**GROSVENOR SUBMISSION. ISSUE 5 (1)**

**Whether the pre-drainage of gas from seams proximate to GMS was conducted adequately.**

**This Submission is for Roof Strata Coal Seams Only. There will be a separate submission for Floor Seams.**

**FINDING**

**The methane pre-drainage system was conducted to only 25% of that required.**

**Reasons**

1. **Ventilation quantity of additional 200 cubic metres per second required to dilute 4.1 cubic metres per second to below 2%.**

**Would require approximately 275 cubic metres per second across the face to dilute goaf gas make. This is physically impossible.**

1. **Evidence of Ray Williams and Andrew Self. (Starts page 2)**

**1) Ventilation quantity required to dilute 4.1 cubic metres per second to below 2%.**

**Grosvenor by the LFI was extracting 4126 litres of Methane per second.**

**6.3 Goaf Drainage**

***Prior to the ignition, ten goaf wells were running, producing around 6425 l/s total flow, of which approximately 4126 l/s was methane. At 2:55pm on 6tl May 2020, only two of these wells were outside normal TARP, being well GR04V009 (44% methane, 9% oxygen) and well GR04V009.5 (31% methane, 14% oxygen). GR04V009.5 went into Level 2 TARP at approximately 14:40pm due to methane levels falling below 30% and the well was throttled back accordingly, reducing the flow and increasing methane purity (subsequently taking this out of Level 2 TARP).***

**To understand exactly how much methane we are talking about, it needs to be converted to CUBIC METRES per second, as all ventilation quantities are measured in cubic metres, so the mine is extracting 4.1m3/s of methane.**

**To deal with this quantity of methane in a ventilation circuit and keep it below 2% would require over 200 cubic metres per second of ventilation.**

**This is 3 times the quantity on the LW 104 face.**

**This around half the total ventilation of the Grosvenor Mine.**

**In effect the Mine is using the concept behind the back bleeder system as practised in the USA Mines but instead of using a sewer road and shaft they use multiple from the start of the block to within metres of the face.**

**An analogy would be having 10 people using straws, simultaneously sucking on a huge flat bottomed thickshake.**

**If they suck harder than the thick shake flow they will suck in air, not just at one place but 10 different places.**

**The first people who start sucking are people at the back of the thickshake.**

**They start sucking air first and suck air for the whole time.**

**RAY WILLIAMS and ANDREW SELF**

**Both Ray Williams and Andrew Self both stated that there was insufficient gas drainage of the P Seam.**

**ANDREW SELF**

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**RAY WILLIAMS**

**Williams pointed out that Arrow energy is undertaken for commercial gas production often 10 to 15 years prior to Mining.**

**It is just as low a cost as possible gas extraction process not gas drainage.**

**It is not designed to perform gas drainage down to levels required for safe methane compliant Underground Longwall Mines.**

**The patterns and numbers of holes are designed for long term gas extraction, not methane drainage for Underground Coal Mining**

**Grosvenor Mine (and the Mines Inspectorate via Second Extraction Notices) for reasons known only to themselves; decided that the gas extraction performed by Arrow would ensure an acceptable level of Risk to the Safety and Health of Grosvenor Underground Coal Mineworkers.**

**Grosvenor**

**DR RAY WILLIAMS stated in testimony.**

***A. Yes. Arrow Energy undertook pre-drainage for commercial gas reasons some 10 to 15 years ahead of mining, and that was done without any regard to mining at all. They drilled in a manner that was the most efficient and least costly from their point of view.***



**PREDRAINAGE**

**Q. We will move to slide number 4. The first task was to review the Goonyella Middle seam pre-drainage. One of the features I think was that there had been pre-drainage by Arrow Energy over a number of years. Would you explain what you observed about that?**

***A. Yes. Arrow Energy undertook pre-drainage for commercial gas reasons some 10 to 15 years ahead of mining, and that was done without any regard to mining at all. They drilled in a manner that was the most efficient and least costly from their point of view.***

**Q. This is to do with drainage of the Goonyella Middle seam, but I'd just like to go to a couple of passages of your report that touch on the subject of drainage of the P seam by Arrow.**

**A. Yes.**

**Q Mr Operator, if we could have Dr Williams' report, WRA.001.001.0001, and we will be alternating between those two documents. Could we go to .0025, please. If we could highlight the third paragraph down, commencing "The P seam tests". You have given an indication there for the purposes of hole numbered DDH295, which I think is also one 6 n longwall 104? TRA.500.020.0008**

**A. Correct.**

**Q. You were able to identify the extent of the Arrow pre-drainage of the P seam at that point?**

**A. Yes.**

**Q. It appears as though there was a reduction of gas content by 28 per cent, from 10.4 down to 7.4; is that the point?**

**A. Yes.**

**TRA.500.020.0008**

**Q. There is a reference there to the extent of pre-drainage by Arrow of the P seam at that location?**

**A. Yes, there is, yes.**

**Q. Particularly in the second line, do I read that correctly that there was a reduction of between 62 to 77 per cent from 9.8 cubic metres per tonne down to 2.3?**

***A. Yes, but the line below says that the Arrow well residual modelling shows a gas content of about 4.5 cubic metres a tonne, and I think the extra bit of gas came out because, fortuitously, what appears on the map as an underground inseam - inseam into the P seam, that is - gas drainage hole was drilled quite close to DDH268. So I think it is somewhat a localised effect.***

***Q******. Could we go back to the PowerPoint and go then to "Conclusions", some of which we have had a look at. I think we have in fact discussed all of those except perhaps the last one. When you have included there, "Inadequate P seam pre-drainage", are you speaking there about inadequacies of the level of drainage by Arrow, or what content would you give it?***

***A. You want to reduce it down to as low a level as you reasonably can. I mean, Arrow pre-drained it - well, they didn't pre-drain it; they just produced out of it, and it is what it is. Over longwall 104, there is still a lot of gas there. So, yes, not desirable to have that much gas in the P seam.***

**TRA.500.020.0052**

**Q. Are you recommending then, in hindsight perhaps, that there ought to have been some further pre-drainage of the P seam?**

***A. Yes, but it is easy to recommend. Pre-drainage takes time. Of all the targets outside the Goonyella Middle seam, it's the P seam that's got the lowest density and a reasonable thickness, so it's the only seam there that's really a pre-drainage target. But it is banded, it is a difficult seam to drill in. So, you know, I think they could do the job okay longwalls ahead. I mean, you could drill surface to inseam holes - not 310mm diameter, but like what Arrow did, about 96mm diameter - line the holes, put them to a vertical riser for production of gas, and do that years in advance and get it down that way. So that would work. Otherwise, you have to do it by underground inseam drilling, and, you know, there are some problems potentially with that.***

**TIME****Q. As the legend indicates, there are some holes depicted in blue and a number in red. The red ones depict, do they not, the reduced gas content arising from the further drainage of that area of the mine?**

***A. Yes, the green ones are the state of drainage before these underground inseam, or UIS, holes were drilled, and that reflects what is left over after Arrow finished. I think quite a decent period of time elapsed before - on drainage for these UIS holes, so that the gas content was further reduced down to around 2 cubic metres a tonne in this longwall block.***

**Q. That was a level of gas content I think as referred to in the secondary extraction SOP?**

**A. Yes.**