RESERVOIR MONITORING

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 The effective stress is in turn related to the fluid pressure in the reservoir and the degree to which gas has been withdrawn from the coal, causing coal shrinkage.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

To raise the level of certainty on reservoir behaviour and to permit prediction of ongoing performance, it is essential to monitor reservoir pressure. This is not best achieved using pressure transducers installed in production holes because of the deleterious effects of having to shut in a production well. Rather, observation wells are required that are free from the effects of well flow.

Sigra supply and install multiple pressure transducers in observation wells. These are frequently exploration core holes. The transducers are strapped to a grout tube line and cemented in place in the well. On surface Sigra provides a data acquisition system based on its radio data loggers. These store and transmit information on the pressures being measured. This is shown in Figure 2.

It is also possible to provide pressure monitoring in yet unused production holes. It is possible for Sigra to install a single transducer through a well head.

In the case of a cased and perforated hole it is possible for Sigra to install multiple packers in the hole. In the latter case the packers are set to straddle perforations with pressure monitoring in between. The packer string may be hung in the hole on tubing or cable. When the well needs to be used for production the packer string may be withdrawn. This is shown in Figure 1.

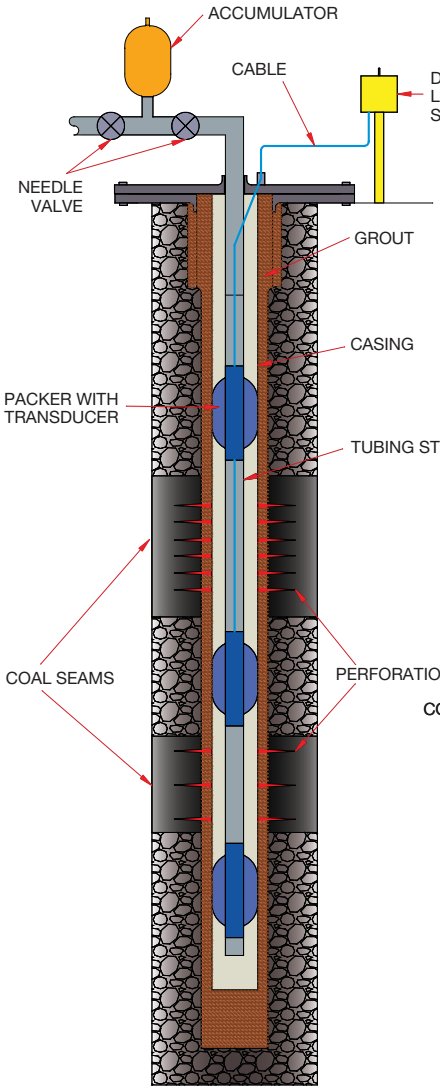

Figure 1. Utilising Sigra packers with replaceable transducers

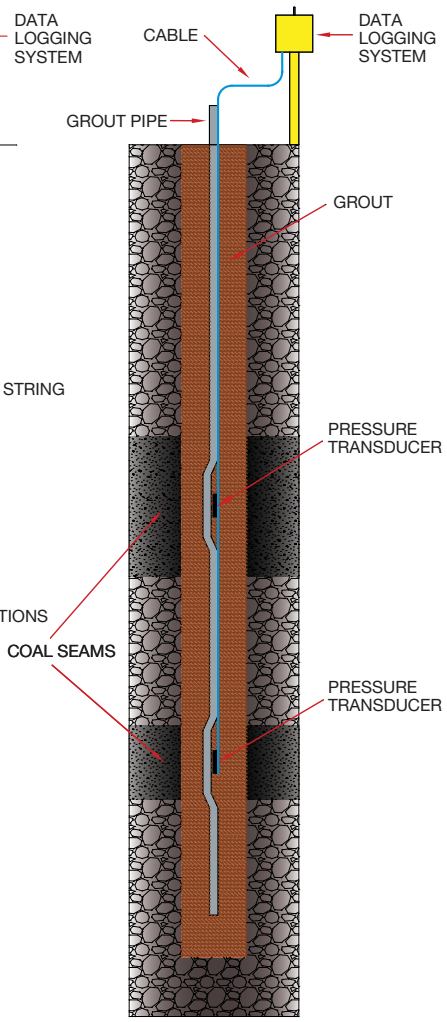

Figure 2. Grouted-in pressure transducers for reservoir monitoring

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