STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:

APPLICATION OF RICHARDSON OPERATING COMPANY TO ESTABLISH A SPECIAL "INFILL WELL" AREA WITHIN THE BASIN-FRUITLAND COAL GAS POOL AS AN EXCEPTION TO RULE 4 OF THE SPECIAL RULES FOR THIS POOL, SAN JUAN COUNTY, NEW MEXICO.

BEFORE EXAMINER STOGNER
OIL CONSERVATION DIVISION
SJCC EXHIBIT NO. 18
CASE NO.

Case No. 12734

SUMMARY OF TESTIMONY OF JACQUES ABRAHAMSE

My name is Jacques Abrahamse and I am an mining engineer. I am currently employed as Ventilation Engineer for the San Juan Underground Mine. I am responsible for development of The Underground Mine Ventilation System and a Mine Gas Monitoring Analysis System. In 1987, I obtained my Mining Engineering Degree with honors from the University of Wollongong in New South Wales. I have taken training in mine ventilation and have received a statutory qualification for ventilation in Australia. Since my graduation, I have worked in underground mines, initially operating underground machines and then in 1991, I joined BHP as a mining engineer. I have developed specific expertise in mine ventilation planning since then. In particular, I was involved in the inquiry into a serious underground explosion at BHP Australia Coal's Moura Number 2 underground mine, and that involvement has given me substantial insight into management of risk of spontaneous combustion. I am familiar with the operations of long wall mines generally and ventilation management of them in particular.

The long wall mining process involves an enormous piece of equipment, made up of numerous shields, AFC's and a shearer. The longwall miner at San Juan Coal Company is 1000 feet wide. The longwall miner shears off long stretches of coal from the coal seam in a highly automated and efficient process. The process is shown on the CD animation which is Exhibit SJCC-12 and the longwall mining schematic, which is Exhibit SJCC-11.

The longwall mining process requires a systematic plan. Adherence to the plan is important for several reasons. First, if the long wall miner is required to stop production, for prolonged periods (days), explosive gases can accumulate, and the risk of explosion increases. Second, it is cumbersome, time consuming and costly to stop a long wall miner

and attempt to move it around obstacles such as well bores. Part of San Jan Coal Company's longwall plan is to keep the longwall equipment operating without the need to disassemble and reassemble it to avoid obstacles.

In July 2001, I was brought to San Juan Mine by BHP because of my experience in ventilation of underground mines. I reviewed the mine plan and the potential gas development in the coal seam. I evaluated the assumption that gas development could safely occur well advance of coal. I concluded that gas development well in advance of mining at San Juan mine could cause significant safety risk for the underground mine and the gas wells if it is not coordinated with mining plans. If infill spacing is allowed, these safety problems will be compounded by the additional drilling or reentry of wells. Safety of its employees is a primary concern for San Juan Coal Company.

Hydraulic fracturing of the coal seam by CBM wells can create dangerous conditions in at least two ways. First, hydraulic fracturing opens passageways for oxygen to mix with remaining methane in the coal bed. This mixture of gases can create conditions conducive to spontaneous combustion and mine fires. This potential is particularly real in coal deposits such as those at San Juan mine. It is exacerbated if the extraction of gas occurs well in advance of coal mining because that sequence allows greater time and opportunity for coal oxidation to occur.

A second way that fracing of the coal seam can create dangerous conditions, particularly in and around gate roads, is by creating cracks in the ceiling and elsewhere that make it difficult to construct a good seal. An important part of ventilation management in underground mines is to seal off areas that have been mined through to prevent dilution of the inert atmosphere in the gob. Cracks in the gate roads create pores that cannot be readily sealed where gases can migrate. Also, cracking in the seam caused by fracing of coal bed methane wells can extend into the roof of the mine and increase the potential for cave-ins. This potential is particularly problematic for longwall mining operations because the extensive shield that is incorporated in the design of a longwall miner. As shown in the schematic (Exhibit SJCC-11), a shield that pushes up onto the mine roof protects miners. If the roof against which the shield is wedged is not stable, dangerous cave-ins can result. Also, the cave ins can halt progress of the longwall miner. Every day that a longwall miner is stalled for cave-ins increases the risk that explosive gases will accumulate, and coal in the gob is exposed to oxidation.

In addition to fracing, an additional safety hazard caused by development of coal bed methane wells is dewatering. Dewatering of the coal formation well in advance of mining creates a pressure differential that allows oxygen to mix with the residual methane. If the mine is allowed to "dry out" in advance of mining, the risk of spontaneous combustion is increased.

The problems created by fracing and dewatering exists for reentered wells, as well as for new wells. Although reentered wells do not require the drilling and placement of additional well bores and casings that a longwall miner must avoid, reentering is

nevertheless problematic because it involves fracing and dewatering in much the same way that the placement of new wells can cause such problems.

San Juan Coal Company's preferred alternative would be for there to be no further wells in its coal seam. As to existing wells, as coal is developed there are ways to manage risks and problems associated with development of coal bed methane from the same coal seam at San Juan mine. First, placement of wells to avoid gate roads and locating them instead in the coal panels can be of help. Second, prohibiting the drilling of new wells, allowing only development from existing wells can manage risk. Third, allowing the coal company input into the location of the wells and sequencing of operations can reduce the risk of spontaneous combustion. Finally, gas can be produced after mining takes place. While the volume of recoverable gas is uncertain in comparison to what could be recovered in advance of mining, experience in the eastern United States shows that economic recovery of methane is achievable after a longwall mining occurs. This is because the longwall mining process leaves coal in the roof (or upper part of the seam), and as the roof collapse behind the longwall equipment advancing into the coal seam, the coal in the roof and rock in the formations above is crushed. This pulverizing effect serves to liberate methane present in the formation in a manner even far more effective than simple hydraulic fracturing, so the percentage of recoverable gas in the formation is higher. Also, "floor heave" results in fractures in rock strata underlying the coal seam that has been mined (in this case the pictured cliff sandstone which is a gas bearing strata). Finally, other seams in the vicinity of the number 8 seam, our target, could be developed for coal bed methane.

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[NOTE: If existing wells that Richardson seeks to reenter are already in the gate roads, how can we avoid them? Does additional fracing matter for them?]