Shallow gas risk in the Central North Sea

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Shallow gas occurs due to the migration of gas up the geological section to a depth of less than 1,000 m and its subsequent entrapment within certain horizons or features. The source of this gas is thought to be from deep hydrocarbon burial. The shallow gas becomes a risk to exploration companies if attempt to drill through it to the underlying hydrocarbon; this is when a blow out could occur. Drilling procedures at this stage do not often contain a blow out preventer therefore could lead to a large gas kick.

Shallow gas surveys are therefore necessary to predict the presence and depth of any such anomalies using data such as seismic and well logs. The main risk in this area is attributed to three horizons. These horizons lie within a package of late Tertiary/Quaternary sediments.

Horizon 1 represents a medium/high gas risk in the southeast of the area and low gas risk in the northwestern part. It is thought that this could be controlled by careful drilling methods and is unlikely to cause uncontrolled blowouts.

Horizon 2 is only present in a limited area over the centre of the basin, but represents a high risk in this region and obviously low in the rest. These high gas zones are associated with large volumes entrapped within

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mounded features that are characteristics of this region. However, they are not in uniform distribution and could be avoided if shown accurately by 3D seismic.

Horizon 3 has a varying gas risk, with a large area which is of medium/high overlapping the perimeter of the central part of the basin. The medium gas risk runs in a band around this and the rest of the area is low (in the north east region mainly). The gas risk associate with this horizon is shown by the chaotic behaviour over the basin.

As these risks have been identified safety procedures can thus be taken to reduce risk to operation or life.