The Potential Socio-Economic Implications of Licensing the SEA3 Area

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Contents **Page**

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1.0 Introduction

1.1 The UK Department of Trade and Industry (DTI) is conducting a sectoral Strategic Environmental Assessment (SEA) of the implications of licensing parts of the UKCS for oil and gas exploration and production. This SEA (SEA 3) is the third in a series planned by the DTI, which will in stages, address the whole of UK waters. As part of the SEA 3 process, a study of the potential socio-economic implications is required. This report fulfils that requirement.

1.2 The whole SEA3 area covers four distinct sub-areas of the UKCS. In the Central North Sea approximately 169 Blocks or Part Blocks in Quadrants 27 to 30 and Quadrants 34 to 39 are open. In the Southern North Sea 161 Blocks or Part Blocks are open. Table 1 gives the details of the SEA3 areas.

1.3 The scope of the study includes estimates of the reserves which might be discovered and developed, and the related exploration, appraisal, development and decommissioning costs. The possible phasing of these activities through time is also examined. The effects of the development of new fields in extending the lives of existing ones and the implications for the provision of necessary infrastructure onshore are also discussed. The employment generated directly and indirectly in the 2 sub-areas is estimated. The distinction is made between employment at the various stages in the exploration, development and production activities. The significance of the employment opportunities provided for the long-term maintenance of a skilled workforce is also considered.

1.4 In preparing a study of this type many assumptions had to be made. In formulating some of the assumptions regarding the likely numbers and types of new developments, the views of the relevant experts in the DTI were fully taken into account. The number of possible new field developments emanating from the round reflects a cautious view of the possibilities.

Table 1

SNS	SNS	SNS	CNS
Carboniferous Trend (Q43-44)	Rotliegend Flank Trend (Q41-42, 46,47,51-54)	London Brabant (Q51-52,53-54,56-57)	Mid North Sea High (Q34-39)
Q43 - 1- 10 (relinquished)	Q40 - 3-5, 9-10, 15 (relinquished)	Q51 - 3-5 (relinquished)	Q27 - 23 to 30 (never licensed)
Q44 - 5 (never licensed) 1-4, 6-7 (relinquished) 8 (partly relinquished)	Q41 - 23 (never licensed) 1-15, 17-20, 24-25, 29-30 (relinquished)	Q52 - 8-10, 14-15, 19-20, 24-25, 28-29 (never licensed) 1-3, 30 (relinquished) 4-5 (partly relinquished)	Q28 - 20-25, 29-30 (relinquished) 26-28 (never licensed
Q45 - 1 (never licensed)	Q42 - 1-3, 5-7, 11, 14, 16-22, 26 (relinquished) 10, 15 (partly relinquished)	Q53 - 21-25, 27-29 (never licensed) 6-7, 9, 11- 14, 16- 20, 26 (relinquished) 15 (partly relinquished)	Q29 -21-22, 26-30 (relinquished)
	Q46 - 5, 10 (relinquished)	Q54 - 6, 11, 16 (relinquished)	Q30 -26 (relinquished)
	Q47 - 1, 6-7, 11-12, 16-18, 22-23, 27 -30 (relinquished) 2, 13, 24 (partly relinquished)	Q56 - 2-20, 22- 30 (never licensed)	Q34 -2-10, 12-15, 17-20, 23-25, 28-30 (never licensed)
	Q48 - 26-27 (relinquished) 28 partly relinquished)	Q57 - 1-4, 6-8, 11-12, 16, 21 (never licensed)	Q35 1-7, 10-12, 15-17, 21-24, 26, 29-30 (never licensed) 8-9, 13-14, 18-20,25,27-28 (relinquished)
			Q36 1-8, 11 (never licensed) 9-10, 12-30 (relinquished)
			Q37 - 1 -30 (relinquished)
			Q38 1-4, 6-8, 11-13, 16-29 (relinquished)
			Q39 - 6-8 (relinquished) 21, 26 (never licensed)

2.0 Possible Exploration, Discoveries and Field Developments

2.1 The socio-economic effects of licensing the SEA3 area depend on the exploration, development, and production activities resulting from the new round. There are many underlying uncertainties involved in estimating these effects. The numbers of Blocks nominated and the number subsequently taken up constitute initial uncertainties. It is understood that around 161 Blocks may be on offer in the SNS and 169 in the CNS.

Many of the Blocks on offer will have been relinquished from earlier rounds or have never been licensed.

2.2 In the 20th Round the take-up was not very high in relation to the number of Blocks put on offer reflecting declining prospectivity.

2.3 The numbers of commitment wells likely to be offered in the new round are also subject to considerable uncertainty. These will reflect both the numbers of Blocks sought and the perceptions of the expected success rates. Exploration success rates, while less than in the 1970's and 1980's, have held up quite well given the maturity of the UKCS acreage in question. One reason for this has been the advances in seismic technology.

2.4 In the present context it is also relevant that much data on previously licensed acreage will be available to new applicants. It is also relevant that in some of the acreage discoveries have already been made. This could enhance the overall success rate, taking into account appraisal as well as exploration.

2.5 It was felt prudent to take a very cautious view of the number of exploration commitment wells. The numbers for the 4 areas and the associated exploration success rates are shown in Table 2.

Table 2

	Carboniferous Trend (Q43-44)	Rotliegend Flank Trend (Q41-42, 46,47,51-54)	London Brabant (Q51-52,53-54,56-57)	Mid North Sea High (Q34-39)
Number of Exploration wells	**3 to 5**	**3 to 5**	**0**	**< 5**
Success Rate 95 to 2001	**24.62%**	**24.62%**	**24.62%**	**10.66%**
Assumption				**15.00%**

2.6 The success rate found for the CNS excludes fields in the MF area as this is well away from the SEA 3 area. It was felt that the success rate may be higher than the 10.66% found as with only 3 wells drilled and no finds in 2000 and 2001 this pulled down the CNS success rate significantly. Because of this an assumed success rate of 15% was used. This reflects the longer-term prospectivity in the 1990's.

2.7 With respect to timing of the exploration effort shown in Table 2 it was assumed that, in line with current licensing policy there would be "early" exploration. Accordingly the timing of the commitment wells was assumed to be as shown in Table 3. An Optimistic and a Pessimistic scenario are shown.

Table 3

Number and Timing of Exploration Wells				
Pessimistic Scenario	Carboniferous Trend (Q43-44)	Rotliegend Flank Trend (Q41-42, 46,47,51-54)	London Brabant (Q51-52,53-54,56-57)	Mid North Sea High (Q34-39)
2003	3	3		1
2004				
2005				
2006				
Total	**3**	**3**	**0**	**1**
Optimistic Scenario				
2003	3	3		1
2004	2	2		3
2005				
2006				
Total	**5**	**5**	**0**	**4**

2.8 This timing and the exploration success rate determines the timing of the fields found as shown in Table 4.

Table 4

Discoveries				
Pessimistic Scenario	Carboniferous Trend (Q43-44)	Rotliegend Flank Trend (Q41-42, 46,47,51-54)	London Brabant (Q51-52,53-54,56-57)	Mid North Sea High (Q34-39)
2003	1	1		1
2004				
2005				
2006				
Total	**1**	**1**	**0**	**1**
Optimistic Scenario				
2003	1	1		1
2004				
2005				
2006				
Total	**1**	**1**	**0**	**1**

2.9 For both the Pessimistic and the Optimistic Scenarios, only 3 exploration finds are likely. It is, however, expected that in total there will be 1 - 5 subsea developments and 2 stand-alone developments in the whole SEA 3 area.

Table 5

Number and Timing of Appraisal Wells				
Pessimistic Scenario	Carboniferous Trend (Q43-44)	Rotliegend Flank Trend (Q41-42, 46,47,51-54)	London Brabant (Q51-52,53-54,56-57)	Mid North Sea High (Q34-39)
2003		Technical reserve		
2004	Exploration find	Exploration find		Exploration find
2005				
2006				
Total	1	2		1
Optimistic Scenario				
2003		Technical reserve		
2004	Exploration find	Exploration find		Exploration find
2005		Technical reserve		
2006				
Total	1	3		1

2.10 Given 3 discoveries, the remaining developments come from known technical reserves. These discoveries are then appraised, but it is also assumed that only 50% of the SNS technical reserve fields may require further appraisal. The timing is shown in Table 5.

Table 6

Possible Developments				
Pessimistic Scenario	Carboniferous Trend (Q43-44)	Rotliegend Flank Trend (Q41-42, 46,47,51-54)	London Brabant (Q51-52,53-54,56-57)	Mid North Sea High (Q34-39)
2003				
2004		Technical reserve		
2005	Exploration find	Exploration find		
2006				Exploration find
Total	1	2		1
Optimistic Scenario				
2003		Technical reserve		
2004		Technical reserves*2		
2005	Exploration find	Exploration find		
2006		Technical reserve		Exploration find
Total	1	5		1

2.11 Table 6 shows the profiles of the number of possible developments.

3.0 Size and Costs of New Discoveries

3.1 The significant discoveries in the SEA 3 quadrants over the last 10 years as reported in the "Brown Book" along with the reserve size from the authors' own databases of sanctioned, probable, and possible fields as reported by the operators, plus a database of known technical reserves was used to calculate the mean discovery size.

3.2 The size and costs of new discoveries was estimated with the employment of the Monte Carlo technique. With respect to size of discoveries the historical evidence was examined. In line with historic experience the distribution of field sizes was taken to be lognormal. The standard deviation (SD) was set at 50% of the mean value.

3.3 With respect to the development and operating costs of new discoveries the mean development cost for the SNS was set at $3 per boe, and for the CNS $4 per boe. Annual operating costs (including tariffs) were assumed to be in the range 8%-15% of accumulated development costs depending on field size. The lower percentages apply to the larger sizes reflecting the economy of scale. Decommissioning costs were set at 10% of field development costs. Table 7 gives the mean discovery size and cost for each of the SEA3 areas.

3.4 The Monte Carlo technique was then used to draw from these distributions to determine the size of fields found. An 8.72 Mboe field was found in the Carboniferous Trend, a 24.3 Mboe field in the Rotliegend Flank area, and a 15.71 Mboe oil field in the Mid North Sea High area.

4.0 Development of Technical Reserves Plus New Discoveries

4.1 For the technical reserve fields it was felt that the largest technical reserves in the Blocks on offer would be the most likely to be developed. There were relatively few technical reserves in the Carboniferous, London Brabant or Mid North Sea High areas, and so the technical reserves in the Rotliegend Flank Trend area have been used. Table 8 shows the potential exploration and technical reserve fields for the Sea 3 area

Table 7

Mean Size of recoverable reserves	Carboniferous Trend (Q43-44)	Rotliegend Flank Trend (Q41-42, 46,47,51-54)	London Brabant (Q51-52,53-54,56-57)	Mid North Sea High (Q34-39)
Mean Discovery size Mboe (10 year average based on Brown Book Significant discoveries)	15.57	17.45	16.8	49.77
Lognormal distribution: SD 50% of mean value				
Mean Devex Discoveries	$3	$3	$3	$4
Mean Devex Technical Reserves	$5	$5	$5	$6
Normal Distribution: SD 20% of mean value				

Table 8

Development Size (Mboe)				
Pessimistic Scenario	Carboniferous Trend (Q43-44)	Rotliegend Flank Trend (Q41-42, 46,47,51-54)	London Brabant (Q51-52, 53-54,56-57)	Mid North Sea High (Q34-39)
2003				
2004		**78.3**		
2005	**8.72**	**24.30**		
2006				**15.71**
Optimistic Scenario				
2003		**8.97**		
2004		**78.3**		
		5.6		
2005	**8.72**	**24.30**		
2006		**26.2**		**15.71**

Table 9

Development Costs $/bbl				
Pessimistic Scenario	Carboniferous Trend (Q43-44)	Rotliegend Flank Trend (Q41-42, 46,47,51-54)	London Brabant (Q51-52,53-54,56-57)	Mid North Sea High (Q34-39)
2003				
2004		**4.01**		
2005	**3.18**	**2.51**		
2006				**5.24**
Optimistic Scenario				
2003		**3.93**		
2004		**4.01**		
		4.28		
2005	**3.18**	**2.51**		
2006		**5.90**		**5.24**

4.2 The Monte Carlo technique was also used to obtain values from the development cost distributions. The resulting values are shown in Table 9.

4.3 The expenditures on E and A (including associated seismic) are based on costs of £7 million per well in the SNS and £12 million per well in the CNS. In conjunction with the numbers of wells discussed above the total expenditures (at 2002 prices) are shown in Table 10.

Table 10

Expenditures on Exploration and Appraisal (£m, 2002 prices)				
Pessimistic Scenario	SNS		CNS	
	Real Exploration Cost	Real Appraisal Cost	Real Exploration Cost	Real Appraisal Cost
2003	42	7	12	
2004		14		12
2005				
2006				
Total £m	**42**	**21**	**12**	**12**
Optimistic Scenario				
2003	42	7	12	
2004	28	14	36	12
2005		7		
2006				
Total £m	**70**	**28**	**48**	**12**

5.0 Economic Modelling

5.1 The exploration finds and the technical reserves fields were then profiled through time with respect to production and costs. Economic modelling using the financial simulation technique was then employed to calculate for each development gross revenues, development costs, operating costs, and decommissioning costs. The allowances for corporation tax were calculated and the post-tax cash flows subsequently calculated. Exploration and appraisal costs and the tax reliefs available were also calculated. Here we assume the investor is in a position which allows immediate relief. Production was subject to economic cut-off when post-tax profits for 3 consecutive years were negative. The investment decision rule adopted was that if a field had a positive NPV at 10% or 15% real discount rate then development would proceed. Otherwise the field would not be developed. (Further details of the financial modelling are discussed in Kemp and Stephen (2002(a)).

5.2 The results of the economic modelling were undertaken for different oil and gas prices. In the results emphasis was given to the results at (a) $20/bbl and 18 pence/therm, (b) $15 bbl and 12 pence/therm and (c) $25/bbl and 24 pence/therm.

6.0 Availability of Offshore Infrastructure

6.1 In the SNS it was felt that under the Pessimistic Scenario there could be 2 developments via sub-sea completions and 1 via platform whilst for the Optimistic Scenario there may be 4 developments via sub-sea and 2 via platforms. The developments have implications for the field lives of existing potential host installations.

6.2 The SNS is a mature area with a proliferation of infrastructure. In a few cases the SEA3 Blocks or part Blocks to be relicensed are close to a number of existing installations, but in most cases they are relatively remote.

a) Carboniferous Trend

6.3 The Carboniferous Trend Area consists of Quadrant 43 Blocks 1 to 10, Quadrant 44 Blocks 1-8 and Quadrant 45 Block 1. Quadrant 43 contained the now decommissioned fields Forbes (43/8-1), Gordon (43/20-1), and Esmond (43/13a-1). The gas from these fields was transported to Bacton via Esmond. The Trent and Tyne field group entered a joint venture with the Esmond transportation system. This is now known as the EAGLES (East Anglia Gas and Liquids Evacuation System). Forbes was in Block 8 but it ceased production in 1993, Gordon was in Block 20 but it ceased production in 1995 along with Esmond which was in Block 13. The Cavendish field is in Block 19 and Cavendish East is in Block 20. The gas from these fields will most likely be transported to Bacton via Trent. These fields are likely to still be producing in 2012. Trent is in Block 24 and Johnstone is in Block 27 but this may be too far to tie in any exploration find. Johnstone gas is transported to Ravenspurn North then onwards through the Cleeton/Ravenspurn South pipeline to Dimlington. There is no close infrastructure in Quadrants 37, 42, or 44.

6.4 Quadrant 44 contains the Caister and Hunter fields in Block 23, Ketch in Block 28, Boulton in Block 21, Murdoch and Watt in Block 22, and Schooner in Block 26, but these fields may be too far away to enable a tie in. Caister/Murdoch, Hunter, Ketch, Boulton, and Schooner gas is transported to Theedlethorpe via the Caister Murdoch pipeline. McAdam and Hawksley in Block 17, Tyne North and South in Block 18 are nearer, but the tie in distance is still quite long. McAdam gas is likely to be transported to Theedlethorpe via the Caister/Murdoch pipeline, whilst Tyne gas is transported to Trent then on through the EAGLES system to Bacton. There is no nearby infrastructure in Quadrants 38, 43 or 45.

6.5 There is no nearby infrastructure for any field discovered in Quadrant 45.

b) <u>London Brabant</u>

6.6 The London Brabant area consists of Quadrant 51 Blocks 3 to 5, Quadrant 52 Blocks 1 to 5, 8 to 10, 14, 15, 19, 20, 24, 25 and 28 to 30, Quadrant 53 Blocks 6, 7, 9, 11 to 29, Quadrant 54 Blocks 6, 11 and 16, Quadrant 56 Blocks 2 to 20 and 22 to 30 and Quadrant 57 Blocks 1 to 4, 6 to 8, 11,12,16 and 21.

6.7 Quadrant 51 has no infrastructure but is close to land. The nearest discoveries are in Quadrant 48 Blocks 21 and 22 which contain Dudgeon and Blythe.

6.8 Part of the Hewett field lies in Block 52 and the Bacton terminal is very near. Hewett gas is transported in a 32 kilometre pipeline to Bacton. Hewett's gas maybe depleted by 2006. The Camelot fields are in Quadrant 53 Block 1 and Camelot South is in Block 2. Camelot gas is transported to Bacton via Leman. Camelot may cease production by 2007. The Wissey field and Welland South and NW are in Quadrant 53 Block 4 and Davy is in Block 5, but these fields may be too far away to act as host fields for any technical reserves or exploration finds in Quadrant 52. Welland gas is currently transported to Bacton via the Thames field, but Welland is nearly depleted. Davy gas is transported to Indefatigable 43 kilometres away then on to Bacton.

6.9 Quadrant 53 contains Wissey, Welland South and NW in Block 4, the Camelot fields in Blocks 1 and 2, Davy in Block 5. Leman is in Quadrant 49 Blocks 26 and 27, and Yare, Thames, Bure, Wensum and Deben are in Block 28, Tristan and Gawain in Block 29, North Davy and Brown in Quadrant 49 Block 30. These fields may be too faraway to tie in any technical reserves or exploration finds in Quadrant 53. Leman gas is landed at Bacton and the Leman field will still be in production after any developments from the SEA 3 area have ceased production. Thames Yare, Wensum and Deben gas is landed at Bacton, but Yare, Bure and Wensum have ceased production. Tristan gas is transported to Welland then to Thames, and then to Bacton whilst Gawain's gas goes to Thames.

6.10 Quadrant 54 has no discoveries. Block 6 might be able to tie in to Davy in Quadrant 53 Block 5 or to Orwell, a field in Quadrant 50 Block 26. Orwell's gas is piped 34 kilometres to Thames.

6.11 Quadrants 56 and 57 have never been licensed and there is no nearby fields or infrastructure.

c) Rotliegen Flank Trend

6.12 The Rotliegend Flank Trend consists of Quadrant 41 Blocks 1 to 15, 17 to 20, 23 to 25, 29 and 30, Quadrant 42 Blocks 1 to 3, 5 to 7, 10, 11, 14, 15 to 22 and 26, Quadrant 46 Blocks 5 and 10, Quadrant 47 Blocks 1,2, 6, 7, 11 to 13, 16 to 18, 22, 23, 24 and 27 to 30, and Quadrant 48 Blocks 26, 27 and 28.

6.13 Quadrant 41 has 2 technical reserve fields but there are no potential host fields nearby in Quadrants 35, 46, 42 or 47.

6.14 Quadrant 42 Block 30 contains the Ravenspurn gas field, Block 29 contains Cleeton, Block 28 contains Wollaston and Whittle. Cleeton gas was transported to Dimlington but it ceased production in 1999. Whittle and Wollaston gas will be transported to the Cleeton/Ravenspurn pipeline. A gas field found in Block, 22, 23 or perhaps 26 may be able to be developed with Whittle and Wollaston.

6.15 The Quadrant 46 Blocks are close to land and the Dimlington terminal is near.

6.16 The Quadrant 47 Blocks are close to the Dimlington and Theddlethorpe terminals. Rough is in Blocks 3 and 8 of Quadrant 47. Amethyst West is in Block 13, Amethyst East is in Block 14, Artemis, Apollo and York are in Block 3, Neptune is in Block 5, Mercury is in Block 9, and Helvellyn and Rose are in Block 10. Amethyst gas is transported 46 kilometres to Easington. Mercury gas is transported to Neptune then on to Cleeton along with gas from Artemis, Apollo and York.

6.17 The Bacton terminal is close to the SEA 3 Quadrant 48 Blocks. The Dawn field which ceased production in late 1999 and Big Dotty are in Block 29 of Quadrant 48, Hewett is also partly in Block 29, Delilah, Deborah, Della and Little Dotty are in Block 30, Blythe is in Block 22 and Dudgeon is in Block 21.

d) Mid North Sea High

6.18 The Mid North Sea High area consists of Quadrant 27 Blocks 23 to 30, Quadrant 28 Blocks 20 to 30, Quadrant 29 Blocks 21, 22 and 26 to 30, Quadrant 30 Block 26, Quadrant 34 Blocks 2 to 10, 12 to 15, 17 to 20, 23 to 25 and 28 to 30, Quadrant 35 Blocks 1 to 30, Quadrant 36 Blocks 1 to 30, Quadrant 37 Blocks 1 to 30, Quadrant 38 Blocks 1 to 4, 6 to 8, 11 to 13 and 16 to 30 and Quadrant 39 Blocks 6, 7, 8, 21 and 26.

6.19 There are no fields or infrastructure in or around the SEA 3 Quadrant 27, 28, 29, 34, 35 and 36 Blocks.

6.20 The Auk and the Fulmar fields are in Quadrant 30 Block 16. Auk may be accessible from Block 26, but this is the only infrastructure available. Fulmar gas is transported to St Fergus.

6.21 The decommissioned Forbes field is in Quadrant 43 Block 8 but this may be too far to tie in any field discovered in Quadrant 37. Forbes gas was transported to Esmond.

6.22 The decommissioned Argyll, Innes, and Duncan fields are in Quadrant 30 Block 24 so there are no nearby fields or infrastructure for any field discovered in the SEA 3 Quadrant 38 area. Argyll is to be redeveloped.

6.23 Fergus is in Quadrant 39 Block 2, Flora Angus and Fife are in Quadrant 31 Block 26. Fergus may cease production in 2003 as may Flora and Fife whilst Angus which ceased production in 1993 is now producing again. None of these fields export gas.

6.24 The general findings are that there is little scope for the further utilisation of the existing infrastructure in all parts of the SEA3 area from the development of new discoveries and technical reserves in Blocks being made available in the 21st Round. The precise location of any new discoveries is, of course, not known, and thus the specific offshore infrastructure which might be utilised cannot be specified. Accordingly this has not been modelled.

7.0 Oil and Gas Production and Availability of Onshore Infrastructure

7.1 To estimate the effects of the new fields on the capacity of the onshore infrastructure full economic modelling was undertaken. The potential gas production from the SNS exploration finds and new developments at 18p/therm under the Optimistic Scenario are shown in Table 11.

Table 11

Potential Gas Production @ $20/bbl and 18p/therm, Hurdle Rate 15% Real 2002 (Optimistic Scenario)			
Gas (average mmcf/d)	SNS		Total
	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00	6.89	6.89
2004	0.00	29.07	29.07
2005	21.50	40.99	62.50
2006	79.62	100.47	180.09
2007	79.62	233.89	313.52
2008	71.90	229.33	301.23
2009	65.52	221.31	286.83
2010	54.10	203.61	257.71
2011	44.02	166.00	210.02
2012	38.98	141.14	180.12
2013	30.24	124.98	155.22
2014	23.32	107.33	130.65
2015	12.87	97.38	110.25
2016	0.00	87.44	87.44
2017	0.00	72.34	72.34
2018	0.00	35.75	35.75
2019	0.00	26.82	26.82
Total Bcf	**190.43**	**702.53**	**892.96**

7.2 The oil potential production profile for the CNS exploration and technical reserve field development are shown in Table 12 below. Again, for economic modelling, a decline rate is added to the production profile.

Table 12

Potential Oil Production @ $20/bbl and 18p/therm, Hurdle Rate 15% Real 2002	
Oil (average tb/d)	CNS Exploration Find
Year	Passing 15% Hurdle Rate
2003	0.00
2004	0.00
2005	0.00
2006	0.00
2007	3.44
2008	7.75
2009	7.75
2010	6.46
2011	4.74
2012	3.87
2013	3.44
2014	3.01
2015	2.58
2016	1.55
2017	0.00
2018	0.00
2019	0.00
Total mmbbls	**16.28**

7.3 Potential gas production under the Optimistic Scenario (Table 11) amounts to 892.96 Bcf with an 18p/therm gas price. The same results are found with a 10% hurdle rate. With the Pessimistic Scenario and an 18p/therm gas price only 648.26 Bcf is likely to be produced (Table 13).

7.4 According to Transco's 2001 10-year Statement there should be sufficient capacity at Teesside, Easington, Dimlington, Theddlethrope and Bacton to absorb this volume of gas which may be produced from the SEA3 area even with substantial imports.

7.5 Tables 14 and 15 show the potential gas production from the SNS exploration finds and new discoveries at 12p/therm and the Optimistic and Pessimistic Scenarios.

Table 13

Potential Gas Production @ $20/bbl and 18p/therm, Hurdle Rate 15% Real 2002 (Pessimistic Scenario)			
Gas (average mmcf/d)	SNS		Total
	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00	0.00	0.00
2004	0.00	0.00	0.00
2005	21.50	0.00	21.50
2006	79.62	47.67	127.29
2007	79.62	143.01	222.64
2008	71.90	143.01	214.92
2009	65.52	143.01	208.54
2010	54.10	131.10	185.20
2011	44.02	107.26	151.28
2012	38.98	95.34	134.32
2013	30.24	89.38	119.62
2014	23.32	83.42	106.75
2015	12.87	77.47	90.33
2016	0.00	71.51	71.51
2017	0.00	59.59	59.59
2018	0.00	35.75	35.75
2019	0.00	26.82	26.82
Total Bcf	**190.43**	**457.84**	**648.26**

Table 14

Potential Gas Production @ $15/bbl and 12p/therm, Hurdle Rate 15% Real 2002 (Optimistic Scenario)			
Gas (average mmcf/d)	SNS		SNS Total
	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00	6.89	6.89
2004	0.00	24.82	24.82
2005	21.50	24.82	46.32
2006	79.62	20.68	100.30
2007	79.62	17.92	97.55
2008	71.90	13.79	85.69
2009	65.52	11.03	76.55
2010	54.10	9.65	63.75
2011	44.02	8.27	52.29
2012	38.98	0.00	38.98
2013	30.24	0.00	30.24
2014	18.50	0.00	18.50
Total Bcf	**183.97**	**50.32**	**234.29**

7.6 With the Optimistic Scenario and a 12p/therm gas price likely gas production may be only 234.29 Bcf and with the Pessimistic Scenario only 183.97 Bcf is likely to be produced as the technical reserve field would not pass the 15% hurdle rate.

Table 15

Potential Gas Production @ $15/bbl and 12p/therm, Hurdle Rate 15% Real 2002 (Pessimistic Scenario)			
Gas (average mmcf/d)	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00		0.00
2004	0.00		0.00
2005	21.50		21.50
2006	79.62		79.62
2007	79.62		79.62
2008	71.90		71.90
2009	65.52		65.52
2010	54.10		54.10
2011	44.02		44.02
2012	38.98		38.98
2013	30.24		30.24
2014	18.50		18.50
Total Bcf	**183.97**	**0.00**	**183.97**

7.7 There are no onshore infrastructure capacity problems associated with these possible developments.

7.8 Tables 16 and 17 show the potential gas production from the SNS exploration finds and new discoveries at 24p/therm under the Optimistic and Pessimistic Scenarios.

Table 16

Potential Gas Production @ $25/bbl and 24p/therm, Hurdle Rate 15% Real 2002 (Optimistic Scenario)			
Gas (average mmcf/d)	SNS		Total
	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00	6.89	6.89
2004	0.00	29.07	29.07
2005	21.50	40.99	62.50
2006	79.62	100.47	180.09
2007	79.62	233.89	313.52
2008	71.90	229.33	301.23
2009	65.52	221.31	286.83
2010	54.10	203.61	257.71
2011	44.02	166.00	210.02
2012	38.98	141.14	180.12
2013	30.24	128.71	158.95
2014	23.32	110.12	133.44
2015	12.87	97.38	110.25
2016	9.65	87.44	97.09
2017	0.00	72.34	72.34
2018	0.00	45.95	45.95
2019	0.00	34.97	34.97
2020	0.00	20.11	20.11
Total Bcf	**193.95**	**718.96**	**912.90**

Table 17

Potential Gas Production @ $25/bbl and 24p/therm, Hurdle Rate 15% Real 2002 (Pessimistic Scenario)			
Gas (average mmcf/d)	SNS		Total
	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00	0.00	0.00
2004	0.00	0.00	0.00
2005	21.50	0.00	21.50
2006	79.62	47.67	127.29
2007	79.62	143.01	222.64
2008	71.90	143.01	214.92
2009	65.52	143.01	208.54
2010	54.10	131.10	185.20
2011	44.02	107.26	151.28
2012	38.98	95.34	134.32
2013	30.24	89.38	119.62
2014	23.32	83.42	106.75
2015	12.87	77.47	90.33
2016	9.65	71.51	81.16
2017	0.00	59.59	59.59
2018	0.00	35.75	35.75
2019	0.00	26.82	26.82
2020	0.00	20.11	20.11
Total Bcf	**193.95**	**465.18**	**659.13**

7.9 With the Optimistic Scenario and a 24p/therm gas price aggregate gas production may be 912.9 Bcf, and with the Pessimistic Scenario 659.13 Bcf is likely to be produced.

7.10 Table 18 shows the potential oil production profile with a $20/bbl oil price and a 15% hurdle rate.

Table 18

Potential Oil Production @ $20/bbl and 18p/therm, Hurdle Rate 15% Real 2002	
Oil (average tb/d)	CNS
	Exploration Find
Year	Passing 15% Hurdle Rate
2003	0.00
2004	0.00
2005	0.00
2006	0.00
2007	3.44
2008	7.75
2009	7.75
2010	6.46
2011	4.74
2012	3.87
2013	3.44
2014	3.01
2015	2.58
2016	1.55
2017	0.00
2018	0.00
2019	0.00
Total mmbbls	**16.28**

7.11 Potential oil production from the Optimistic Scenario and the Pessimistic scenario amounts to 16.28 million barrels with a $20/bbl oil price. The same result is found with a 10 % hurdle rate.

7.12 Table 19 shows the potential oil production profile with a $15/bbl oil price. The aggregate amounts to 15.7 million barrels.

Table 19

Potential Oil Production @ $15/bbl and 12p/therm, Hurdle Rate 15% Real 2002	
Oil (tb/d)	CNS
	Exploration Find
Year	Passing 15% Hurdle Rate
2003	0.00
2004	0.00
2005	0.00
2006	0.00
2007	3.44
2008	7.75
2009	7.75
2010	6.46
2011	4.74
2012	3.87
2013	3.44
2014	3.01
2015	2.58
2016	0.00
2017	0.00
2018	0.00
2019	0.00
Total mmbbls	**15.71**

7.13 Table 20 shows the potential oil production profile with a $25/bbl oil price.

Table 20

Potential Oil Production @ $25/bbl and 24p/therm, Hurdle Rate 15% Real 2002	
Oil (average tb/d)	CNS
	Exploration Find
Year	Passing 15% Hurdle Rate
2003	0.00
2004	0.00
2005	0.00
2006	0.00
2007	3.44
2008	7.75
2009	7.75
2010	6.46
2011	4.74
2012	3.87
2013	3.44
2014	3.01
2015	2.58
2016	1.55
2017	1.16
2018	0.00
2019	0.00
Total mmbbls	**16.70**

7.14 Potential oil production amounts to 16.7 million barrels with a $25/bbl oil price.

8.0 Potential Employment in UK From Licensing of SEA3 Area

8.1 The licensing of the SEA3 areas will have an impact on the level of employment in the UK. The methodology used to calculate the employment effects broadly follows that used by PACEC (PACEC (2002)). Essentially the approach in that report estimates employment from the levels of expenditure using the national input-output tables to estimate all the indirect and induced employment. Direct employment refers to direct employment in exploration, development, production and decommissioning. Indirect employment refers to employment generated by the initial expenditures throughout the supply chain. The input-output tables are used to calculate this employment. Induced employment (or trickle-down employment) refers to the employment generated by the spending of employment income in the direct and indirect categories.

8.2 The study by COGENTSI and PACEC estimated multipliers from which the indirect and induced employment was calculated. The procedure adopted for the present study was to base the calculation on the average multipliers for the period 1999-2003. The multipliers for the direct employment as estimated by COGENTSI and PACEC was modified to reflect the likelihood that, because the great majority of new developments resulting from licensing in the SEA3 area will be with sub-sea systems or not normally manned platforms, the direct employment from the expenditures will be less than the 1999-2003 average.

8.3 The possible total employment generated in the whole SEA3 area under the Optimistic, $20, 18 pence case is shown in Table 21. The Pessimistic result is shown in Table 22. Employment peaks at just under 6,854 in 2007 when development activity reaches its peak under the Optimistic Scenario, and 4,713 under the Pessimistic Scenario. The estimates for the SNS under the 18 pence case are shown in Table 23. It is seen that the peak is also in 2007 with 6,063 jobs. The estimates for the CNS under the $20, 18 pence case are shown in Table 24. Peak employment is 1,208 in 2004.

8.4 Total possible employment for the whole SEA3 area under the $15, 12 pence scenario is shown in Table 25. Peak employment is over 2,713 in 2004 under the Optimistic Scenario or 1,733 in 2006 under the Pessimistic Scenario. There is thus a very substantial sensitivity to the employment prospects. The Pessimistic result is shown in Table 26. The estimates for the SNS under the 12 pence case are shown in Table 27. Employment peaks in 2003 at 1,519. The results for the CNS under the $12, 12 pence scenario are shown in Table 28. Employment peaks at 1,208 in 2004.

8.5 Total possible employment for the whole SEA3 area under the $25, 24 pence scenario is shown in Table 29. Peak employment is over 6,854 in 2007 under the Optimistic Scenario or 4,713 in 2007 under the Pessimistic Scenario. There is thus a very substantial sensitivity to the employment prospects. The Pessimistic result is shown in Table 30. The estimates for the SNS under the 12 pence case are shown in Table 31. Employment peaks in 2007 at just under 6,063. The results for the CNS under the $12, 12 pence scenario are shown in Table 32. Employment peaks at 1,208 in 2004.

Table 21																		
Number of Jobs Created from SEA 3																		
$20/bbl and 18p/therm Optimistic Scenario	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Direct																		
Exploration	201	297	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development + Decommissioning	21	80	206	408	445	293	149	32	0	0	6	8	0	21	19	36	0	73
Opex	4	15	35	105	185	200	204	190	172	163	146	129	125	99	72	53	53	0
Total Direct Jobs	**226**	**392**	**264**	**513**	**631**	**493**	**353**	**222**	**172**	**163**	**152**	**137**	**125**	**120**	**91**	**89**	**53**	**73**
Indirect jobs (supply chain)																		
Operations	10	41	93	280	496	536	546	509	459	435	391	345	336	265	192	142	142	0
Development + Decommissioning	169	647	1,672	3,315	3,618	2,380	1,212	263	0	0	45	67	0	169	158	293	0	596
Exploration	661	975	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total direct and indirect	**1,066**	**2,055**	**2,105**	**4,108**	**4,745**	**3,409**	**2,112**	**995**	**631**	**598**	**588**	**550**	**461**	**553**	**441**	**523**	**194**	**669**
Induced jobs (trickle down)	755	1,311	882	1,715	2,109	1,649	1,182	744	574	543	507	459	419	400	305	297	177	245
Total	**1,821**	**3,366**	**2,987**	**5,822**	**6,854**	**5,057**	**3,294**	**1,739**	**1,204**	**1,141**	**1,095**	**1,009**	**880**	**953**	**746**	**821**	**371**	**914**

Table 22																		
Number of Jobs Created from SEA 3																		
$20/bbl and 18p/therm Pessimistic Scenario	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Direct																		
Exploration	201	86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development + Decommissioning	0	37	166	283	305	261	84	0	0	0	0	0	0	21	19	0	0	73
Opex	0	0	12	70	129	144	147	136	121	115	109	104	102	76	49	53	53	0
Total Direct Jobs	**201**	**122**	**177**	**352**	**434**	**405**	**232**	**136**	**121**	**115**	**109**	**104**	**102**	**96**	**68**	**53**	**53**	**73**
Indirect jobs (supply chain)																		
Operations	0	0	31	186	345	385	394	363	323	307	293	279	273	202	130	142	142	0
Development + Decommissioning	0	298	1,344	2,295	2,481	2,117	685	0	0	0	0	0	0	169	158	0	0	596
Exploration	661	282	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total direct and indirect	**862**	**702**	**1,553**	**2,833**	**3,260**	**2,907**	**1,312**	**499**	**444**	**422**	**402**	**383**	**375**	**467**	**356**	**194**	**194**	**669**
Induced jobs (trickle down)	673	409	593	1,177	1,452	1,353	775	453	404	383	366	349	341	322	227	177	177	245
Total	**1,535**	**1,112**	**2,146**	**4,010**	**4,713**	**4,259**	**2,087**	**952**	**848**	**805**	**768**	**732**	**717**	**789**	**583**	**371**	**371**	**914**

Table 23																		
Number of Jobs Created from SEA 3 in SNS																		
$20/bbl and 18p/therm Optimistic Scenario	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Direct																		
Exploration	162	139	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development + Decommissioning	21	80	206	365	389	233	114	32	0	0	6	8	0	21	0	36	0	73
Opex	4	15	35	105	173	179	179	165	149	140	123	106	103	76	72	53	53	0
Total Direct Jobs	**186**	**234**	**264**	**470**	**562**	**412**	**293**	**197**	**149**	**140**	**129**	**115**	**103**	**97**	**72**	**89**	**53**	**73**
Indirect jobs (supply chain)																		
Operations	10	41	93	280	462	480	479	441	398	374	330	284	275	204	192	142	142	0
Development + Decommissioning	169	647	1,672	2,968	3,161	1,892	929	263	0	0	45	67	0	169	0	293	0	596
Exploration	531	455	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total direct and indirect	**896**	**1,377**	**2,105**	**3,718**	**4,185**	**2,784**	**1,701**	**902**	**547**	**514**	**505**	**466**	**377**	**469**	**264**	**523**	**194**	**669**
Induced jobs (trickle down)	623	781	882	1,572	1,878	1,379	980	660	498	468	431	383	343	324	240	297	177	245
Total	**1,519**	**2,158**	**2,987**	**5,290**	**6,063**	**4,163**	**2,681**	**1,562**	**1,045**	**982**	**936**	**849**	**721**	**793**	**504**	**821**	**371**	**914**

Table 24															
Number of Jobs Created from SEA 3 in CNS															
$20/bbl and 18p/therm Optimistic Scenario	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Direct															
Exploration	40	158	0	0	0	0	0	0	0	0	0	0	0	0	0
Development + Decommissioning	0	0	0	43	56	60	35	0	0	0	0	0	0	0	19
Opex	0	0	0	0	13	21	25	25	23	23	23	23	23	23	0
Total Direct Jobs	**40**	**158**	**0**	**43**	**69**	**81**	**60**	**25**	**23**	**23**	**23**	**23**	**23**	**23**	**19**
Indirect jobs (supply chain)															
Operations	0	0	0	0	34	55	67	67	61	61	61	61	61	61	0
Development + Decommissioning	0	0	0	347	457	488	284	0	0	0	0	0	0	0	158
Exploration	130	520	0	0	0	0	0	0	0	0	0	0	0	0	0
Total direct and indirect	**170**	**678**	**0**	**389**	**560**	**625**	**411**	**93**	**83**	**83**	**83**	**83**	**83**	**83**	**177**
Induced jobs (trickle down)	132	530	0	143	231	270	201	84	76	76	76	76	76	76	65
Total	**302**	**1,208**	**0**	**532**	**791**	**895**	**612**	**177**	**159**	**159**	**159**	**159**	**159**	**159**	**242**

Table 25														
Number of Jobs Created from SEA 3														
$15/bbl and 12p/therm Optimistic Scenario	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Direct														
Exploration	201	297	23	0	0	0	0	0	0	0	0	0	0	0
Development + Decommissioning	21	29	76	130	85	96	48	0	0	8	0	7	14	19
Opex	4	12	25	51	64	70	71	67	59	50	47	39	23	0
Total Direct Jobs	**226**	**338**	**125**	**181**	**150**	**166**	**119**	**67**	**59**	**59**	**47**	**46**	**37**	**19**
Indirect jobs (supply chain)														
Operations	10	33	68	137	172	189	190	178	159	134	126	105	61	0
Development + Decommissioning	169	236	619	1,056	694	776	388	0	0	67	0	53	116	158
Exploration	661	975	76	0	0	0	0	0	0	0	0	0	0	0
Total direct and indirect	**1,066**	**1,582**	**887**	**1,373**	**1,016**	**1,131**	**697**	**245**	**218**	**260**	**173**	**204**	**213**	**177**
Induced jobs (trickle down)	755	1,131	417	605	501	555	397	222	199	196	157	153	123	65
Total	**1,821**	**2,713**	**1,304**	**1,978**	**1,517**	**1,686**	**1,094**	**467**	**417**	**456**	**330**	**358**	**337**	**242**

Table 26														
Number of Jobs Created from SEA 3														
$15/bbl and 12p/therm Pessimistic Scenario	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Direct														
Exploration	201	86	0	0	0	0	0	0	0	0	0	0	0	0
Development + Decommissioning	0	0	55	118	85	96	48	0	0	0	0	7	14	19
Opex	0	0	12	38	53	61	62	58	52	50	47	39	23	0
Total Direct Jobs	**201**	**86**	**67**	**156**	**138**	**156**	**110**	**58**	**52**	**50**	**47**	**46**	**37**	**19**
Indirect jobs (supply chain)														
Operations	0	0	31	102	142	162	167	156	139	134	126	105	61	0
Development + Decommissioning	0	0	451	954	694	776	388	0	0	0	0	53	116	158
Exploration	661	282	0	0	0	0	0	0	0	0	0	0	0	0
Total direct and indirect	**862**	**367**	**549**	**1,212**	**974**	**1,095**	**664**	**214**	**191**	**185**	**173**	**204**	**213**	**177**
Induced jobs (trickle down)	673	287	225	520	463	522	368	195	174	168	157	153	123	65
Total	**1,535**	**654**	**774**	**1,733**	**1,437**	**1,617**	**1,032**	**409**	**365**	**352**	**330**	**358**	**337**	**242**

Table 27													
Number of Jobs Created from SEA 3 in SNS													
$15/bbl and 12p/therm Optimistic Scenario	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Direct													
Exploration	162	139	23	0	0	0	0	0	0	0	0	0	0
Development + Decommissioning	21	29	76	87	29	35	13	0	0	8	0	7	14
Opex	4	12	25	51	52	50	46	41	37	28	24	17	0
Total Direct Jobs	**186**	**180**	**125**	**138**	**81**	**85**	**59**	**41**	**37**	**36**	**24**	**23**	**14**
Indirect jobs (supply chain)													
Operations	10	33	68	137	138	133	123	111	98	74	65	45	0
Development + Decommissioning	169	236	619	709	237	288	104	0	0	67	0	53	116
Exploration	531	455	76	0	0	0	0	0	0	0	0	0	0
Total direct and indirect	**896**	**904**	**887**	**984**	**455**	**506**	**286**	**152**	**135**	**177**	**90**	**121**	**130**
Induced jobs (trickle down)	623	601	417	462	270	285	196	138	123	120	81	78	48
Total	**1,519**	**1,505**	**1,304**	**1,446**	**725**	**791**	**482**	**290**	**258**	**297**	**171**	**199**	**177**

Table 28														
Number of Jobs Created from SEA 3 in CNS														
$15/bbl and 12p/therm Optimistic Scenario	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Direct														
Exploration	40	158	0	0	0	0	0	0	0	0	0	0	0	0
Development + Decommissioning	0	0	0	43	56	60	35	0	0	0	0	0	0	19
Opex	0	0	0	0	13	21	25	25	23	23	23	23	23	0
Total Direct Jobs	**40**	**158**	**0**	**43**	**69**	**81**	**60**	**25**	**23**	**23**	**23**	**23**	**23**	**19**
Indirect jobs (supply chain)														
Operations	0	0	0	0	34	55	67	67	61	61	61	61	61	0
Development + Decommissioning	0	0	0	347	457	488	284	0	0	0	0	0	0	158
Exploration	130	520	0	0	0	0	0	0	0	0	0	0	0	0
Total direct and indirect	**170**	**678**	**0**	**389**	**560**	**625**	**411**	**93**	**83**	**83**	**83**	**83**	**83**	**177**
Induced jobs (trickle down)	132	530	0	143	231	270	201	84	76	76	76	76	76	65
Total	**302**	**1,208**	**0**	**532**	**791**	**895**	**612**	**177**	**159**	**159**	**159**	**159**	**159**	**242**

Table 29																			
Number of Jobs Created from SEA 3																			
$25/bbl and 24p/therm Optimistic Scenario	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Direct																			
Exploration	201	297	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development + Decommissioning	21	80	206	408	445	293	149	32	0	0	0	6	8	0	21	19	0	36	73
Opex	4	15	35	105	185	200	204	190	172	163	156	136	125	123	95	76	76	53	0
Total Direct Jobs	**226**	**392**	**264**	**513**	**631**	**493**	**353**	**222**	**172**	**163**	**156**	**142**	**134**	**123**	**115**	**96**	**76**	**89**	**73**
Indirect jobs (supply chain)																			
Operations	10	41	93	280	496	536	546	509	459	435	417	365	336	330	253	204	204	142	0
Development + Decommissioning	169	647	1,672	3,315	3,618	2,380	1,212	263	0	0	0	45	67	0	169	158	0	293	596
Exploration	661	975	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total direct and indirect	**1,066**	**2,055**	**2,105**	**4,108**	**4,745**	**3,409**	**2,112**	**995**	**631**	**598**	**573**	**552**	**537**	**453**	**537**	**457**	**280**	**523**	**669**
Induced jobs (trickle down)	755	1,311	882	1,715	2,109	1,649	1,182	744	574	543	521	474	447	412	385	319	255	297	245
Total	**1,821**	**3,366**	**2,987**	**5,822**	**6,854**	**5,057**	**3,294**	**1,739**	**1,204**	**1,141**	**1,094**	**1,027**	**983**	**865**	**922**	**776**	**534**	**821**	**914**

Table 30

Number of Jobs Created from SEA 3

$25/bbl and 24p/therm Pessimistic Scenario	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Direct																			
Exploration	201	86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development + Decommissioning	0	37	166	283	305	261	84	0	0	0	0	0	0	0	21	19	0	0	73
Opex	0	0	12	70	129	144	147	136	121	115	109	104	102	100	71	53	53	53	0
Total Direct Jobs	**201**	**122**	**177**	**352**	**434**	**405**	**232**	**136**	**121**	**115**	**109**	**104**	**102**	**100**	**92**	**72**	**53**	**53**	**73**
Indirect jobs (supply chain)																			
Operations	0	0	31	186	345	385	394	363	323	307	293	279	273	267	191	142	142	142	0
Development + Decommissioning	0	298	1,344	2,295	2,481	2,117	685	0	0	0	0	0	0	0	169	158	0	0	596
Exploration	661	282	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total direct and indirect	**862**	**702**	**1,553**	**2,833**	**3,260**	**2,907**	**1,312**	**499**	**444**	**422**	**402**	**383**	**375**	**367**	**451**	**371**	**194**	**194**	**669**
Induced jobs (trickle down)	673	409	593	1,177	1,452	1,353	775	453	404	383	366	349	341	334	308	242	177	177	245
Total	**1,535**	**1,112**	**2,146**	**4,010**	**4,713**	**4,259**	**2,087**	**952**	**848**	**805**	**768**	**732**	**717**	**702**	**759**	**613**	**371**	**371**	**914**

Table 31

Number of Jobs Created from SEA 3 in SNS

$25/bbl and 24p/therm Optimistic Scenario	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Direct																			
Exploration	162	139	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development + Decommissioning	21	80	206	365	389	233	114	32	0	0	0	6	8	0	21	0	0	36	73
Opex	4	15	35	105	173	179	179	165	149	140	133	114	103	100	72	76	76	53	0
Total Direct Jobs	**186**	**234**	**264**	**470**	**562**	**412**	**293**	**197**	**149**	**140**	**133**	**119**	**111**	**100**	**93**	**76**	**76**	**89**	**73**
Indirect jobs (supply chain)																			
Operations	10	41	93	280	462	480	479	441	398	374	356	304	275	269	192	204	204	142	0
Development + Decommissioning	169	647	1,672	2,968	3,161	1,892	929	263	0	0	0	45	67	0	169	0	0	293	596
Exploration	531	455	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total direct and indirect	**896**	**1,377**	**2,105**	**3,718**	**4,185**	**2,784**	**1,701**	**902**	**547**	**514**	**489**	**469**	**453**	**370**	**454**	**280**	**280**	**523**	**669**
Induced jobs (trickle down)	623	781	882	1,572	1,878	1,379	980	660	498	468	445	399	371	336	310	255	255	297	245
Total	**1,519**	**2,158**	**2,987**	**5,290**	**6,063**	**4,163**	**2,681**	**1,562**	**1,045**	**982**	**934**	**867**	**824**	**706**	**763**	**534**	**534**	**821**	**914**

Table 32																
Number of Jobs Created from SEA 3 in CNS																
$25/bbl and 24p/therm Optimistic Scenario	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Direct																
Exploration	40	158	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development + Decommissioning	0	0	0	43	56	60	35	0	0	0	0	0	0	0	0	19
Opex	0	0	0	0	13	21	25	25	23	23	23	23	23	23	23	0
Total Direct Jobs	**40**	**158**	**0**	**43**	**69**	**81**	**60**	**25**	**23**	**23**	**23**	**23**	**23**	**23**	**23**	**19**
Indirect jobs (supply chain)																
Operations	0	0	0	0	34	55	67	67	61	61	61	61	61	61	61	0
Development + Decommissioning	0	0	0	347	457	488	284	0	0	0	0	0	0	0	0	158
Exploration	130	520	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total direct and indirect	**170**	**678**	**0**	**389**	**560**	**625**	**411**	**93**	**83**	**83**	**83**	**83**	**83**	**83**	**83**	**177**
Induced jobs (trickle down)	132	530	0	143	231	270	201	84	76	76	76	76	76	76	76	65
Total	**302**	**1,208**	**0**	**532**	**791**	**895**	**612**	**177**	**159**	**159**	**159**	**159**	**159**	**159**	**159**	**242**

9.0 Possible Investment, Operating and Decommissioning Expenditures

9.1 Capital expenditure (excluding drilling) for the SEA3 field developments with $20/bbl and 18p/therm price are shown in Tables 33 and 34 below.

Table 33

Potential Capex @ $20/bbl and 18p/therm, Hurdle Rate 15% Real 2002 (Optimistic Scenario)				
Capital Costs (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00	0.00	6.29	6.29
2004	0.00	0.00	21.64	21.64
2005	0.00	16.81	32.02	48.84
2006	12.93	16.81	57.83	87.57
2007	6.47	0.00	57.83	64.29
2008	12.93	0.00	16.67	29.60
2009	0.00	0.00	0.00	0.00
Total £m Real 2002	**32.33**	**33.63**	**192.28**	**258.24**

Table 34

Potential Capex @ $20/bbl and 18p/therm, Hurdle Rate 15% Real 2002 (Pessimistic Scenario				
Capital Costs (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00	0.00	0.00	0.00
2004	0.00	0.00	11.11	11.11
2005	0.00	16.81	27.79	44.60
2006	12.93	16.81	27.79	57.53
2007	6.47	0.00	27.79	34.25
2008	12.93	0.00	16.67	29.60
2009	0.00	0.00	0.00	0.00
Total £m Real 2002	**32.33**	**33.63**	**111.15**	**177.11**

9.2 With the Optimistic Scenario under the medium price and the high price cases likely capital expenditure (excluding drilling costs) may be £258.24 million (real 2002) and with the Pessimistic Scenario it may be £177.11 million.

9.3 Development drilling expenditures for the SEA3 exploration and technical reserve field developments with an 18p/therm price are shown in Tables 35 and 36 below.

Table 35

Potential Drilling @ $20/bbl and 18p/therm, Hurdle Rate 15% Real 2002 (Optimistic Scenario)				
Drilling Costs (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00	0.00	0.00	0.00
2004	0.00	0.00	2.52	2.52
2005	0.00	0.00	13.54	13.54
2006	0.00	5.86	30.24	36.10
2007	10.58	8.84	51.27	70.69
2008	5.29	10.74	43.18	59.20
2009	10.58	3.88	30.78	45.24
2010	0.00	0.00	9.83	9.83
2011	0.00	0.00	0.00	0.00
Total £m Real 2002	**26.45**	**29.32**	**181.35**	**237.13**

Table 36

Potential Drilling @ $20/bbl and 18p/therm, Hurdle Rate 15% Real 2002 (Pessimistic Scenario)				
Drilling Costs (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00	0.00	0.00	0.00
2004	0.00	0.00	0.00	0.00
2005	0.00	0.00	5.56	5.56
2006	0.00	5.86	22.23	28.09
2007	10.58	8.84	38.90	58.32
2008	5.29	10.74	33.34	49.37
2009	10.58	3.88	11.11	25.58
2010	0.00	0.00	0.00	0.00
2011	0.00	0.00	0.00	0.00
Total £m Real 2002	**26.45**	**29.32**	**111.15**	**166.92**

9.4 With the Optimistic Scenario under the medium and the high price likely drilling expenditure may be £273.13 million (real 2002) and with the Pessimistic Scenario it may be £166.92 million.

9.5 The results indicate that over the period, total development expenditure at an $20/bbl and 18p/ therm price could amount to more than £495 million in real 2001 terms for the SEA3 area.

9.6 Operating expenditures for the SEA3 fields with an 18p/therm price are shown in Table 37 below and 38.

Table 37

Potential Operating Cost @ $20/bbl and 18p/therm, Hurdle Rate 15% Real 2002 (Optimistic Scenario)				
Operating Cost Costs (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00	0.00	1.16	1.16
2004	0.00	0.00	4.63	4.63
2005	0.00	3.57	7.00	10.56
2006	0.00	11.56	20.17	31.73
2007	3.90	12.17	40.12	56.20
2008	6.27	12.10	42.26	60.62
2009	7.64	11.24	42.96	61.85
2010	7.64	9.99	39.95	57.59
2011	6.88	8.89	36.22	51.99
2012	6.88	8.34	34.04	49.26
2013	6.88	7.38	30.02	44.28
2014	6.88	7.38	24.81	39.07
2015	6.88	7.38	23.72	37.98
2016	6.88	0.00	23.07	29.95
2017	0.00	0.00	21.77	21.77
2018	0.00	0.00	16.02	16.02
2019	0.00	0.00	16.02	16.02
Total £m Real 2002	**66.70**	**100.02**	**423.96**	**590.68**

Table 38

Potential Operating Cost @ $20/bbl and 18p/therm, Hurdle Rate 10% Real 2002 (Pessimistic Scenario)				
Operating Cost Costs (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00	0.00	0.00	0.00
2004	0.00	0.00	0.00	0.00
2005	0.00	3.57	0.00	3.57
2006	0.00	11.56	9.52	21.08
2007	3.90	12.17	22.99	39.06
2008	6.27	12.10	25.27	43.64
2009	7.64	11.24	25.77	44.66
2010	7.64	9.99	23.46	41.09
2011	6.88	8.89	20.85	36.61
2012	6.88	8.34	19.54	34.76
2013	6.88	7.38	18.89	33.15
2014	6.88	7.38	17.33	31.59
2015	6.88	7.38	16.68	30.94
2016	6.88	0.00	16.02	22.90
2017	0.00	0.00	14.72	14.72
2018	0.00	0.00	16.02	16.02
2019	0.00	0.00	16.02	16.02
Total £m Real 2002	**66.70**	**100.02**	**263.08**	**429.80**

9.7 With the Optimistic Scenario and the medium price likely operating expenditures may be £590.68 million (real 2002) and with the Pessimistic Scenario they may be £429.8 million.

9.8 Decommissioning costs for the SEA3 exploration and technical reserve field developments with an 18p/therm price are shown in Table 39 and 40 below.

Table 39

Potential Decommissioning Cost @ $20/bbl and 18p/therm, Hurdle Rate 15% Real 2002 (Optimistic Scenario)				
Decommissioning Costs (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00	0.00	0.00	0.00
2004	0.00	0.00	0.00	0.00
2005	0.00	0.00	0.00	0.00
2006	0.00	0.00	0.00	0.00
2007	0.00	0.00	0.00	0.00
2008	0.00	0.00	0.00	0.00
2009	0.00	0.00	0.00	0.00
2010	0.00	0.00	0.00	0.00
2011	0.00	0.00	0.00	0.00
2012	0.00	0.00	0.00	0.00
2013	0.00	0.00	1.69	1.69
2014	0.00	0.00	2.52	2.52
2015	0.00	0.00	0.00	0.00
2016	0.00	6.29	0.00	6.29
2017	5.88	0.00	0.00	5.88
2018	0.00	0.00	10.92	10.92
2019	0.00	0.00	0.00	0.00
2020	0.00	0.00	22.23	22.23
Total £m Real 2002	**5.88**	**6.29**	**37.36**	**49.54**

Table 40

Potential Decommissioning Cost @ $20/bbl and 18p/therm, Hurdle Rate 15% Real 2002 (Pessimistic Scenario)				
Decommissioning Costs (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00	0.00	0.00	0.00
2004	0.00	0.00	0.00	0.00
2005	0.00	0.00	0.00	0.00
2006	0.00	0.00	0.00	0.00
2007	0.00	0.00	0.00	0.00
2008	0.00	0.00	0.00	0.00
2009	0.00	0.00	0.00	0.00
2010	0.00	0.00	0.00	0.00
2011	0.00	0.00	0.00	0.00
2012	0.00	0.00	0.00	0.00
2013	0.00	0.00	0.00	0.00
2014	0.00	0.00	0.00	0.00
2015	0.00	0.00	0.00	0.00
2016	0.00	6.29	0.00	6.29
2017	5.88	0.00	0.00	5.88
2018	0.00	0.00	0.00	0.00
2019	0.00	0.00	0.00	0.00
2020	0.00	0.00	22.23	22.23
Total £m Real 2002	**5.88**	**6.29**	**22.23**	**34.40**

9.9 With the Optimistic Scenario and the medium price likely decommissioning expenditure may be £49.54 million (real 2002) and with the Pessimistic Scenario it may be £34.4 million.

9.10 Capital expenditures (excluding drilling) for the SEA3 field developments with a $15/bbl and 12p/therm are shown in Tables 41 and 42 below.

Table 41

Potential Capex @ $15/bbl and 12p/therm, Hurdle Rate 15% Real 2002 (Optimistic Scenario)				
Capital Costs (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00	0.00	6.29	6.29
2004	0.00	0.00	6.29	6.29
2005	0.00	16.81	0.00	16.81
2006	12.93	16.81	0.00	29.75
2007	6.47	0.00	0.00	6.47
2008	12.93	0.00	0.00	12.93
2009	0.00	0.00	0.00	0.00
Total £m Real 2002	**32.33**	**33.63**	**12.58**	**78.54**

Table 42

Potential Capex @ $15/bbl and 12p/therm, Hurdle Rate 15% Real 2002 (Pessimistic Scenario)				
Capital Costs (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00	0.00		0.00
2004	0.00	0.00		0.00
2005	0.00	16.81		16.81
2006	12.93	16.81		29.75
2007	6.47	0.00		6.47
2008	12.93	0.00		12.93
2009	0.00	0.00		0.00
Total £m Real 2002	**32.33**	**33.63**	**0.00**	**65.96**

9.11 With the Optimistic Scenario and the low price likely capital expenditure (excluding drilling costs) may be only £78.54 million (real 2002) and with the Pessimistic Scenario they may be only £65.96 million.

9.12 Drilling expenditures for the SEA3 field developments with a $15/bbl and 12p/therm price are shown in Tables 43 and 44 below.

Table 43

Potential Drilling @ $15/bbl and 12p/therm, Hurdle Rate 15% Real 2002 (Optimistic Scenario)				
Drilling Costs (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00	0.00	0.00	0.00
2004	0.00	0.00	2.52	2.52
2005	0.00	0.00	6.29	6.29
2006	0.00	5.86	3.77	9.64
2007	10.58	8.84	0.00	19.42
2008	5.29	10.74	0.00	16.03
2009	10.58	3.88	0.00	14.46
2010	0.00	0.00	0.00	0.00
2011	0.00	0.00	0.00	0.00
Total £m Real 2002	**26.45**	**29.32**	**12.58**	**68.35**

Table 44

Potential Drilling @ $15/bbl and 12p/therm, Hurdle Rate 15% Real 2002 (Pessimistic Scenario)				
Drilling Costs (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00	0.00		0.00
2004	0.00	0.00		0.00
2005	0.00	0.00		0.00
2006	0.00	5.86		5.86
2007	10.58	8.84		19.42
2008	5.29	10.74		16.03
2009	10.58	3.88		14.46
2010	0.00	0.00		0.00
2011	0.00	0.00		0.00
Total £m Real 2002	**26.45**	**29.32**	**0.00**	**55.77**

9.13 With the Optimistic Scenario and the low price likely drilling expenditure may be only £68.35 million (real 2002) and with the Pessimistic Scenario they may be £55.77 million.

9.14 The results indicate that over the period the total development expenditure at $15/bbl and 12p/therm price could amount to more than £146 million in real 2002 terms for the SEA3 area.

9.15 Operating expenditures for the SEA3 field developments with a $15/bbl and 12p/therm price are shown in Tables 45 and 46 below.

Table 45

Potential Operating Cost @ $15/bbl and 12p/therm, Hurdle Rate 15% Real 2002 (Optimistic Scenario)				
Operating Cost Costs (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00	0.00	1.16	1.16
2004	0.00	0.00	3.70	3.70
2005	0.00	3.57	4.11	7.67
2006	0.00	11.56	3.90	15.46
2007	3.90	12.17	3.43	19.51
2008	6.27	12.10	2.98	21.35
2009	7.64	11.24	2.68	21.56
2010	7.64	9.99	2.53	20.16
2011	6.88	8.89	2.23	18.00
2012	6.88	8.34	0.00	15.21
2013	6.88	7.38	0.00	14.26
2014	6.88	5.05	0.00	11.93
2015	6.88	0.00	0.00	6.88
Total £m Real 2002	**59.82**	**90.30**	**26.72**	**176.85**

Table 46

Potential Operating Cost @ $15/bbl and 12p/therm, Hurdle Rate 15% Real 2002 (Pessimistic Scenario)				
Operating Costs (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00	0.00		0.00
2004	0.00	0.00		0.00
2005	0.00	3.57		3.57
2006	0.00	11.56		11.56
2007	3.90	12.17		16.07
2008	6.27	12.10		18.37
2009	7.64	11.24		18.88
2010	7.64	9.99		17.63
2011	6.88	8.89		15.77
2012	6.88	8.34		15.21
2013	6.88	7.38		14.26
2014	6.88	5.05		11.93
2015	6.88	0.00		6.88
Total £m Real 2002	**59.82**	**90.30**	**0.00**	**150.13**

9.16 With the Optimistic Scenario and the low price likely operating expenditures may be only £176.85 million (real 2002) and with the Pessimistic Scenario they may be only £150.13 million.

9.17 Decommissioning costs for the SEA3 exploration and technical reserve field developments with a $15/bbl and 12p/therm price are shown in Tables 47 and 48 below.

Table 47

Potential Decommissioning Cost @ $15/bbl and 12p/therm, Hurdle Rate 15% Real 2002 (Optimistic Scenario)				
Decommissioning Costs (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00	0.00	0.00	0.00
2004	0.00	0.00	0.00	0.00
2005	0.00	0.00	0.00	0.00
2006	0.00	0.00	0.00	0.00
2007	0.00	0.00	0.00	0.00
2008	0.00	0.00	0.00	0.00
2009	0.00	0.00	0.00	0.00
2010	0.00	0.00	0.00	0.00
2011	0.00	0.00	0.00	0.00
2012	0.00	0.00	2.52	2.52
2013	0.00	0.00	0.00	0.00
2014	0.00	1.98	0.00	1.98
2015	0.00	4.31	0.00	4.31
2016	5.88	0.00	0.00	5.88
Total £m Real 2002	**5.88**	**6.29**	**2.52**	**14.69**

Table 48

Potential Decommissioning Cost @ $15/bbl and 12p/therm, Hurdle Rate 15% Real 2002 (Pessimistic Scenario)				
Decommissioning Costs (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00	0.00		0.00
2004	0.00	0.00		0.00
2005	0.00	0.00		0.00
2006	0.00	0.00		0.00
2007	0.00	0.00		0.00
2008	0.00	0.00		0.00
2009	0.00	0.00		0.00
2010	0.00	0.00		0.00
2011	0.00	0.00		0.00
2012	0.00	0.00		0.00
2013	0.00	0.00		0.00
2014	0.00	1.98		1.98
2015	0.00	4.31		4.31
2016	5.88	0.00		5.88
Total £m Real 2002	**5.88**	**6.29**	**0.00**	**12.17**

9.18 With the Optimistic Scenario and the low price likely decommissioning expenditures may be £14.69 million (real 2002) and with the Pessimistic Scenario they may be £12.17 million.

9.19 Operating costs for the SEA3 field developments under the $25/bbl and 24p/therm scenario are shown in Tables 49 and 50. With the Optimistic Scenario and the high price likely operating expenditures may be £640.22 million (real 2002) and with the Pessimistic Scenario they may be £460.09 million.

9.20 Decommissioning costs for the SEA3 fields under the $25/bbl and 24p/therm scenario are shown in Tables 51 and 52. With the Optimistic Scenario and the high price likely decommissioning expenditure may be £49.54 million (real 2002) and with the Pessimistic Scenario it may be £34.4 million.

Table 49

Potential Operating Cost @ $25/bbl and 24p/therm, Hurdle Rate 15% Real 2002 (Optimistic Scenario)				
Operating Cost (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00	0.00	1.16	1.16
2004	0.00	0.00	4.63	4.63
2005	0.00	3.57	7.00	10.56
2006	0.00	11.56	20.17	31.73
2007	3.90	12.17	40.12	56.20
2008	6.27	12.10	42.26	60.62
2009	7.64	11.24	42.96	61.85
2010	7.64	9.99	39.95	57.59
2011	6.88	8.89	36.22	51.99
2012	6.88	8.34	34.04	49.26
2013	6.88	7.38	32.95	47.21
2014	6.88	7.38	27.04	41.30
2015	6.88	7.38	23.72	37.98
2016	6.88	7.38	23.07	37.33
2017	6.88	0.00	21.77	28.64
2018	0.00	0.00	23.07	23.07
2019	0.00	0.00	23.07	23.07
2020	0.00	0.00	16.02	16.02
Total £m Real 2002	**73.58**	**107.41**	**459.24**	**640.22**

Table 50

Potential Operating Cost @ $25/bbl and 24p/therm, Hurdle Rate 15% Real 2002 (Pessimistic Scenario)				
Operating Costs (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00	0.00	0.00	0.00
2004	0.00	0.00	0.00	0.00
2005	0.00	3.57	0.00	3.57
2006	0.00	11.56	9.52	21.08
2007	3.90	12.17	22.99	39.06
2008	6.27	12.10	25.27	43.64
2009	7.64	11.24	25.77	44.66
2010	7.64	9.99	23.46	41.09
2011	6.88	8.89	20.85	36.61
2012	6.88	8.34	19.54	34.76
2013	6.88	7.38	18.89	33.15
2014	6.88	7.38	17.33	31.59
2015	6.88	7.38	16.68	30.94
2016	6.88	7.38	16.02	30.28
2017	6.88	0.00	14.72	21.59
2018	0.00	0.00	16.02	16.02
2019	0.00	0.00	16.02	16.02
2020	0.00	0.00	16.02	16.02
Total £m Real 2002	**73.58**	**107.41**	**279.10**	**460.09**

9.21 With the Optimistic Scenario and the high price likely operating expenditures may be £640.22 million (real 2002) and with the Pessimistic Scenario they may be £460.09 million.

Table 51

Potential Decommissioning Cost @ $25/bbl and 24p/therm, Hurdle Rate 15% Real 2002 (Optimistic Scenario)				
Decommissioning Costs (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00	0.00	0.00	0.00
2004	0.00	0.00	0.00	0.00
2005	0.00	0.00	0.00	0.00
2006	0.00	0.00	0.00	0.00
2007	0.00	0.00	0.00	0.00
2008	0.00	0.00	0.00	0.00
2009	0.00	0.00	0.00	0.00
2010	0.00	0.00	0.00	0.00
2011	0.00	0.00	0.00	0.00
2012	0.00	0.00	0.00	0.00
2013	0.00	0.00	0.00	0.00
2014	0.00	0.00	1.69	1.69
2015	0.00	0.00	2.52	2.52
2016	0.00	0.00	0.00	0.00
2017	0.00	6.29	0.00	6.29
2018	5.88	0.00	0.00	5.88
2019	0.00	0.00	0.00	0.00
2020	0.00	0.00	10.92	10.92
2021	0.00	0.00	22.23	22.23
Total £m Real 2002	**5.88**	**6.29**	**37.36**	**49.54**

Table 52

Potential Decommissioning Cost @ $25/bbl and 24p/therm, Hurdle Rate 15% Real 2002 (Pessimistic Scenario)				
Decommissioning Costs (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	0.00	0.00	0.00	0.00
2004	0.00	0.00	0.00	0.00
2005	0.00	0.00	0.00	0.00
2006	0.00	0.00	0.00	0.00
2007	0.00	0.00	0.00	0.00
2008	0.00	0.00	0.00	0.00
2009	0.00	0.00	0.00	0.00
2010	0.00	0.00	0.00	0.00
2011	0.00	0.00	0.00	0.00
2012	0.00	0.00	0.00	0.00
2013	0.00	0.00	0.00	0.00
2014	0.00	0.00	0.00	0.00
2015	0.00	0.00	0.00	0.00
2016	0.00	0.00	0.00	0.00
2017	0.00	6.29	0.00	6.29
2018	5.88	0.00	0.00	5.88
2019	0.00	0.00	0.00	0.00
2020	0.00	0.00	0.00	0.00
2021	0.00	0.00	22.23	22.23
Total £m Real 2002	**5.88**	**6.29**	**22.23**	**34.40**

9.22 With the Optimistic Scenario and the high price likely decommissioning expenditure may be £49.54 million (real 2002) and with the Pessimistic Scenario it may be £34.4 million.

10.0 Potential Tax Revenues

10.1 The potential tax take from the exploration, development and production activities was calculated under the existing tax arrangements. The expenditure figures are those discussed above. Thus the tax take takes no account of deductions for loan interest, overheads, and R and D expenditures. Accordingly, the tax revenue figures will be overstated.

10.2 Tables 53 and 54 below shows the tax revenues from production under the $20/bbl and 18p/therm case. Negative tax take reflects the relief of ongoing expenditure on new projects against income received from non-SEA 3 fields.

Table 53

Potential Production Taxbill @ $20/bbl and 18p/therm, Hurdle Rate 15% Real 2002				
Taxbill (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	-4.80	-16.80	-3.97	-25.57
2004	-19.20	-16.80	-3.87	-39.87
2005	0.00	-2.50	-13.05	-15.55
2006	-5.17	7.23	-16.89	-14.84
2007	-1.19	12.52	1.78	13.10
2008	6.37	9.76	19.43	35.55
2009	8.87	11.17	28.66	48.71
2010	10.41	10.22	33.59	54.23
2011	7.13	8.01	29.14	44.28
2012	5.33	6.91	23.47	35.71
2013	4.43	4.99	20.16	29.59
2014	3.53	3.18	17.27	23.99
2015	2.64	0.43	16.10	19.17
2016	0.48	-2.52	13.75	11.72
2017	-2.35	0.00	10.30	7.95
2018	0.00	0.00	-1.38	-1.38
2019	0.00	0.00	0.64	0.64
2020	0.00	0.00	-8.89	-8.89
Total £m Real 2002	**16.48**	**35.80**	**166.24**	**218.52**

Table 54

Potential Production Taxbill @ $20/bbl and 18p/therm, Hurdle Rate 15% Real 2002 (Pessimistic Scenario)				
Taxbill (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	-4.80	-16.80	-2.80	-24.40
2004	-4.80	-5.60	-4.45	-14.85
2005	0.00	-2.50	-13.34	-15.84
2006	-5.17	7.23	-11.29	-9.23
2007	-1.19	12.52	1.71	13.04
2008	6.37	9.76	7.47	23.60
2009	8.87	11.17	22.83	42.87
2010	10.41	10.22	25.07	45.70
2011	7.13	8.01	19.85	34.99
2012	5.33	6.91	17.24	29.48
2013	4.43	4.99	15.93	25.36
2014	3.53	3.18	14.99	21.70
2015	2.64	0.43	13.69	16.75
2016	0.48	-2.52	12.38	10.35
2017	-2.35	0.00	9.77	7.42
2018	0.00	0.00	2.99	2.99
2019	0.00	0.00	0.64	0.64
2020	0.00	0.00	-8.89	-8.89
Total £m Real 2002	**30.88**	**47.00**	**123.80**	**201.68**

10.3 With the Optimistic Scenario and the medium price aggregate, tax revenues may be £218.52 million (real 2002) when allowance is given for exploration and appraisal expenditures. With the Pessimistic Scenario tax revenue may be £201.68 million (real 2002).

10.4 Tables 55 and 56 show the take under the $15/bbl and 12p/therm case.

Table 55

Potential Total Taxbill @ $15/bbl and 12p/therm, Hurdle Rate 15% Real 2002				
Taxbill (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	-4.80	-16.80	-4.57	-26.17
2004	-19.20	-16.80	-0.65	-36.65
2005	0.00	-4.39	-2.61	-7.00
2006	-5.17	0.25	0.55	-4.36
2007	-2.99	5.54	1.77	4.32
2008	2.33	3.46	1.22	7.01
2009	4.83	5.43	0.86	11.12
2010	7.05	5.48	0.68	13.21
2011	4.66	4.16	0.56	9.37
2012	3.31	3.49	-1.01	5.80
2013	2.64	2.34	0.00	4.98
2014	1.96	0.43	0.00	2.39
2015	1.29	-1.72	0.00	-0.43
2016	-2.35	0.00	0.00	-2.35
Total £m Real 2002	**-6.45**	**-9.11**	**-3.20**	**-18.77**

Table 56

Potential Production Taxbill @ $15/bbl and 12p/therm, Hurdle Rate 15% Real 2002 (Pessimistic Scenario)				
Taxbill (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	-4.80	-16.80	-2.80	-24.40
2004	-4.80	-5.60	0.00	-10.40
2005	0.00	-4.39		-4.39
2006	-5.17	0.25		-4.92
2007	-2.99	5.54		2.55
2008	2.33	3.46		5.79
2009	4.83	5.43		10.26
2010	7.05	5.48		12.53
2011	4.66	4.16		8.81
2012	3.31	3.49		6.80
2013	2.64	2.34		4.98
2014	1.96	0.43		2.39
2015	1.29	-1.72		-0.43
2016	-2.35	0.00		-2.35
Total £m Real 2002	**7.95**	**2.09**	**-2.80**	**7.23**

10.5 With the Optimistic Scenario and the low price tax revenues may be negative £18.77 million (real 2002) when allowance is given for exploration and appraisal expenditures. With the Pessimistic Scenario tax revenues may be £7.23 million (real 2002).

10.6 The tax takes under the $25/bbl and 24p/therm are shown in Tables 57 and 58.

Table 57

Potential Production Taxbill @ $25/bbl and 24p/therm, Hurdle Rate 15% Real 2002				
Taxbill (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	-4.80	-16.80	-3.37	-24.97
2004	-19.20	-16.80	-1.33	-37.33
2005	0.00	-0.62	-9.46	-10.08
2006	-5.17	14.20	-8.09	0.94
2007	0.60	19.49	22.27	42.36
2008	10.41	16.06	39.52	65.98
2009	12.91	16.91	48.05	77.87
2010	13.78	14.96	51.43	80.17
2011	9.60	11.87	43.68	65.14
2012	7.35	10.32	35.84	53.51
2013	6.23	7.64	31.92	45.79
2014	5.11	5.22	27.09	37.42
2015	3.98	1.56	23.63	29.17
2016	1.29	0.43	21.41	23.13
2017	0.28	-2.52	16.64	14.40
2018	-2.35	0.00	6.87	4.52
2019	0.00	0.00	3.03	3.03
2020	0.00	0.00	-3.73	-3.73
2021	0.00	0.00	-8.89	-8.89
Total £m Real 2002	**40.02**	**81.93**	**336.50**	**458.45**

Table 58

Potential Production Taxbill @ $25/bbl and 24p/therm, Hurdle Rate 15% Real 2002 (Pessimistic Scenario)				
Taxbill (£m real 2002)	CNS	SNS		Total
	Exploration Find	Exploration Find	Technical Reserves	
Year	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	Passing 15% Hurdle Rate	
2003	-4.80	-16.80	-2.80	-24.40
2004	-4.80	-5.60	-4.45	-14.85
2005	0.00	-0.62	-13.34	-13.96
2006	-5.17	14.20	-7.11	1.92
2007	0.60	19.49	14.24	34.34
2008	10.41	16.06	20.00	46.47
2009	12.91	16.91	35.36	65.18
2010	13.78	14.96	36.55	65.29
2011	9.60	11.87	29.24	50.71
2012	7.35	10.32	25.59	43.27
2013	6.23	7.64	23.76	37.64
2014	5.11	5.22	22.30	32.63
2015	3.98	1.56	20.47	26.01
2016	1.29	0.43	18.65	20.37
2017	0.28	-2.52	14.99	12.76
2018	-2.35	0.00	6.12	3.77
2019	0.00	0.00	2.99	2.99
2020	0.00	0.00	0.64	0.64
2021	0.00	0.00	-8.89	-8.89
Total £m Real 2002	**54.42**	**93.13**	**234.32**	**381.87**

10.7 With the Optimistic Scenario and the high price tax revenues may be £458.45 million (real 2002) when allowance is given for exploration and appraisal expenditures. With the Pessimistic Scenario tax revenues may be £381.87 million (real 2002).

11.0 General Conclusions

11.1 With real oil prices of $20 per barrel and gas prices of 18 pence per therm licensing of the SEA3 area could lead to the cumulative production of over 16 million extra barrels of oil and 890 billion extra cubic feet of gas. Total extra development expenditure could amount to around £495 million at 2002 prices. Extra operating expenditures could amount to over £590 million at 2002 prices. Extra employment will be generated throughout the industry supply chain in the period 2002-2020 with the peak being in 2007 at nearly 6,850 jobs under the Optimistic Scenario and 4,700 under the Pessimistic Scenario.

11.2 Over the last few years the employment trend in the North Sea industry has been downwards. The planned licensing round would make a modest but worthwhile contribution towards moderating the pace of employment decrease. Currently the industry is facing serious skill shortage and recruitment problems. One of the reasons for the recruitment problem is the perception that the North Sea industry is mature or "sunset", and does not offer interesting long-term employment opportunities. The effects of the proposed round would be to extend the employment time horizons for a modest number of employees in the industry. This could also result in a small increase in the rate of return from investment in training.

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Appendix I

Abbreviations

Boe:	Barrels of oil equivalent
Capex:	Development costs excluding development drilling.
CNS:	Central North Sea
Development Costs (Devex):	All field development costs including drilling and other capital expenditure.
Mmcfd:	Million cubic feet per day
NNS:	Northern North Sea
NPV:	Net Present Value
Opex:	Operating costs
SNS:	Southern North Sea
tb/d:	Thousand barrels per day
Technical reserves:	Discovery not yet developed nor currently being considered for development.