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HORIZON SCANNING SR009

**HSE HORIZON SCANNING INTELLIGENCE GROUP SHORT REPORT****METHANE GAS HYDRATES****1. Issue**

The possible use of methane gas hydrates as a future source of natural gas.

Status: Review in 2010
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**2. Background**

Methane gas hydrate is a solid combination of methane and ice. It is found under continental shelves and on land under permafrost and can contain from 80-99.9% of methane. Estimated reserves are said to be twice the combined total of known global reserves of oil, gas and coal put together, offering enough fuel for the world for 'thousands of years'. Burning the methane will produce carbon dioxide, but methane itself is a greenhouse gas many times worse than carbon dioxide. Since methane is already being released into the atmosphere as global warming melts permafrost, then it might be better to burn the methane rather than let it escape into the atmosphere. However, there are many technical issues associated with recovering the hydrate, including risks to the atmosphere through accidental escapes and weakening of seafloor sediments leading to underwater mudslides.

The US has had a development programme since 2000 and aims to make progress towards commercial use of hydrates by 2015.<sup>1</sup> The Chinese government is investing \$100 m over the next ten years in developing hydrate as a fuel.<sup>2</sup>

**3. Relevance to occupational safety and health**

Recovery of methane from gas hydrates will be a considerable challenge, but the implications for the UK may not be great as far as direct involvement in recovery is concerned. The sea around the UK is not deep enough for hydrate and no reserves have been detected. Therefore any consequence of large-scale uptake of hydrate as a fuel globally will impact on the UK via the import of methane released from hydrate elsewhere, transported as liquefied natural gas.

Depending on the scale involved, this might lead to an increase in the infrastructure needed to deal with such imports. At present the UK has only one LNG import facility, on the Isle of Grain, and two more are under construction at Milford Haven expected to begin operations in 2007. The

<sup>1</sup> <http://www.netl.doe.gov/technologies/oil-gas/FutureSupply/MethaneHydrates/maincontent.htm#MoreText>

<sup>2</sup> <http://worldwatch.org/node/4513>

combined capacity of the three terminals, once operational is 15-40 bcm/year or about 25% of UK consumption.

There is benefit from having a proportion of our gas imported in the form of LNG as a diversity of supply routes provides for continuity in times of disruption. If methane gas hydrate reserves are eventually exploited then it is possible that additional import capacity would be needed. However, this would just be a question of volume as the technology and safety issues will be the same as those for the existing terminals.

Any significant use of methane gas hydrate is likely to be at least ten years away. There is no mention of methane gas hydrate in the government's 2006 Energy Review<sup>3</sup> and there seems to be little interest in the topic within HSE at present.

#### **4. Recommendations**

Exploitation of methane gas hydrate reserves is likely to be some years away, and if this happens the technical and safety issues as far as the UK is concerned are likely to be well understood. A conclusion of the HSE contribution<sup>4</sup> to Energy Review was 'hazards of gas storage (including LNG terminals) are significant, but the hazards and risks are generally understood and can be managed through existing arrangements and standards'. At present no further action is necessary, but the topic should be revisited in two years.

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<sup>3</sup> <http://www.cabinetoffice.gov.uk/strategy/downloads/su/energy/TheEnergyReview.pdf>

<sup>4</sup> <http://www.hse.gov.uk/consult/condocs/energyreview.htm>