comes in and says, "Well, it would've been progressive over time." This particular aspect of this report which is essentially saying, and it does say this, "The

30

company did not pause to gather the information it needed to fully assess the hazards associated with the decision that is to widen the panel, is inaccurate, wrong, misleading and unfair.” Would you agree?

1240

5 A. I wouldn't say that we'd go to that extent, but our concern was that there was information that did not appear to, didn't entirely appear to have been paused for, that's all.

Q. But there was nothing in any report obtained that said, "Don't widen the goaf."

10 A. That's correct.

Q. And the decision to sign-off the permit to widen it was made after expert consultation?

A. Yep. Can –

Q. Which you would expect is a prudent management step?

15 A. Yes, you would. Part of the frame of reference that we were coming from too was to understand why the concern with widening the panel, and it seemed to me particularly to me as an operator in this instance that it was more primarily concerned with surface subsidence as has been mentioned, rather than an actual cave-in of the goaf, and in that
20 respect I have less of a concern with the widening from the subsidence point of view, and similarly and to the point being, what is the cave-in characteristic going to be and the immediate working of working area of that particular excavation. That's my focus. But we were concerned that it was more, more concerned with managing the subsidence rather
25 than the goaf cave-in.

Q. Yes, and I appreciate the point. I mean the island sandstone was sufficiently robust to deal with any subsidence issues which may have got the company into trouble with their access permits.

A. Yes.

30 Q. But the way that that particular comment is put and the way that other things have been taken from Lawrence's report would suggest to someone reading this report that goaf shouldn't have been extended. The panel should have stayed 31?

A. I appreciate that.

Q. And I'm suggesting that what is not just an inference, it's a statement in this report, is wrong, misleading and unfair, particularly to my client. Would you agree?

5 A. I take your point.

Q. Yes, because the emphasis has been made later on in the DOL report at page 131, at 318.9, really perhaps to hammer home the executive summary point, that Lawrence had noted that extending panel 1, 15 metres down dip had decreased strata stability against a flanking normal fault, something that was put to you yesterday by counsel.

10

A. Mmm.

Q. Well, that's it, just a geological reality, isn't it?

A. It is.

Q. You're going towards a fault you might get some instability in that direction?

15

A. You could expect it, yes.

MR WILDING:

Sir, I don't wish to take time correcting certain matters, but rather simply wish to record that the transcript at pages 4596 and 97 accurately record the questions that I asked and their tenor.

20

THE COMMISSION:

Four?

25

MR WILDING:

Sorry, 4596 and 4597.

CROSS-EXAMINATION: MR HAIGH – NIL

QUESTIONS FROM COMMISSIONER HENRY:

Q. Mr Reece, several questions, you mentioned at some stage the name "spaghetti junction"?

30

A. Yes.

Q. And you made an oblique comment about that name. I took it to mean that you were concerned in some way about that area?

A. Oh, I find it somewhat perplexing. It's almost an admission that in a formal sense that this is less than ideal, simply by the fact that there's so many utilities running in a disordered manner that even the mine acknowledge that it was not ordered, so it was just – and my comment, and my question, my discussion in the early stages of the investigation was along the lines of do people actually really formally call it that? So it was more some degree of surprise to some extent because I actually needed to clarify what we were going to call that sort of an area and I was surprised that it was actually formally referred to as that.

1245

Q. So that really relates to the design of the mine, in your mind?

A. Well at that point, and that's not to take away from yes if you have difficulties in those changes that occur that you do need to modify and things are less than ideal, but it was just striking the number of services and the array was perplexing.

Q. Now the next question I have is about drainage, gas drainage, and I just want to make sure that I understand that if I follow your evidence, that given the amount of methane at Pike River?

A. Yep.

Q. The first approach should have been to reduce the level of that methane?

A. Ideally, yes.

Q. Through drainage?

A. Yes.

Q. And then deal with the rest through ventilation?

A. That's correct.

Q. And I think you said that the areas to be mined should be drained for a certain amount of time or an amount of time before extraction started?

A. What we typically find is that you need time to drain. So it actually needs to be, ideally, factored into your mine design so that you can get drainage holes in advance of the mine workings so that you give the

area a sufficient amount of time to drain to a level whereby the ventilation can then manage the rest. You can't actually drain all of the gas out of the coal so it's a case of minimisation and it depends on the seam characteristics as to how long that's likely to take and what the
5 expanse is that you're trying to drain from and the spread of the holes in that area, so there's a number of factors. So it's not actually a case of simply wanting to have time before you go in there. It's actually needing the time to allow it to drain is the point.

Q. That, from what I heard, could be as long as six months?

10 A. Well it depends on the characteristics. If you're talking about an expansive area that could be significant. I wouldn't expect that that area of the mine would need anywhere near that sort of time and that's to do with the permeability, the actual allowance of the flow through the coal, but in bigger operations six months is not uncommon. But it's more a
15 case of trying to get a reasonable estimate of what the duration is so that you can plan for it.

Q. And in regard to ventilation I think you explained very clearly how the amount that was going in to start with is dissipated by various means including resistance of the tunnel and so on?

20 A. Yeah.

Q. Is it normal in your industry to build in safety buffers if you like in these calculations? In other words from a layperson's point of view, say you needed 130 litres a second out a certain point?

A. Yes.

25 Q. Is it, given all the problems that you might have, is it normal to try and make that 150 or how do you do it?

A. It's probably not a case of problem. It's just the physical engineering and the physics of providing ventilation. So by nature you need to overdesign in order to get an appropriate quantity to the location that
30 you need it. But it's also about having quality of installations, so it's twofold, yeah.

Q. So it's overdesign and quality?

A. Yes.

Q. Was the two factors you talk about?

A. Yep. But the overdesign, again you're actually installing the ventilation and the ventilation devices. Part of the process needs to be fairly regular monitoring and assessment of it, of the ventilation system so that you know what your efficiency is, and if the efficiency starts to drop off, then things need to be done.

1250

A. And there are options such as improving the ventilation devices, obviously but also adding other roadways, indeed that's what they were in the process of doing was completing that third roadway but also then potentially increasing fan speeds or even changing fans or providing different systems but it's a case of designing and engineering that system.

Q. My final question really is with regard to the expert panel exercise that you've been through where you've given the lack of access. You've had come up with various scenarios based on the best information you could get and I think we appreciate very much that work. It does leave a fairly nebulous situation which can't be avoided, I guess, but has any work of this nature been done before elsewhere where trying to solve this conundrum without access. Have you personally or any of your members of your panel had any experience similar to this in the past?

A. Similar but obviously not the same sort of extent but yes, and it typically ends up being done through boreholes. And my personal experience has been attempting to get in with boreholes particularly into goaf areas but then even when we were able to gain access to the work areas, if it's in a goaf you just can't get in there to know, but obviously in other areas, David, Professor Cliff has certainly conducted an extensive amount of work in attempting to analyse similar situations again with boreholes with cameras and so on and whilst there is a certain amount of description it's still quite elusive. Even some of the mines, so there's been, sadly in Australian context, in recent times there's been similar sort of events that have also been attempted with cameras and indeed,

re-entry and not necessarily conclusive but certainly refining, I suppose, that'd be the point.

QUESTIONS FROM COMMISSIONER BELL:

1253

- 5 Q. Mr Reece, good afternoon. I've got a few questions on a range of topics. Just on the first one, if we look at one of your premises for this matter was the goaf fall releasing large volumes of methane through cross-cut three one west stopping. If this stopping had been built to a 5 psi standard?
- 10 A. Yeah.
- Q. Couldn't the explosion have been avoided altogether?
- A. I don't know if we could – it depends on the nature of the explosion, and if indeed that's been the only source, but it starts to limit the options. It would be a case or the expectation would be a case it would be
- 15 contained within the return. If it was the fan that provided an ignition source or indeed a diesel that was in that return, then potentially not, but it reduces the likelihood of other situations.
- Q. We've talked about the main fan a lot here. I mean I just want - have you come across a main fan being underground anywhere in the world?
- 20 A. The only installation – sorry, a main fan, no.
- Q. Yes.
- A. A booster fan, yes but a different situation.
- Q. Should the regulator have allowed that main fan to be there? As a regulator yourself in another life?
- 25 A. I couldn't have. It's simply because of the fact that it's in immediate danger of damage and you don't have the ability to for ongoing ventilation.
- Q. Just a bit more on ventilation. In Mr White's evidence which he will give next week on paragraph 50(d), he says there was more than adequate
- 30 ventilation?
- A. Mmm.

Q. Whereas in 69 and 70 paragraphs of your statement, you're basically saying that's not the case, that at least one working face should have been stopped?

A. Yes.

5 Q. What's the Commission to take of these two opposing views?

A. I guess my understanding from an earlier statement from Mr White was also an acknowledgment that they were actually having to reduce the ventilation quantity and indeed throttle back auxiliary fans in that inbye area. So to us there was an acknowledgment that from a mine
10 perspective ventilation was sufficient to run a certain amount of mining areas. Our concern was they were trying to do too much. The other thing that we found was that, and I've touched on it in the, it was touched on in the report, was that the auxiliary fans in 3 and 4 in the furthest extent of the mine in that six cut-through area of one west, were
15 actually providing a boost.

1256

A. So they were actually assisting the ventilation and that's not intended to be the design, they're not supposed to work that way, so we still have concerns that it's not quite sufficient. Indeed even the deputies' reports
20 were saying that they were often modifying the flow through the auxiliary fans to get sufficient control.

Q. This is probably ventilation as well, but do you think that the, and I know you're not a hydro-mining person, but do you think the hydro-mining panel could've safely have been mined. We've heard evidence of
25 methane being wafted off there, the fringe, the goaf and the workings when the monitor was started up, could that have been mined safely with the ventilation as it stood?

A. It would appear that even with the ventilation as it was, there was still situations where significant volumes of methane were being flushed out
30 into the return so even if the ventilation had been beefed up there's still that concern that there's significant volumes going through that fan and that's something that wouldn't have been allowed, so potentially there's

need for removal, dilution, something else to control it. At the time, not acceptable to send 5% down a return.

5 Q. Just getting onto the FAB the fresh air base, well, we've looked at this in some detail across the Commission, whether it's a changeover station or a refuge bay or an FAB can you comment, was it any of those. I mean in terms of a brattice door, water running down one wall, a methane riser within, does it fit the definition of any of those areas?

10 A. Not from our experience it's not the location that you would've had it if you were indeed, you should have something. You need a changeover station, you need some means for changing breathing apparatus in an underground mine in order to affect an escape but you would be aiming to have that in, as far as you could, a position of safety. And some of those things don't add up to a position of safety, aside from the brattice door.

15 Q. Just on another topic, talking about the inexperienced workforce or the number of new people working there, as a mine manager, what's the sort of normal ratio you would expect inexperienced workers versus experienced workers?

1259

20 A. Gee, that's actually changing with time. You'd like to say no more than about 10 or 20% inexperienced workers. But the sad reality we're facing at the moment with expansion in our industry is you might be up to 50%. You certainly wouldn't want to go anymore than that. You need, and even at that level, that's concerning for me because – and that can even relate to the level of supervision and depth of knowledge of supervisors in that area, 50% starts to become way too much, that's starting to be the numbers that we're looking at.

25 Q. Do you have any feel for the numbers at Pike?

A. No, I don't. I really didn't have a look.

30 Q. We had evidence from a Mr Albert Houlden who did make comments along that area that there was a large number of experience – inexperienced miners. Do you think the contraband problems could be

maybe a little related there was inexperienced people there that didn't realise?

5 A. I would expect so. That's typically how it arises because people don't appreciate the nature of the hazard and it doesn't, it often doesn't strike them as something that's evident. You can't see gas. You can't smell it. You can't – methane. So, it almost becomes an unknown or an unnecessary until people can comprehend the gravity of the energy involved, so...

10 Q. Talk about ignition sources just very quickly, based on your report, or the expert panel's report, the main fan is a low probability than for arguments sake, other electrical installations inbye the mine, is that?

A. That's correct, yeah.

Q. With respect to diesels, are there any documented cases of diesel vehicles being sources of ignitions in this sort of situation?

15 A. Well there's, you're going back quite a number of years, there are instances of diesels being sources of ignition. In recent times it's more to do with them being uncontrolled in, not being able to be controlled in a high methane situation, not necessarily creating an ignition source, but certainly creating a great degree of alarm, so there have been instances
20 where diesels have caused an ignition, or suspected to have caused an ignition.

Q. And frictional ignition, rock on rock, I mean how common is that? I know, I accept, you know, that the other variations of frictional ignition, but rock on rock, is that particularly?

25 A. Yeah. It's one of those things that's not been excluded. There's been laboratory testing that's been able to replicate or to demonstrate it, but it's one of those things that's not been found in a true mining sense.

Q. And just getting onto gas monitors, did you check the calibration records of the gas monitors that were in use at the mine?

30 A. Yes, there was some work done on those but I don't recall exactly all the upshot of the –

Q. So you can't comment as to whether or not they were poorly calibrated or calibrations had been missed or they were out of calibration?

1302

A. Some were noted as being things like alarms not set at the correct level. There was some indication of calibration that didn't appear to be right.

5 Q. And to use Mr Wilding's words, a prudent mine manager would ensure that all of the gas monitoring equipment at the mine was calibrated?

A. Yeah.

Q. All of the time?

10 A. And that's one of the things that goes into your maintenance management system. It's about regular and ongoing focus on that and demonstration of it.

Q. Just finally. This mine was a difficult operation in terms of many definitions?

A. Yes.

15 Q. And in fact what it needed was really the best of everything. It needed the best gas monitoring, it needed the best methane drainage but in fact the opposite happened. Is that a fair comment do you think?

20 A. I suppose it would be unfair of me to comment because I really didn't have, I obviously didn't have any day to day or any deeper interaction. I suppose just to qualify a point. I made the comment that it was a tough mine, but then my experience is there's lots of tough mines around. So what it does mean is that that means that the diligence employed needs to respond to that level. From my perspective none of the hazards involved were outside the realms of good mining practice or knowledge, so those things needed to be implemented, and that then particularly renders a tough situation manageable but it's a case of implementing
25 those things, and what we're saying is that there were deficiencies in the application of those practices.

QUESTIONS FROM THE COMMISSION:

30 Q. Mr Reece two, I hope, short points. Firstly, you've just told Mr Henry that the six month drainage estimate you gave yesterday would not have applied to Pike. What would you say for Pike?

A. The difficulty for me is you actually need to determine the drainage characteristic. There were graphs that were showing the lead times on the drainage characteristic and in effect a tailing off the gas, but I don't recall the actual time intervals and could certainly have a look and see what that is, but it relates to permeability, but the gas will actually tell you the story of how long it's going to take.

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1305

Q. The second thing is to do with the location of the likely ignition source. I understood you to say that the panel favoured the inbye development or working area of the mine because of the heat characteristic experienced in the drift and because of the absence of a reflection wave at the portal?

10
A. That's correct.

Q. That brings me to your paragraph 118.2 and I'm just wondering whether it's got a misprint in it. It says this, "If the explosion occurred near the inbye development faces, then it would be expected to see a reflected explosion wave following the initial wave. Only one pressure wave was evident." That seems to me to be inconsistent?

15
A. Yes, yes. I think the point that was being alluded to was it needs to be further inbye but it's difficult to predict exactly where. If it was further inbye but not right in the immediate areas you would expect to see some sort of reflectance. So we're saying, I think it's more of an inbye area but not, further inbye but not midway between if that makes sense, so that you get that reflection. I think we need to tidy the language up at that particular one and I've noted it, they need to clarify, it maybe a miss. It's obviously not clarified enough for our purposes.

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RE-EXAMINATION: MR MANDER

Q. Mr Reece, you were asked about a conclusion contained in the summary of the department's report, DOL3000130010, relating to the lack of specific geotechnical advice and geological data, could I ask you to have a look at the body of the report, paragraph 3.21, if you could?

**WITNESS REFERRED TO DOL3000130010 – PARAGRAPH 3.21
PAGE 135**

1308

5 Q. I'm not sure if this can be brought up or not? Paragraph 3.21.1, it refers there to the need for core drilling for additional data. Perhaps if I just give you the opportunity to read through that paragraph?

A. Yeah.

10 Q. Now is it apparent that the advice that was received from the consultants was premised on the basis that there would be further information, further in-seam drilling to obtain more data in order to make a more accurate assessment –

A. And it's actually not in-seam drilling. They're actually talking about surface drilling, but yes, drilling into the roof strata to get a better idea.

15 Q. So the reports that were obtained were premised on the basis that this exercise or this type of exercise would be undertaken in the future to test the modelling undertaken by the geotechnical advisors?

A. That's what it would appear, yes.

1310

20 Q. And I'm mindful of time, but the report goes on to note that from interviews and from documentation it's apparent that that core data wasn't subsequently obtained. Just the other matter. It was put to you or you were asked to consider the utility of a further borehole being drilled down into the vicinity of the goaf region for the purposes of furthering the investigation. Would you accept that the efficacy of doing that and obtaining useful information would also be dependent upon
25 technical advice regarding what could be viewed down that borehole having regard to the lighting and the capacity and ability of the particular camera?

1311

30 A. Definitely and that was the comment I made. It's about the field of view that you can achieve and where you need it and what you expect to see, what you need to see as a result of that, yes.

4704

WITNESS EXCUSED

COMMISSION ADJOURNS: 1.12 PM

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