

RESERVOIR MONITORING

Coal seams are complex reservoirs. They store gas by a process of sorption that is non-linearly related to gas pressure. Fluid movement is by a combined process of diffusion and two - phase Darcy flow, with absolute permeabilities highly dependent on the effective stress in the coal. The effective stress is related to the fluid pressure in the reservoir and the degree to which gas has been withdrawn from the coal, causing shrinkage. In addition, coal seam reservoirs frequently display significant directional permeability that is only detectable using multiple monitoring wells.



To confidently predict reservoir behaviour and assess ongoing performance, it is essential to monitor reservoir pressure. This may be achieved using pressure transducers installed in production holes, however, this is not best practice due to deleterious effects of having to shut in a production well. Alternatively, observation wells which are free from the direct effects of well flow are required.

Sigra supply and install multiple pressure transducers in observation wells. These are frequently exploration core holes. The transducers are strapped to a grout tube and cemented in place in the well. On the surface, Sigra provide a data acquisition system based on radio data loggers. These store and transmit information on the pressures being measured as shown in Figure 1.

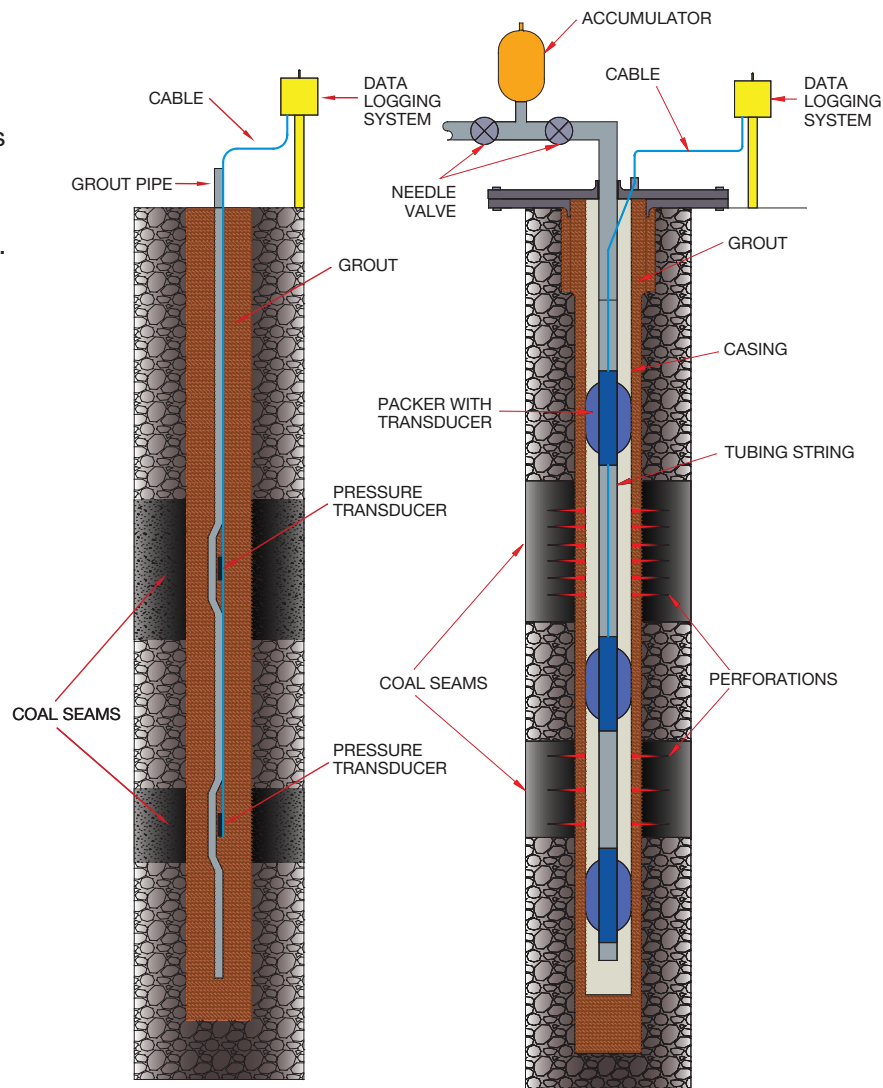


Figure 1. Grouted-in pressure transducers for reservoir monitoring

Figure 2. Utilising Sigra packers with replaceable transducers

It is also possible to provide pressure monitoring in unused production holes. To do this, Sigra install a single transducer through a well head.

Sigra can install multiple packers in cased and perforated holes. Packers are set to straddle perforations with pressure monitoring in between. The packer string is hung in the hole on tubing or cable. The packer string is withdrawn when the well needs to be used for production. This is shown in Figure 2.