

Gas monitoring

It is highly recommended that gas monitoring should take place when drilling or piling into coal workings. Gas monitors and alarms should be positioned close to those who might be affected such as drilling operators and properties on or near to the site. The layering of gases should also be considered. CO₂ will be found at lower levels whereas methane will be found at higher levels.

All gas monitors being used need to be calibrated and tested, with copies of supporting certificates available on site. Contractors must ensure that site staff or the occupants of any buildings have been briefed on their operation and understand the need for them.

Spontaneous combustion

During spontaneous combustion coal catches fire without an external heat source, usually as a result of air flowing over it. This poses a particularly high risk during the use of air flush. Spontaneous combustion occurs when heat is produced by the mechanical action of the drill on the coal and the oxidation of coal due to the injected air.

If a coal seam spontaneously combusts, it is possible for the fire to spread through old workings threatening the safety of any properties lying above them. **It is important that the Fire Service is informed as water** added to burning coals can dissociate, releasing oxygen and hydrogen, leading to an uncontrolled and unpredictable explosion.



Guidance for site operatives on the risk of hazardous gases when drilling or piling through coal



To report an **emergency** call 01623 646 333

Source pathway – receptor model

Drilling into old coal mine workings can cause a serious hazard with mine gases being known to cause illness and fatalities among local residents as well as posing a risk to worker safety.

This leaflet is based on a guidance document, which uses a 'source-pathway-receptor model' to outline how hazards and incidents relating to mine gas can occur.

- the source is the origin of the mine gas such as a coal seam
- the pathway is a route along which gases can move from one place to another such as mine entries, old workings, boreholes, service ducts, fractures and permeable strata
- the receptor is where mine gases can accumulate or have an immediate impact on human health
- mine gases can affect receptors at significant distances from the drill site where the two locations are connected by pathways
- it is crucial that the sources, pathways and receptors relating to the site are considered when risk assessing any intrusive investigation, treatment or piling works that are likely to come into contact with past coal mine workings.

Source pathway – receptor diagrams

The following diagrams illustrate the mechanisms that lead to both on and off site mine gas incidents through the source-pathway-receptor model.

They cover different combinations of sources, pathways and receptors in an effort to highlight how gas migration can affect both workers and the public.

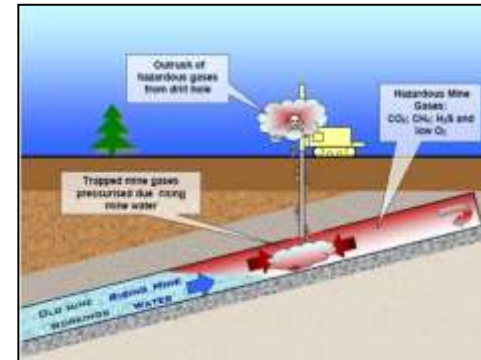


Diagram 1 - shows how drilling works can lead to mine gas hazards affecting worker safety on site

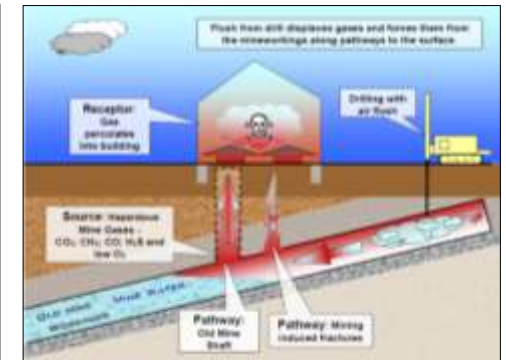


Diagram 2 - shows how mine working investigations can cause hazards outside the site boundaries

Drilling flush and injected materials

Atmospheric pressure together with pressure differences from injection materials, such as grout, or from rising mine waters, can all encourage the migration of mine gases through pathways:

- any material that is injected into mine workings will have the effect of displacing any gas that is already present
- before selecting a drilling fluid, the risk assessment should consider the possible presence, creation or mobilisation of hazardous gases
- a selected drilling fluid should eliminate or minimise the risk
- air/air mist flushes have a greater potential to mobilise gases due to the increased pressure
- the use of air/mist flush is not generally recommended within a 50 metres radius of any receptor
- a guideline risk matrix for flush selection is available in the full guidance document

Full guidance can be found at coal.gov.uk