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INDEPENDENT PLANNING COMMISSION

MEETING WITH INDEPENDENT GROUNDWATER EXPERT AND DEPARTMENT OF PLANNING, INDUSTRY AND ENVIRONMENT

RE: HUME COAL AND BERRIMA RAIL PROJECTS STAKEHOLDER MEETING (SSD7171 & SSD 7172)

PANEL:	**PETER DUNCAN AM (Chair)** **PROF ALICE CLARK** **CHRIS WILSON**
ASSISTING PANEL:	**LINDSEY BLECHER** **CASEY JOSHUA**
GROUNDWATER EXPERT:	**HUGH MIDDLEMIS**
DEPARTMENT OF PLANNING, INDUSTRY AND ENVIRONMENT:	**STEPHEN O'DONOGHUE** **PHIL JONES**
LOCATION:	**VIA VIDEO CONFERENCE**
DATE:	**9.01 AM, FRIDAY, 16 JULY 2021**

MR P. DUNCAN AM: Good morning, and welcome. Before we begin, I'd like to acknowledge the traditional owners of the land from which we variously meet today, which for me is the Darramuragal or Darug people. I'd like to pay my respects to their elders past, present and emerging. Welcome to the meeting today to discuss the Hume Coal and Berrima Rail project which is currently before the commission for determination. Hume Coal Pty Ltd is the application and is proposing to build a new underground coal mine in the Southern Highlands region of New South Wales and develop associated rail infrastructure to support the mining operations.

Two components are the subject of two separate development applications made to the Department of Planning, Industry and Environment but, for the purposes of this assessment, are integrated. The associated projects are located 100 kilometres south-west of Sydney and seven kilometres north-west of Moss Vale in the Wingecarribee Local Government Area. My name is Peter Duncan. I am the chair of this commission panel. I'm joined by my fellow commissioners, Professor Alice Clark and Chris Wilson. We're also joined by Lindsey Blecher and Casey Joshua from the Office of the Independent Planning Commission. We are meeting today with Hugh Middlemis, the independent expert for – who provided advice to the department during its assessment of the project.

I'd like to note that Mr Middlemis is a member of the Mining and Petroleum Gateway Panel, which is a subcommittee of the commission. However, I confirm that because the project is not located on biophysical strategic agriculture land, the commission's Mining and Petroleum Gateway Panel, and, consequently, Mr Middlemis has not been – has had no involvement with the project on behalf of the commission. In the interests of openness and transparency, and to ensure the full capture of information, today's meeting is being recorded and a complete transcript will be provided and made available on the commission's website.

This meeting is one part of the commission's consideration of this matter and will form one of several sources of information upon which the commission will base its determination. It is important for the commissioners to ask questions of attendees and to clarify issues whenever it is considered appropriate. If you are asked a question and not in a position to answer, please feel free to take the question on notice and provide any additional information in writing which we will then put on our website. I request that all members here today ensure they do not speak over the top of each other so that we can get accuracy of the transcript. We will now begin. Over to you, Steven.

MR S. O'DONOGHUE: Thanks, Commissioner. Yeah. Steve O'Donoghue, Director of Resources ..... Hugh did also undertake the expert review of the groundwater modelling on behalf of the department, and I'll throw it over to you for questions, unless you've got some ..... comments you want to make, but otherwise we can probably just ..... the question.

MR DUNCAN: Excellent. And, Hugh, there's three questions that we've put on the agenda, so I'm happy to have a ..... you wish to make, but we'll work through those three questions and hopefully have a discussion towards the end.

MR H. MIDDLEMIS: I might need a little bit of clarification on some of those questions. There – there's some detail in there that I don't really understand.

MR DUNCAN: Okay. All right ..... do you want – have you got anything you want to ask on that one? I think that was pretty clear.

MR MIDDLEMIS: The question – well, the devil in the detail in this case was the questions raised about the assumptions, so that the questions have been raised by whom, and which assumptions in particular would you like me to comment on?

MR DUNCAN: I might ask Alice or Chris if they wish to comment on that.

MR C. WILSON: There were references to standard industry assumptions and that those standard industry assumptions hadn't been used in the modelling. Is it – could that be clarified, please?

MR MIDDLEMIS: If you can point me to where that question specifically is perhaps. I'm not – in my review of all of the work, I'm not aware of any – any major flaw.

MR WILSON: It was in the department's assessment report. Steve, you might want to talk to it.

MR MIDDLEMIS: You got a date on that, Steve?

MR WILSON: You're on mute, Steve.

MR O'DONOGHUE: I think it's more in issues raised by DPIE Water, I guess, about some of the modelling assumptions that they weren't – weren't happy with, so I guess the – the – I guess all of the independent peer reviewers on the proponents' side and Mr Middlemis were – you know, in terms of the model being fit for purpose, agreed that that was the case. I think the – the question is more – probably more related to some residual issues that DPIE Water, sort of, raised in relation to some modelling assumptions around hydraulic conductivity, in particular, and some of these assumptions around the use of Berrima Colliary data.

MR WILSON: Okay. So is that a question that we'd more appropriately ask to DPIE Water? Is that – is that what you're saying?

MR O'DONOGHUE: It's a question you can ask for DPIE Water, but, like, Hugh might want to comment on, I guess, his view of the – more broadly about the modelling assumptions and the being fit for purpose for the – for impact assessment.

MR WILSON: Okay. Thanks.

MR MIDDLEMIS: So I've just had a quick look at a couple of the statements from DPIE Water dated 2019 and 2020, and there's one mention of assumption, and that is in relation to the drawdowns associated with extraction volumes because of injection of water into the mine down voids. Those issues have been addressed quite thoroughly in the latest independent review by Dr Lloyd Townley, so I – you know, I – I think those questions about the assumptions have been – have been definitely addressed. The other points Steve raised – one was about variations of permeability with depth, and I note that the DPIE Water memo, I think, on the 2019 date draws attention to it and suggests that there's no indication of a decreasing permeability with depth, and they – and they – to justify their claim – I don't think it holds water, their argument.

To justify their claim, they point out that there are some occurrences of, you know, highish permeability with depth, but there's quite a clear trend line of decreasing permeability with depth, so I think they're trying to suggest a weak argument to support their view that permeability increases with depth, and also their view that there is a high permeability zone immediately overlying the coal measures, and those points have been, again, considered and addressed in the latest review by Dr Lloyd Townley as well as my reviews, as well as responses from EMM, not that I'm defending EMM at all, but it seems to me that DPIE Water are the ones – are the one suggesting – or making an argument for a certain case, and I don't think the facts justify the argument.

PROF A. CLARK: Peter, I think that covers off on that – that point.

MR DUNCAN: Yep. You're happy with that, Alice?

PROF CLARK: I am. Chris?

MR WILSON: Yes. Fine. Thanks.

MR DUNCAN: Okay. All right. Well, let's move to the next one, the clarification of groundwater concerns with reference to the aquifer interference policy.

MR MIDDLEMIS: Yeah. I'm not sure that I'm in a great position to comment on whether or not it's acceptable. I can say that the drawdown predictions that were made were made, essentially, by what we call scenario differencing, so you take a mining case and then a non-mining case and difference the two, and that is a method that's indicated in the best practice guidelines as a way of reducing uncertainty. So you've got a – you've got an approach that uses uncertainty analysis, in the first case, to identify the probability associated with those impacts, and you've used scenario differencing which helps also further reduce that uncertainty, so the predictions, I think, are reasonable and robust – a reasonable and robust indication about what might happen. I don't think I'm – I would put myself forward as making a judgment on whether or not they're acceptable.

MR DUNCAN: Okay.

MR WILSON: Okay. Thank you. So was that the same – was the scenario difference method used at Tahmoor?

MR MIDDLEMIS: Yes. It's a very common method used at Tahmoor.

MR WILSON: Okay. So it's standard practice, yeah?

MR MIDDLEMIS: Well, yeah.

MR WILSON: And at Tahmoor – correct me if I'm wrong, Steve – those predictions were found to be very conservative; is that correct?

MR O'DONOGHUE: I think with the Tahmoor case, the issue there is that there's a lot more data available because of the – the North Tahmoor Mine has been operating for a long period of time, so that – that informed the model, because the other point is that they've got a lot of, I guess, experience in the actual – what the actual impacts that occurred at the North Tahmoor Mine, which – which was demonstrated in that – the number of bores impacted or that required make-good or compensatory water, was very low compared to the predictions of the model in that instance, and the company could rely or draw on that data to, you know, support their arguments of the likely level of impact on the compensatory water.

MR WILSON: So how does it work? Does the actual data – is that actual data used instead of certain assumptions? Sorry. I'm not a groundwater person, obviously, but is that how it occurs?

MR O'DONOGHUE: Well, I guess there – there's two things, I guess. The model is predicting a drawdown. The aquifer interference policy sets a minimal acceptable level of two metre.

MR WILSON: Yep.

MR O'DONOGHUE: So that gives an indication that if it exceeds that that there's – there may be a requirement for compensatory water, but it depends on the individual circumstance of the bore – the bore and the – you know, the depth of the bore against the drawdown predictions. So for Tahmoor – for the Tahmoor South and North, where there's quite a extensive layer of Hawkesbury Sandstone that the bores are tapped into, I guess, what they've found is that the impacts on the bores, despite the predictions, haven't occurred in terms of the people seeking compensatory water.

MR WILSON: Okay. Alice.

MR DUNCAN: We talked about this last week quite a bit, didn't we, and - - -

MR WILSON: Yeah. We did.

MR DUNCAN: - - - earlier in the week, but – so the issue here when we go to the second part of the question, in the applicant's view, is to do with the depth that is raising the difference between the two, isn't it? That's the major – major point.

MR O'DONOGHUE: I guess in terms of, like, depth to the coal seam and the – and the geological layers above the coal seam and the – I guess the depth of the water source in the Hawkesbury Sandstone are different in the two locations.

MR WILSON: Yeah. The – correct me if I'm wrong. The depth at Tahmoor South Bore, it's about 300, isn't it, 350?

MR O'DONOGHUE: I think it's about the order of 350 to 400 metres.

MR WILSON: And here we're talking, what 80 to 170, are we, or .....

MR O'DONOGHUE: Well, 120 average.

MR WILSON: 120 average.

MR DUNCAN: Okay. Alice, do you have anything further on that one?

PROF CLARK: No. That – that covered off my questions there, Peter.

MR DUNCAN: Okay. And then the third one is issue of the deterioration, potentially, of the bulkheads over the long term and what impacts that might have on groundwater. So I'm not sure – Hugh, would you like to comment on that?

MR MIDDLEMIS: I will try to, Commissioner. This is a question where I might need a bit of detail. Let me try to give a bit of an answer. If I understand the question, it's about, in the long term, in other words, once the mine has closed and the groundwater levels have recovered, bulkheads are there, and they're holding some perhaps less quality water than in situ, what would happen if they failed? And so I have to – I have to speculate because a simulation hasn't been done, but the model is very capable of running a simulation called particle tracking. Very easy to do in a matter of hours, sort of thing, no need for recalibration or anything.

You put some particles in the mole at depth, you know, behind the bulkheads, as it were, and then you run a simulation forward, and the particles just move with the flow and show you where that flow might go. That would be the best way I could provide objective evidence of what might happen, not where this flow might go, but in order to get flow, you need to have a gradient, and we're talking about an aquifer at some depth, and usually the circulation of flow is, sort of, shallow.

You have to – you have to conceive of – of a – of a flow – of a gradient that – that mobilises water at depth and brings it towards a receptor, say, a bore that might be pumping, so I – you know, you'd – I have to speculate to suggest how that might happen, but, certainly, if a bore was nearby and pumping, and – and that bore was at

similar depth to the bulkheads or perhaps a little bit above it, and the bulkheads failed, it's likely that such a bore would draw whatever quality water is behind the bulkhead towards that bore. So that's – that's definitely a possibility if the bulkhead failed. If there was nobody pumping nearby, I'm suggesting that probably not a lot would happen, but, really, that's speculation which should be tested with a model simulation called particle tracking.

MR DUNCAN: Okay.

PROF CLARK: So, Hugh, if I understand you correctly, the modelling approach is able to do this, there are sufficient data inputs that could go into it do this, and it wouldn't take long to do this. I – just from my own information, and, Hugh, it may not be a question to yourself, maybe to Steve or to yourself, has anybody asked for this to be done in – in previous work on this - - -

MR MIDDLEMIS: I don't know.

PROF CLARK: Steve, to your knowledge, has anybody else asked for this to be done?

MR O'DONOGHUE: Look, I don't think – I don't think that's the case. Yeah.

PROF CLARK: Okay. All right. Thank you. So we know the depth and we know the juxtaposition of the bottom of those bores to where this – this might occur from the mine planning. We actually have the inputs to be able to do this.

MR MIDDLEMIS: I believe so, yeah, from – from what I've seen in the reports. Yes.

PROF CLARK: Thank you.

MR DUNCAN: And, Alice, we have the information from the mining experts as well, so we have the scenario if we wish to pursue it.

PROF CLARK: Sounds like it's only a couple of hours' work.

MR MIDDLEMIS: Can I just – just for – as usual, with modelling, there's devil in the detail. Couple of hours work to show where the flows paths might go. If you wanted to analyse the concentrations of whatever contaminates might be involved, that's – that's much more work, and I'm just saying if you wanted to have an idea about whether or not a plume – hate to call it that – could be mobilised from a certain place towards another place under conditions of pumping or no pumping, that's a few hours' work with particle tracking, easy to do.

PROF CLARK: But the qualitative impact on that water that comes out of the bore is a – is a bigger job.

MR MIDDLEMIS: The – analysing the effects on concentrations from the source, which is behind the bulkheads, to the destination, which is a pumping bore, for example, what happens along that flow path? Changes to concentrations, that's a bigger job. That – that's weeks.

PROF CLARK: Thank you.

MR MIDDLEMIS: But – sorry. But you could still use the modelling tool to do it. It just – it's just a more detailed difficult task.

PROF CLARK: And would that task involve an understanding of the material that that water flows through before it gets to the place where the bore is sucking it up.

MR MIDDLEMIS: It would, but I think there's already quite good characterisation of water quality across this area. You might have to speculate a little bit about the quality of the water that's going to be held behind the bulkheads. I don't know if there's been any column testing or anything of how the – how the coal rejects or whatever it is they're going to store underground might interact with the in situ aquifer down there. I'm not – I guess it's been looked at. It's not part of my work. I haven't looked at it. That might need a bit more work, but I think the in situ character of – and quality of the aquifer is probably quite well known.

PROF CLARK: Yep. So given that they'll be placing coal rejects down there, that would be a very important factor to include in that modelling.

MR MIDDLEMIS: Yes. We – what we're talking about is source pathway receptor modelling, so the source is behind the bulkhead. You have to understand what that is. The pathway is the flow path, and the receptor is whether or not you have a bore that's pumping or whether it's just the aquifer just – just sitting there without any other outside influence. You have to understand those processes, and then you can run the simulation. This is a – this is, once again, a very – quite a standard source pathway receptor-type impact assessment. It is a very standard mining impact assessment method. It was used in this case with Hume – with the Hume Coal Project anyway for looking at groundwater ..... assistance. This is just a slightly different version of it.

PROF CLARK: Thank you.

MR DUNCAN: Thanks. Well, that's bringing us to the end of the formal questions. Do we – Chris or Alice, do you want to ask – we had a discussion before about make good and then the timeframe. Do we want to talk about - - -

MR WILSON: Yeah. Just – just a general question, Steve. It doesn't involve you, I don't think, but post – post-closure – so 20 years has passed. There's make-good provisions in place. How do those make-good provisions deal with the potential impacts beyond mine closure? In my understanding, drawdown would continue for considerable time. I think it's 45 years' recharge, is it, or – I can't remember the

exact figure, but how do those – how would those make – make-good provisions deal with post-closure impacts?

MR O'DONOGHUE: Look, it – it's a difficult one, because you would be relying on assumptions in the – in the model about – like, at that time, you know, there's – most projects we would require ongoing model recalibration and validation. If some of the impacts are in the future or they start later in the mine life, you would need – you know, you would need to factor in that future loss, you know, particularly if the – if, you know, the mine was being rehabilitated and, you know, surrender of mining leases and, you know, surrender of consents, etcetera, so there would have to be a dollar value, that present value determined in terms of what that could be potentially, but it's a – it's a difficult one. That – I guess, it's one of the issues I guess we raised in our presentation, that factoring in future loss is problematic and you know how you would do that.

MR WILSON: So it's based on prediction, but if those predictions are wrong or, for instance, if there's inconsistency between what's predicted and what happened, how is it resolved?

MR O'DONOGHUE: Look, I guess as the – as the system – one thing about that is the system gets stressed, you know, if mining develops. You know, that informs the model. You get a better - - -

MR WILSON: Actual data?

MR O'DONOGHUE: Get actual data about – following the stressing of the system, so, certainly, over time, that – those predictions would improve and better inform, you know, that potential ..... I don't know. Hugh, have you got any, sort of, comment on that?

MR MIDDLEMIS: No. I agree. You'd make a good groundwater modeller, Steve. That can be the answer you give. The model, as it is, is based on information to date. More – more information becomes available when you – if the mine gets approved and it does ahead, in that that's a – that would put big stress on the system. To date, we've only got pumping test stressors and things like that. Doing mining is a much bigger stress on that system, so you learn more about how the system responds, and, therefore, when it – you would – you know, as you get near closure, you would do some simulations with an updated model that would give you a lot more confidence in – in what happens post-mining.

MR WILSON: Okay. So the bottom line is all those make-good provisions would need to be sown up before 20 years, the end of the mine, Steve, or – is that how it works?

MR O'DONOGHUE: Look – look, they – they would be. I mean, I guess they're predicting through the life of the mine – they've got predictions now on when – when bores, you know, would be impacted as the – as the mine develops. So it'd be

a change in – through the life of the mine. I guess they need to look, you know, towards – towards the end of mine life prior to – prior to closure to come to a final, sort of, agreement on – on what the – that compensation or make-good - - -

MR WILSON: Okay. So from an administrative point of view, how does it work after mine closure? The mine is still responsible, yeah?

MR O'DONOGHUE: Look, the mine – the mine is still responsible. I mean, I guess, this is why we're saying administratively it's difficult with a large number of bores, you know, in our experience with the things we're involved in. One of the issues that does come up is about that future loss and ability to determine what – what that is. So it is a difficulty, but you would – you know, you wouldn't need – there would need to be some – some, I guess, expert input at that point to determine what – you know, what solution there is for – that would provide that compensatory water or alternative, you know, into perpetuity.

MR WILSON: Okay. Thanks.

PROF CLARK: So just so I understand that, following on from Chris's question, the mine closes, it's 20 years down the track. You've had all of the 20 years' worth of modelling to, you know, update these models, and it closes, it's all finished. 20 years down the track, something happens. Who – who looks after it then? Is it the department? The company's gone by then, I guess.

MR O'DONOGHUE: Well, if the – if the – at some point, there'd be surrender of the mining lease and surrender of the, you know, consent, so that there wouldn't be an – at that point, there wouldn't be any obligation on the proponent at that time.

PROF CLARK: So post-surrender of the consent, the obligation lies where?

MR O'DONOGHUE: Well, it would – it doesn't lie – it's whatever – if you made – if the – if they've made a compensation at that time, and it's acceptable at that point to everyone, then that's provided.

MR DUNCAN: So the clarify is there that you – the agreement is made on the compensation, and that's dealt with if every party agrees, but I guess where Alice was heading, Steve, it would come back to the government, I assume, if everything had been surrendered; would that be right? If there would be no agreement – if there were no agreement achieved on the compensation.

MR O'DONOGHUE: I'm not – look, I'm not sure if that's the case, Peter, in that – in that instance, but, look, I take that on notice as to – there are – you know, the issue is that at closure, like, when a – when a consent is surrendered and when a lease is surrendered that the government is satisfied, you know, with the requirements and that residual issues have been, you know, rehabilitated or measures put in place.

MR DUNCAN: I guess that's what I was trying to say. In most cases, you would try to resolve all those issues before you accepted closure.

MR O'DONOGHUE: That's right. Yeah. Yeah.

MR DUNCAN: Yep.

MR O'DONOGHUE: You need to – you need to have a good level of satisfaction that, you know, the residual issues have been closed off prior to surrendering, you know, the instruments.

MR DUNCAN: I understand. Thank you. All right. Alice, do you have further questions for you or Steven?

PROF CLARK: Not at this stage. Thanks, Peter.

MR DUNCAN: Chris?

MR WILSON: No. I'm right. Thank you, Peter.

MR P. JONES: Can I just make one point on the – the groundwater and rejects in placement?

MR DUNCAN: Yes, Phil.

MR JONES: It was an issue that was addressed in some detail in the EIS and also the RTS by Hume Coal, and their analysis concluded that the leachate quality would be nearly indistinguishable from the ambient groundwater quality at that time, so they have done work on that – on that area.

PROF CLARK: So, Phil, did they do the column test that Hugh referred to before?

MR JONES: I'm not sure about column testing, but they certainly did groundwater testing, and the groundwater quality itself would be of – groundwater in that reject in placement zone would be the same as groundwater quality in the ambient area, so would there be that pathway, and, if so, would it have an impact? I guess one of the things I came up with was the addition of limestone to the coal rejects to – to assist with groundwater quality, and with that work they found that, yeah, that there would be no groundwater quality issue.

PROF CLARK: And what about the predictive pumping draw tests and the modelling of that that Hugh referred to? Was that done?

MR JONES: I'm not sure about that. Hugh might be able to comment on whether that would be an issue. If – if the groundwater quality is okay, then does that cause an issue?

MR MIDDLEMIS: Thanks, Phil. I appreciate that input. I'd – it's been a while since I looked at all this stuff, so my memory is fading, so thanks for that information. I mentioned the source pathway receptor method of doing the impact assessment, so you start with the source, and if the source is virtually the same quality as the in situ water, then there's no impact. There's a report that was curated by the National Water Commission back in 2010. I can send the information through to Steve, and he can forward it to you if you like.

It is the – if you like, the best practice guideline on doing mining project impact assessments, and it recommends this method, and, essentially, one of the principles is if – if the risk at the source, for example – if there's no risk at the source, in other words, the water quality is virtually the same as the in situ, then that risk disappears and that doesn't need to be assessed, so I'm not surprised specific modelling hasn't been done if – if the analysis was that the water quality behind the bulkhead is virtually the same as the in situ water, because the in situ water is there because of its various flow paths through the aquifer already to get to that situation, so it - - -

PROF CLARK: Is it – is it possible to determine the quality of that source water that's come through those placed – in placed backfill without doing the column leech test that you referred to?

MR MIDDLEMIS: Yes. You can – you can use geochemical modelling, so you can input parameters, but there are assumptions involved, of course, so that's why – look – and you're pushing my expertise a little bit here. I'm not a geochemist, but that's why they do things like column – column leech testing and other tests – bench tests and lab tests, if you like, using samples from the ore deposit or samples of tailings from a test that's already been done. They – they use that testing to really prove up the assumptions around any geochemical analysis, and, look, I'd have to look at the reports to – to understand what they had done. Maybe Phil knows.

PROF CLARK: Thanks.

MR JONES: I'd have to go back and have another look as well or point to on Hugh's to the areas where it was looked at, but it certainly was considered in detail during the assessment.

MR DUNCAN: Okay. Thank you, Phil. That's all fine. All right. Alice, again, anything further?

PROF CLARK: No. Thank you.

MR DUNCAN: Chris?

MR WILSON: No. No. Thanks, Peter.

MR DUNCAN: Okay. Well, you, Steve and Phil, look, thank you very much for your time today. Obviously, this is a complex area, so we really wanted to get a bit more clarity and really appreciate your time today.

MR MIDDLEMIS: Thank you.

MR DUNCAN: Thank you very much.

MR O'DONOGHUE: Thanks, Commissioner.

RECORDING CONCLUDED **[9.32 am]**