MEMORANDUM FROM RESEARCH COUNCILS UK FOR THE ENERGY AND CLIMATE CHANGE COMMITTEE'S INQUIRY INTO UK DEEPWATER DRILLING – IMPLICATIONS OF THE GULF OF MEXICO OIL SPILL

Introduction

1. Research Councils UK (RCUK) is a strategic partnership set up to champion the research supported by the seven UK Research Councils. RCUK was established in 2002 to enable the Councils to work together more effectively to enhance the overall impact and effectiveness of their research, training and innovation activities, contributing to the delivery of the Government's objectives for science and innovation. Further details are available at www.rcuk.ac.uk.

2. This evidence is submitted by RCUK on behalf of the Research Councils listed below and represents their independent views. It does not include or necessarily reflect the views of the Science and Research Group in the Department for Business, Innovation, and Skills (BIS). The submission is made on behalf of the following Councils:

Economic and Social Research Council (ESRC)
Natural Environment Research Council (NERC)

3. NERC's comments are based on input from by the following research centres and individuals: the British Geological Survey (BGS), the National Oceanography Centre (NOC), the Scottish Association for Marine Science (SAMS), the Sea Mammal Research Unit (SMRU), the UK Energy Research Centre (UKERC), and NERC Natural Hazards Theme Leader, Professor John Rees*.* For more information on NERC's research and collaborative centres and science themes visit the NERC website www.nerc.ac.uk.

4. Following responses to specific questions, Annex A outlines the need to establish a longer-term deep-water observatory in the west of Shetland in order to meet the high level objectives of the UK and Devolved Governments' *Our seas – A Shared Resource*[1]. Information on previous survey work and how NOC and BGS could continue to work with industry to survey the area in the future is provided.

Executive summary

- The west of Shetland region is physically a very different environment to the Gulf of Mexico, so environmental impact of a deep water spill in this area would be different, in many aspects.
- A regulatory system could be enacted to compel companies to develop a shared-deep-water rapid response system to cap wells, and the levels of insurance cover companies are obliged to have could be increased.
- The UK's regulatory system is robust but could be improved, though there is a limit to which increased regulation can be implemented and effective.
- Scenarios which may reduce the need to exploit deepwater reserves during the transition to a low carbon economy are discussed. However, given our current reliance on oil and gas, such exploitation may be necessary.
- Under free market regulations the contribution of deepwater reserves to security of supply may be limited, though there may be some economic benefits of exploitation.

[1] http://www.defra.gov.uk/environment/marine/legislation/hlmo-sharedseas.htm

Responses to questions

1. What are the implications of the Gulf of Mexico oil spill for deepwater drilling in UK?

Environmental implications

1.1 The spill appears to have had a significant environmental impact on the Gulf of Mexico (GoM), but the overall scale of the impact is not yet apparent and may not be for many years. Environmental impacts may not easily translate to the UK as the physical environment and ecology of deep waters off Shetland is significantly different to that encountered in the GoM:

a) Geological differences - The seafloor geology of the UK shelf to the west of the Shetlands region is complex, with ridges and other features that would strongly influence the direction of dispersion of any releases.

b) Temperature - The deep bottom water off Shetland is colder than that at a similar depth in the GoM, the surface temperature is also less than in the Gulf region (9-10°C in winter, much cooler than the Gulf's summer temperature of over 30°C). Consequently, there is less potential for evaporation of lighter hydrocarbon fractions, so a winter spill in the region will experience a slower biological decay and lower evaporative loss.

c) Oceanographic conditions - The Shetland region is significant in terms of global ocean circulation so significant spills would not be as contained as in the Gulf, though the dispersion into deep open-ocean would be similar. The wave climate off Shetland is rougher though GoM storms are much larger and experience greater extremes in Hurricane season, which cause a complete shutdown of exploration, production and any remedial work on spills.

d) Ecology - Extreme temperature ranges in the Shetland area are very important in regulating the distribution of animal life on the seafloor and in the water column. Though considerable work has been done on seafloor - or "benthic" – communities, they are less well understood with respect to the water column and how the deep sea ecosystem varies over time. There are gaps in knowledge around the toxicology of cold deep water organisms and their reactions to chemical and drilling muds used by the industry. Gaps in our knowledge are particularly significant given the water column supports some of the most commercially-important fish stocks in the UK eg North Atlantic mackerel and monkfish. In addition, the region is an important migratory route for marine mammals moving between the northern seas in the summer to temperate/tropical Atlantic waters in the winter.

1.2 It must be emphasised that there are significant dangers inherent in drilling on all parts of the UK Continental Shelf (UKCS), not just in deep water. A spill in any depth of water could occur as a consequence of exploration, appraisal or development drilling, or as a result of oil production on the UKCS. Indeed, there are often greater technical challenges in some of the relatively shallow water areas of the UKCS where the target reservoirs are under higher than normal heat and pressure eg in high pressure high temperature (HTHP) fields. However, despite these dangers, the record in the UKCS is very good.

Managerial and public perception implications

1.3 The BP experience in the GoM has already had the noticeable effect of tightening practices within drilling companies operating worldwide, which will, for as long as these improved practices continue, make all drilling safer.

1.4 There is a clear need for industry to develop a system of jointly coping with deep-water problems on the UKCS. A group of four GoM operating companies has already begun to develop their own rapid response plan whereby they are committing US $1 billion to create a rapid-response system to deal with deep-water spills in the GoM. This voluntary effort includes building modular containment equipment that will be kept on standby for emergency use. Their initial financing of $250 million each will be used to build a set of containment equipment, like underwater systems and pipelines, which will be able to deal with a variety of deepwater problems and can be deployed rapidly in the event of a spill. It would be sensible to consider, perhaps through legislation, the development of a similar system for the deep waters of the UKCS.

1.5 All companies operating on the UKCS are obliged to have insurance cover to offset the costs of cleaning up oil spills. The required levels of this cover could be reviewed.

1.6 A significant implication for deepwater drilling in the UK is public perception. The public view, enforced by both the media and US commentators, is that this is the US' - even the World's - worst environmental disaster. As more information has become available a better assessment of the impact has been derived it has become clear this is not the case. The majority of the major NGO's have put forward a realistic picture of the situation and NOC scientists have been involved in numerous public debates on radio, television, in open public meetings and online and in general there has been little disagreement over the core facts.

2. To what extent is the existing UK safety and environmental regulatory regime fit for purpose?

2.1 The UK/European safety and regulatory regime is better established than that for the US. A large magnitude oil spill would not respect national borders around the North Sea and Shetlands, as such, there is a strong European interest resulting in tighter regulations and response. Regulations and working practices have evolved over the last 40 years based on a close working relationship between the offshore oil and gas sector and the relevant Government departments, and are arguably more stringent and better adhered to than in the GoM. Many pioneering deep-sea methodologies and technologies were initially developed and deployed in UK waters, in close collaboration with DTI (now BIS). The UK Health and Safety regime for offshore drilling was improved markedly in the wake of the Piper Alpha disaster and Government and industry efforts have continued to produce improvements in safety systems since. The UK system is now regarded as one of the safest operating systems in the world. However, no system is fool-proof nor beyond improvement.

2.2 It is understood that, in the wake of the GoM disaster, the HSE plans to increase the number of safety inspectors and the number of safety inspections of offshore installations, both of which are to be welcomed.

2.3 Daily operational reports should be produced by all operators and should be studied by responsible HSE staff to ensure that best practices are adhered to and that previously-agreed operational plans are implemented. However, it is impractical to expect HSE inspectors to be able necessarily to identify when short cuts have been taken; it would not be feasible, practical or desirable to monitor all communications between the various operational elements on a drilling rig to ensure that issues have been fully identified and correctly acted upon.

2.4 HMG already operates a system whereby potential operating companies undergo a rigorous vetting process to ensure that they are capable of conducting their offshore operations safely, thoroughly and effectively.

2.5 The UK regime takes into account requirements of treaties such as OSPAR and the evolving integrated European Marine and Maritime policy frameworks, however, currently the oil and gas sector lies outside of the remit of the Marine and Coastal Access Act, 2009. This omission leads to a situation where offshore wind, wave and tidal energy installations (and associated cables etc) are looked at in a holistic manner but oil and gas platforms are treated separately. A strong case could be made to bring all offshore activities under the same regulatory regime.

2.6 There are still issues over where emergency control centres are established once an incident takes place but generally the regime is healthy. The recently established Marine Management Organisation will be working closely with the Marine and Coastguard Agency to further develop oil spill response and management systems. Critically the UK has in place the Secretary of States Representative for Maritime Salvage and Intervention (SOSREP)[2]; a key role that did not have an equivalent in the initial stages of the GoM incident.

2.7 Safety and environmental legislation should draw on the best available and impartial science. High quality, high resolution seabed and habitat maps are necessary for the progress of science and effective, integrated management of the seas using ecosystem-based approaches. NERC is underpinning the provision of such resources through support for National Capability[3] and programmes (past and present) of strategic earth science and marine research, in particular at the NOC, BGS and SAMS. One example is the recently launched UK Marine Environmental Mapping Programme (MAREMAP) project[4]. MAREMAP is a new NERC initiative that will lead to an improved understanding of the marine environment around the UK. It is coordinated by the NOC, BGS and SAMS, in partnership with University of Southampton and Channel Coastal Observatory.

2.8 As well as informing the regulatory process, the capacity NERC supports is vital in times of emergency. A number of NERC scientists have been approached to advise the US regulatory authorities and others in the aftermath of the Gulf incident.

3. What are the hazards and risks of deepwater drilling to the west of Shetland?

3.1 The hazards of deepwater drilling to the west of Shetland are the same as drilling in any area of the continental shelf, though maybe less so than in places where there are

[2] http://www.mcga.gov.uk/c4mca/mcga-environmental/mcga-dops_cp_sosrep_role.htm
[3] http://www.nerc.ac.uk/research/capability/
[4] http://www.noc.soton.ac.uk/shmg/maremap

known issues of high pressure and high temperature reservoirs. The greatest degree of danger lies in exploration of the unknown. As more wells are drilled in the deeper-water areas, so understanding of both the exploration setting and of the hazards to be encountered will increase.

3.2 There are known sea-bed hazards west of Shetland, such as slump scars and mass flow slides, that are well documented and for which industry already takes account when designing offshore drilling campaigns.

3.3 There is always a hazard when operations are conducted at depths below which divers can operate. In such circumstances it is necessary to rely on remotely operated vehicles (ROVs). ROVs have been used in the offshore industry for many years, and are effective tools for working at depth. However, they have their limitations. Clearly, as the GoM experience has demonstrated, operating equipment at great depths is difficult, and not all readily available mechanical systems are capable of operating at great depths. A shortage of supply of such equipment could provide a potential to increase hazard.

3.4 Potential penetration of shallow methane hydrate deposits may affect the technical specification of the well and its casing eg due to thermal effects on the setting of concrete structures. There is a large difference between the risks of drilling versus those encountered once production is underway with well-established wellheads. Methane hydrate deposits are commonplace in the cold, deep waters of the North East Atlantic and may be detected locally by seismic survey techniques. Care must be taken to avoid introducing heat or rapid pressure changes during drilling and cementing activities to prevent physically destabilizing surrounding sediments. This can cause loss of integrity of sea-floor infrastructure, triggering submarine landslides or out-gassing of deposits and associated risk of explosion. In future these methane hydrates may themselves become an important source of fuel though no hydrates have been found in UK waters in drilling thus far. Research is underway to learn more about how they can be safely exploited, but for now they remain a hazard in sub-sea – especially cold water – development.

3.5 Extreme weather conditions in the West of Shetland present a hazard. Storms tend to be longer lived than the more violent hurricanes of the Gulf. Drilling activities are timed to avoid the worst Atlantic storms but unintended oil release from drill-ships or platforms severely damaged by heavy seas could occur. Persistent heavy weather would delay emergency responses.

3.6 Deep water installations west of Shetland typically use an automated seabed structure to collect oil and gas which is then pumped to a floating storage unit eg a modified oil tanker, on the surface. Potentially an accident or terrorist attack on the floating production system could lead to an oil spill. Damage to seafloor wellheads would require a deliberate act of sabotage, or the sinking of a heavy structure (such as a large ship or floating platform) directly onto the wellhead.

4. Is deepwater oil and gas production necessary during the UK's transition to a low carbon economy?

4.1 The UKERC Energy 2050[5] report examined scenarios exploring all dimensions of the possible development of the UK energy system through to 2050. The report examined

[5] http://www.ukerc.ac.uk/support/tiki-index.php?page=Energy+2050+Overview

scenarios to a) deliver reliable energy to consumers while b) meeting the UK's legal commitment to reduce carbon dioxide emissions by 80% by 2050 (as prescribed by the 2008 UK Climate Change Act). Scenarios fulfilling these criteria involved a significant reduction in demand for oil (up to 95%) and gas (up to 85%) based on 2005 levels. In the interim years the UK demand for oil and gas reduces whilst still being significant.

4.2 Within the UKERC 2050 scenarios there is significant variation in the rate and scale of demand reduction of oil and gas between different scenarios. Both oil and gas demand tend to decline more slowly when the carbon ambition is lower or when low-carbon technologies are delayed in deployment. Conversely, the fastest rate of decline in oil and gas demand arises when the carbon ambition is highest, when energy system resilience is prioritised and in scenarios when people adopt low-carbon lifestyles. For example, in a resilient low-carbon energy system scenario both oil and gas demand is approximately halved by 2030.

4.3 Reducing demand for oil and gas may further reduce the necessity for deepwater oil and gas production by reducing the UK's sensitivity to global shortages in these commodities. The UKERC Energy 2050 study represents a UK-centric view, but of course oil and gas markets are global.

4.4 Whilst the UKERC 2050 study demonstrates the potential for a decline in the demand for oil and gas, it should be noted that oil and gas currently provide 75% of the UK's total primary energy, and the UKCS satisfies about 2/3 of the UK's primary energy demand. It is predicted that in 2020, 70% of the primary energy in the UK will still come from oil and gas[6], even if the 20% target for renewable energy is met. The UKCS has the potential to satisfy half of the UK's oil and gas demand in 2020 if investment is sustained.

Peak oil as a driver of necessity

4.5 In 2009 the UKERC Technology and Policy Assessment team produced a report on Global Oil Depletion[7]. The report argues that conventional oil production is likely to peak before 2030, with a significant risk of a peak before 2020. A peak in conventional oil production is expected to be followed by a year on year decline in oil production of over 4%. This is likely to drive increased interest in harder to exploit oil (such as deepwater oil) and the exploitation of unconventional oil and gas resources such as tar sands and gas hydrates. However, a peak in oil production may also drive technology development in alternatives to oil such as biofuels, coal to liquid technology and increasing electrification of energy services (such as transport and heat).

4.6 At the global level, Shell has produced scenarios looking at the future development of the energy system[8]. In the two scenarios (scramble and blueprint) oil demand reaches a plateau in the 2020s and declines slowly afterwards. However, in neither of these scenarios are climate change goals met.

Market impacts of exploiting deepwater oil and gas

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[6] 'Section 2: Industry at a Glance' in the Economic Report 2010 published by UK Oil and Gas, July 2010, see: http://www.oilandgasuk.co.uk/publications/viewpub.cfm?frmPubID=375

[7] http://www.ukerc.ac.uk/support/Global%20Oil%20Depletion

[8] http://www.shell.com/home/content/aboutshell/our_strategy/shell_global_scenarios/

4.7 In the short term, preventing the exploitation of deepwater oil and may be welcomed by OPEC through its effect on oil price. In the longer run, high oil prices will result in a faster transition to a low carbon economy. However, economic studies show that a high oil price is a poor substitute to a high carbon price as a driver of de-carbonisation.

4.8 In terms of gas production, a quicker decline in UK gas production leads to more rapid UK integration into (and dependence on) the global market, potentially driving transition to a low carbon economy. If gas discoveries are made in deep waters off the UK, the UK would essentially exit the liquified natural gas (LNG) market, just as shale gas exploitation has driven the US out of the LNG market.

4.9 The question of whether climate policies will boost or depress gas demand and therefore the necessity of exploitation of deepwater reserves is uncertain: it will probably boost it in electricity generation and depress it in industrial and residential sectors.

5. To what extent would deepwater oil and gas resources contribute to the UK's security of supply?

Limiting factors

5.1 Annex B summarises a recent Society of Petroleum Engineers article (2009)[9] which attempts to quantify the size of deep water hydrocarbon (oil and gas) resources across the globe. It suggests that the likely speed and volume of future deep water production is unlikely to arrest decline in existing production, or reduce the growing imports needed to fill the gap between supply and demand.

5.2 Under current oil market regulations it is difficult to see how deepwater oil will significantly improve security of supply over oil produced elsewhere in Europe. Since the UK operates a free market the oil will be sold in contracts on the global market. Protectionist policy is unlikely in the short to medium term, although a supply shock may change that.

5.3 Under IEA and EU rules, UK is committed to sharing available oil with partners in the event of major disruption so West of Shetland oil will not be in any way reserved for the UK. However, West of Shetland could be seen as the UK's contribution to collective security.

5.4 Given these considerations, reducing demand is arguably the best way to significantly improve security of supply with aggressive low-carbon roll-out a necessity.

Benefits of exploitation

5.5 Given the method used by the IEA and others to calculate future oil production, oil yet to be found and known oil fields yet to be developed are already accounted for. This includes deep water. If we were not to produce the resource known in UK waters then future projections would need to be revised and global future demand similarly reduced

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[9] *"Worldwide Deepwater Petroleum Exploration and Development Prospectivity: Comparative Analysis of Efforts and Outcomes"* Authors: Omowumi O. Iledare, SPE. Louisiana State University SPE Annual Technical Conference and Exhibition, 4-7 October 2009, New Orleans, Louisiana

to deal with supply imbalance. Any future scenarios relying on IEA reference scenario will be necessarily affected.

5.6 Increased supply from deepwater sites, while unlikely to arrest the continuing decline in production, could reduce the rate of growth of imports. Although it is unlikely that as many resources will be found in deepwater as have already been exploited in the North Sea, future exploitation of gas hydrates could form a valuable component of the UK's long-term energy supply.

5.7 It is forecast that some 17% of the UK's remaining oil and gas reserves lie under waters to the west of Shetland. The remainder of the UKCS is classified as mature basin, and has a declining production curve profile. Potential revenue for exploitation may therefore prove valuable to the treasury and the UK economy.

5.8 In a global market, the west of Shetland will add to supply and put some downward pressure on global prices. In the event of a major disruption, having more supply in the hands of independent oil companies will ease the effects.

RCUK, September 2010

ANNEX A - Existing environmental surveys of the sea bed off Shetland and the importance of maintaining survey capability

1. To ensure any prospective industrial operations in west of Shetland meet the UK's High Level Marine Objectives outlined in the UK and Devolved Governments' *Our seas – A Shared Resource*[1], operating companies and regulatory authorities must have the means to observe and monitor the condition of the marine environment. A great deal could be done collectively to instrument the region, using the tools and platforms already in place and available to the industrial and marine communities. The following paragraphs outline previous survey work and how surveys could be maintained and developed in the future.

Previous surveys

2. In 1996 the Atlantic Frontier Environmental Network (AFEN), a consortium of oil and gas exploration companies, working with then the Southampton Oceanography Centre (now NOC), commissioned a large-scale regional survey of the West of Shetland seabed environment. This industry driven survey adopted a new ethos: to work collectivity to make a strategic regional assessment rather than site-by-site specific assessments, and developed a new approach drawing on the experience of the industry, its regulators, industry contractors and the academic community. The practical conduct of the survey used the NERC ship RRS Charles Darwin and drew on a range of NERC developed technology and techniques for seabed survey, sampling and visualization. These seabed survey tools were operated in an integrated fashion, the sidescan sonar mapping guiding the seabed sampling and visualization, which in turn fed back ground-truthing data for the improved interpretation of the sidescan sonar data.

3. In 1998 AFEN commissioned a further survey, including areas north and west of Shetland and areas in the Rockall Trough. The general concept and approach of the AFEN surveys was then taken forward by the DTI with a survey of the Wyville Thomson Ridge and central axis of the Faroe-Shetland Channel in 1999. The DTI surveys continued with work during 2000 and the completion of SEA4 field work with the 2002 survey to the north of Shetland. Southampton Oceanography Centre was involved throughout.

4. Following the AFEN and DTI surveys, the SEA4 area is undoubtedly the most extensively studied deep-sea area in the world. These surveys were undertaken prior to any industrial development in the region and importantly, all of these studies have been carried out using common approaches and techniques throughout. The resultant dataset of biological and supporting environmental information is a unique resource for the study of deep-sea ecology and is the more interesting for the complex and varied environmental setting of the SEA4 area.

5. Critically the results of the AFEN and DTI studies have long been public domain and widely disseminated and a number of scientific journal articles relating to the Faroe-Shetland Channel have been published[10,11,12,13]. Our understanding of the region is also

[10] Narayanaswamy B &, Bett BJ (in subm) Macrobenthic biomass relations in the Faroe-Shetland Channel: an Arctic-Atlantic boundary environment. PLoS ONE.
[11] Narayanaswamy BE, Bett BJ & Hughes DJ (2010) Deep-water macrofaunal diversity in the Faroe-Shetland region (NE Atlantic): a margin subject to an unusual thermal regime. *Marine Ecology Special Issue*. 31: 237-246. doi:10.1111/j.1439-0485.2010.00360.x

enhanced by one of the longest time series of measurements of hydrography maintained by Marine Scotland (formerly Fisheries Research Service) and by regular physical mapping eg of the Ellet Line, undertaken by SAMS and the NOC as part of NERC national capability, within the strategic marine research programme Oceans 2025 (2007-2012). NERC supported research at NOC on deep sea benthic biology, NOC capability for strategic environmental assessments and seabed mapping and SAMS Northern Seas Programme has built on this base. NOC is now regarded as a leading European player in this sphere eg in its lead of large European research projects such as HERMES and its successor HERMOINE; however, there is no routine biological mapping of the region.

6. BGS undertook a detailed research project (Westen Frontiers Association) on the geohazards associated with exploration in the Faroe-Shetland Basin with a focus on shallow geohazards, such as slope stability. This work was undertaken in collaboration with all the operators on the Atlantic Margin. Results of the work are both published and held by operators. This work did not include evaluation of deeper hazards such as over-pressured reservoirs, where the operators have the knowledge from their own work.

Maintaining survey capability

7. There is a great deal that could be done collectively to instrument the region, using the tools and platforms already in the region and available to the industrial and marine communities. The AFEN model of industrial and academic collaboration could be a good model for the institutional framework for further work. The opportunity to build observation and long term monitoring capacity into the design of the oil field infrastructure from the outset should not be missed. Alternately, if a drilling moratorium were to be established it would be vital to ensure that the region remained open to researchers – Government, academic and industrial.

8. Whilst a repeat of the AFEN surveys would be desirable scientifically, it would be extremely expensive. However, it should be possible to design a good comparator survey, with the support of the industry that might be undertaken within one or more research cruises. Such cruises could also help plug gaps in the knowledge in the light of the Gulf Experience and in relation to smaller marine fauna. Very different fauna exist in the Northern Rockall and the Faroe Shetland channel regions and it would be important to ensure that both are addressed and that work is done to identify ‘target organisms’ – indicator species such as scavenging amphipods that are easily acquired and tested for toxicology impacts.

9. NOC would be well placed to work with the industry in specifying and designing such a long term observatory and along with the SAMS, inform the planning of research in the region. NOC, in close collaboration with key players in the oil and gas industry, runs the "Scientific and Environmental ROV Partnership using Existing iNdustrial Technology" (SERPENT) project which aims to make cutting-edge industrial ROV technology and data more accessible to the world's science community, share knowledge and progress deep-sea research. The programme interacts with science and conservation groups globally to communicate the project to the public, increasing the awareness of our fragile

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[12] Narayanaswamy BE, Bett BJ & Gage JD (2005) Ecology of bathyal polychaete fauna at an Arctic-Atlantic boundary (Faroe-Shetland Channel, North-east Atlantic). *Marine Biology Research* 1: 20-32

[13] Narayanaswamy BE. (2000) Macrofaunal Ecology of the West Shetland Slope PhD thesis - University of Southampton

marine resources. The project has a growing network of UK and global partners. Observations are made to within 200m of the drill sites, focusing on the degree of disturbance.

10. NOC is currently a partner in the Deep-ocean Environmental Long-term Observatory System (DELOS) project led by the University of Aberdeen. This could also provide a model for developments in the Shetland region. The DELOS project aim is to increase understanding of the deep water areas BP are gradually extending into off Angola, and provide long term environmental monitoring to enhance deep sea scientific research.

ANNEX B – A note on UK deep water oil resource

1. A recent Society of Petroleum Engineers article (2009) attempts to quantify the size of deep water hydrocarbon (oil and gas) resources across the globe. This resource is estimated at 11.9 billion tonnes oil equivalent (TOE) in 2007. Of this 15% (or about 1.8 billion TOE) was discovered in Europe and of that only 25% approximately was located in the UK (450 million TOE approx). Of this only 237 million TOE is oil.

2. Global production of oil in 2009 was 3820.5 million tonnes while 1P[14,15]remaining reserves stood at 181.7 billion tonnes. UK consumption in 2009 was 74.4 million tonnes. Therefore, in terms of global demand the UK deep water resource is small. It does amount to approx 3 years of domestic consumption. It is not, however, likely to be reserved for the domestic market unless the market regime is changed.

3. Global average lag time between discovery and production for deep water is approximately 80 months. However, Europe has a significantly greater lag than the global average, at approximately 116 months. This means that access to this deep water oil will be delayed and protracted, minimising the resources impact on global supplies significantly.

[14] 1P is a measure of Proven reserves
[15] Though not stated the SPE is likely to be using a 1P definition of reserves.