The control of coal gas is one of the key operations in underground coal mines for safe mining. One technique to prevent methane emissions is to lower the coal gas content before mining by draining the gas from coal seams. Underground mining creates extensive fractures in the roof and floor rock of the coal seam being mined. If the fractures cut through overlying or underlying gaseous coal seams, they may form conduits for coal gas from the other seams to migrate into the working area.

Passive seismic monitoring is an efficient tool to locate fracturing events and infer rock failure mechanisms for stress interpretation. CSIRO used this technique to map fracture locations to infer channels and mechanics for coal gas emissions at an Australian mine. This mine had conducted an extensive gas drainage program to the coal seam before it was being mined. Excessive coal gas was still unexpectedly encountered during mining of the seam. Underlying gassy coal seams were suspected to be the sources of the unexpected gas. However, the mechanisms of the gas migration were not understood.

The passive seismic monitoring results revealed the distribution of the rock fractures in the floor of the coal seam and it is evident that the fractures extended to the underlying seams. Between the working seam and underlying seams the source mechanisms indicate extensive low-angle shear failures parallel to the bedding. This favours the formation of vertical fracture channels for gas transmission. Seismicity shows a good correlation with underground gas flows. Every period of noticeable seismicity is followed by a significant increase of gas flow.