dti

SEA 6

Background

JULY 2005

STRATEGIC ENVIRONMENTAL ASSESSMENT FOR OFFSHORE OIL & GAS LICENSING

INFORMATION FOR STAKEHOLDERS

CONTENTS

1 BACKGROUND AND PURPOSE

1.1 Purpose of this document

This document is intended to provide background to stakeholders on the current Department of Trade and Industry (DTI) offshore Energy Strategic Environmental Assessment, SEA 6. (Note, once the assessment is completed an Environmental Report will be issued for full public consultation.)

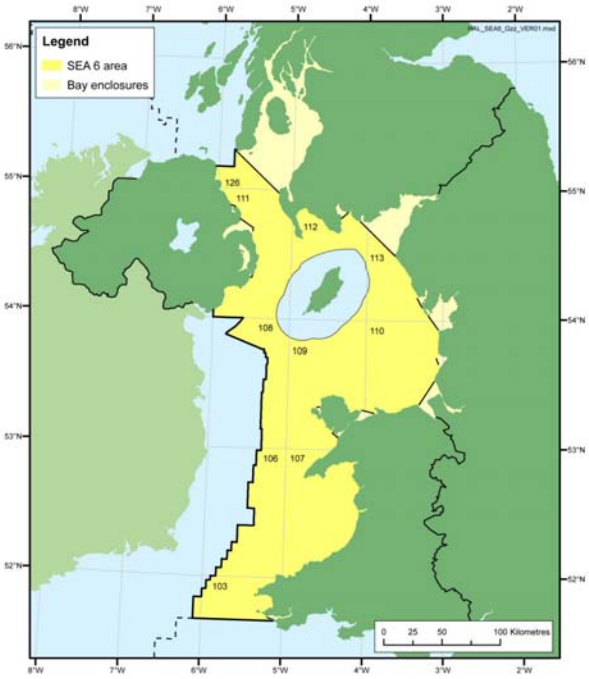
The main focus of SEA 6 is the consideration of a draft plan for a 24th offshore oil and gas licensing round to offer blocks for oil and gas licensing in parts of the Irish Sea – see Figure 1a below.

In addition, as part of SEA 6, an assessment will be made of the implications of re-offering during the same licensing round, currently unlicensed blocks within the areas covered by the earlier offshore oil and gas SEAs (SEAs 1 to 5 in Figure 1b).

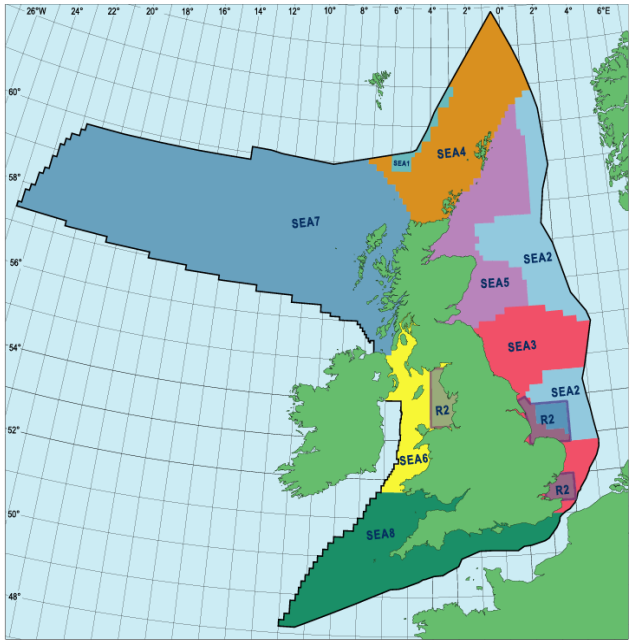
Although the DTI SEA programme covers offshore energy (oil & gas and renewables) there is currently only a draft plan for an oil and gas licensing round proposed for the SEA 6 area.

Figure 1 – DTI Offshore Energy SEA Areas

a) SEA 6 Area



b) SEA Sequence



Note - to allow full consideration, the SEA 6 area is shown extending to the shoreline within bay enclosure lines (shaded paler yellow) although these “bay” areas would not form part of an offshore oil and gas licensing round.

1.2 Background to the DTI SEA process

The *Petroleum Act 1998* vests all rights to the nation's petroleum resources in the Crown. The DTI is responsible for licensing exploration and regulating development of the UK's oil and gas resources. The Secretary of State for Trade and Industry can grant licences that confer exclusive rights to "search and bore for and get" petroleum. Each of these licences confers such rights over a limited area and for a limited period. Licensing of the UKCS for oil and gas exploration and production commenced in 1964 and has progressed through a series of rounds.

Further information on offshore licensing can be found on the DTI's website at www.og.dti.gov.uk/upstream/licensing/index.htm.

In 1999, the DTI commenced an SEA process for offshore energy with a sequence of sectoral SEAs of the implications of further licensing of the UKCS for oil and gas exploration and production. Completed SEAs and licensing rounds are tabulated below.

	Area Covered (see Figure 1 b)	**Licensing Round**
SEA 1	The deep water area along the UK and Faroese boundary	19th Round (2001)
SEA 2	The central spine of the North Sea which contains the majority of existing UK oil and gas fields	20th Round (2002)
SEA 3	The remaining parts of the southern North Sea	21st Round (2003)
SEA 4	The offshore areas to the North and West of Shetland and Orkney	22nd Round (2004)
SEA 5	Parts of the northern and central North Sea to the east of the Scottish mainland, Orkney and Shetland	23rd Round (2005)

In addition, during 2003, the DTI conducted an SEA covering three strategic regions off the coasts of England and Wales in relation to a second round of offshore wind leasing – areas shown as R2 on Figure 1b.

Full details of the SEA process, the steering group (established in early 2001) and documentation can be found at www.offshore-sea.org.uk, a website specially set up to promote transparency and facilitate public consultation in relation to the DTI Offshore Energy SEAs.

Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment (commonly called the SEA Directive) was adopted to provide a *strategic* complement to the *Council Directives (85/337/EEC and 97/11/EC)* which require Environmental Impact Assessments of *specific* developments and activities. A series of regulations have been established across the United Kingdom to implement the requirements of the Directive.

The Environmental Assessment of Plans and Programmes Regulations 2004 apply to any plan or programme which relates either solely to the whole or any part of England[1] or to England and any other part of the UK.

The SEA Directive applies to plans and programmes whose first formal preparatory act was on or after 21 July 2004, and also, with retroactive effect, to those which have not been either adopted or submitted to a legislative procedure leading to adoption by 21 July 2006. The process for SEA 6 commenced in the spring of 2004.

[1] Including the territorial waters of the United Kingdom that are not part of Northern Ireland, Scotland or Wales, and waters in any area for the time being designated under Section 1(7) of the *Continental Shelf Act 1964*.

2 SEA 6 – WORK TO DATE

For SEA 6, initial scoping with environmental authorities and a range of academic and conservation organisations commenced early in 2004 and focussed on ascertaining seabed survey needs. This is because of the timescale needed to organise, collect and analyse offshore seabed samples. The conclusion was that further survey work was necessary to investigate seabed habitats and biota prior to SEA 6. Field work was conducted during the summer of 2004.

A range of other technical studies have been commissioned to underpin the assessment – see topic list below.

Technical Reports

- Recreational Boating Activities
- Authigenic Carbonates
- Benthos
- *Modiolus*
- Cephalopods
- Conservation
- Contaminants
- Fisheries
- Geology
- Sediment Transport
- Hydrography
- Marine Mammals
- Maritime Archaeology
- Other Users
- Plankton
- Prehistoric Archaeology
- Socio-economics
- Underwater Noise
- Inshore Seabirds Review

Data Reports

- SEA 6 Contamination
- SEA 6 Fish & Fisheries
- SEA 6 Geology
- SEA 6 Oceanography
- SEA 6 Plankton
- SEA 678 Cetaceans

These studies have been framed to also facilitate future SEA for offshore renewable energy when such plans or programmes are proposed. The technical and data reports are available for download at www.offshore-sea.org.uk. (Reports for previous SEAs are also available at this site.)

The SEA Team is aware of and has been taking account of the various Irish Sea regional management initiatives including the JNCC Irish Sea Pilot and regional seas programme, and the DEFRA Marine Spatial Planning Pilot.

An Assessment Workshop involving the SEA steering Group, Technical Authors and SEA Team was held over two days in April 2005.

A wider stakeholder meeting is planned for 23rd August 2005.

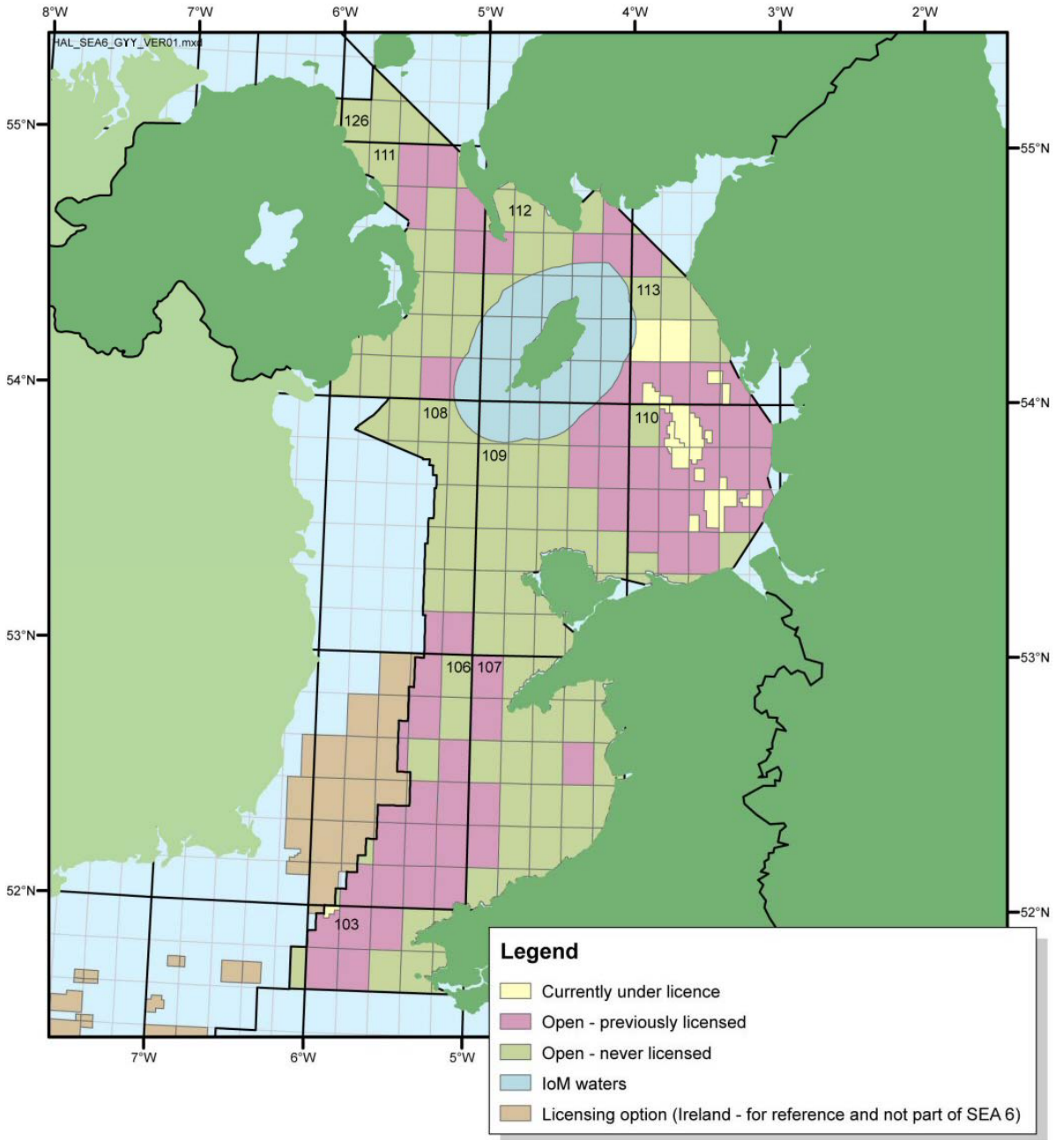
On completion of the Assessment the draft plan and associated Environmental Report will be issued for a 3 month public consultation period on the website during the autumn 2005.

In keeping with the Government's move towards "less paper" where feasible, scoping and subsequent consultation is conducted electronically using e-mail and the SEA website.

3 HISTORY OF OIL AND GAS LICENSING WITHIN THE SEA 6 AREA

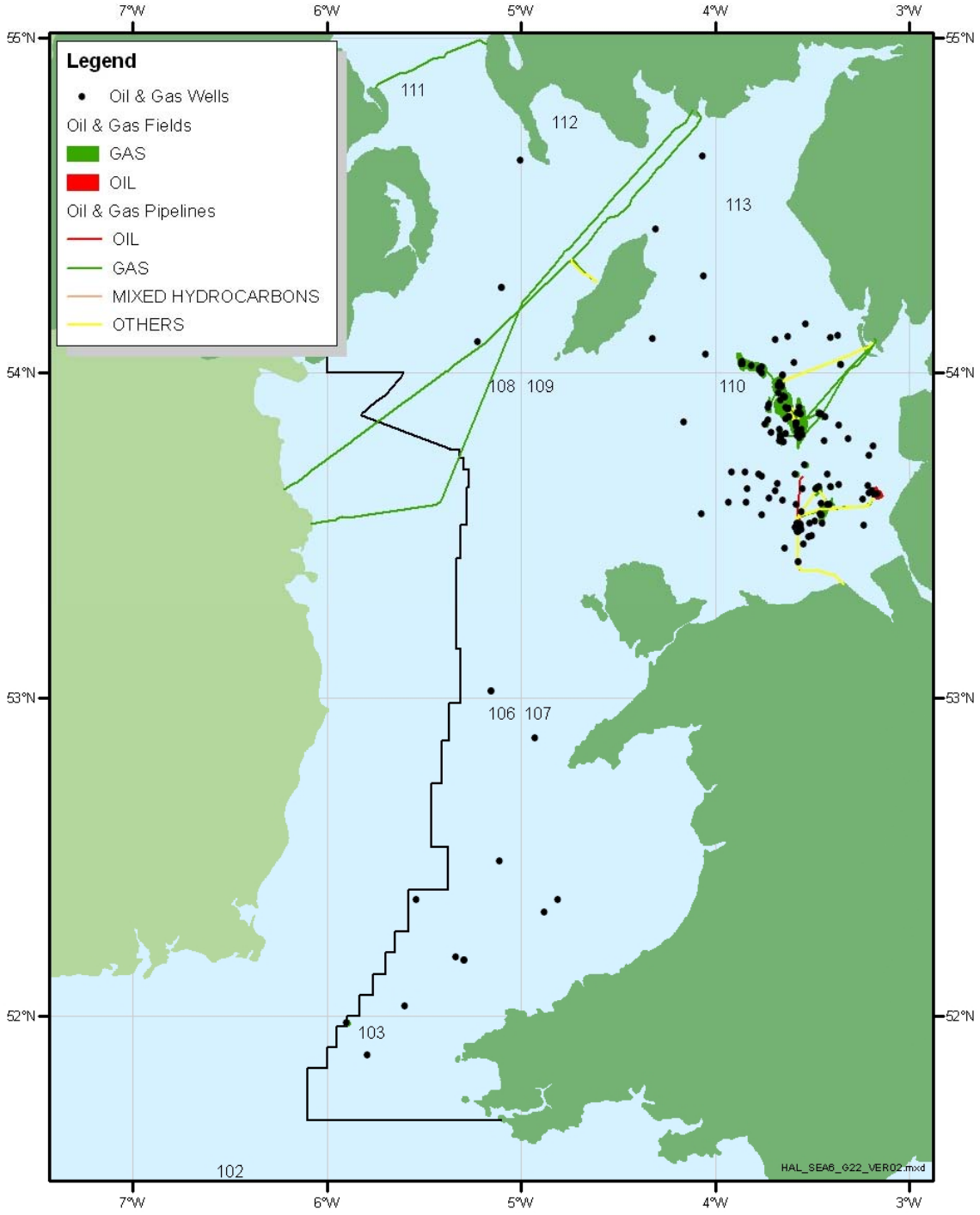
Blocks within the SEA 6 area were first offered for oil and gas licensing in 1965. Of the blocks within the area, 2 are currently wholly under licence, 13 are partly licensed and partly relinquished, 57 have been licensed but are now wholly relinquished - see Figure 2. Many blocks have been previously offered for licensing but have not been applied for.

Figure 2 – SEA 6 oil & gas licensing history and current status



A summary of past exploration wells and current production infrastructure in the SEA 6 Area is shown below (also included are gas interconnector pipelines between the UK, Ireland and the Isle of Man).

Figure 3 – SEA 6 oil & gas exploration wells, producing fields and infrastructure



4 DRAFT PLAN

4.1 Draft Plan and the Alternatives

SEA 6 will address all the Blocks within the area in terms of the implications of licensing for oil and gas exploration and development. Depending on the outcome of the SEA process and other Government considerations, all or a proportion of the unlicensed Blocks within the SEA 6 area may be offered for licensing in the 24th round.

Alternatives proposed for the development of oil and gas resources within the proposed 24th Round area have been identified as:

1. Not to offer any blocks for Production Licence award
2. To proceed with the licensing programme as proposed
3. To restrict the area licensed temporally or spatially

4.2 Potential activity following a licensing round in SEA 6 area

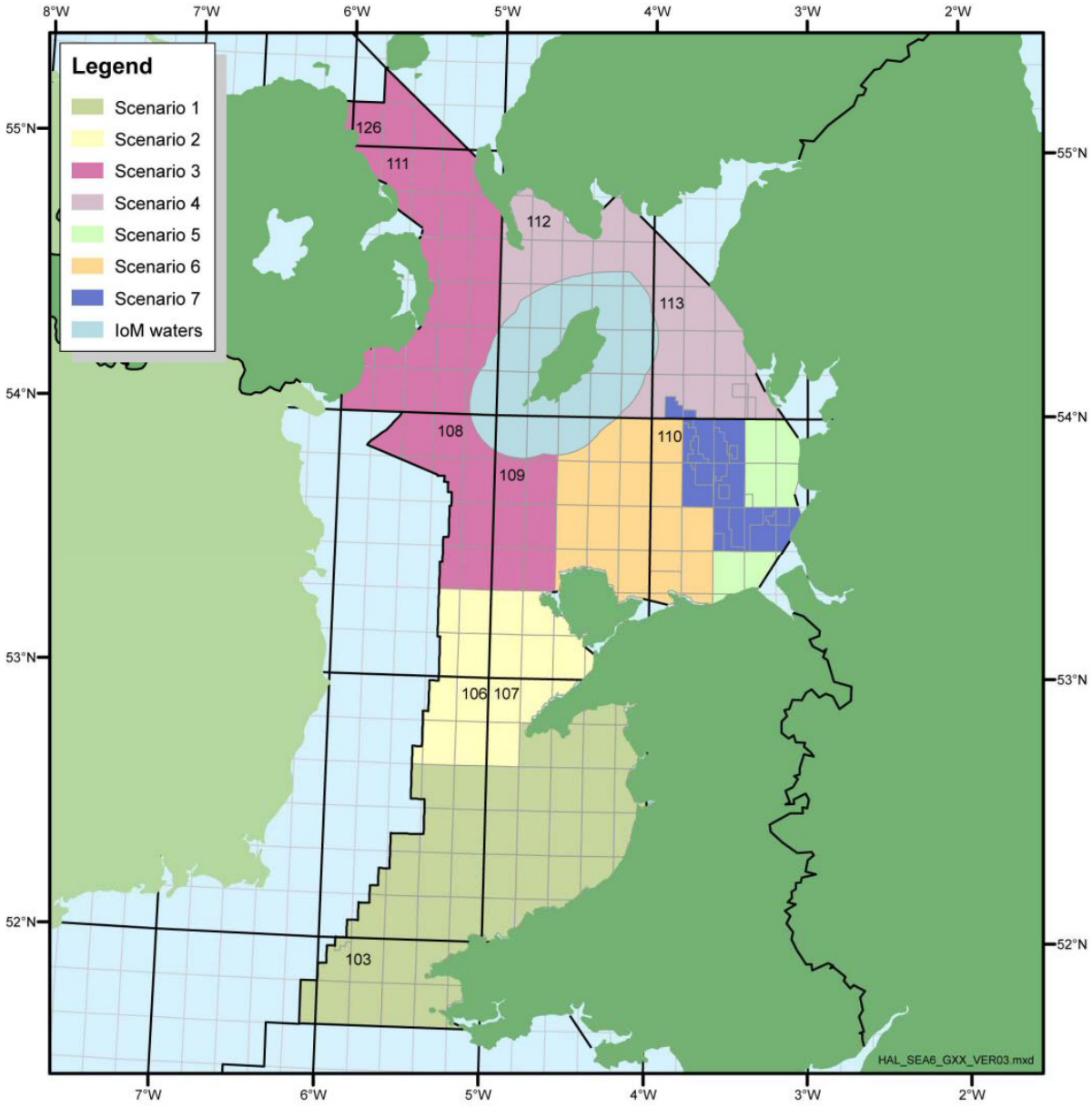
For commercial hydrocarbon resources to occur, a number of factors and features have to coincide. These include:

- The presence of source rocks, with an appreciable organic matter content
- Adequate depth of burial to allow the conversion of the organic matter to oil or gas through the action of temperature and pressure
- The presence of rocks with sufficient porosity to allow the accumulation of oil or gas
- Cap or seal rocks to prevent the oil or gas from escaping from the reservoir rocks
- Migration pathways to permit oil and gas formed in the source rocks to move to reservoir formations

Based on geological characteristics and potential for finding hydrocarbon reserves the SEA 6 area can be divided into 7 areas shown in Figure 4:

1. Cardigan Bay and St Georges Channel – shown in Figure 4 as Scenario area 1
2. Caernarfon Bay – shown as Scenario area 2
3. West Irish Sea Basin – shown as Scenario area 3
4. East Irish Sea Basin – shown as Scenario area 4
5. Eastern Flanks of the Mature Irish Sea – shown as Scenario area 5
6. Western Flanks of the Mature Irish Sea – shown as Scenario area 6
7. Mature Irish Sea – shown as Scenario area 7

Figure 4 – SEA 6 activity scenario areas



Note: Information sourced from www.og.dti.gov.uk

Both exploration and development activity levels and timing would depend on a range of factors including the number of blocks licensed, work programme commitments made by licensees, exploration success, economic and commercial factors and Government approval of development plans.

The DTI have provided projections of the scale of potential exploration and production activity, which could follow licensing of the SEA 6 area. The projections are best estimates on the basis of current understanding and thus indicative. A summary of the prospectivity of each area is given below.

Cardigan Bay and St Georges Channel Basin - Scenario area 1

Prospectivity

There is a proven gas reserve in the St George's Channel area where an exploration well (Well 103/1-1, drilled in 1994) discovered gas in the Upper Jurassic sands. Other prospectivity has been demonstrated by oil and gas shows encountered at most stratigraphic levels in wells in the basin. However, it is possible that oil in shallower (<2500 ft) Jurassic reservoirs will be significantly biodegraded and that compaction and subsequent uplift of formations may have affected the integrity of the top seal formations. Studies indicate that the Lower Jurassic Lias Group mudstones are likely to be fully mature in the axial region of the St Georges Channel Basin. Two wells in the St Georges Channel proved reservoir quality sandstones in the Middle Jurassic.

Potential activity under existing licences within the area

- Only an appraisal well in the gas discovery in Block 103/1 is likely in the near future.
- if the appraisal well is successful further seismic may be required for field delineation and a development is possible

Scenarios for assessment of potential activity following future licensing

Licensing after SEA 6 will be likely dependent on the results of the appraisal well in Block 103/1. It is considered unlikely that further blocks will be applied for in this area during a 24th Round. For assessment purposes the following activity scenario will be used:

- A maximum of 10 blocks under Frontier licences.
- Up to 500 km^2 3D seismic data.
- If licensed, a well could be drilled within 4 years of award on a Frontier licence.

Caernarfon Bay – Scenario area 2

Prospectivity

The Westphalian Coal Measures are predicted to be widespread beneath the Caernarfon Basin and may have been mature for gas generation; however, neither of the two wells drilled in Caernarfon Bay encountered economic accumulations of oil or gas. Exploration Well 107/1-1 (drilled in 1992) proved the presence of basal Triassic Sherwood sandstone and the potential for Lower Permian Collyhurst reservoir.

Potential activity under existing licences within the area

- None

Scenarios for assessment of potential activity following future licensing

It is considered unlikely that further blocks will be applied for in this area during a 24th Round. For assessment purposes the following activity scenario will be used:

- A maximum of 10 blocks under Frontier licences.
- Up to 500 km^2 3D seismic data.
- If licensed, a well could be drilled within 4 years of award on a Frontier licence.

West Irish Sea Basin – Scenario area 3

Prospectivity

Large parts of the West Irish Sea Basin remain unexplored, but the few wells that have been drilled in the Solway and Peel basins did not encountered potential reservoirs or accumulations of oil or gas.

Potential activity under existing licences within the area

- None

Scenarios for assessment of potential activity following future licensing

It is considered unlikely that further blocks will be applied for in this area during a 24th Round. For assessment purposes the following activity scenario will be used:

- A maximum of 10 blocks under Frontier licences.
- Up to 500 km^2 3D seismic data.
- If licensed, a well could be drilled within 4 years of award on a Frontier licence.

East Irish Sea Basin - Scenario area 4

Prospectivity

Structural closures in the Triassic Ormskirk Sandstone Formation of the Sherwood Sandstone Group provide the main target in the East Irish Sea Basin. The Permian Collyhurst Sandstone Formation forms a secondary target in the basin. The Collyhurst demonstrates close similarities with the Leman Sandstone of the Southern North Sea, which originally prompted exploration in the area, but no Permian production has been established in the area to date.

Triassic Ormskirk gas discoveries were made by exploration Wells 113/29-2 (1992) and 113/28-2 (1994). Another undeveloped gas discovery lies in Block 113/27, the well found an accumulation in the Permian Collyhurst, but the primary Triassic Helsby reservoir did not flow. Further prospectivity in the area has been identified by the British Geological Survey (BGS).

Potential activity under existing licences within the area

- Field development plans for simultaneous gas and wind farm development of what is now called Ormonde North and South Fields are now under review.

Ormonde will be a phased co-generation development. Phase 1 includes drilling and completion of production wells at Ormonde South (Block 113/29), installation of a removable gas turbine generator platform, a transformer hub platform and cable connected to the wind farm to be installed in Block 113/28a. Phase 2 includes drilling and completion of production wells at Ormonde North (Block 113/28) and relocation of the gas turbine generator platform from Ormonde South to Ormonde North. A number of alterative export routes are still being evaluated for gas and power.

- An exploration well may be drilled in either Block 113/21 or 22 in 2005. Further seismic (up to 500 km^2 3D seismic data) may be acquired.

Scenarios for assessment of potential activity following future licensing

There may some interest in Licences in this area with potentially one block being applied for under a Traditional Licence with a firm well and up to 200km^2 of 3D seismic. For assessment purposes in addition to the above the following activity scenario will be used:

- A maximum of 10 blocks under Frontier licences.
- Up to 500 km^2 3D seismic data.
- If licensed, a well could be drilled within 4 years of award on a Frontier licence.

Eastern Flanks of the Mature Irish Sea - Scenario area 5

Prospectivity

Triassic Ormskirk and Permian Collyhurst leads have been identified by the BGS, but they are poorly defined on 2D seismic data. Exploration Well 110/8a-5 encountered only minor amounts of oil and was not tested, the elongate N/S block structure could be re-licensed, appraised and if successful, and potentially subsea tied back existing infrastructure.

Potential activity under existing licences within the area

- None

Scenarios for assessment of potential activity following future licensing

There may some interest in Licences in this area with potentially two blocks being applied for under Traditional Licences with a firm well each and up to 500km^2 of 3D seismic. For assessment purposes in addition to the above the following activity scenario will be used:

- A maximum of 8 blocks under Frontier licences.
- Up to 500 km^2 3D seismic data.
- If licensed, a well could be drilled within 4 years of award on a Frontier licence.

Western Flanks of the Mature Irish Sea - Scenario area 6

Prospectivity

Numerous wells on the western flank of the mature Irish Sea basin have encountered potential reservoirs or accumulations of gas. The 110/12a-1 well encountered a small gas column in Triassic Ormskirk reservoir. Shows were encountered in the 112/30-1 well at Carboniferous level; however the presence and deliverability of Carboniferous reservoirs are unproven. The BGS has identified Triassic Ormskirk prospectivity that could be developed as sub sea tie backs to existing infrastructure.

Potential activity under existing licences within the area

- none

Scenarios for assessment of potential activity following future licensing

Very limited interest is expected in this area. For Assessment purposes in addition to the above the following activity scenario will be used:

- A maximum of 10 blocks under Frontier licences
- Up to 500 km^2 3D seismic data.
- If licensed, a well could be drilled within 4 years of award on a Frontier licence.

Mature Irish Sea - Scenario area 7

Prospectivity

Established production and identified prospectivity is found in the Triassic Ormskirk reservoir, and currently there is limited ullage in existing facilities. The 110/14-1 well encountered oil, but further appraisal is required. Additional exploration prospectivity is identified in structurally complex traps.

Potential activity under existing licences within the area

- Calder field began production in 2004 and phase 2 development will include Crossans and Darwen fields.
- An appraisal of the 110/14-2 gas discovery well may be drilled in 2005, which could be developed via Calder.
- Exploration drilling in Block 110/14 may progress in 2005.
- There may be an appraisal well of the oil discovery 110/14-1. A vertical well would be necessary to confirm the interpretation, but development could be via a long offset well from the Lennox platform until the Lennox field oil is depleted and the oil pipeline in converted to a gas pipeline.
- There are no current plans for seismic acquisition. However, there are only three 3D proprietary (but now released) seismic surveys in the mature fields area, acquired in 1994/5. It is likely that new seismic will be acquired in the next 5 years to delineate infield and near field potential (250-500 km^2 3D seismic)

Scenarios for assessment of potential activity following future licensing

There may some interest in Licences in this area. For assessment purposes in addition to the above the following activity scenario will be used:

- A maximum of the remaining unlicensed whole or part blocks applied for under a Frontier or Promote licence.
- Up to 500 km^2 3D seismic data.
- If licensed, a well could be drilled within 4 years of award on a Frontier or Promote licence.

5 SEA 6 ENVIRONMENTAL REPORT - PROPOSED CONTENTS AND ISSUES

Potential sources of effects from the activities which may result from implementation of the draft plan will be considered in terms of the likely significant effects on the environment, including biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage (architectural and archaeological heritage), landscape and the interrelationship between the factors.

A draft contents for the SEA 6 Environmental Report is given below and a working list of topics to be assessed in detail in Section 10.4 of the report is given in Table 1.

Draft Contents List

Non-Technical Summary

1 Introduction and Background
- 1.1 Introduction
- 1.2 Regulatory context to SEA
- 1.3 History of the DTI SEA process
- 1.4 Licensing context
- 1.5 Scope and purpose of the SEA
- 1.6 SEA 6 Area
- 1.7 Organisation of the consultation document
- 1.8 Supporting studies and documents

2 Strategic Environmental Assessment Process
- 2.1 Introduction
- 2.2 Overview of the SEA process
- 2.3 Scoping the SEA
- 2.4 Assessment workshop
- 2.4 Stakeholder meeting
- 2.5 Studies and surveys
- 2.6 Further consultation process

3 Regulatory Context
- 3.1 SEA Directive
- 3.2 Licensing
- 3.3 Control of operations

4 Activities
- 4.1 Introduction
- 4.2 Alternatives
- 4.3 Scenarios
- 4.4 Stages of activity

5 SEA 6 Area Physical and Chemical Environment
- 5.1 Regional overview
- 5.2 Geology, substrates and shoreline types
- 5.3 Climate and meteorology
- 5.4 Oceanography and Hydrography
- 5.5 Contamination of water and sediments

6 SEA 6 Area Ecology
- 6.1 Regional overview
- 6.2 Plankton
- 6.3 Benthos

Table 1 - Working list of SEA 6 assessment topics

Issue	Potential sources of significant effect
Biodiversity	Physical damage to biotopes Marine discharges – potential effects of non-native species introductions in ballast water discharges Major oil spill effects and associated damage to habitats and ecosystem function
Population	Interactions with other users: Commercial implications of exclusion of fishing activities in vicinity of infrastructure, and safety risks of interactions between fishing gear and subsea infrastructure. Interactions with shipping, military and other human uses of the offshore environment Socio-economic consequences of oil spills Positive socio-economic effects of potential activities, in terms of employment, expenditure and tax revenue
Human health	Potential for significant effects on human health – associated with effects on local air quality resulting from atmospheric emissions Potential food chain effects of major oil spills
Fauna **zooplankton** **benthos** **cephalopods** **fish** **marine reptiles** **birds** **marine mammals**	Underwater noise - potential behavioural and physiological effects on marine mammals, fish associated with seismic surveys Physical damage to biotopes – potential effects on benthos, associated with anchoring and infrastructure construction Physical presence of infrastructure and support activities may cause behavioural disturbance to fish, birds, marine mammals Marine discharges – potential effects of produced water discharges on zooplankton and fish; drilling wastes effects on benthos Oil spills – risks of effects on all faunal groups
Flora **phytoplankton** **macroalgae** **seagrass**	Marine discharges – potential effects of non-native phytoplankton species introductions in ballast water discharges Oil spills – risks of effects of beached oil on intertidal algal and macrophyte populations

Issue	Potential sources of significant effect
Soil	Physical effects of anchoring and infrastructure construction on seabed sediments Marine discharges – sediment modification and contamination by particulate discharges Permanent effects of reinjection of produced water and cuttings Onshore disposal of returned wastes – requirement for landfill Oil spills (with or without chemical dispersion) – risk of sediment contamination
Water	Marine discharges – contamination by soluble and dispersed discharges Oil spills (with or without chemical dispersion) – risk of contamination of the water column by dissolved and dispersed hydrocarbons
Air	Local air quality effects resulting from exhaust emissions, flaring and venting Emissions of acid gases Air quality effects of a major gas release or volatile oil spill
Climatic factors	Contributions to greenhouse gas emissions Greenhouse gas emissions associated with combustion of hydrocarbons produced as a result of proposed activities, are outside scope of assessment
Material assets	None envisaged
Cultural heritage, including architectural and archaeological heritage	Potential effects in relation to known or postulated archaeological heritage
Landscape	None, assuming offshore locations of proposed activities Potential visual impacts of nearshore exploration and development including seascape effects
The inter-relationship between the issues	Multiple effects – biodiversity and faunal effects associated with habitat disturbance; contamination of water, sediment and fauna; oil spill risks Implications for Marine Spatial Planning Conflicts between issues and receptors – reinjection vs marine discharges; and options for oil spill contingency