EXPLORING THE RATIONALES FOR RELAXATIONS IN THE UK PETROLEUM FISCAL REGIME 1980-2000

Volume Two: Chapters 8, 9, Appendices & References

by

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CHAPTER 8: TESTING THE RATIONALES FOR THE UK 1993 PETROLEUM TAX RELAXATION

8.1 Introduction

The 1993 petroleum tax relaxation involved the following reforms as presented in chapter three of this thesis (section 3.4.4):

a. PRT was abolished for oil fields with development consents on or after 16th March 1993.
b. PRT allowances were also abandoned. These allowances were: oil allowance, exploration and appraisal expenditure allowance and the Cross Field Allowance.
c. The rate of PRT was reduced from 75 to 50 per cent for paying oil fields that had obtained development consents before 16th March 1993.

It can be seen from the above reforms that the 1993 petroleum tax relaxation was different from the other two previous relaxations (1983 and 1987-88) in terms of defining areas which would benefit from this tax reform. This petroleum tax relaxation divided oil fields liable to PRT into two groups based on development consent date. These were: (a) oil fields developed after 16th March 1993 which would not pay any PRT; and (b) oil fields developed before 1993 which would be liable to PRT at 50 per cent, but with no allowances. From these divisions it can be seen that, unlike previous relaxations, this tax reform targeted the whole area of the UKCS. This is because it did not specify a certain area to benefit from the reform, as was specified in the 1983 and the 1987-88 tax relaxations.

Chapter four of this thesis identified the following rationales for the 1993 petroleum tax relaxation:

1. Encouraging more exploration and development activities of UK oil and gas resources by allowing companies to retain more of their profits.

2. Creating incentives for oil companies to invest in old fields.
3. Abolishing PRT for new fields and reducing the rate to 50 per cent for old fields because PRT allowances cost the Government money in 1992, and removing them would enable the Government to gain more revenue.
4. Abolishing PRT for new fields and reducing the rate to 50 per cent for old fields to balance the effect of removing the Cross Field Allowance on the PRT paying fields.
5. Flattening the UK petroleum fiscal regime in different areas.

This chapter, similar to chapters six and seven, will empirically test the above rationales in the light of the above-mentioned tax reforms. The next section will discuss fields which benefited from this tax relaxation.

8.2 Fields Which Benefited From The 1993 Petroleum Tax Relaxation

Fields that benefited from this tax relaxation will be classified in two groups. The first includes any oil fields that obtained development consents between 16th March 1993 and 2000. The second consists of oil fields which obtained development consents before 16th March 1993. Every UKCS oil field, both onshore and offshore, was therefore affected by the 1993 PRT reform. Regarding the first category of oil fields, 64 offshore and eight onshore oil fields had obtained development consents during the period March 1993-2000. However, ten oil fields had revised development plans during this period, noticeably during 1993 and 1994. Table 8-1 presents data regarding offshore oil fields that were developed between March 1993 and 2000.

Table 8-1: Offshore Oilfields that Obtained Development Consents Between 1993 and 2000

Offshore Oil Fields Development 1993-2000									
Oil Field	Location	Discovery Date	Annex B Approval Date	Reserve Volume (mboe)	Oil Field	Location	Discovery Date	Annex B Approval Date	Reserve Volume (mboe)
Douglas	WeB	Nov-90	Oct-93	90	Schiehallion	WeB	Oct-93	Apr-96	575
Medwin	CNS	May-79	Nov-93	2	Curlew	CNS	May-90	Jun-96	132
Lennox	WeB	Jul-92	Dec-93	60	Brimmond	CNS	Jun-85	Jun-96	3
Fife	CNS	Apr-91	Mar-94	48	Dauntless	CNS	Nov-94	Jul-96	3
Birch	CNS	Oct-85	Mar-94	41	Gannet E	CNS	Jun-82	Jul-96	42.5
Machar	CNS	Apr-76	Apr-94	162	Gannet F	CNS	Mar-69	Jul-96	20
Blenheim	CNS	Nov-90	May-94	23	West Brae	CNS	Aug-75	Sep-96	39
Carnoustie	CNS	Apr-80	Jun-94	1	Kingfisher	CNS	Jun-72	Oct-96	114.5
Pelican	NNS	Aug-75	Jul-94	103	Mallard	CNS	Sep-90	Oct-96	26.5
Andrew	CNS	Jun-74	Jul-94	179	Iona	CNS	Mar-82	Oct-96	25.5
Harding	NNS	Jan-88	Sep-94	220	Galley	CNS	Oct-74	Mar-97	35
Foinaven	WeB	Oct-92	Nov-94	250	Bladon	CNS	Nov-96	Apr-97	3
Captain	CNS	May-77	Jan-95	359	Ross	CNS	Dec-81	May-97	64
Guillemot A	CNS	Dec-79	Feb-95	49	Merlin	NNS	Feb-97	Aug-97	28
Teal	CNS	Dec-89	Feb-95	40	Pierce	CNS	Mar-76	Aug-97	144
Teal South	CNS	Oct-92	Feb-95	307	Janice	CNS	May-90	Sep-97	70
Thelma	CNS	Jul-76	Apr-95	51	Larsh	CNS	Mar-86	Sep-97	10
Stirling	CNS	Mar-80	Jun-95	3	Renee	CNS	Apr-76	Feb-98	16
Nevis	NNS	Aug-74	Sep-95	116	Rubie	CNS	Mar-85	Feb-98	7
Dunlin S W	NNS	Jul-73	Nov-95	400	Bittern	CNS	Jun-96	Mar-98	128.5
MacCulloch	CNS	Mar-90	Nov-95	62	Guillemont W	CNS	Oct-79	Mar-98	65
Banff	CNS	Oct-91	Nov-95	84.5	Guillemont NW	CNS	Jul-85	Mar-98	
Telford	CNS	Oct-92	Dec-95	64	Flora	CNS	Jul-79	Apr-98	17
Monan	CNS	Dec-90	Dec-95	25	Buckland	NNS	Mar-79	Apr-98	44
Heron	CNS	Nov-88	Dec-95	105.5	Kyle	CNS	Aug-93	Oct-98	38
Egret	CNS	Aug-91	Dec-95	18	Gannet G	CNS	Apr-98	Nov-98	13
Mungo	CNS	May-89	Dec-95	203	Orion	CNS	Sep-71	Jan-99	21
Arkwright	CNS	Apr-90	Dec-95	25	Cook	CNS	Nov-83	May-99	23
Skua	CNS	Jun-89	Dec-95	28	Keith	NNS	Aug-83	Dec-99	40.5
Magnus S	NNS	Jun-74	Feb-96	23.5	Blake	CNS	Mar-97	Jan-00	56
Fergus	CNS	Oct-94	Mar-96	7	Beauly	CNS	Jun-98	Aug-00	3
Durward	CNS	Oct-93	Apr-96	11	Leadon	NNS	Jun-79	Dec-00	145

Sources: location from GEM (2004, v. 3.01); discovery date from the DTI (2000a). Notes: Annex B approval dates from the DTI (2004d) and reserves volume from the OPL (2004). Location abbreviations used in the above table: CNN for central North Sea; NNS for northern North Sea; and WeB for west of Britain. Mboe stands for million barrels of oil equivalent.

From the above table, it can be seen that 21 offshore oil fields were discovered in the 1960s and 1970s, but these fields obtained development consents after 1993. In terms of size of the oil fields, 64 offshore, one has a large reserve, six have medium reserves, 20 have small reserves and 37 have very small reserves. Further, four fields are located in the west of Britain, nine in the northern North Sea and 51 in the central North Sea. These statistics show that the majority of the offshore oil fields that gained development consent after 1993 were of a very small size and located in the central North Sea. Notwithstanding, these statistics also show that a considerable number of the fields that obtained development consents during the period 1993-2000 were discovered during the 1960s and 1970s. This means that these fields were not considered commercial under the pre-1993 petroleum fiscal regimes, and this reform might have made them again commercial propositions.

The main focus of this research is on UK offshore activities. Therefore the analysis in this chapter will ignore both onshore fields and revised onshore fields. This will not affect the results materially for a number of reasons. This is because the number of onshore fields is small compared with the number of offshore fields that were granted development consents between 1993 and 2000, and because this research focuses mainly on offshore fields.

8.3 Testing the Rationales For the 1993 Petroleum Tax Relaxation

Investigating the theoretical effects of the 1993 petroleum tax relaxation on offshore oil fields indicates significant effects. Obviously oil fields liable to PRT at the time of the relaxation should have benefited from the reduction in the rate of PRT from 75 to 50 per cent. At the same time these fields lost the allowances that used to be offset against the PRT profit, such as allowance for exploration and appraisal expenditures. As was disclosed above, most of the fields benefiting from this tax relaxation were of a very small and small reserves' volume. However, a number of these fields would not any way have been liable to PRT because of the size of their reserves, the oil allowance, and the safeguard concept. As a negative aspect of this relaxation, companies which operated benefiting fields had lost the ten per cent Cross Field Allowance, which was also abolished

in 1993. This ten per cent Cross Field Allowance acted as allowable cost against PRT for paying (receiving) fields. Table 8-2 presents three PRT scenarios with regard to the PRT liability of a number of the offshore oil fields that obtained development consent between March 1993 and 2000.

Table 8-2: Scenarios of PRT Liability of a Number of Post-1993 Oil Fields

Oil Field	Total PRT Liability £M		
	Post-1993	Post-1983	Pre-1983
Douglas	0	38.5	102.4
Medwin	0	0	0
Lennox	0	5.7	47.3
Fife	0	0.7	14.1
Birch	0	0	0
Machar	0	49.5	255.6
Blenheim	0	0	0.4
Pelican	0	0	0
Andrew	0	405.4	590.2
Harding	0	770.4	916.3
Foinaven	0	454.6	441.6
Captian	0	0	0
Guillemot A	0	0	0
Teal	0	0	20.7
Teal South	0	0	0

Note: Figures in the above table were obtained by applying different fiscal scenarios to the fields in the table. This application was by using the GEM (2004, v. 3.01). The scenarios are: the pre- and the post-1983, and post-1993 petroleum fiscal regimes.

The above table shows that there were cases where oil fields which would not have been liable to PRT according to the pre-1993 and pre-1983 petroleum fiscal regimes. This means that these fields did not benefit from the 1993 petroleum tax relaxation, which abolished the PRT. Their operating companies lost the Cross Field Allowance which helped them previously in reducing their PRT liabilities in other fields.

The next sections present the tests and analyses of individual rationales for the 1993 petroleum tax relaxation.

8.3.1 Encouraging More Exploration and Development of the UK Oil and Gas Resources by Allowing Companies to Keep More of Their Profits

This rationale is common to the three petroleum tax relaxations as was shown in chapters six and seven of this thesis, (see sections 6.4.1 and 7.3.2). In order to test this rationale, the growth of oil and gas activities will be measured. This growth can be measured, as was stated in chapter five of this thesis (section 5.4), by measuring the increases in expenditure on these activities, and the increases in the number of drilling wells relating to each activity. After that, the cash flow of oil companies will be checked to see if the 1993 tax relaxation resulted in these companies keeping more of their profits. Moreover, the possibility of using these profits in further activities within the UKCS will be discussed and illustrated.

The next section discusses exploration and development activities post-1993 in some detail, and examines the possible effects of changes in oil prices on exploration activity.

Exploration and Development Activities

Table 8-3 presents figures relating to UKCS exploration, appraisal, development and production activities during the period 1990-2000.

Table 8-3: UKCS Exploration, Appraisal, and Development Activities During the Period 1990-2000

Year	Oil Price £	Exploration Expenditure £M	Exploration and Drilling Wells	Development Expenditure on Oil Fields £M	Development Drilling Wells	Number of Development Consents Granted	Operating Expenses £M	Oil Production, 000bbls
1990	13.2	1,182	237	2,425	124	6	2,311	91,588
1991	11.4	1,637	197	3,343	144	7	2,643	91,260
1992	11.0	1,955	145	3,774	167	4	2,603	94,251
1993	11.3	1,508	121	3,231	162	3	2,885	100,085
1994	10.4	1,213	115	2,560	202	9	3,036	126,706
1995	10.9	939	119	2,876	244	17	3,054	129,894
1996	13.3	1,097	147	2,997	261	13	3,100	129,742
1997	11.8	1,194	136	2,934	257	7	3,122	128,234
1998	7.9	762	115	3,188	281	9	3,072	132,633
1999	11.2	457	55	2,000	225	3	2,955	137,125
2000	19.1	377	73	1,758	216	3	3,117	126,246
Source: DTI (1990-2000), The Brown Book, Appendices 2, 5 and 6.								

It can be seen from the above table that the level of exploration and development expenditure and the number of drilling activities varied during the period 1990-2000. Exploration and development expenditures fluctuated throughout the above period. These expenditures decreased after 1992 over the years 1993, 1994 and 1995. Then after 1995, they increased up to the year 2000, but stayed below the 1992 level. Similarly, the number of exploration and appraisal wells decreased after 1992, and increased slightly in 1996, but after that followed a downward trend. Noticeably, the number of development drilling wells increased after 1993 peaking at 281 wells in 1998 and after that decreased in 1999 and 2000. It can be seen from Table 8-3 that the number of development consents that were granted every year was in line with the number of development drilling wells during the period 1993-2000. It also can be seen, from the above table and discussion, that after 1993 there was a growth in development activity, but not in exploration activity. The 1993 petroleum tax changes, by abolishing exploration expenditure allowance, reduced exploration incentives. This is likely to have affected exploration activities. This inference is supported by the above figures and discussion. At the same time the tax changes have encouraged more development as they reduced the tax burden on oil production. This is reflected in the noticeable increase in oil production after 1992.

However, it was discussed in chapter five, section 5.6, that exploration activity is sensitive to changes in oil prices. As can be seen from Table 8-3 oil price decreased significantly after 1993. This decline might have caused a reduction in exploration activities within the UKCS. In searching for a possible link between changes in oil prices and exploration activities, a correlation coefficient was plotted, using data from Table 8-3, in the first instance between exploration expenditure and oil prices and in the second between the number of exploratory wells and oil prices. The correlation coefficient was plotted for the period 1993-2000, this to observe the association of these variables. The results of this statistical measure show that the relationship between exploration activity and changes in oil prices during the period 1993-2000 were not in the normal range. This is because the correlation coefficient between exploration expenditure and oil prices is equal to –0.598, and to –0.281 for the correlation between the number of exploratory wells and oil prices. This indicates that exploration activities during the period 1993-2000 were not associated with changes in oil prices, but influenced by something else – most likely the 1993 petroleum tax changes.

Profits and Cash Flow of UK Oil and Gas Companies

As was addressed in chapter four (section 4.3.3) a number of companies stated that they benefited from the 1993 petroleum tax relaxation. One of these statements is BP's (1993, p. 29) declaration:

> "From 1 July 1993, the Finance Act reduced the rate of Petroleum Revenue Tax (PRT) from 75% to 50%, eliminated relief for exploration expenditure, and removed the PRT liability for new fields. The benefit to 1993 after-tax income of the reduced rate on current production was about £60 million".

This section will empirically check the cash flow of the Government and the oil and gas industry. It will examine first the Government take to show changes, if any, to this take after 1993. Then it will present the cash flow of oil fields and oil and gas companies, to illustrate changes to these cash flows. Table 8-4 presents annual total PRT payments along with total oil production and total Government tax revenues from the oil industry over the period 1990-2000.

Table 8-4: PRT and Government Tax Take 1990-2000

Financial Year	PRT £M	Total Revenues £M	Total Offshore Oil Production (M tonnes)
1989/1990	1,050	2,401	86.234
1990/1991	860	2,343	83.129
1991/1992	-216	1,016	85.222
1992/1993	69	1,339	90.213
1993/1994	359	1,266	114.383
1994/1995	712	1,683	116.743
1995/1996	968	2,338	116.679
1996/1997	1,729	3,351	115.340
1997/1998	963	3,331	119.061
1998/1999	504	2,514	123.977
1999/2000	847	2,594	114.635
Source: DTI (1989-2000), The Brown Book, Appendices 8 and 9.			

The above table shows that PRT payments were declining till 1992, when the PRT cost the Government £216 million. The DTI (2000a, p. 124, footnote) states: "The net PRT repayment in 1991/92 and low net receipts in 1992/93 resulted from high tax-relievable expenditure claimed on some fields". However, the 1993 petroleum tax reforms should have increased the PRT receipts in subsequent years, and therefore the total Government tax take. This supports what Mr. Geoff Barnard stated in the interview with the author when he mentioned that the Cross Field Allowance cost the Government money in 1992, and this led to abolishing this allowance in the 1993 Budget. [99] Government revenues increased after 1992. This theoretically means that the oil industry take should have decreased. It was mentioned above that some companies had benefited from the 1993 petroleum tax changes, and saved money from the reduction in the PRT rate. Oil companies' cash flow does not give a clear picture of an increase in receipts as a consequence of the reduction, if any, in PRT payments, as cash flow might increase because of a reduction in other costs or an increase in receipts. However, as can be seen from Table 8-4 above, oil production increased after 1992 up to 116.7 million tonnes in 1995. This increase in crude oil production should have increased the total payment of PRT to the Government, and at the same time benefited the oil and

[99] Mr Geoff Barnard is a civil servant from the Oil Taxation Office (OTO) of the Inland Revenue. He was interviewed by the author in London on 20/01/2004.

gas industry's cash flow. Nevertheless, checking the Government take (cash flow) from oil companies should give a better idea regarding any changes in these companies' cash flows resulting from the reduction in PRT after 1993, bearing in mind that the Government take depends not only on PRT rate but also on the level of production and oil prices. The best measurement is therefore the one that links PRT payments to production. Calculating PRT payments for one tonne of oil for a number of companies over the period 1990-2000 will provide such a measure. These calculations should show any increase/reduction in PRT payments for a tonne of oil, and hence will indicate any decrease/increase in the oil industry's cash flow as a consequence of the 1993 petroleum tax reform.

Table 8-5 presents PRT payments for a tonne of oil equivalent for a number of oil and gas companies operating within the UKCS during the period 1990-2000.[100] The companies were selected based on the criterion that these companies should have had PRT liabilities before 1993. It is clear from Table 8-5 that the companies' liability to PRT per tonne of oil equivalent (toe) was reduced after 1993. For example, Exxon Mobil's PRT liability was reduced from £17.2/toe in 1993 to £4.6/toe in 1994, and was in the same range over subsequent years. [101] However, it is noticeable that the PRT liability increased for every company in 1996-1997, and more specifically in 1997. This increase in the PRT during these two years might be because of the substantial increase in oil price from £16 in 1995 to £20 in 1996 and £18 in 1997, or the increase in oil production over these two years. Total offshore oil production decreased from 116.7 million tonnes of oil (mmto) in 1996 to 116.6 mmto in 1997 and to 115.3 mmto in 1997.

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[100] For detailed calculation please refer to Appendix 5.1.
[101] toe stands for tonne of oil equivalent, and mmto stands for million tonne of oil.

Table 8-5: PRT/toe For Companies Operating in the UKCS During the Period 1990-2000

Year	PRT Payments £/Tonne					
	BP	ChevronTexaco	Shell	ExxonMobil	Premier	Viking
1990	33.6	38.3	37.1	37.4	0.9	3.7
1991	36.5	39	15.1	15.2	-0.8	18.2
1992	27.1	30.4	15.1	15.4	0	1.3
1993	25.3	32.3	17	17.2	0	-3.6
1994	17.5	16.5	4.5	4.6	0	24.7
1995	17.8	20.7	5.3	5.4	21.8	4.2
1996	24.0	20.1	9.1	9.1	19.3	3.2
1997	20.8	21.8	13.4	13.5	20.4	2.3
1998	10.9	10.3	5.6	5.9	13.8	-2.6
1999	6.3	2.9	2.6	2.9	14.2	-3.7
2000	15.4	8.5	10.9	11.4	27.8	0
Source: calculations based on data extracted from GEM (2004, v. 3.01)						

Note: toe stands for tonne of oil equivalent.

However, it should also be noted that different companies may be affected differently, as companies which were liable to PRT before 1993, should have benefited from the reduction in PRT rate from 75 to 50 per cent. Conversely, companies that were not liable to the PRT before 1993, and would not have been liable after that date, would not have benefited from these tax changes.

Conclusion

In the light of the above analysis and discussion, it can be concluded that the 1993 petroleum tax relaxation was a success in stimulating development activity, but not exploration activity. It helped also oil and gas companies to make extra profit resulting from the saving in PRT payments as a consequence of reducing the PRT rate to 50 per cent. However, the 1993 petroleum tax relaxation did not offer any incentive to companies with only small and very small oil fields, because these companies might not previously have been liable to PRT. Companies with large oil fields liable to PRT benefited from the reduction in the PRT rate from 75 to 50 per cent, but they no longer benefited from any offsets against PRT liabilities. The link between the two parts of this rationale (i.e., allowing oil companies to keep more of their profits to use them in further exploration and development within the UKCS) is not valid. It was discussed before in chapter six of this thesis (section 6.4.3). This point was argued in that section that it is not necessary for

any oil corporation to use any extra finance arising from any particular province in further investment in that province. For example, an oil and gas company might generate extra cash flow from its operations in the North Sea and use this extra money in investment in the Gulf of Mexico, rather than in the North Sea.

The 1993 petroleum tax changes are most likely to have stimulated production activities rather than exploration and development. First of all, they abolished the exploration expenditure relief, and so exploration activity was expected to slow down. In addition, as was shown in Table 8-1 and Table 8-2 above, most new discoveries were of very small and small oil reserves, and a number of these fields would not have been liable to PRT according to the pre-1993 tax regime. Therefore, abolishing PRT for these fields brought nothing to them in reality. Reducing PRT for old fields to 50 per cent should have provided incentive to increase production, and meant that oil companies would have been encouraged to produce more to benefit from this reduction. However, it cannot be stated here that any increase in oil production from the UKCS after 1992 was merely because of the 1993 petroleum tax reforms, as oil prices and the oil market play essential role in deciding the production volume. It was stated earlier in this chapter that oil prices had not had a significant effect on exploration activity during the period 1993-2000, and this might be because of the adverse effects of the fiscal changes on this activity. However, the abolition of, and the reduction in, PRT rate and any increase in oil prices should have acted as a production incentive.

From the above analysis it can be stated that the rationale was only partly met by the policy, because it was not successful in persuading oil companies to increase their investment in exploration activity. However, the analysis shows that the policy was successful in stimulating oil companies to increase their investment in the development phase and consequently increase their production – although, as we shall see, this was at the expense of a substantial loss in Government revenue.

8.3.2 Creating Incentives for Oil Companies to Invest in Old Fields

This rationale targets old fields, as re-investing in old fields means that more development operations and facilities will be added to an existing field at a certain

time in its productive life, to enable further extraction of the recoverable reserves. This re-investment requires DTI approval. In this regard, operators should prepare a revised Field Development Program (FDP). The purposes of such a programme are: (1) to advise the DTI of divergence from any former approved field development programme; and, (2) to demonstrate that the field is managed in a manner that will maximise economic recovery of the hydrocarbons. This programme should be used to identify departures from the expected performance and planned development. The FDP should contain a number of items, one of which is a field description. This description should detail recoverable reserves, well status and operations, facilities and infrastructure of the field. The DTI deals with these programmes and approves them if they provide evidence of commerciality and recoverable commodities (DTI, 2005). The expected benefits of re-investment in old fields may be one or more of the following: (a) maintaining cash flow and employment; (b) using the existing infrastructure for more production; and (c) obtaining more petroleum from existing fields. The main idea behind this policy initiative is to promote the idea that those fields may still yield valuable output even after they are thought to be exhausted. "Think renewal rather than end-game" was the slogan of the DTI (DTI, 2000c)

As was mentioned above in this chapter (section 8.2), ten development revisions were made during the period 1993-2000, namely, one onshore and nine offshore oilfields. Table 8-6 presents data relating to type, discovery dates, development dates and revised development dates for these ten oil fields.

Table 8-6: Revised Development Cosents for Oil Fields During 1993-2000

Oil field	Type	Discovery	Development	Revision
Wytch Farm	Onshore	1973	76	1993
Brent	Offshore	1971	1975	Mar-93
				Apr-93
Tern	Offshore	1975	1985	1993
Scott	Offshore	1984	1990	1994
Claymore	Offshore	1974	1985	1994
Scapa	Offshore	1975	1985	1994
Brae South	Offshore	1972	1980	1994
Osprey S W	Offshore	1974	1988	1994
Magnus	Offshore	1974	1978	1994

Source: oil fields' names, types and revision dates were obtained from the DTI (2004d), and discovery dates and development dates were obtained from the DTI (2000a) and OPL (2004).

It can be seen from the above table that the revised FDPs for the above fields took place in the two years 1993-1994. It was mentioned in testing rationale one above that oil companies were encouraged to increase oil production because of a reduced tax rate (50 per cent PRT). This was a real incentive to oil companies to revise the state of existing fields in order to increase production. However, because of the scarcity of detailed information available about decision drivers for oil fields' developments and re-developments, it cannot be stated that the re-developments of the above fields were solely a consequence of the 1993 petroleum tax relaxation. For example, the re-development of the Brent oil field in 1993 was not because of the 1993 petroleum tax changes, as this decision was made in 1992 by Shell Oil (OPL, 1998, p. 308; Kuyper, 2002). There is scarcity of information about the conditions for the re-investment in old fields. Even trying to check whether these fields have achieved the expected benefits from their revised development plans is not possible by reference to any data available in the public domain. It can be seen from Table 8-7 that capital expenditure was increased materially in 1993 and 1994 for these fields. This increase represents the required re-development costs. In terms of production, it cannot be established how much production increased as a consequence of the revised development. For example, Table 8-7 shows capital expenditure and production history for a number of the revision in these oil fields.

Table 8-7: Capital Expenditure and Oil Production of Re-developed Oil Fields Over the Period 1990-2000

Year	Tern		Clymore		Scapa		Magnus	
	Capex £M	Oil Production 000t/y	Capex £M	Oil Production 000t/y	Capex £M	Oil Production 000t/y	Capex £M	Oil Production 000t/y
1990	155	0.0	50.5	2,000	15.8	1,250	16.2	6,700
1991	731.6	0.0	155.4	2,525	14.8	1,300	0.0	6,775
1992	630.7	0.0	70.5	2,300	0.0	1,400	14.5	7,550
1993	361.1	1,630.00	110.9	2,350	34.7	1,375	7.1	7,750
1994	115.3	8,642.50	81.5	2,350	6.8	1,175	62.4	7,775
1995	95.8	9,207.50	98.6	2,225	6.6	850	80.9	6,175
1996	126.5	7,350	38.4	2,150	9.6	950	51.2	5,150
1997	42.2	6,200	24.8	2,075	9.4	925	25.5	3,475
1998	37.3	5,132.75	36.1	1,775	0.0	785.25	32.1	3,550
1999	35.4	4,347	35.4	1,665	0.0	654.5	40.0	3,445
2000	11.5	3,107	46.0	1,632.75	0.0	471	10.5	3,291

Source: is based on figures extracted from the Annual Summary Cash Flow tables of the related fields in the GEM (2004. v. 3.01). Note: Capex stand for capital expenditure; t/y stands for tonne a year; 000t/y stands for thousands tonne a year.

From the above table, it can be seen that the capital expenditure for Scapa oil field was increased dramatically in 1993, while oil production was decreasing after 1992. The re-development might have prevented the field from being abandoned, and helped extract more commodities from this field, but the data do not show when the field was expected to be closed down. The same applies to the other fields. Therefore, it can be said that the scarcity of data and information prevent this rationale being tested. However, in consultation with Mike Earp, a senior economist who is working for the DTI,[102] it was mentioned that a field development approval proceeds at the end of a long discussion with oil companies and a long time spent in preparation of plans. Mr Earp added: "*I'd be surprised if any of your projects came forward quickly as a result of a tax change - but I have no detailed knowledge of any of them and I doubt if anyone in DTI (or the companies concerned) does now*".

Based on the above data and analysis, and by taking Mike Earp's comments into account, and assuming that the ten fields were re-developed based on plans prior to 1993, it will be suitable to conclude that this rationale was not met by the policy, since no more re-developments commenced between 1994-2000. On the

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[102] The consultation was via email. For full information see Appendix 5-2.

other hand, it is still important to stress that the scarcity of information and data regarding the re-development drivers meant that it could not be established whether this rationale was met by the policy.

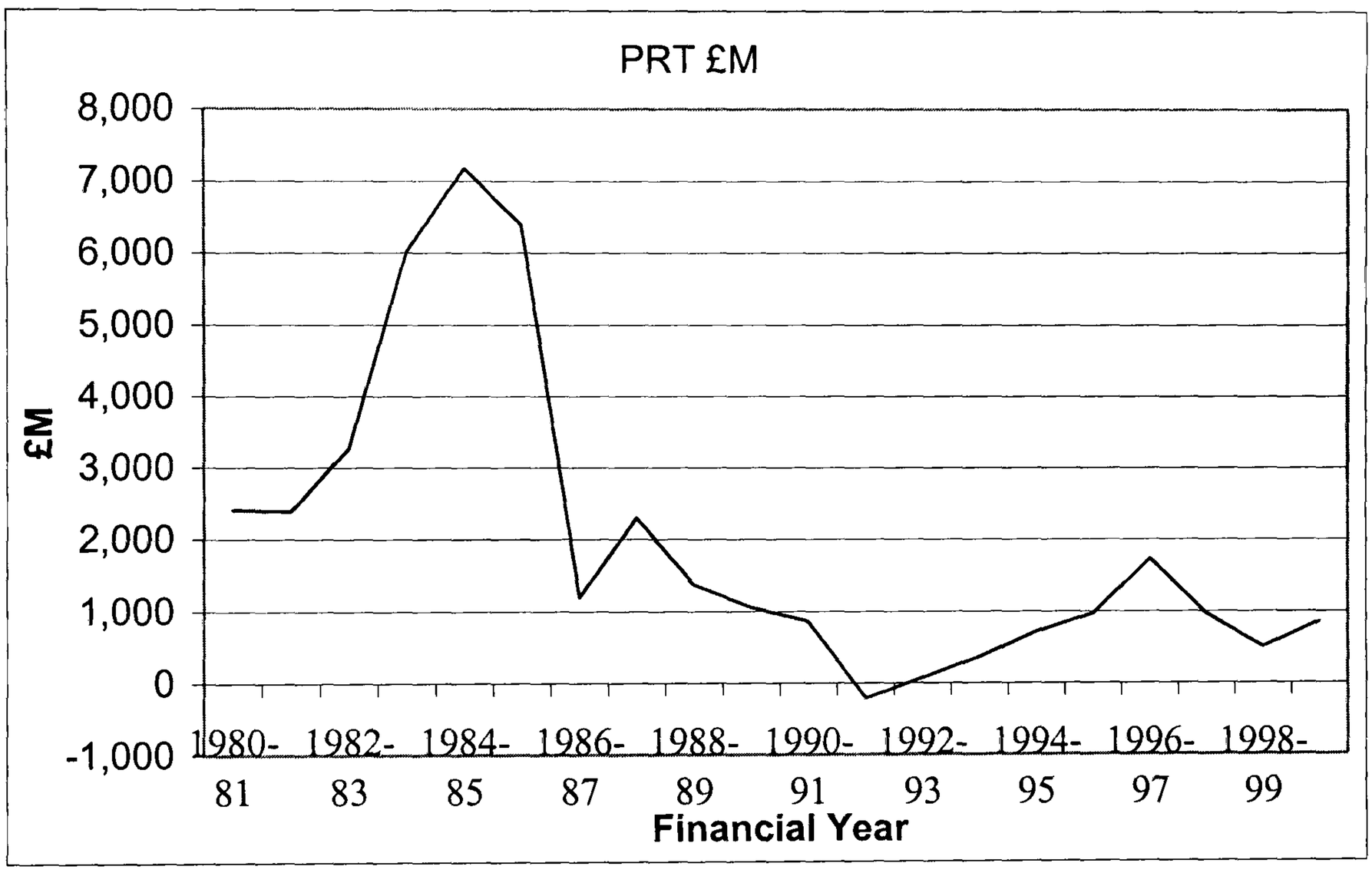
8.3.3 Abolishing PRT for New Fields and Reducing the Rate to 50 Per Cent for Old Fields Came Because PRT Allowances Cost the Government Money in 1992, and Removing Them Would Enable the Government to Gain More Money

The focus of this rationale is on the benefit to the Government. In particular it addresses the issue of the benefit to the Government from removing PRT allowances. These allowances were the Cross Field Allowance and the Cross Field Exploration and Appraisal (E&A) relief. Testing this rationale will be carried out by examining the total Government take from PRT before and after the reform was implemented. Investigating the effects of PRT allowances on total PRT payments should also help performing this test. This test will be performed by using the GEM (2004, v. 3.01). Detailed steps of using the GEM in performing the calculations are shown in Appendices 4.3 and 5-3. Offshore oil fields and operating companies that will be used in the analysis were obtained from the DTI (2004d).

The Cross Field Allowance was the most important allowance which was abolished in 1993. This is because new oil fields tended to be small and protected by the safeguard from paying PRT, as was shown in rationale one of this chapter (section 8.3.1). This means that oil allowances were not important for these new fields. Removing the oil allowance from old fields also was not significant, since by 1993 these fields would have most probably benefited from the total accumulated quantities of oil allowances. It can therefore be said that the most important allowance to be removed was the Cross Field Allowance. It was shown in chapter seven (Table 7-7 on page 263) that the total theoretical financial benefit of the Cross Field Allowance to the oil fields which benefited from this allowance would have been £625.3 million over the period 1987-1992. This theoretically means that PRT payments were reduced by this sum over the period 1987-93. Abolishing this allowance should have benefited the Government take. The

question that might be raised is whether reducing the PRT rate in the 1993 Budget for paying fields to 50 per cent has compensated for the effect of removing the Cross Field Allowance from the companies' and the Government's points of view. Table 8-4 above shows that in 1992 PRT cost the Government £216 million. Figure 8-1 shows how PRT payments increased after 1980 to peak at £7,177 million in 1985, declined in 1986 to £1,188 million, recovered to £2,296 million in 1987 and declined after that to £-216 million in 1992. After 1992 the total PRT payments increased, to peak at £1,729 million in 1997.

Figure 8-1 Total PRT Payments Between 1980-2000



Source: is based on data extracted from the DTI (2000a), Appendix 5.

It can be clearly seen from the above figure that after the Cross Field Allowance was implemented in 1987, PRT payments to the Government declined gradually to result in a negative cash flow in 1992. This analysis indicates a clear effect of the Cross Field Allowance on total PRT payments to the Government between 1987 and 1992. The main focus of this analysis will be on the effect of the Cross Field Allowance, and the reduction of the PRT rate to 50 per cent on the Government tax take. The next paragraph explains the test which was used in performing this analysis.

The analysis was applied at a company level, and it used data for the period 1993-2000. The reason for choosing these dates was because 1993 was the date of the tax reform, and this study covers the period up to 2000. Two scenarios will be applied in this context. The first is based on the assumption that the Cross Field Allowance was not removed in 1993.[103] The second is based on the assumption that PRT rate was not reduced to 50 per cent in the 1993 Budget. Based on the first assumption, the calculation was performed for fields developed between 1993-2000. Fields were grouped according to their operating companies. In this regard, a 75 per cent (PRT) was calculated on ten per cent of development expenditure of these fields over the period 1994-2000. This represents the saving arising to oil companies on PRT payments as a consequence of benefiting from the Cross Field Allowance. Based on the second scenario, PRT was calculated on a 75 per cent and 50 per cent rate for companies that had developments during the period 1994-2000. [104] Calculations will be performed for unmerged companies for simplicity. For each company, the total PRT payment over the period 1994-2000 was compared at 50 per cent and 75 per cent PRT rate. The difference in the totals at these two rates represents the effect of reducing the PRT rate to 50 per cent on companies' cash flow,[105] and hence on Government tax take. Total Cross Field Allowance for fields relating to each company over the period 1994-2000 were compared with the PRT saving as a consequence of the PRT rate reduction for the same company over the same period. Here the possibilities are:

1. Total Cross Field Allowance loss for a company would be less than the gain on PRT payments. In this case the company would have benefited from the 1993 petroleum tax relaxation, by paying less PRT.
2. Total Cross Field Allowance loss for a company would be more than the gain on PRT payments. Here, the company would have made a "loss" because of the 1993 petroleum tax relaxation, by paying more PRT, to the benefit of the Government.

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[103] This scenario was applied in testing rationale number 3 in chapter seven of this thesis. For detailed steps of using the GEM (2004) in performing this scenario, see Appendix 4-3.

[104] For more information regarding the application of this scenario please refer to Appendix 5-3 "A".

[105] Detailed calculations are shown in appendix 5-3 B for BP.

3. Total Cross Field Allowance loss for a company would equal the gain on PRT payments. Here the reduction in the PRT rate to 50 per cent would just offset the effect of removing the Cross Field Allowance.

Calculations were made for four companies: BP, Amerada Hess, Total and Shell (Table 8-8).

Table 8-8: Gain on PRT vs. Loss from Removal of the Cross Field Allowance 1994-2000

Company	Gain on PRT £M	Cross Field Allowance Loss £M
BP	1,986.50	315.3
Amerada Hess	162.7	82.34
Total	106.3	62.13
Shell	545.2	257.5

It can be seen that the total Cross Field Allowance loss would be less than the total PRT gain for every company. This means that reducing the PRT rate to 50 per cent had benefited oil companies as they paid less PRT. In other words, the relaxation benefited the UK oil industry's cash flow, a finding which is consistent with the BP statement cited above on page 284. However, removing the Cross Field Allowance should have benefited the Government, because new fields tended to be of small sizes and not liable to PRT. This means that PRT payments were received from certain established fields, and the Cross Field Allowance was excluding a significant share of payments from these fields from being subject to PRT. The negative PRT in 1992 might have arisen as a consequence of declining oil prices during the early 1990s. Oil prices declined from $23.3 (£13.1) in 1990 to $20.1 (£11.3) in 1991, to $19.3 (£10.9) in 1992, and to $17 (£11.3) in 1993. These reductions in oil prices lowered oil companies' profits and hence, with the many allowances given, resulted in a negative PRT in 1992. In the succeeding years when oil prices increased, and with the slight increase in oil production, the total Government take from PRT payments increased.

Conclusion

The above test shows that Government revenues from PRT were negative in 1992, i.e., the Government paid cash to oil companies. The Cross Field Allowance caused a considerable share of PRT revenues to be lost by the Government. Obviously removing such an allowance should have enabled the Government to keep more of its tax revenues. Abolishing PRT for new fields would, theoretically, have encouraged oil companies to increase their investment. However, given that new fields tended not to be liable to PRT, abolishing this tax for new fields was irrelevant. On the contrary, reducing the rate to 50 per cent for old paying fields was very relevant. The analysis shows that oil companies gained more revenues by reducing PRT rate to 50 per cent than they would have benefited from keeping the Cross Field Allowance in force. It can therefore be concluded that removing PRT allowances would have benefited the Government, but reducing the PRT rate to 50 per cent benefited oil companies. It might have been thought at the time that the Cross Field Allowance would have cost the Government more money in future, by offsetting ten per cent of development expenditure of new fields against PRT liabilities in other fields. Removing this allowance, along with reducing the PRT rate for paying fields, would benefit the Government in the long term. However, as was shown in the analysis, the removal of the Cross Field Allowance did not offset the effect of reducing the PRT rate to 50 per cent up to the year 2000 from the Government perspective. Furthermore, the number of new developments between 2000 and June 2005 was only 22 according to the DTI (2004d). This means that the Government might have been better off by not to remove the Cross Field Allowance or not reduce the PRT rate to 50 per cent. Based on this analysis, it can be stated that this rationale was not met by the policy.

8.3.4 Abolishing the PRT for New Fields and Reducing the Rate to 50 Per Cent for Old Fields was to Balance the Effect of Removing the Cross Field Allowance on the PRT Paying Fields

The previous rationale focused on benefit to the Government from the 1993 petroleum tax relaxation, while this rationale focuses on benefits to the oil and gas industry from this relaxation. The test of the previous rationale showed that the reduction of the PRT rate to 50 per cent not only balanced the effects of abolishing the Cross Field Allowance, but also exceeded it. This is from the oil and gas industry perspective. However, the Government should have benefited from abolishing the Cross Field Allowance, which cost £216 million in 1992. The slight increase in production rate and the increase in oil prices after 1993 should have benefited both the Government and the oil industry. In this regard, for example, Amerada Hess would not have been liable to PRT in 1990 at oil production of 3,006.5 (000t/y).[106] However, when its production increased to 6,472.7 (000t/y) in 1996, the company became liable to this duty (GEM, 2004, v. 3.01). A different situation applies to other oil companies. It is obvious from Table 8-9 below that oil and gas production had increased after 1993 for some other companies that operated in the UKCS at the time, while their PRT payments were decreased. This supports the previous argument that the 1993 relaxation was a production incentive, because oil companies could produce more at a reduced PRT liability, i.e., 50 per cent. Table 8-9 shows PRT payments along with oil production for a number of oil companies over the period 1990-2000. It can be seen from the table, and from Figure 8-2, Figure 8-3 and Figure 8-4, that different companies have different links between oil production and PRT payments.

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[106] 000t/y stands for thousand tonnes a year.

Table 8-9: Oil Production and PRT Payments Over the Period 1990-2000

Year	All Fields		BP		Amerada Hess	
	Oil Production 000t/y	PRT Payments £M	Oil Production 000t/y	PRT Payments £M	Oil Production 000t/y	PRT Payments £M
1990	94,649.72	3,461.99	19,659.57	857.47	3,006.48	-
1991	93,967.10	2,829.09	18,183.67	887.17	3,186.99	-
1992	98,312.03	2,346.24	19,416.62	684.61	4,575.20	-
1993	103,347.03	2,814.86	20,046.50	691.94	4,365.52	-
1994	126,923.14	1,439.03	23,414.65	539.18	6,472.73	2.97
1995	133,110.40	1,634.78	21,980.35	527.46	7,228.03	62.88
1996	133,237.11	2,310.72	22,566.91	783.18	7,112.03	54.49
1997	131,525.89	2,570.09	21,118.32	643.46	7,017.66	51.00
1998	135,644.29	1,401.40	25,020.80	368.00	6,061.33	33.96
1999	139,288.92	911.58	29,698.08	260.01	6,130.49	14.68
2000	127,093.18	2,346.31	27,155.26	639.16	6,208.25	34.60

Source: figures in the above table were extracted from the related Annual Summary Cash Flow tables of the above companies in the GEM (2004). The following three figures are based on data in the above table.

Figure 8-2: All Fields' Oil Production and PRT Payments Over the Period 1990-2000

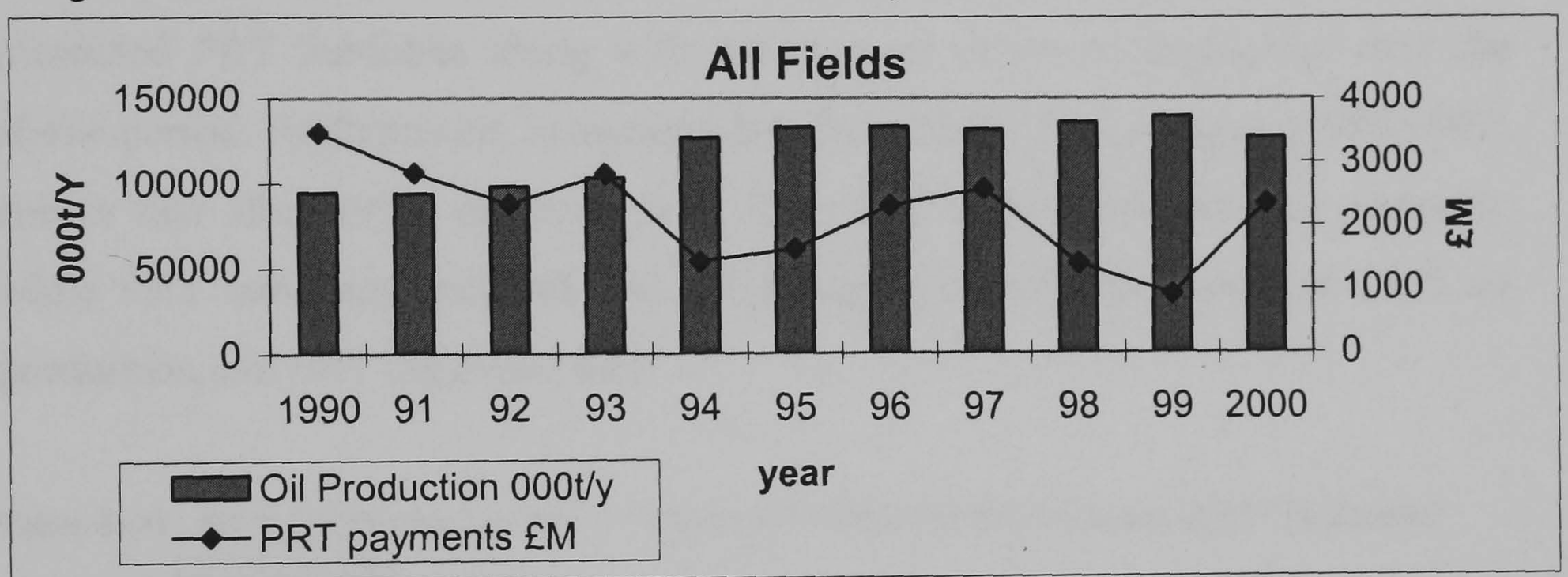


Figure 8-3: BP Oil Production and PRT Payments Over the Period 1990-2000

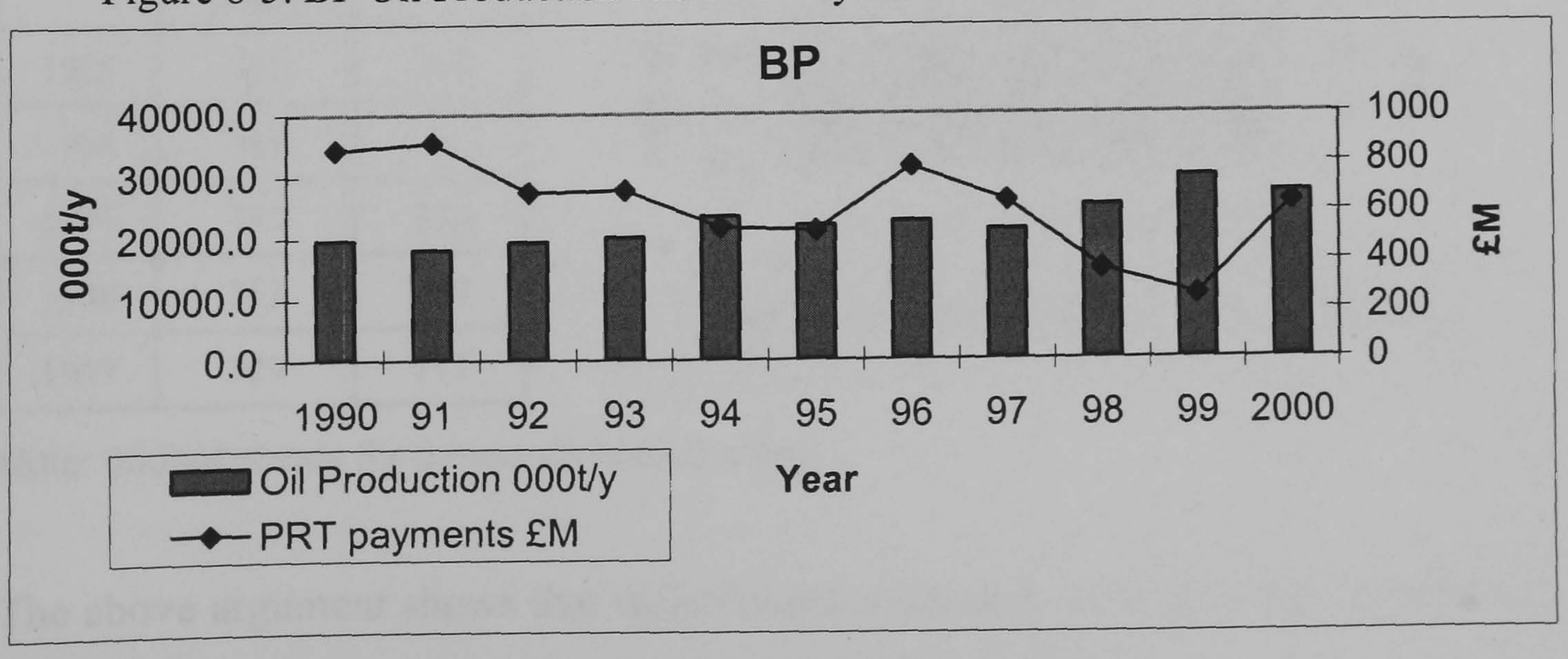
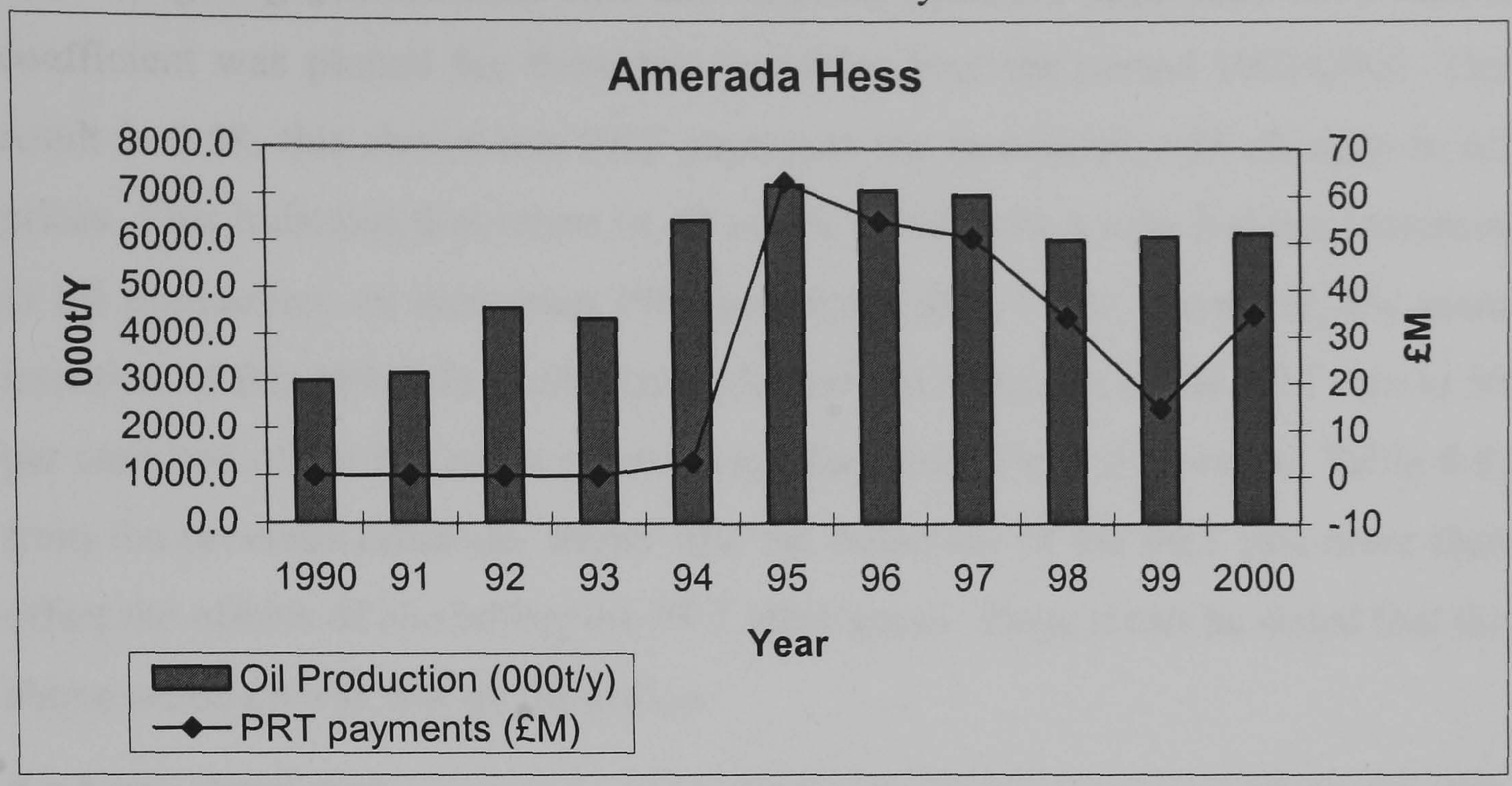


Figure 8-4: Amerada Hess Oil Production and PRT Payments Over the Period 1990-2000



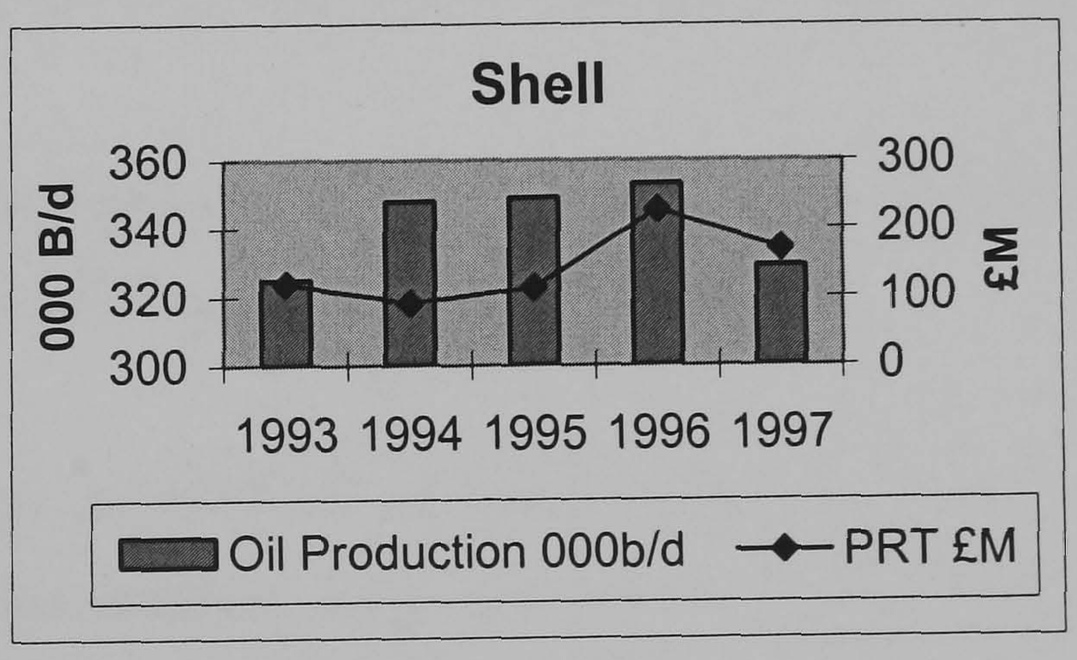
It can be seen from the above table and figures that while oil production increased after 1993 for all the fields in the UKCS, PRT liabilities decreased. The same can be said about BP. The relationship is different for Amerada Hess, which had increased PRT liabilities along with the increase in its oil production over the above period. Furthermore, extracting data from Shell Oil Company (1993-1997) shows that after 1993, oil production from UKCS increased for this company while PRT liabilities declined. The following table and figure present Shell oil production and PRT payments data.

Table 8-10 : Shell Oil Production and PRT Payments

Year	Oil Production 000b/d	PRT £M
1993	325	119
1994	348	91
1995	349	113
1996	353	227
1997	329	171

Note: 000b/d stands for thousands barrels a day.

Figure 8-5: Shell Oil Production and PRT payments



The above argument shows that different oil companies have different experience with regard to changes in oil production and PRT payments.

In investigating a relationship between oil prices and PRT payments, a correlation coefficient was plotted for these two variables over the period 1993-2000. The result is 0.58; this shows that PRT payments are associated with changes in oil prices. This indicates that raises in oil prices could have a role, besides increases in oil production, in increasing PRT payments after 1993. However, the main intention of this rationale is checking whether the reduction of the PRT rate to 50 per cent had offset the effect of removing the Cross Field Allowance. Table 8-8, from the previous rationale, shows that the reduction of the PRT rate more than offset the effects of abolishing the PRT allowances. Thus, it can be stated that the above rationale was met by the policy.

8.3.5 The PRT Reform was an Attempt by the Government to Make the UK Petroleum Fiscal Regime Flat in Different Areas

This rationale proposed that the 1993 petroleum tax relaxation was a means for removing tax differentials between different areas of the UKCS. However, this tax relaxation had left the UKCS with three fiscal areas. These were:

1. Offshore and onshore fields developed before 1982, which were liable to Royalty at 12.5 per cent, PRT at 50 per cent and CT at 33 per cent up to 1997 and 31 per cent up to 2000.
2. Offshore oil fields developed between 1982 and 1993, which were liable to PRT at 50 per cent and CT at 33 per cent up to 1997 and 31 per cent up to 2000.
3. Offshore and onshore fields developed after 1993, and which were liable to CT only at 33 per cent up to 1997 and 31 per cent up to 2000.

From the above it can be seen that the 1993 tax relaxation divided the UKCS into three areas with three different tax marginal rates: the first one had a 70.68 per cent, the second had a 66.5 per cent, and the third had a 33 per cent only (31 per cent after 1997). This discussion points to the fact that the 1993 petroleum tax relaxation, instead of removing tax differentials between different areas, added a new fiscal system to new fields which obtained development consents after 1993. Each of these areas had different taxes and different liabilities from the others.

However, the 1993 petroleum tax relaxation made the fiscal regime flat for fields which obtained development consents after 1993. These fields did not have to pay PRT after 1993, and they were exempt from royalty payments after 1983 and 1988. Therefore, it can be said that the above rationale was not met by the policy on the basis of the historical division of the UKCS fields into the pre-1993 fields groups and post-1993 fields group.

8.4 Summary

The 1993 petroleum tax relaxation was not successful since it could not create real incentives for oil companies to invest in old field, and the loss resulted from abolishing the PRT for new fields and reducing the rate to 50 per cent for old fields was more than the loss resulted from the Cross Field Allowance. Furthermore, the relaxation did not make the petroleum fiscal regime roughly the same in different areas of the UKCS. However, oil and gas companies favoured the relaxation as abolishing PRT for new fields and reducing the rate for old fields compensated the loss of abolishing the Cross Field Allowance. Table 8-11 presents a summary of the results which were obtained from testing the above rationales. The following paragraphs summarise the results which were obtained from testing the rationales for the 1993 tax relaxation.

The 1993 petroleum tax relaxation discouraged exploration incentives and encouraged development and production activities. The tests showed that the UK oil industry benefited from the reduction of the PRT rate to 50 per cent. This was reflected in reduced payments of PRT per tonne of oil after 1993. Abolishing PRT for new fields did not have material effects on these fields, because most of the new fields tended to be of small and very small sizes. These fields would not have been liable to PRT according to the pre-1993 petroleum tax system, because the safeguard and the oil allowances would have protected them from being liable to this duty. At this point it can be said that while the Cross Field Allowance was a company incentive.

Table 8-11: Summary of the Results of Testing the Rationales for the 1993 Petroleum Tax Relaxation

The 1993 Petroleum Tax Relaxations Rationales	The Rationale		
	Was	Was not	Was partly
	Met by the Policy		
Encouraging more exploration and development of UK oil and gas resources by allowing companies to keep more of their profits.			√
Creating incentives for oil companies to invest in old fields.		√	
Abolishing PRT for new fields and reducing the rate to 50 per cent for old fields came because PRT allowances cost the Government money in 1992, and removing it would enable the Government to gain more money.		√	
Abolishing PRT for new fields and reducing the rate to 50 per cent for old fields was to balance the effect of removing the Cross Field Allowance on the PRT paying fields.	√		
An attempt by the Government to make the petroleum fiscal regime roughly the same in different areas.		√	

There is some indication of re-investment in old fields after the 1993 petroleum tax relaxation was implemented. The scarcity of data and information prevents a clear decision being reached as to whether the policy of creating incentives for oil companies to invest in old fields was achieved: in other words, whether re-investment in the ten mentioned old oil fields was a consequence of the 1993 petroleum tax relaxation or other factors. Being that ten re-investments took place in 1993 and 1994, and Mike Earp's assertion (from the DTI) that re-development plans take a relatively long time to proceed, it is most likely that the decisions for re-development had been taken well before the tax relaxation was implemented.

The analysis showed that oil companies had benefited from the 1993 petroleum tax relaxation by gaining more on reduced PRT payments. The policy of removing PRT allowances and reducing the rate to 50 per cent was not successful. The Government would have been derived more revenue if the PRT rate had not been reduced to 50 per cent and the allowances had not been removed. However, the policy encouraged more production and, with the increase in oil prices, the PRT payments were increased. This means that both the Government and the oil industry had benefited from the 1993 petroleum tax relaxation. The analysis showed that the oil companies had benefited from reducing the PRT rate to 50 per cent more than it had lost from the Cross Field Allowance. This meant that the difference between the PRT gain and the Cross Field Allowance loss was a loss for the Government, and particularly that the increase in production and oil prices did not compensate for this loss.

The 1993 petroleum tax relaxation divided the UKCS into three areas of different fiscal regime interests. Fields in each of these areas were subject to a different marginal tax rate from fields in other areas. Therefore, it can be said that the 1993 petroleum tax relaxation did not make the whole UK petroleum fiscal regime flat.

However, the 1993 petroleum tax relaxation acted in a different way from the previous tax relaxations in that it was a direct production incentive. Oil companies had benefited from this tax relaxation, as they were encouraged to produce more to benefit from a reduced PRT rate. The 1983 and the 1987-88 petroleum tax relaxations were directed at exploration and development, while the 1993 petroleum tax relaxation discouraged exploration by removing the exploration expenditure relief, and reduced development incentives by removing the Cross Field Allowance. However, as was mentioned in chapter five (section 5.4), investment in the oil and gas industry is a cycle and encouraging one stage may increase investment at other stages. Therefore, encouraging the production stage, by reducing the PRT rate, should have encouraged more exploration and development in the UKCS. There was not a noticeable increase in these activities after 1993. This might be because the risk arose from too many petroleum tax changes over the period 1981-1993. With such risk oil companies should have

focused on production activities rather than exploration and development in the UKCS.

CHAPTER 9: CONCLUSION

This chapter presents the conclusions of testing the rationales for the UK petroleum tax relaxations. Consequently, it reflects about the success and validity of the UK policy of tax relaxations in stimulating oil investment activities in the UKCS. This is to create a focused basis for discussing the significance of the findings from the thesis. One of the main objectives of this thesis was to identify the historical rationales for the three UK tax relaxations, and to test them from an *ex-post* position. This will help in reflecting upon the success of the UK tax relaxation policy. In other words, the thesis aimed at testing the assumptions, the validity, and the performance of the UK petroleum fiscal regime focusing on the interventionist approach of achieving aims via the use of the tax relaxation policy. The overall results of these tests and evaluation should also help in identifying the type of mineral resources governance that is in use in the UK.

In order to clarify these objectives, this chapter will first outline the major results of testing the rationales that were presented in chapters six, seven and eight. Secondly, it will discuss the success of the UK petroleum tax relaxations policy. Thirdly, it will shed light on the issue of governance the mineral resources. Fourthly, it will highlight the significance of the results.

9.1 The Outcome of the 1983 UK Petroleum Fiscal Regime Relaxation

There have been several objectives of the 1983 petroleum tax relaxation. These aims are reflected in the rationales for this tax relaxation (see Table 4-1 on page 127). However, the Government policy focused chiefly on the following:

1. Encouraging oil and gas activities, and focus mainly on accelerating development activity in the UKCS in general and in particular exploring and developing marginal fields. This would lead to more oil production and hence more taxes to be collected by the Government.
2. Securing an adequate share of North Sea revenues to the nation.

3. Making the UK petroleum fiscal regime more sensitive to changes in the world oil prices by linking taxation directly to profit.

Based on the above, it can be seen that the Government's policy of tax relaxation in 1983 aimed at increasing oil investments and hence increasing the total tax take from oil companies. However, the Government was not successful in achieving its aims: little came out of this relaxation and this little actually cost the Government significant amount of forfeited revenue. The tests showed that in the most cases the rationales were not met or met partly by the policy, see Table 9-1. This indicates that the 1983 petroleum tax relaxation as a full package was unsuccessful. The following paragraphs review the results of testing the rationales for the 1983 petroleum tax relaxation.

The main target of the 1983 petroleum tax relaxation was to encourage more investment in the UKCS in terms of exploration, appraisal, development and production. The relaxation was not very successful in stimulating these activities and failed in particular in preventing the decline in development investment. It was concluded that this tax relaxation was a main driver for the development of two small oil fields; Innes and Duncan (see section 6.4.1 on page 189). The development of these two small oil fields is not sufficient to conclude that this relaxation was successful in increasing investment at the development stage. This is because Innes and Duncan were very small fields out of 14 oil fields developed during the period 1983-1987. The other twelve fields would have gone ahead anyway. The tests showed that exploration, appraisal, and development activities were directly linked and driven by changes in oil prices during the period 1980-1987. However, the relaxation managed to increase the total oil production as a consequence of the development of Innes and Duncan. This was a positive contribution towards sustaining production after 1988, but this was very minor contribution. This means that changes to the petroleum fiscal regime in 1983 did not have significant impact on oil investment activities during the period 1983-1987. In other words, the tax relaxation policy failed to stimulate further oil investment activities, and the Government failed to achieve its main objective of this tax relaxation..

Table 9-1: Summary of the Results of Testing the Rationales for the 1983 Petroleum Tax Relaxation

The 1983 Petroleum Tax Relaxations Rationales	The Rationale		
	Was	Was not	Was partly
	Met by the Policy		
Encouraging oil and gas activities, which include exploration, appraisal and development activities.		√	
Making sure that the regime secures an adequate share of North Sea revenues for the nation.	√		
Helping the oil and gas industry's cash flow to accelerate development activities.		√	
Encouraging the smaller and more costly fields (the marginal fields) in new areas to be explored and developed.			√
The relaxation would encourage more exploration and development and this would help increasing the production level, which means more PRT and taxes to be paid by the industry to the Government.		√	
Making the whole tax regime more sensitive to changes in the world oil price by linking taxation exclusively to profit rather than to mixture of profits and revenues.			√
Sustaining indigenous production beyond about 1988/90.			√
Removing APRT would release some additional funds, which could be used for further investments.			√
Correcting action by the Government to the 1981 petroleum fiscal regime package, which introduced the SPD and gas levy.		√	
Keeping the whole Governmental revenues from existing fields and at the same time attracting the oil and gas industry to explore and develop new fields in new areas.			√

Note: a 'tick' indicates whether the rational in questions was, was not, or was partly met by the policy.

It was found that the Government had lost a portion of its take from new fields. This was because new fields were exempted from paying royalties, and had benefited from a double oil allowance compared with old fields. The loss was estimated to be of £13.5 million from the 14 oil fields that were developed between April 1982 and 1987. Extending the analysis to 1993 showed further loss to the Government which had lost a sum of £344.2 million ($582m) during the

period 1983-1993 because of this relaxation. The extra revenues from Innes and Duncan (£54.5 million) during the period 1983-1993 did not compensate for the loss from the other twelve fields. This clarifies that the minor increase in oil production resulting from the 1983 tax relaxation was at the expense of the Government. Based on the above, it can be claimed that the UK Government was not successful in employing the tax relaxation policy in achieving its main target of increasing oil investment activities and consequently increase its tax take.

The only positive sign of this relaxation is that although the 1983 petroleum tax relaxation reduced the marginal tax rate for new fields compared with old fields, it was still securing an adequate share from the oil resources to the nation (Petroconsultants, 1996). The average international petroleum tax take was set at 75.3 per cent, while the marginal tax take from new fields in the UK was 79.3 per cent between 1982 and 1987 (see Table 6-9 on page 202). The relaxation aimed at, and was successful in keeping Government revenues from old fields which were not targeted, while trying to encourage more investment in new areas. This is not significant, since the 1983 tax relaxation did not target old fields. On the other hand, the cash flow of oil companies had benefited by £195.5 million because of the petroleum tax reform. The increase in oil companies' revenues means a bigger share of the mineral resources was going to these companies, and hence a smaller share to the Government. However, this is one sign of a non-proprietorial fiscal regime which is based on the idea of mineral resources being a free gift of the nature.

The sharp decline in oil prices in the mid 1980s was a major restriction on the success of the 1983 petroleum tax relaxation. This was reflected in the Government losing a portion of its revenues from new fields because of the relaxation. These new fields would have been liable under the pre-1983 tax regime to royalty charges and would not have benefited from PRT allowances. However, abolishing royalties was more important to smaller fields than PRT allowances. This is because in most cases these fields would not have been liable to PRT because of the safeguard protection. The cash flow of these fields benefited by £132.3 million from abolishing royalties; while the benefit was £66.6 million from the PRT relief (see section 6.4.3). This is a logical result because

these fields were of small reserves and would not have been liable to PRT under the pre-1983 tax regime.

It was found that fields which had obtained development consents after 1982 tended to be of smaller sizes compared with fields developed before that date. One of the major underpinnings of the rationales behind the relaxation was that it would cost more for the increasingly smaller discoveries on the UKCS to be developed. In fact such thinking had no empirical justification as the analysis showed that the costs of production of the new, smaller fields were lower not higher than those of their larger predecessors – something which should come as no surprise once it is born in mind that the newer, smaller discoveries do not require new infrastructure – they can latch onto and make use of the infrastructure built at great capital expense to access the earlier discoveries. For example, it was found that the average cost of a production unit (barrel of oil) from a small new field located in the central North Sea was $15.9, while it was about $30.7 from an old field from the same size and in the same geological location (see Table 6-13 on page 212). Also the cost of a reserve unit was $12 in a new large field located in the northern North Sea, while the cost was $23 in an old field of the same reserve size within the same geological location (see section 6.4.4). These results are realistic because new fields had benefited in their development from the existence of infrastructure and improved technology. This means that these new fields had to bear less capital and other costs compared with old fields. In supporting this opinion, the author calculated the average operating and capital costs of the reserve and production units for both small and old new fields that are located in the central North Sea. It was found that these costs were almost double in old fields compared with the costs of new fields. The average unit operating cost was found to be $7.5 in the new fields and $14.5 in old fields. Also, while the average unit capital cost was $7.5 in new fields, it was $16.6 in old fields.

The tax relaxation was beneficial for oil companies, as it increased the cash flow of these companies. One rationale suggested that this increase in cash flow would have been used in further investment activities within the UKCS. Actually the test illustrated that the removal of APRT and the lower tax burden on new fields after 1983 had helped the increase in the oil companies' cash flow. However,

investment activities in a particular area will not necessarily increase just because of a possible increase in a company's cash flow that might arise from that particular area (see sections 6.4.3 and 6.4.8). The extra cash flow might have been used in further investment in any other areas of interest to the operating company, or even in extra dividends to shareholders for example. However, the removal of APRT should have increased the oil companies' cash flow in the short term, as companies had to pay PRT on the due date. This short-term refreshment in the oil companies' cash flow is not sufficient for making long-term investment decisions such as exploration and/or development decisions. These decisions need a large continuous long-term source of finance, which means that the removal of APRT was unsuitable as a source of finance for stimulating this kind of investment.

In terms of the sensitivity of the UK petroleum fiscal regime to changes in the world oil prices, it was found that the pre-1983 tax system was sensitive to changes in oil prices. This is because changes in oil prices would have brought changes in many different parameters. For example, assuming a three per cent increase in oil prices would have brought the following changes of the parameters of Clyde oil field: (1) an increase in the total field cash flow equal to 17 per cent, (2) an increase in the field post tax IRR equal to 0.86 percentage point, (3) an increase in the total Government tax take of 13 per cent, and (4) an increase in the average Government tax take per barrel of 11.1 per cent (see Table 6-15 on page 224). The 1983 petroleum tax relaxation made the *new* regime more sensitive to changes in oil prices. This sensitivity was changed to the benefit of the oil and gas industry in the case of increasing oil prices, but to the benefit of the Government in the case of decreasing these prices (see section 6.4.6 and Table 6-16 on page 225). However, according to the post-1983 petroleum fiscal regime, an increase in oil prices by three per cent would have changed the above mentioned parameters for Clyde oil field as follows: (1) an increase in the total field cash flow of 18 per cent, (2) an increase in the post tax IRR of the field by 0.90 percentage points, (3) an increase in the total Government tax take by 12 per cent, and (4) an increase in the average tax take per barrel by 10.8 per cent. It was claimed above that the sensitivity of the post-1983 petroleum fiscal regime to changes in oil prices was increased to the benefit of the oil and gas companies. This is because for example a change to the oil prices by three per cent would increase the total cash flow of

Clyde, for example, by 18 per cent, while the increase would have been by 17 per cent under the pre-1983 petroleum tax system. Furthermore, the average Government tax take per barrel of oil would increase by 10.8 per cent with a three per cent increase to oil prices under the post-1983 tax scenario. The increase in the average Government tax take per barrel would be 11.1 per cent under the pre-1983 petroleum fiscal regime scenario. Similar results were obtained when different changes to oil prices were assumed, for example a four and ten per cents.

Based on the above, it can be stated that the UK Government managed to increase the sensitivity of the fiscal regime, applied to new fields, to changes in the world oil prices. However, this change in sensitivity was to the benefit of the oil and gas companies, but not the Government. This is another sign of a non-proprietorial regime which sees that during difficult times for oil companies, the Government should interfere to compensate these companies for their loss by relaxing the fiscal regime or by providing some other investment incentives.

Overall, it can be stated that the 1983 petroleum tax relaxation was not successful in stimulating more investment activities in the North Sea, and hence more oil production and higher Government tax take. On the contrary, the fiscal regime was relaxed for new fields; this had a negative impact on the Government take, but a positive effect on the oil companies' rent. The sharp decline in oil prices in the mid 1980s restricted the desired Government aims of the relaxation in terms of further investments, namely further oil production and further rent to both the oil and gas industry and the Government. These circumstances altogether led to the conclusion that the 1983 petroleum tax relaxation was not well planned and the consequence was that the Government aims behind the relaxation were not achieved. In other words, the Government was not successful in achieving its targets by using the policy of introducing a 'petroleum tax relaxation' in 1983. This was one of the reasons for the Government to present the second petroleum tax relaxation in 1987-88.

9.2 The Outcome of the 1987-88 UK Petroleum Fiscal Regime Relaxation

By introducing the 1987-88 petroleum tax relaxation, the UK Government had the following main objectives.

1. Accelerating oil and gas investments in new areas.
2. Encouraging the development of the explored marginal oil fields in different areas of the UKCS.
3. Extending the profit relatedness of the fiscal regime to the Southern Basin fields of the North Sea.

It can be seen from the above aims that the Government focused on marginal oil fields in this tax relaxation. This was to increase oil supply, and hence to increase its petroleum tax take.

The 1987-88 relaxation was successful in encouraging oil investment activities in the areas of new oil fields. Also the relaxation was successful in compensating for the dramatic fall in post-tax company cash flow, which resulted from the dramatic fall in oil prices in 1986, from the North Sea operations. However, the 1987-88 tax relaxation was limited in encouraging developments of explored marginal oil fields, as out of 85 explored oil fields the relaxation was successful in turning only three of them into proved properties. On the other hand, this tax relaxation did not encourage any investment activities in the Southern Basin of the North Sea; because this basin was not targeted by this tax relaxation. Table 9-2 presents a summary of results obtained by testing the rationales for the 1987-88 petroleum tax relaxation.

The following paragraphs review the results obtained by testing the rationales for the 1987-88 petroleum tax relaxation.

Table 9-2: Summary of the Results of Testing the Rationales for the 1987-88 Petroleum Tax Relaxation

The 1987-88 Petroleum Tax Relaxations Rationales	The Rationale		
	Was	Was not	Was partly
	Met by the Policy		
The unsuccessful 1983 petroleum tax relaxation was a reason for forming the 1987-88 relaxation.			√
To encourage further exploration and development expenditure on new fields.	√		
To develop explored marginal fields.			√
To reduce costs and encourage development activities in the marginal fields in the Southern Basin area of the North Sea.		√	
Abolishing royalties for the Southern Basin of the North Sea, to make the petroleum fiscal regime more profit-related.		√	
Introducing the Cross Field Allowance was to compensate for the dramatic fall in post-tax company cash flow from North Sea operations, and the implications of this for expenditure on new field projects.	√		

Note: a 'tick' indicates whether the rational in questions was, was not, or was partly met by the policy.

The lack of success of the 1983 petroleum tax relaxation was one of the major reasons that led the Government to present the 1987-88-tax relaxation. Also, the sharp slump in oil prices in the mid 1980s validated the Government intention of introducing such a relaxation. This decline in oil prices in the mid 1980s caused the cash flow of oil companies and oil fields to suffer a significant decline. The introduction of the Cross Field Allowance did increase the cash flow of these companies and fields, and was also a reason for boosting oil investment activities in the central and northern North Sea after 1987. The tests showed that the Cross Field Allowance had a positive impact on exploration and development activities in the areas of new fields. These effects are represented by the increased number of exploration and development drillings, and hence an increase in exploration and development expenditure after 1987. This means that introducing the Cross Field Allowance was a successful policy to enhance exploration and development

activities in the central and northern North Sea (see Table 7-2 on page 250). This is not surprising, because companies wanted to benefit from the Cross Field Allowance, and thus they accelerated their investments in these areas. In terms of encouraging the development of *unproved marginal fields*, the Cross Field Allowance stimulated the development of three discovered marginal oil fields; these were Strathspey, Miller and Scott (see section 7.3.3 on page 260). However, it was concluded that the policy of stimulating development of small marginal fields was not very successful, since out of 85 oil fields discovered before 1987, only three were developed as a consequence of the Cross Field Allowance measure. This means that the other fields, which were developed after 1987, had benefited from the Cross Field Allowance, but they would have been considered commercially viable without the allowance. This in its turn indicates a Government loss from these fields because of the allowance policy.

It was suggested that the 1987-88 petroleum tax relaxation should have benefited new oil fields in the Southern Basin of the North Sea. However, this basin had not seen any oil developments after 1982, as it is mainly a gas basin. This means that the Southern Basin did not benefited from this tax relaxation, since the relaxation did not target gas fields. It was also suggested that eliminating royalties for new fields was to make the whole oil fiscal regime flat in the UKCS. This suggestion is flawed for the same previously stated reason.

Based on the above, it can be concluded that the UK Government did achieve its main targets for the 1987-88 petroleum tax relaxation. Oil and gas investment activities were enhanced by the influence of the Cross Field Allowance, and this allowance also encouraged the development of a number of previously explored oil fields, namely – Strathspey, Scott, and Miller. However, this tax relaxation was not effectively planned regarding the Southern Basin of the North Sea because this Basin did not witness oil developments after 1982. The success of this tax regime created a significant financial benefit for the oil industry, but not for the Government as the Cross Field Allowance cost the Government money in 1992. This was the reason for abolishing this allowance in the 1993 tax reform.

9.3 The Outcome of the 1993 UK Petroleum Fiscal Regime Relaxation

The main Governmental objectives of the 1993 petroleum tax relaxation can be summarised as follows:

1. Encouraging oil and gas investment activities, with a particular focus on old fields.
2. Removing the negative effects of the Cross Field Allowance on Government tax take.

These objectives mirror the rationales for the 1993 petroleum tax relaxation from the Government point of view (see Table 4-3 on page 129).

The 1993 petroleum tax relaxation was not successful in achieving the above aims, in particular the first one. Although oil companies found production incentives in this relaxation, exploration and development activities were not increased. This is because by abolishing the Cross Field Allowance the Government removed the development incentives. However, the removal of PRT for new fields and the reduction of its rate to 50 per cent for old fields were to the benefit of oil companies, but not the Government. The gain from the PRT reforms was higher than the loss resulting from removing the Cross Field Allowance for oil companies. Table 9-3 presents a summary of the results obtained by testing the rationales for the 1993 petroleum tax relaxation.

The following paragraphs review the conclusions of testing these rationales and reflect on the success of the 1993 petroleum tax relaxation package, and hence on the validity of this tax relaxation.

Table 9-3: Summary of the Results of Testing the Rationales for the 1993 Petroleum Tax Relaxation

The 1993 Petroleum Tax Relaxations Rationales	The Rationale		
	Was	Was not	Was partly
	Met by the Policy		
Encouraging more exploration and development of UK oil and gas resources by allowing companies to keep more of their profits.			√
Creating incentives for oil companies to invest in old fields.		√	
Abolishing PRT for new fields and reducing the rate to 50 per cent for old fields came because PRT allowances cost the Government money in 1992, and removing it would enable the Government to gain more money.		√	
Abolishing PRT for new fields and reducing the rate to 50 per cent for old fields was to balance the effect of removing the Cross Field Allowance on the PRT paying fields.	√		
An attempt by the Government to make the petroleum fiscal regime roughly the same in different areas.		√	

Note: a 'tick' indicates whether the rational in questions was, was not, or was partly met by the policy.

The 1993 petroleum tax relaxation stimulated the production phase, but not exploration and development activities. This is because the 1993 petroleum tax reform withdrew the exploration expenditure allowance, which had acted previously as an exploration incentive, and the Cross Field Allowance which had acted as development incentive. The reduction of the PRT rate from 75 to 50 per cent for old fields, and abolishing this duty for new fields, had benefited the cash flow of the oil companies (see Table 8-8 on page 297). For example, while PRT cost BP £27.1 per tonne of oil in 1992, the cost was £17.5 in 1994. In general, this tax reform had benefited companies that were liable to PRT at that time. It was

also found that BP, for example, would have benefited by £315.3 million from the Cross Field Allowance, while the PRT saving was £1,986.5 million over the above period (see section 8.3.3). The difference between the gain from the PRT reforms and the financial loss of the Cross Field Allowance is a gain to the oil and gas companies' cash flow, and at the same time a loss to the Government tax take (see section 8.3.4). Therefore, the policy of removing the Cross Field Allowance, and reducing the PRT rate to 50 per cent was not successful in enabling the Government to increase its revenues after 1993. However, oil companies with only small and very small oil fields would not have been benefited, since these companies would not have been liable to PRT before the tax reform, and reducing the PRT rate to 50 per cent meant nothing to them in fact.

The 1993 petroleum tax relaxation acted mainly as a production incentive, as oil companies were encouraged to produce more at a reduced tax rate from old fields, and paid only CT on profits, i.e., at a rate of 31 per cent, from new fields. This opinion is supported by the UK oil production statistics which show that total oil production increased after 1993 (see Table 8-3 on page 285 and Table 8-4 on page 287). The total Government tax take increased as well, but it was a very slight increase. Thus, it can be considered the production aspect of the Government policy that was incorporated in the 1993 petroleum tax relaxation was successful. Obviously this was at the expense of the Government tax take.

It was also claimed that the 1993 petroleum tax reform would have made the UK petroleum fiscal regime flat in different areas of the UKCS. In other words, the 1993 petroleum fiscal regime would remove the differences in tax liabilities of oil fields in different areas of the UKCS. This claim was not rational since this tax relaxation added a new fiscal regime with new terms that differed from other fiscal regimes in other areas of the UKCS. It also left the UKCS with three different fiscal regimes in the different areas. For example, fields in the new areas, which had benefited from this tax relaxation, had to pay only CT at 31 per cent. Fields that were developed before 1983 were liable to royalties at 12.5 per cent, PRT at 50 per cent, and CT at 31 per cent. Offshore oil fields that were developed between 1982 and 1993 were liable to PRT at 50 per cent and CT at 31 per cent. This left the UKCS with three different tax regimes and did not remove the

differences in tax payments between fields in different geological areas. This was a main reason for describing the UK petroleum fiscal regime as one of the weakest regimes in the world (Rutledge and Wright, 1998b, p. 811).

It was suggested that the 1993 petroleum tax relaxation would create incentives for oil companies to re-invest in old oil fields. Here the analysis was restricted by a lack of information regarding these re-investment drivers. However the available data, beside the interview with Mr Mike Earp of the DTI indicates that this policy was not successful in stimulating more investments in old fields after 1993. The long time required for planning a re-development project and approving this plan by the DTI is evidence that the re-development of ten oil fields during the period 1993-94 was not because of the 1993 petroleum tax relaxation. For example, it was stated in chapter eight of this thesis, section 8.3.2, that the decision to re-develop the Brent oil field was made in 1992, and the plan was approved in March 1993.

It can be concluded that the 1993 petroleum tax relaxation was successful in increasing the cash flow of the oil companies and in stimulating more production. However, this success was at the expense of the Government revenues. It was therefore the case that all three fiscal relaxations of 1983, 1987-88, and 1993 resulted in a sacrifice of actual Government's revenues.

The evolution of the UK petroleum fiscal regime shows that the Government tried to secure more fiscal revenues from its oil resources up to 1982. After that it relaxed the petroleum fiscal regime three times to the year 2000. One of the main aims of the Government of introducing these relaxations was increasing oil investment activities. The 1983 and 1993 petroleum tax relaxations were not successful in achieving this aim. The Cross Field Allowance was an effective tool in encouraging development activities in the central and northern North Sea. However, none of these relaxations increased the Government tax take from the North Sea, but it was always the Government who lost fiscal revenues as a result of these relaxations. This is an essential character of the non-proprietorial regime. It can be concluded that the 1987-88 petroleum tax relaxation was the most successful one among the three relaxations.

Introducing the three tax relaxations represent a significant change in the Government attitude towards its petroleum resources after 1982. This change in attitude indicates a change in the type of governance the petroleum resources. The next section illustrates this issue.

9.4 The UK's Mineral Resources Governance: Proprietorial vs. Non-Proprietorial

The discussion in section 2.2.1 established that the UK ownership of petroleum resources differs from the normal ownership under standard concession agreements. This means that the concessionaire is given a right to produce from the concession area, but he does not have ownership over the minerals in ground. This indicates that the concessionaire is only granted mining and economic rights, but not mineral rights. This means that the UK has a unique model of concession which is often referred to as "the North Sea Model". This model accommodates private interests under public control. The public control, or 'ownership', allows the Government through its licensing system to lease out new areas and produce more oil from these areas, and also from old areas.

Section 2.3.1 described different meanings of the economic rent concept, and section 2.4 illustrated two different types of governance of mineral resources: proprietorial and non-proprietorial. Using the developmental conceptualisation which was discussed in section 2.4 to define the UK petroleum fiscal regime, in the light of the obtained outcome of testing the rationales for the three petroleum tax relaxations, gives significant results. Up to 1982 the UK Government seems to have adopted proprietorial regime for the governance of its mineral resources and behaved like a private landlord. Since the Government has tried before 1982 to capture more differential rent from different levels of oil production. For example, royalty payments and licence fees represented the customary ground rent, while SPD, PRT and CT payments represented the differential, or 'Ricardian', rent. The 1983 petroleum tax relaxation abolished the main part of the customary ground rent, or 'royalties', for new fields. Part of the differential rent had already been abolished in 1982, i.e., SPD. These actions were aimed at stimulating exploration

and development activities in new areas, i.e., central and northern North Sea, and in particular marginal oil fields.

The 1987-88 petroleum tax relaxation offered oil companies a significant portion of the Government's economic rent in forms of oil allowances in general, and in particular via the Cross Field Allowance. The new fields, according to the1987 Financial Act, were targeted for differential rent merely, since they were only liable to PRT, besides ordinary CT. The 1993 petroleum tax relaxation left the UK Government with a very small proportion of economic rent from new oil fields, which was represented by the CT payments. This tax relaxation offered the UK petroleum resources from these fields to oil companies at a very low requirement for the surrender of economic rent in the context of the international benchmark for Government tax takes. It was discussed earlier in section 2.3 that oil companies have to pay special taxes because they deplete non-renewable oil resources, and they make super-profits compared to other businesses. Nevertheless, in the UK after 1993, the oil companies only had to pay standard corporation tax just like any other business despite depleting the UK non-renewable oil resources, and enjoying the super-profits. The tests of the rationales for the three tax relaxations showed that the Government had actually sacrificed, with each policy change, a significant part of its rent to the oil industry.

The UK Government seems to have adopted the Ricardian rent theory to frame its licensing policy for oil resources, in that, as new fields after 1983 tended to be of small and very small reserves, the Government imposed a new policy based on fiscal relaxations. This policy induced changes in the UK contractual structure, and brought the Government rent down. This might be because it was thought at the time that new fields, because of their small reserves, would not be as profitable as large fields, but would be more costly in extraction terms. However, the analysis showed that the new policy increased the cash flow of the oil companies, which gained benefit from extracting the UK oil resources from fields located in well-established areas. This demonstrates that the UK oil policy was not very well planned. The new fiscal regime followed the slogan "the land to the tiller" or "the minerals to the miner". Hence, it can be concluded here that the assumptions of this research, which were presented in section 5.3.1 on page 132,

are proved to be wrong. This is because the UK Government failed to increase its fiscal revenues by using the fiscal regime relaxation policy in encouraging oil investment activities.

These features clarify the type of the UK governance of its oil resources as non-proprietorial for a number of reasons. These are:

1) The UK Government depends on the DTI, as a licensing agency, in opening up new areas for investment when investors' proposals meet the DTI terms for work plans and experience. The overall goal was always to allow oil companies to deplete the available oil resources from the small and very small fields at the lowest possible cost to the companies.
2) The Government played an administrative role over petroleum resources, believing that natural resources are a free gift of nature to producers and, eventually, to consumers. However, even this belief is wrong as in the case of the UK oil resources, oil was not free gift for consumers who have to pay a high final price when compared with the exploitation cost - producers alone enjoyed the super profits.
3) In term of taxation, the customary ground rent, royalties, were abolished. The UK petroleum fiscal regime post-1993 primarily targetted excess profit, whilst oil companies were enjoying the super-profits from the new fields.

The above illustrates how the ownership of mineral resources is not very important compared with the type of governance exercised over these resources.

It was also illustrated earlier in this thesis (section 2.4 on page 41) that when countries and individuals gain more experience and self-confidence to develop their mineral resources, they move to the proprietorial form of control, which focuses on granting the mineral's owner a greater share of the minerals e.g., as in the case of Indonesia. It was also mentioned in section 3.5, on page 94, that after 1975, but prior 1982, UK oil policies were directed at ensuring high tax take for the state, more regulated development investment, exercising more control over oil supply, and encouraging the offshore supplies industry in the UK. Hence, the policy was changed for the period 1982-2000 for the satisfaction of the oil

companies by relaxing the petroleum fiscal regime three times. This means that the UK behaviour was against the norm regarding the change in governance mineral resources from non-proprietorial to proprietorial regime, since the UK petroleum fiscal regime seemed to be proprietorial between 1975 and 1983, and then changed to non-proprietorial after 1983.

9.5 The Significance of the Results

This section will discuss the significance of the findings of this research based on two perspectives, these are the literature and the policy.

9.5.1 Significance of the Findings With Respect to the Literature

The results of this research are significance and unique when compared with other similar studies, particularly Martin (1997). This uniqueness arises from the many differences between the research design, methods, and methodology of this research compared with Martin's. Some of these differences were discussed earlier in section 5.7. This section will illustrate the main differences regarding the results and their validity. Martin (1997) focused on the increase in the UK oil production that arose because of lower taxation, lower cost and other factors. He studied the impact of both the 1983 and 1993 petroleum tax relaxations, and the effect of the cost reduction resulted from improved technology on the developments of new fields. This research traced the historical rationales for the three UK petroleum tax relaxations- 1983, 1987-88, 1993 and tested these rationales from an *ex-post* position. One of the main aims was to evaluate the success of the tax relaxation policy, and another aim was to illustrate the financial effects of these tax relaxations on the Government tax take and the cash flow of oil companies. In his study, Martin (1997) did not take into account the effects of abolishing PRT relief. This research did so via examining the effects of introducing and, later on, abolishing the Cross Field Allowance on the Government's and the oil companies' cash flow. One of the main weaknesses in Martin's analysis is that he built his conclusion on an unrealistic analytical approach. He related all of the production and the Government tax take from fields that started production after 1985 primarily to the 1983 and 1993 petroleum tax relaxations and the improved technology. This contradicted the realty that a

number of these fields, which started production after 1985, were developed not because of the less tax or advanced technology issues, but because of their commercial viability without the tax breaks. This research specified the direct effects of the petroleum tax relaxations on a number of measures. These measures are reflected in an increase in production, the effects on Government tax take, and the increase in the cash flow of oil companies, this in its turn helps to evaluate the success and validity of the tax relaxation policy. The results of this research agree with Martin (1997) in that there were boosts in oil production after 1993 and this was at the expense of the Government tax take. This point supports the description of the UK tax system as a non-proprietorial regime.

9.5.2 Significance of the Findings with Respect to the Policy

In section 9.4 the UK's governance of its oil resources was categorised as non-proprietorial. The question that may be asked here is whether given that this type of governance works for the UK. Mainly that it does not work, that any incentives devised by the Government will always be dwarfed by the incentive and disincentive effects of movements in oil prices, and that in any event international oil companies with global strategies and interests may simply take the proceeds of the incentives and invest elsewhere, for example BP.

From the analysis in this thesis the overall policy lesson for other countries is that government intervention to change the fortunes of their oil industry using tax breaks is likely to fail. Not only are the effects of such breaks likely to be overshadowed by the alternating incentive or disincentive offered by changing oil prices, but they will also lose the government revenues to no avail.

If this is the overall conclusion, were there any components of the relaxations which were successful and which might usefully be emulated? Here the candidates would be the Cross Field Allowance which stimulated development activities and the reduction in PRT in 1993 which clearly stimulated current production. However, both of these measures resulted in the sacrifice of actual or potential government revenues and thus might only be contemplated if other

objectives, such as improving the balance of payments were higher on a government's agenda.

These conclusions mean that different, alternatives policies should be considered. The thesis provides the following clues to what these might be for the UK Government, and which may be of a significant benefit to other oil producing countries. The UK Government might have been better off if it had designed its tax relaxations according to fields of specific reserve volumes or extraction costs, rather than based on certain development consent's dates or geological locations. The fiscal regime could be designed in a way that it could extract a specified percentage of the oil price to the Government; therefore it could be more flexible with changes in oil prices. However, such a system would treat fields from different reserve sizes similarly and would not be stable because oil prices change rapidly. The most effective fiscal regime would be designed with link to the operating profit. This can be done by exempting a certain level of profit from being liable to petroleum taxes, and place higher tax percentages on higher profit layers. Such a system would treat small and marginal fields favourably compared with large and more profitable fields, and will extract higher take from the very profitable fields to the Government. Moreover, such a fiscal regime, as it is based on operating profits, would take the different costs into account and at the same time would be flexible with changes in oil prices.

The results of this research support the statement that the UK petroleum fiscal regime is one of the weakest regimes in the world. They provide a valuable lesson for oil producing countries, and in particular the UK, regarding the usefulness and limitations of using tax relaxation policy as a tool for controlling oil and gas activities.

APPENDICES

Appendix One

Transcription of the interview with Mr Geoff Barnard, a senior tax officer from the Oil Taxation Office on 20th of January 2004, at 1.00pm

Q- what were the rationales for the 1983 petroleum tax relaxation package?
The phasing out of APRT was replaced by the instalment regime under which PRT is paid in instalments, replaced it, and the speed of collecting it.

Royalty was not dealt with by the Inland Revenue, it was the DTI who dealt with royalty. As far as I know the rationale behind abolishing it for post 82 fields was that it was thought the major fields had been discovered in the North Sea and royalty was disincentive to invest, because it takes 12.5 per cent of the gross revenues, so by removing it was giving an incentive. Indeed the whole of 83 changes was to some extent aimed at providing an incentive to further exploration. The increase in the oil allowance for PRT meant that smaller fields would be more viable to develop because they would not be paying PRT.

PRT was only intended to tax the super profit of the very large fields, in theory some small fields may pay PRT if they are very profitable. Generally, most small fields will never pay PRT, and it was never intended that they should; because they are generating profit in the sort of normal commercial range not the super profit the likes of Forties and Brent fields' developments.

Q : were these changes a necessary action by the Government?

At the time it was the right action by the government to form the tax relaxation package. The North Sea has always been balanced between the government receiving its fair share of the revenues from the North Sea, at the same time the investment has to come from the private sector because since we got rid of the

BNOC, all investments have been private. So you are continuingly trying to strike a balance, and the North Sea is an expensive province to cooperate.

When you are looking at international oil companies, they can invest wherever they want and find reserves at less cost. So you have to make UK attractive in the international context.

Of course achieving that is not only through tax, but also by the general regime, infrastructure, labour supply and everything else. Its an attractive regime to work in compared to some other countries.

Q: what were the rationales for the 1987-88 changes?

PRT was introduced as a field based tax and there was no intention that you could set expenditure from one field against another field. However, when looking at the regime in 1987, it was felt there needed to be some incentive towards exploration and allowing some costs of one field to be off set against another field would give companies that are already paying PRT an incentive to keep exploring. It did not benefited companies who were not paying PRT. It was an incentive to continue further exploration.

It certainly led to difficulties later on because the effect of it was unforeseen. Revenues by 1993 had dropped to zero because of the volume of relief being allowed. But at the time these changes and similarly removing royalty for the Southern Basin fields was effective, and recognition that most of, if not all, the major reserves in Southern Basin have been found. And what was going to be there is going to be fairly small, and applying royalty to future small fields might then meant they would have never been developed. So it was mainly to encourage development, because there were a lots of fields discovered forty years ago and they have never been developed and tax is one reason but mainly they were too small and uneconomic using the technology available at time. Now advances in technology make them economic. So some of these small fields are coming in.

Q: were these changes effective?

The removal of royalty would have helped companies' decision-making when these small fields give better rate of return. Companies use the rate of return as derive for their investments decision over time and obviously something like royalty affects companies investments decision.

But the question here is: did introducing the Cross Field Allowance encourage exploration? Because of rate of tax on PRT paying fields was round about 80 per cent if not slightly higher because of accumulated effects of CT and PRT. Allowing the Cross Field Allowance meant that almost the entire cost of exploration was met by tax relief. So the number of exploration wells drilled absolutely rocketed because the government was paying almost the entire cost, through tax relief.

It was not costing the companies anything to drill and that what was led to the 1993 changes, because of the cost of the cross-field allowance relief, which was thought originally to be no more perhaps 20-50 million.

Abolishing PRT in 1992-93 we were not getting any money and in a one year 92 we repaid more than what we collected, and that was the direct result of the Cross Field Allowance. So the cross-field allowance brought a negative effect on the Government revenues. It encouraged exploration but it recurred responsible exploration because you can get the relief providing as an exploration well, perhaps companies did not target them as accurately.

Because one of the aims of the PRT regime was to tax super profits far more fields have been found than are ever going to pay PRT. So you actually had an allowance which was giving relief against a PRT paying field in anticipation of the new field paying PRT, yet the new field might be too small even if it came into to pay PRT. So effectively you were giving relief and not getting anything back.

Q: what were the rationales for the 1993 tax relaxation?

Reducing the PRT rate from 75 to 50 per cent as a part of the 1993 package, we also got rid of the Cross Field Allowance. We gave an incentive to the companies with PRT paying fields that they were retain a bit more themselves to future exploration. The allowance was completely wiping out the receipts, so removing it pushed the tax receipts up, and this brought, in a way, the original situation before introducing the allowance; and reducing the rate to 50 per cent was to help companies to fund future projects. And the fact that new fields would not pay PRT gave companies greater reward for the risk they take in exploration.

The 1993 tax relaxation was certainly formed without any discussion with the industry, and when it came they knew nothing about it in advance.

Transcript of the Interview with Mr Mike Earp on 23rd of December 2003 (12.00-1.00 pm)

What does a tax relaxation mean?

Packages of measures and is possibly a combination of something look like lighter burdening in one area and heavy in another. So there is a considerable difficulty when you look at individual measures, which are lighter, or over a package which is refocusing maybe.

Describing major changes:

(93)

- abolishing PRT was a major reduction in burden.
- Removing Cross Filed Allowance, in someway, you can see … to serve some kind of activity.
- Measure the effect.

(83)

(87)

Not major changes or significant.

What are the rationales for the three relaxations?

Rationales of the 1983 changes are to boost the industry's activity as there have been a period of rapid discovery and development of fields, and number of fields have been discovered and have not been put forward development. Here we have to find out what was the real reason of developing fields whether it was tax relaxation or something else like improving technology or providing a better infrastructure and it's better to go case by case, and it's a difficult job to isolate the impact of changes.

The driver of 1983 tax relaxation was the level of activity. What the stains of development? Is it the stock of existing discoveries? Why would not existing discoveries being developed as soon as they would be able to? Why over time a lot of existing discoveries being eventually developed? Development decisions based on combination of technology and availability of infrastructure.

Relaxation of 1983 would have given some stimulation to development of some fields. Royalty is non-profit related and without it the system is being made more profit related and without it we are having more sensitive regime.

Many fields have been discovered and suddenly they have been developed after 1983. As there still the improvement in technology, accumulated experience, and the availability and capacity of the infrastructure which had spread in the North Sea over time.

To isolate the individual effects you should look at individual cases and speak to people who know the details of particular fields and what were the reasons to put fields forward at certain time. It is still difficult to do this because of the number of fields and the time of development of these fields, and you need to ask why development of these fields did not go earlier. The other difficulty is that number of these fields have been developed by group of companies. Sometimes a decision of developing certain fields is a discovery of another field in the area and then it might be worth creating the necessary infrastructure which might be the main reason of developing this field.

The 1983 changes are probably not successful as they might plan to be. Then oil price changes have influenced the activity during that period.
Looking at oil price in Sterling pound have totally different history which give different impression.

(1993)

1993 tax relaxation took place to encourage investing even in old fields, and this to create incentive for companies to keep investing in old fields in a way to keep balance between investing in new and old fields.

Suggestions in 1997, in the 1988 budget, 6 pages in the press release outlined in little details alternative measure packages options did not go forward.
1992 the PRT cost the government money.
Licensing rounds affected the activities.

1993 changes have never came as a result of any pressure of influence of the industry as changes in 1993 came from the Treasury and the Inland Revenue and formed a shock to the DTI as changes have not been discussed with the DTI at that time. So changes came mainly from the government.

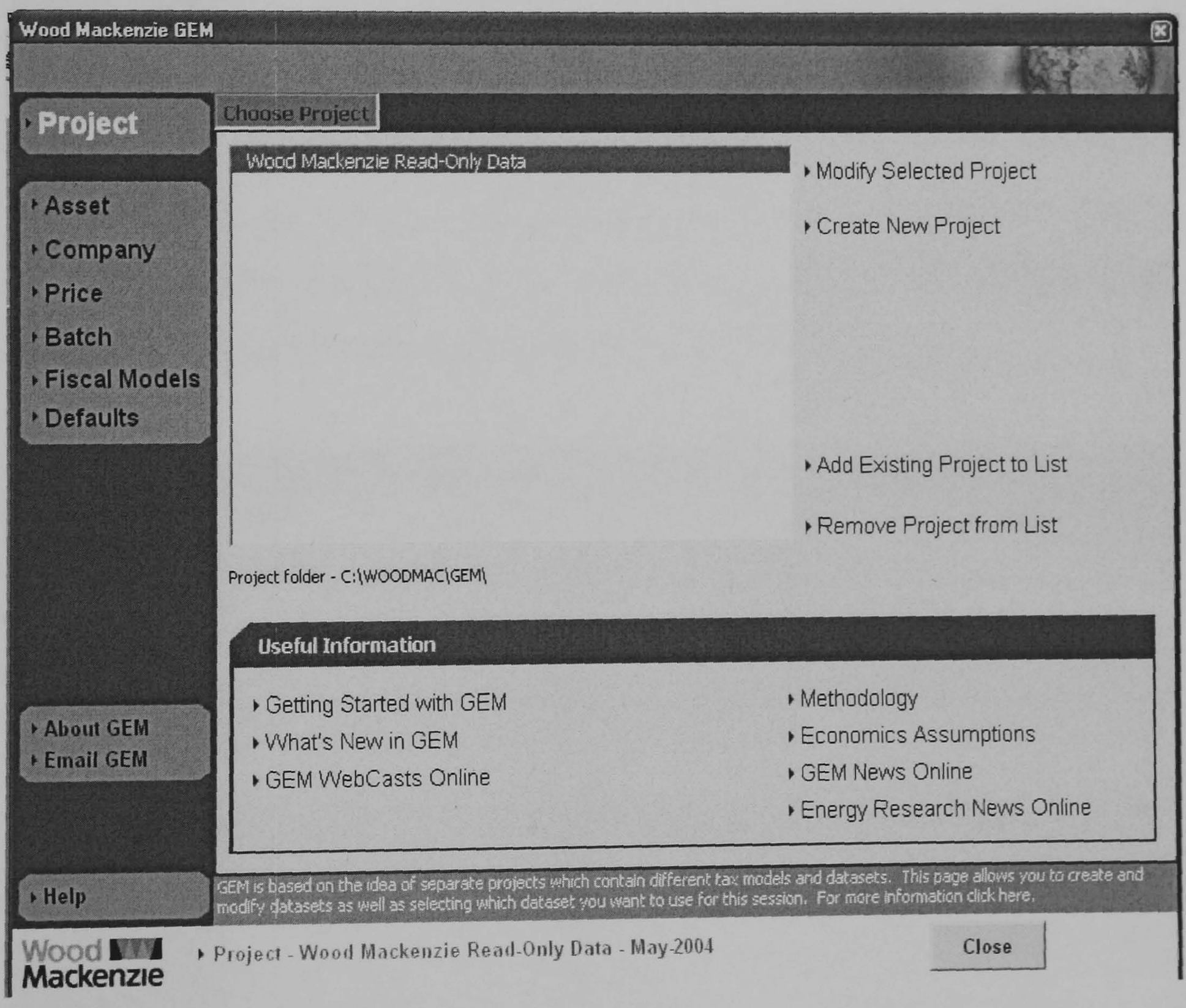
Appendix Two

As was mentioned in Chapter Five the GEM allows running fields' calculations against different fiscal and price assumptions. The following sections will explain briefly how the GEM performs the above two functions. It will start with building different fiscal scenarios and then talk about building price scenarios.

Appendix 2-1

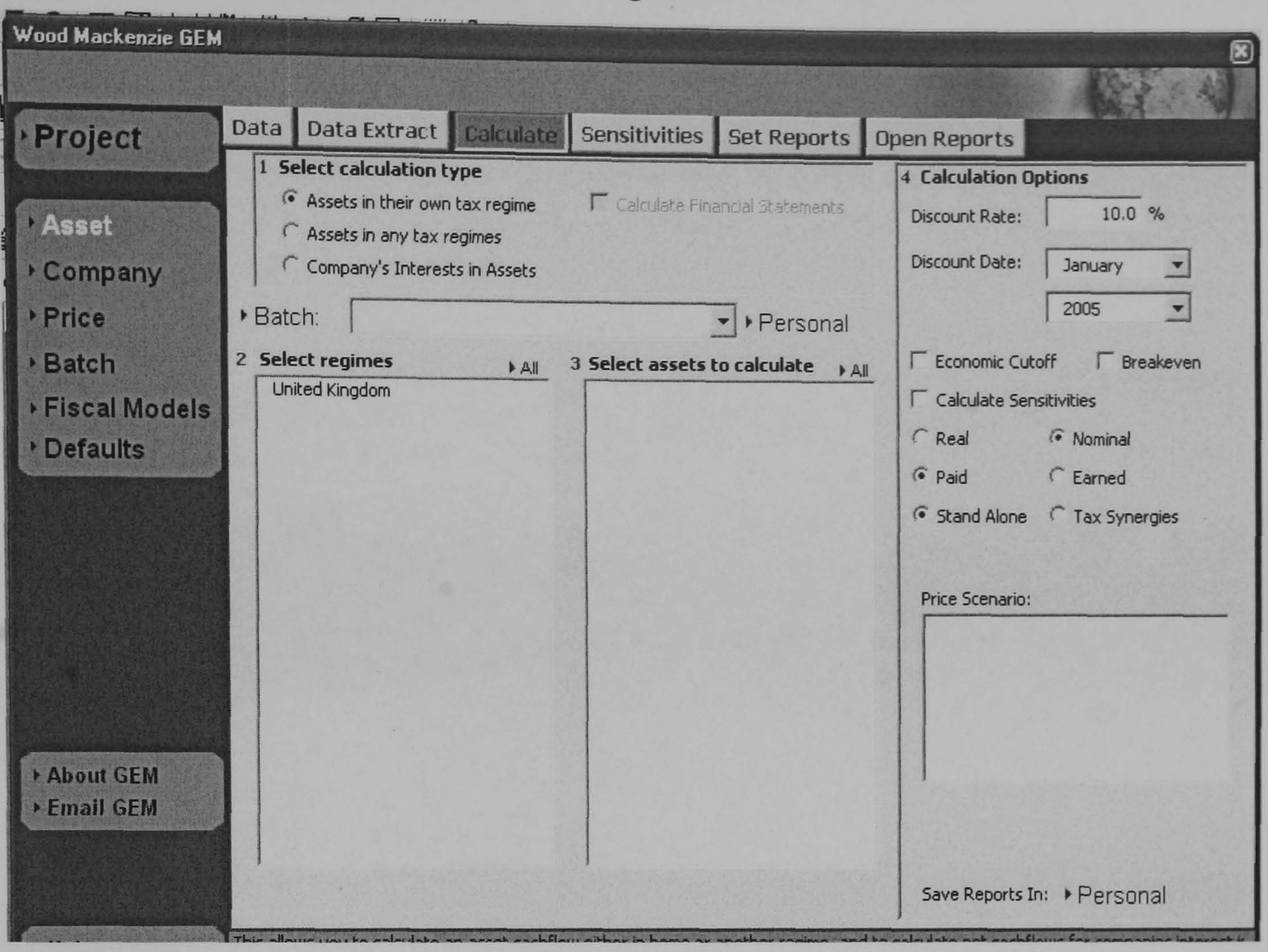
Calculating Fields' Parameters based on Different Fiscal Scenarios

The main page of the GEM contains three assumptions, which are: Assets (Oil and Gas fields), Company and Price as can be seen from the following window.

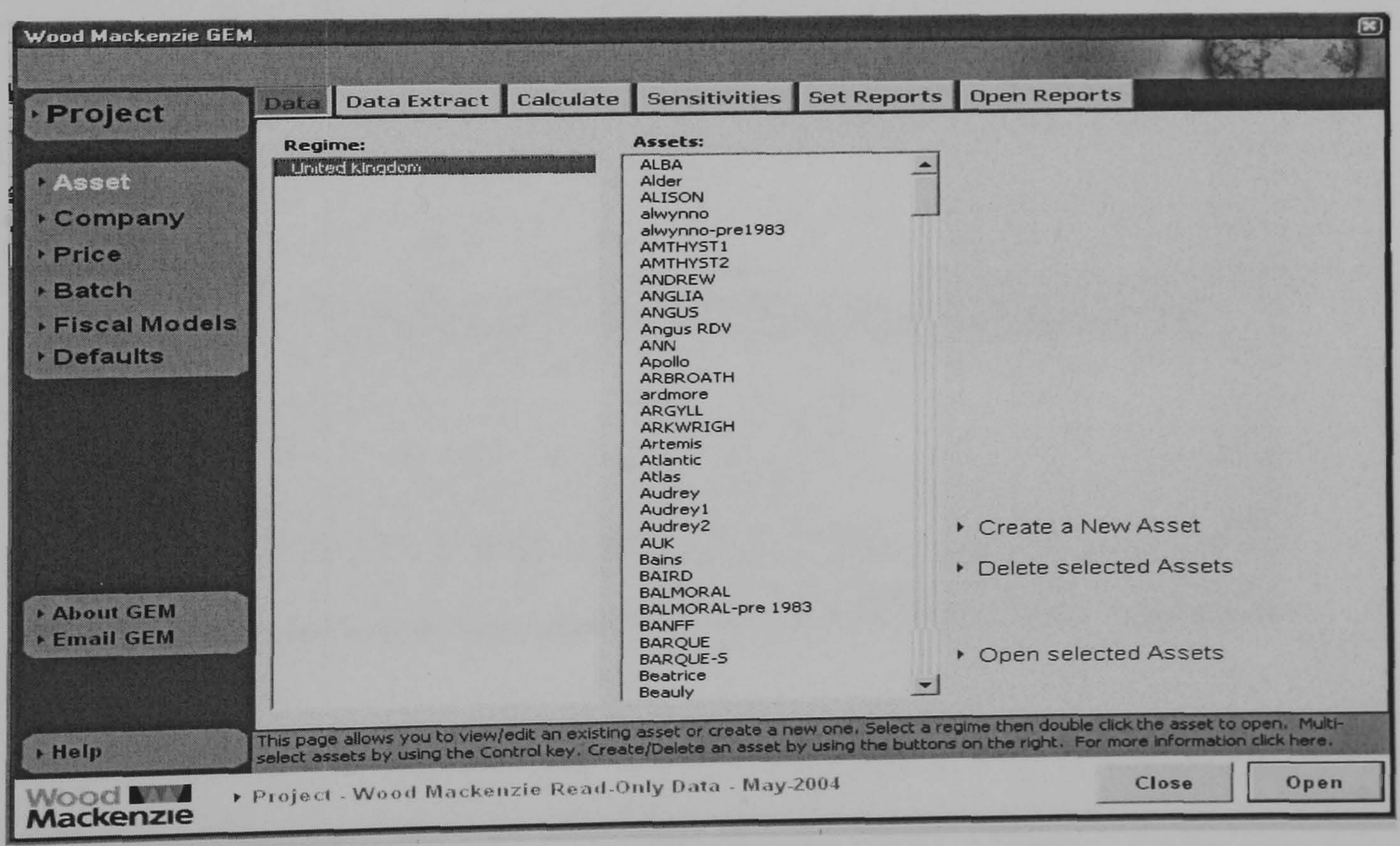


If it is required to calculate the financial parameters for any field according to a certain tax regime then the following steps are to be performed:

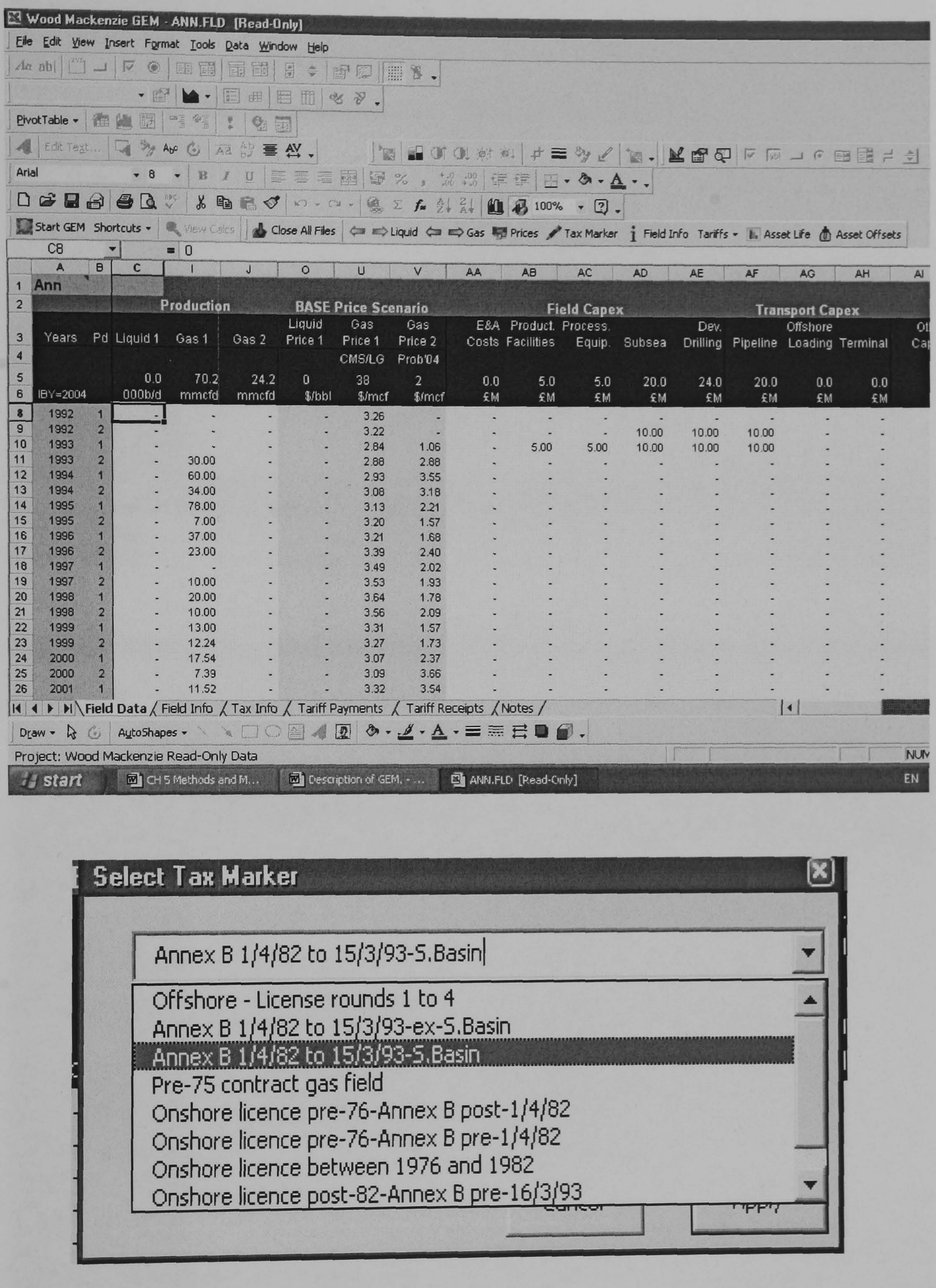
1- Click on asset to get the following screen:



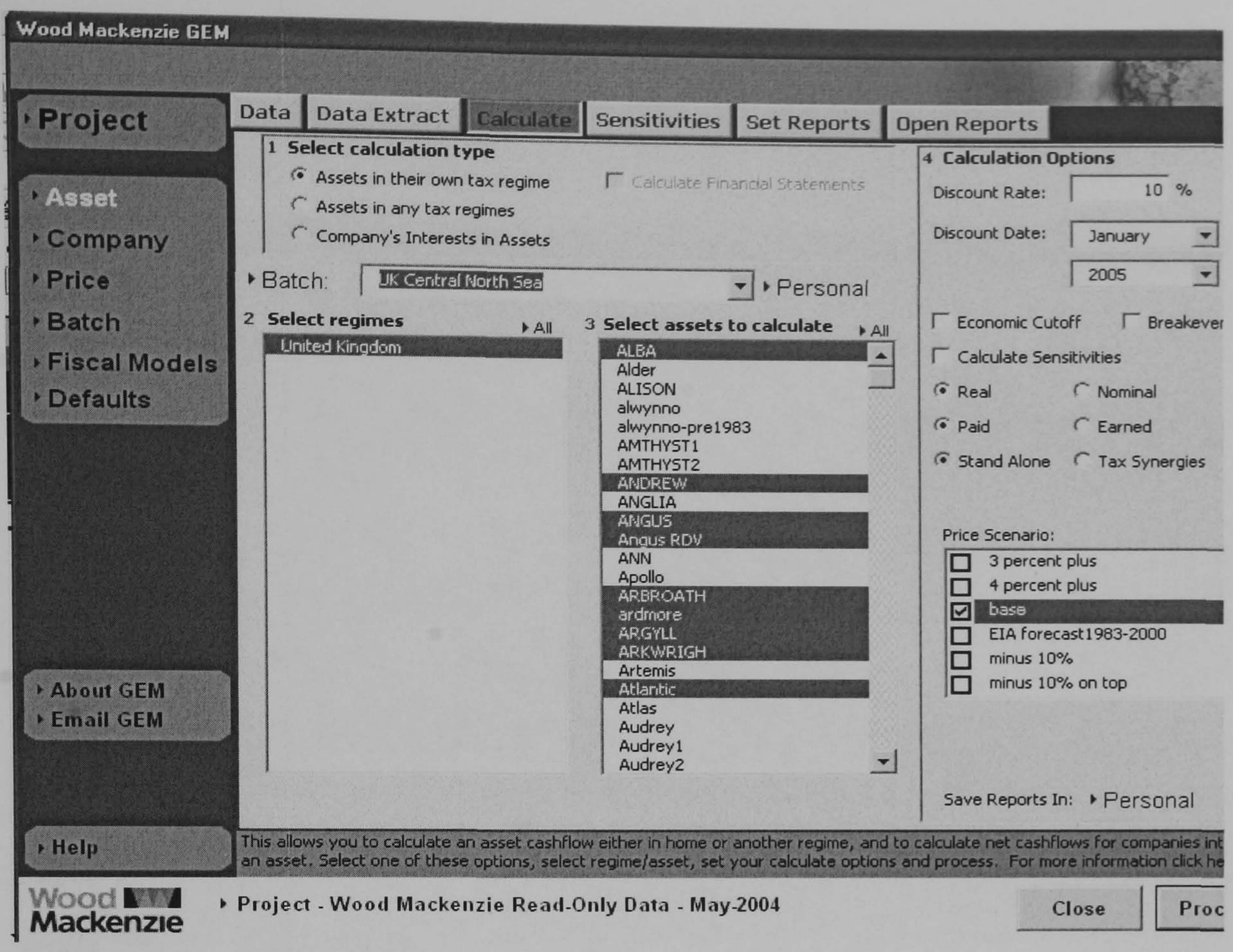
2- Select the data tab from the above dialogue box, then United Kingdom to have all the fields, and after that select the field you want to do calculations for, and click on Open Selected Asset to have the next screen shown:



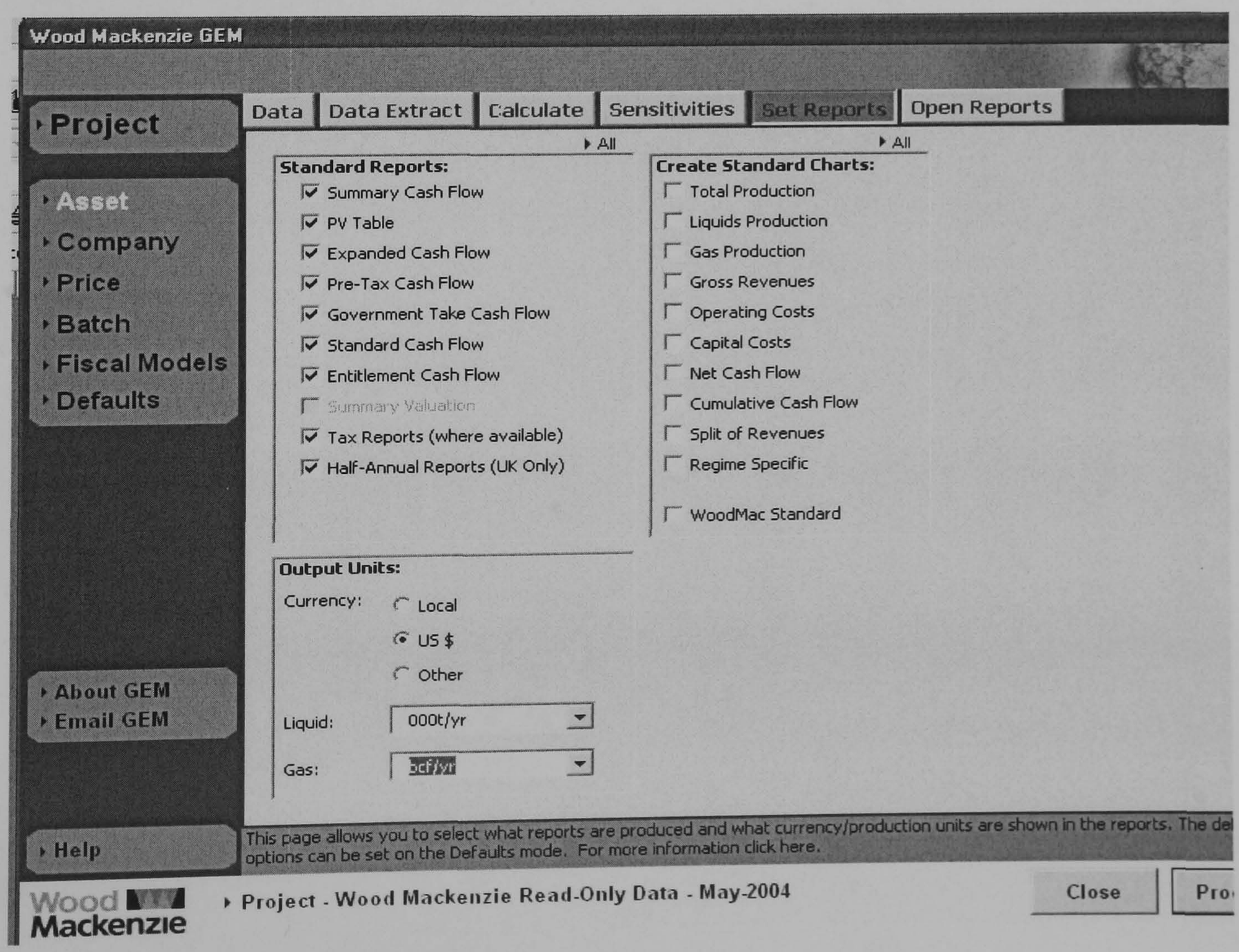
When a field's file is open then by clicking on the "Tax Marker" icon on the tool bar menu it gives a dialogue box allows choosing from one of nine tax regimes.



After choosing the required tax regime and saving it and closing the opened window, select the Calculate tab. Here we can do the required calculation based on the fiscal regime we have chosen, and according to a selected price scenario as can be seen from the next dialogue window.



The "Set Report" icon on the above window allows choosing required reports, and also allows setting the output defaults regard currency and liquid, as shown in the following window.



Clicking on process button performs the asset's calculations and gives the following reports:

ood Mackenzie GEM - ALISON-United Kingdom-base

le Edit View Insert Format Tools Data Window Help

Table ▾ Edit Text...

10 B I U % , .0 .00 .00 .0 A

art GEM Shortcuts ▾ View Calcs Close All Files Print Open Reports

A1 = Field Name:

A	B	C	D	E	F	G	H	I	J	K	P
ield Name:			Alison						Created On:	16-Apr-05	
alculation Mode:			Real	Paid							

Year	Pd	Production		Gross	Op	Capital	Royalty	SPD/	PRT	Corp.	Total Field
		Liquids	Gas	Revenue	Costs	Costs		APRT		Tax	Cash Flow
		000t/yr	bcf/yr	$M	$M	$M	$M	$M	$M	$M	$M
1995	1	0.0	0.0	0.0	0.0	23.2	0.0	0.0	0.0	0.0	-23.2
1995	2	0.0	2.2	4.2	1.9	18.4	0.0	0.0	0.0	0.0	-16.1
1996	1	0.0	12.8	24.1	5.5	0.0	0.0	0.0	0.0	0.0	18.6
1996	2	0.0	12.4	24.3	5.5	0.0	0.0	0.0	0.0	0.0	18.8
1997	1	0.0	15.0	29.7	6.5	0.0	0.0	0.0	0.0	0.0	23.3
1997	2	0.0	1.8	3.6	1.8	0.0	0.0	0.0	0.0	4.0	-2.1
1998	1	0.0	3.7	7.3	2.4	0.0	0.0	0.0	0.0	0.0	5.0
1998	2	0.0	1.8	3.5	1.7	0.0	0.0	0.0	0.0	6.9	-5.1
1999	1	0.0	2.6	4.6	1.9	0.0	0.0	0.0	0.0	0.0	2.7
1999	2	0.0	2.4	4.3	1.9	0.0	0.0	0.0	0.0	1.6	0.8
2000	1	0.0	3.4	5.6	2.1	1.8	0.0	0.0	0.0	0.3	1.4
2000	2	0.0	2.2	3.5	1.6	1.7	0.0	0.0	0.0	0.7	-0.4
2001	1	0.0	3.4	5.9	1.6	0.0	0.0	0.0	0.0	0.3	3.9
2001	2	0.0	1.1	1.8	0.9	0.0	0.0	0.0	0.0	0.7	0.1
2002	1	0.0	0.9	1.5	0.8	0.0	0.0	0.0	0.0	0.5	0.2
2002	2	0.0	0.4	0.7	0.7	0.0	0.0	0.0	0.0	0.1	-0.1

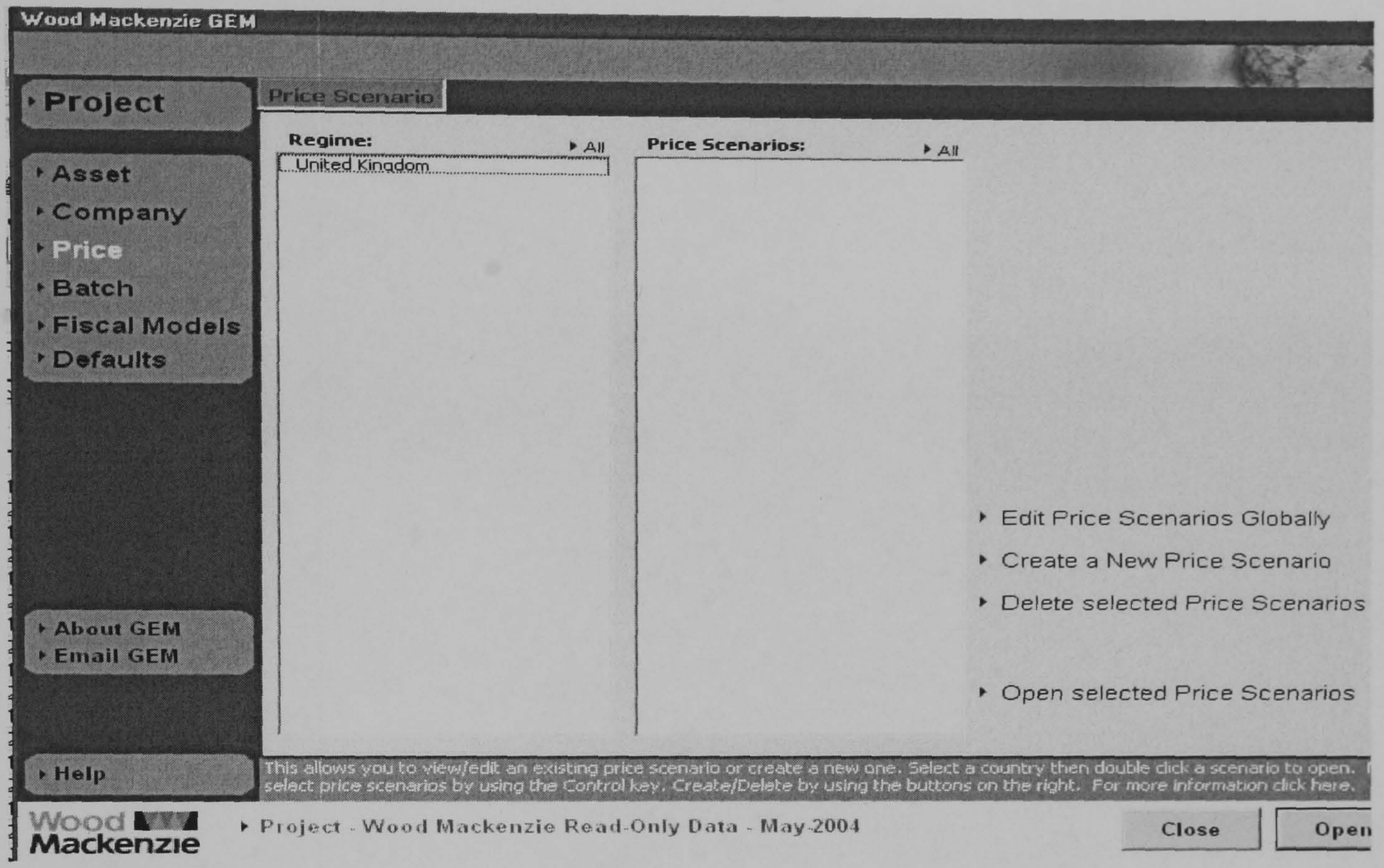
Summary Cash Flow | Annual Summary Cash Flow | PV Table | Expanded Cash Flow | Annual Expanded Cash Flow | Pre-Tax

AutoShapes

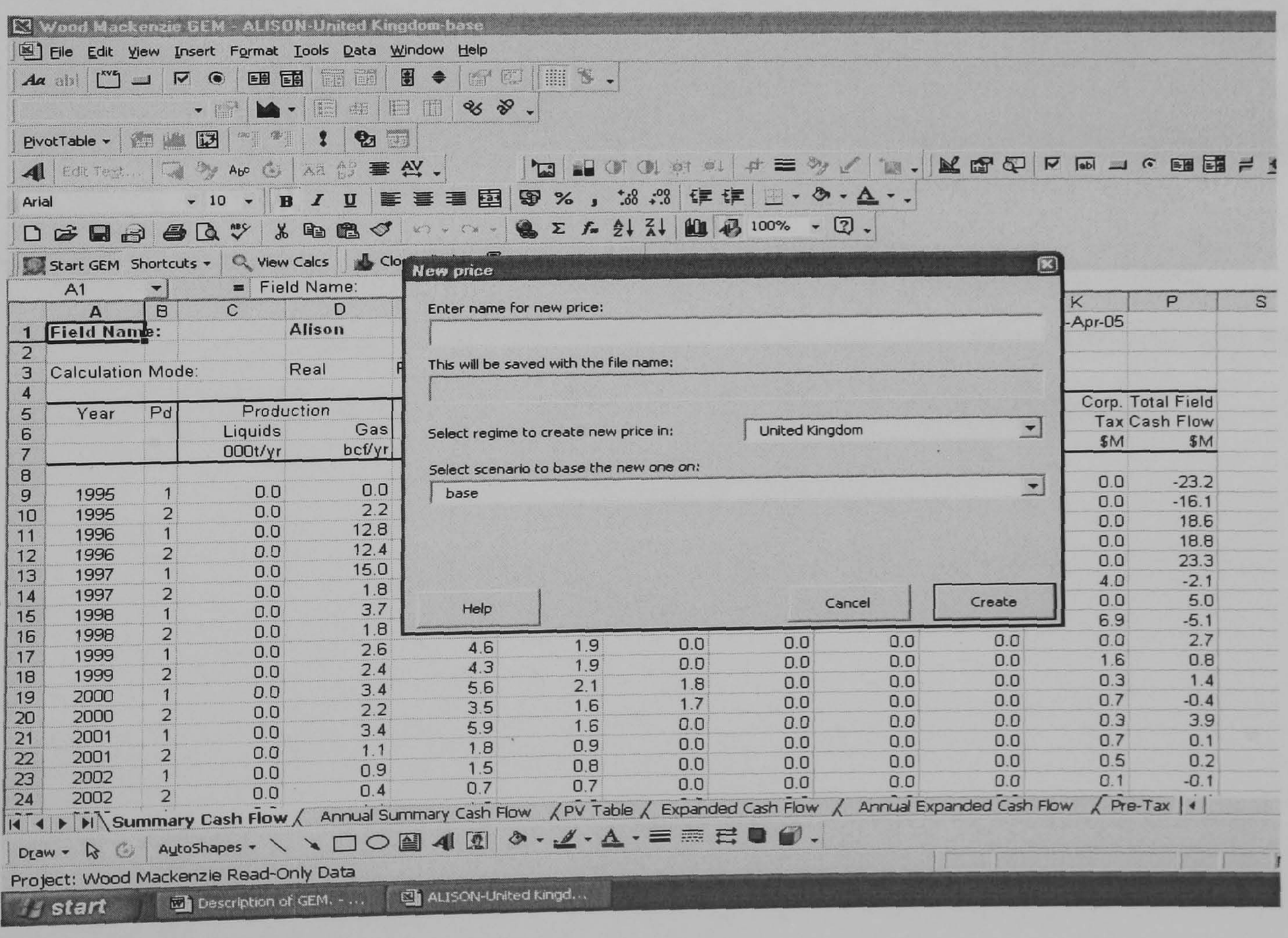
rt: Wood Mackenzie Read-Only Data

Calculating Fields' Parameters based on Different Oil Price Scenarios

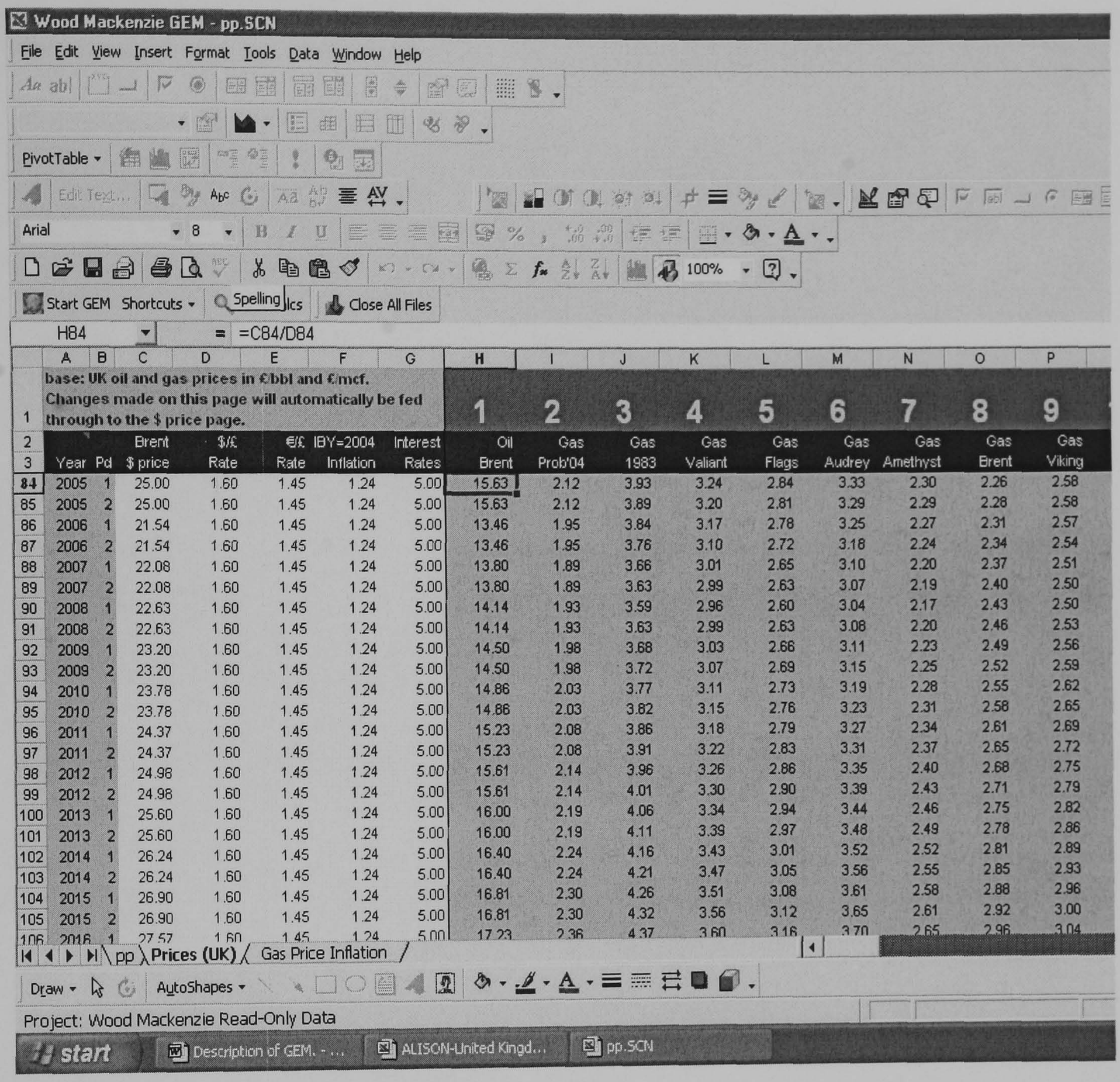
To build up a new price scenario, from the main page of the GEM select the Price, the following window will come out:



Then select Create a New Price Scenario option, and the following window should appear.



Enter a suitable name for the new scenario, select the regime of interest (UK in our case), and choose Base as the scenario to base your new price file on. Then press Create, and the result will be the following window.



Prices under column (H) refer to Brent, and these can be changed and saved.

By following the above steps and saving the results and new price scenario will be created and saved which can be used for further research and applications.

Appendix Three

Table 1: Government Take Per Barrel of Oil $/Barrel (Rationale No 2)

Year	Oil Price $Barrel	SCAPA				EIDER				DEVERON			
		Post-1983 Budget	% of Oil Price	Pre-1983 Budget	% of Oil Price	**Post-1983 Budget**	% of Oil Price	Pre-1983 Budget	% of Oil Price	**Post-1983 Budget**	% of Oil Price	Pre-1983 Budget	% of Oil Price
1983	30.34	0	0	0	0	0	0	0	0	**0**	0	6.93	22.84
1984	29.8	0	0	0	0	0	0	0	0	**16.36**	54.90	17.07	57.28
1985	28.04	**0**	0	6.4	22.82	0	0	0	0	**2.98**	10.63	7.73	27.57
1986	15.04	**1.87**	12.43	2.23	14.83	0	0	0	0	**14.67**	97.54	14.09	93.68
1987	18.37	**-0.8**	-4.35	2.36	12.85	0	0	0	0	**3.07**	16.71	4.62	25.15
1988	14.82	**1.87**	12.62	1.87	12.62	0	0	0	0	**6.56**	44.26	6.35	42.85
1989	18.22	**-0.9**	-4.94	0	0	0	0	0	0	**1.18**	6.48	0.86	4.72
1990	23.69	**1.73**	7.30	0.75	3.17	0	0	0	0	**4.24**	17.90	4.24	17.90
1991	20.11	**6.38**	31.73	9.92	49.33	**5.51**	27.40	5.51	27.40	**18.13**	90.15	18.13	90.15
1992	19.35	**4.79**	24.75	8.37	43.26	**6.19**	31.99	6.19	31.99	**2**	10.34	2	10.34
1993	16.64	**4.38**	26.32	7.56	45.43	**7.25**	43.57	7.25	43.57	**3.2**	19.23	3.2	19.23

Table 2: Data Regarding Oil Fields Developed Between Appril 1982-87 (Rationale No 4)					
Field Name	Location	Development Date	total reserves (mmboe)	IRR (Post-tax)%	IRR (pre-tax)%
ALWYNE NORTH POST-1983	Northern North Sea	Oct-82	677.7	10.32	13.4
ALWYNE NORTH pOST-1983				9.96	13.4
CLYDE Post-1983	Central North Sea	Dec-82	153.8	6.26	8.19
CLYDE Pre-1983				6.08	8.19
PETRONEL Post- 1983	Central North Sea	Apr-86	48.4	108.23	120.25
PETRONEL Pre-1983				86.44	120.25
ROBROY Post-1983	Central North Sea	Jan-86	123.2	23.38	30.58
ROBROY Pre-1983				20.1	30.58
IVANHOE Post-1983	Central North Sea	Jan-86	80	29.05	34.86
IVANHOE Pre-1983				22.75	34.86
EIDER Post-1983	Northern North Sea	Oct-85	111	16.79	21.54
EIDER Pre-1983				15.88	21.54
SCAPA Post-1983	Central North Sea	Sep-85	127	45.98	51.98
SCAPA Pre-1983				36.81	51.98
TERN Post-1983	Northern North Sea	Feb-85	288	16.13	21.58
TERN Pre-1983				15.21	21.85
CYRUS Post- 1983	Central North Sea	Nov-84	26.9	#	1.38
CYRUS Pre-1983				#	1.38
INNES Post-1983	Central North Sea	Nov-84	6.2	20.57	25.43
INNES Pre-1983				13.67	25.43
Deveron Post-1983	Northern North Sea	Sep-84	17.1	171.52	190.11
Deveron Pre-1983				146.31	190.11
BALMORAL Post-1983	Central North Sea	Dec-83	113.6	8.74	10.75
BalMORAL Pre-1983				8.48	10.75
DUNCAN post-1983	Central North Sea	Sep-83	18.1	15.96	26.96
DunCAN Pre-1983				2.57	26.96
HIGHLANDER Post-1983	Central North Sea	Nov-83	79.7	162.48	183.95
HIGHLANDER Pre-1983				118.57	183.95

Table 3:Reserves and Production Unit Cost Calculations Under the Post-1983 Budget for Fields Developed Between April 1982-87 (Rational No. 4)

Field Name	total reserves (mmboe)	Operating Costs $Million	Capital Costs $Million	Total Costs $Million	Reserve Unit Cost $boe	oil Production 000t/y	Gas production bcf/y	Total Production (000toe)	Production Unit Cost $ tonn	Production Unit Cost $boe
ALWYN NORTH	677.7	2,440.2	5711.8	8,152	12.03	45,192.8	1976	45,276.86	180.05	24.006
CLYDE	153.8	1,689.1	1848.2	3,537.3	23.00	20,191.8	36.2	20,193.34	175.17	23.356
PETRONEL	48.4	459.3	136.7	596	12.31	6,161.2	19.2	6,162.02	96.72	12.896
ROBROY	123.2	730.4	759	1,489.4	12.09	15,247.3	67.4	15,250.17	97.66	13.022
IVANHOE	80	592.1	404.3	996.4	12.46	10,387.1	23.6	10,388.1	95.92	12.789
EIDER	111	651.1	1176.6	1,827.7	16.47	15,205.5	0	15,205.5	120.20	16.027
SCAPA	127	962.1	618.2	1,580.3	12.44	17,392.9	0	17,392.9	90.86	12.115
TERN	288	1,459.4	2054.9	3,514.3	12.20	39,073.4	0	39,073.4	89.94	11.992
CYRUS	26.9	176	450.6	626.6	23.29	3,679.3	0	3,679.3	170.30	22.707
INNES	6.2	100.1	89.2	189.3	30.53	845	0	845.0	224.02	29.870
Deveron	17.1	301.6	74.6	376.2	22.00	2,343.8	0	2,343.8	160.51	21.401
BALMORAL	113.6	1051.6	1297.4	2,349	20.68	15,565.5	0	15,565.5	150.91	20.121
DUNCAN	18.1	363.8	446	809.8	44.74	2,480	0	2,480.0	326.53	43.538
HIGHLANDER	79.7	707.1	459.8	1,166.9	14.64	10,924.3	0	10,924.3	106.82	14.242

Table 4:Reserves and Production Unit Cost Calculations Under the Post-1983 Budget for Number of Fields Developed Before April 1982 (Rationale No: 4).

Field Name	Location	Development Date	Total Reserves (mmboe)	Operating Costs $Million	Capital Costs $Million	Total Costs $Million	Reserve Unit Cost $boe	Total Oil Production 000t/y	Total Gas Production bcf/y	Total Production (000toe)	Production Unit Cost $ tonn	Production Unit Cost $boe
Magnus		Dec-78	1054.1	5,474.8	7,366.6	12,841.4	12.18	131,241.8	545.9	131,265.0	97.83	13.044
Maureen		Feb-79	223.4	1,466.6	3,786.2	5,252.8	23.51	30,596.3	0	30,596.3	171.68	22.891
Fulmar		Jun-78	596.7	3,041.9	4,550.8	7,592.7	12.72	78,046.4	153.3	78,052.9	97.28	12.970
Cormorant 2 (north)	Northern North Sea	Apr-79	608.7	4,744.6	9,300.8	14,045.4	23.07	81,703.3	69.6	81,706.3	171.90	22.920
Argull		Dec-76	73.4	1,352.2	1,054.7	2,406.9	32.79	10,060.0	0	10,060.0	239.25	31.901
Auk		Jun-77	142.8	1,899.7	1,665.9	3,565.6	24.97	19,565.9	0	19,565.9	182.24	24.298
Buchan		Mar-78	139.9	2,064.4	1,888.8	3,953.2	28.26	19,165.8	0	19,165.8	206.26	27.502
Beatrice		Jun-00	167.3	2,208.8	4,068.5	6,277.3	37.52	22,923.3	0	22,923.3	273.84	36.512
Hutton		Aug-80	193.1	1,715.0	4,647.5	6,362.5	32.95	26,453.3	0	26,453.3	240.52	32.069
Tartan		Mar-79	146.7	1,928.7	2,863.5	4,792.2	32.67	19,125.4	40.4	19,127.1	250.54	33.406

Note: mmboe stands for million barrels of oil equivalent; boe stands for barrel of oil equivalent; 000t/y stands for thousand tonne a year; bcf/y stands for billion cubic feet a year;

Table 5: Comparison Between Operating and Capital Unit Costs for Old and New Fields Based on Geographical Location and Reserve Volume (Rational. 4)

Location of Oil Fields	Offshore Oil Fields Developed During the Period April 1982-1987						Offshore Oil Fields Developed Before April 1982					
	Field Name	Total Reserves (mmboe)	Operating Costs $Million	Capital Costs $Million	Unit's Operating Cost $	Unit's Capital Cost $	Field Name	Total Reserves (mmboe)	Operating Costs $Million	Capital Costs $Million	Unit's Operating Cost $	Unit's Capital Cost $
Central North Sea (small size reserves)	SCAPA	127	962.1	618.2	7.58	4.87	ARGULL	73.4	1,352.2	1,054.7	18.42	14.37
	CLYDE	153.8	1689.1	1848.2	10.98	12.02	AUK	142.8	1,899.7	1,665.9	13.30	11.67
	BALMORAL	113.6	1051.6	1297.4	9.26	11.42	BUCHAN	139.9	2,064.4	1,888.8	14.76	13.50
	ROBROY	123.2	730.4	759	5.93	6.16	BEATTRICE	167.3	2,208.8	4,068.5	13.20	24.32
	IVANHOE	80	592.1	404.3	7.40	5.05	TARTAN	146.7	1,928.7	2,863.5	13.15	19.52
	HIGHLANDER	79.7	707.1	459.8	8.87	5.77						
Northern North Sea (small size reserves)	EIDER	111	651.1	1,176.6	5.87	10.60	HUTTON	193.1	1715	4,647.5	8.88	24.07
Northern North Sea (large size reserves)	ALWYN NORTH	677.7	2,440.2	5,711.8	3.60	8.43	CORMORANT 2 (north)	608.7	4,744.6	9,300.8	7.79	15.28

Source: Wood Mackenzie, 2004.

Table 6 : Offshore Drilling Activities According to Each Geological Area (Rational No. 4)

		East of England	East of Scotland	East of Shetland	West of England/Wales	West of Shetland
1980	Exploration	0	19	7	0	6
	Appraisal	0	13	8	0	1
	Development	0	45	77	0	0
1981	Exploration	1	37	7	0	2
	Appraisal	1	15	10	0	0
	Development	4	39	94	0	0
1982	Exploration	9	36	11	4	3
	Appraisal	8	24	11	0	0
	Development	11	36	71	0	0
1983	Exploration	9	45	9	1	4
	Appraisal	17	18	13	3	0
	Development	10	34	51	0	0
1984	Exploration	24	53	20	1	5
	Appraisal	19	44	13	0	0
	Development	18	37	51	2	0
1985	Exploration	17	48	19	1	8
	Appraisal	24	26	13	0	1
	Development	28	49	47	9	0
1986	Exploration	12	34	16	1	7
	Appraisal	17	13	10	0	0
	Development	32	15	34	4	0
1987	Exploration	20	30	13	2	3
	Appraisal	16	23	23	0	0
	Development	37	31	52	4	0

Source: DTI, The Brown Book, Appendix 2 (1980-1987).

Table 7: Offshore Oil Field Discovered During the Period April 1982-87 (Rational No. 4)						
Field Name	Discovery Date	Reserves				
		Oil (mmbbls)	Gas		Total Oil (mmboe)	Reserve Size
			Gas (bcf)	mmboe	reserve	
Alba	Dec-84	450	0	0	450	Large
Birch	Oct-85	32	52	9.17	41.17	Very Small
Brimmond	Jun-85	3	0	0.00	3	Very Small
Chanter	Sep-85	4	16	2.82	4.38	Very Small
Gannet E	Jun-82	42	3	0.53	42.07	Very Small
Glamis	Nov-82	18	0	0.00	18	Very Small
Guillemot Northwest	Jul-85	35	120	21.16	37.82	Very Small
Larch	Mar-86	10	0	0.00	10	Very Small
Leven	Oct-83	9	0	0.00	9	Very Small
Miller	Mar-83	315	450	79.34	325.58	Medium
Ness	May-86	40	0	0.00	40	Very Small
Rob Roy	May-84	175	45	7.93	176.06	Small
Rubie	Mar-85	7	0	0.00	7	Very Small
Scott	Jan-84	450	180	31.73	454.23	Large
Sedgwick	Nov-85	19	0	0.00	19	Very Small
Skua	Jun-86	25	16	2.82	25.38	Very Small
Sources: DTI, the Brown Book, 1999, review of fields & OPL, 2003/04						

Table:8, Yearly Oil Production from Duncan and Innes Oil Fields (Rationale No. 5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yearly Total
1983											6,659	44,555	51,214
1984	45,929	80,330	74,967	68,937	63,992	73,743	71,587	63,371	39,450	41,497	14,849	24,615	663,267
1985	34,348	53,579	90,552	76,992	106,048	95,490	114,495	87,629	74,571	64,243	44,958	48,710	891,615
1986	38,438	44,868	53,418	47,682	49,203	43,138	42,370	24,306	35,239	25,414	22,134	21,362	447,572
1987	18,920	29,344	24,023	30,168	16,738	24,371	25,476	24,946	22,175	23,493	20,127	21,519	281,300
1988	17,684	7,528	14,792	14,234	16,258	15,229	13,207	14,724	13,600	9,833	12,489	8,108	157,686
1989	6,721	2,406	9,488	9,232	11,417	9,497	8,212	6,738	5,640	5,373	4,806	4,228	83,758
1990	3,857	1,911	3,930	8,118	7,878	7,732	5,055	5,826	5,407	5,690	5,688	675	61,767
1991	1,008	3,828	6,673	5,623	6,247	4,010	6,107	5,464	3,269	2,875	2,198	4,342	51,644
1992	5,066	3,700	3,645	4,583	5,489	5,133	4,802	4,907	3,646	1,992			42,963
Duncan oil field (production million tonnes)													2,732,786

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yearly Total
1985			23,484	17,765	15,105	27,665	18,413	25,872	23,771	22,380	17,917	34,960	227,332
1986	24,822	27,489	32,648	23,278	26,919	30,613	29,555	14,416	14,000	24,411	18,475	12,981	279,607
1987	7,817	15,447	12,604	16,794	16,132	15,376	13,540	14,152	12,472	10,651	11,443	12,498	158,926
1988	10,961	4,565	6,060	12,233	12,198	11,245	10,817	10,205	9,006	6,005	7,484	6,369	107,148
1989	5,992	1,741	7,321	8,139	7,529	7,754	6,234	4,872	4,352	5,810	5,398	4,127	69,269
1990	3,908	2,388	3,068	6,153	5,966	5,464	4,731	4,552	3,980	4,120	4,182	667	49,179
1991	0	347	0	0	0	0	0	0	0	0	0	0	347
1992	0	0	0	0	0	0	0	0	0	0			0
INNES oil field (production million tonnes)													891,808

Source: DTI, 2004a.

Table 9: Governmental Take During the Period April 1982-1993 (Rational No. 5)				
Field Name	Pre-Budget		Post-Budget	
	£M	$M	£M	$M
Alwyn North	167.3	291.1	167.3	291.1
Clyde	27.3	62.9	29.5	51.3
Petronel	150.8	264.6	80.8	142.3
Robroy	143.8	251.8	113.7	197.4
Ivanhoe	115.1	202.9	56.9	99.4
Eider	84.7	146.6	82.8	146.6
Scapa	135.9	224.9	77	142.1
Tern	0	0	0	0
Cyrus	0	0	0	0
Innes	18.1	0	10.5	18.1
Deveron	68.9	103.9	55.9	86.2
Balmoral	45.5	79.4	36.8	63.8
Duncan	73.6	84.8	44	55.4
Highlander	400.2	648.3	240.1	400.7
Totals	1339.5	2276.4	995.3	1694.4
Source: Wood Mackenzie (2004)				

Table 10: Sensiticity of the UK Petroleum Fiscal Regimes to Changes in World Oil Prices (Rational No. 6)

Increase in Oil Prices by 10% and Andother 10% on the Top					
DEVERON		Total Field's Cash Flow $M	Post-Tax IRR %	Total Government Take $M	Governmental Take Per Barrel of Oil $
Pre-1983 Budget	Plus 10 per cent	162.7	170.07	138.3	7.87
	Plus 10 per cent on top	202.1	194.77	166.7	9.48
	Base Case	127	146.31	112.5	6.40
Post-1983 budget	Plus 10 per cent	183.2	197.34	117.8	6.70
	Pluse 10 % on Top	225.7	224.29	143.1	8.14
	Base Case	144.6	171.52	94.9	5.40
Percentage of Changes when Prices Increase by First 10 per cent					
Pre-1983		28.110	16.239	22.933	22.93
Post-1983		26.694	15.054	24.131	24.13
Percentages of Changes when Prices Increase by 10 onTop of the First 10 per cent					
Pre-1983		59.134	33.121	48.178	48.18
Post-1983		56.086	30.766	50.790	50.79

Decrease in Oil Prices by 10% and Another 10% on the Top					
DEVERON		Total Field's Cash Flow $M	Post Tax IRR %	Total Government Take $M	Governmental Take Per Barrel of Oil $
Pre-1983 Budget	Minus 10 per cent	91.3	120.77	86.7	4.93
	Minus10% on the Top	59	95.38	63.6	3.62
	Base Case	127	146.31	112.5	6.40
Post-1983 budget	Minus 10 per cent	106	143.96	71.9	4.09
	Minus10 per cent on the top	71.1	116.89	51.4	2.92
	Base case	144.6	171.52	94.9	5.40
Percentage of Changes when Prices Increase by First 10 pe rcent					
Pre-1983		-28.110	-17.456	-22.933	-22.93
Post-1983		-26.694	-16.068	-24.236	-24.24
Percentages of Changes when Prices Increase by 10 on top of the first 10 per cent					
Pre-1983		-53.543	-34.810	-43.467	-43.47
Post-1983		-50.830	-31.851	-45.838	-45.84

Source: Wood Mackenzie (2004)

Appendix Four

Appendix 4-1

(The Application of The Cross Field Allowance scenario)

The following steps show an example of the procedures used in applying the Cross Field Allowance scenario. It presents number of reports and screens from the GEM (2004) that were used in this application and also the calculations that were applied.

Using the GEM (2004) to run the calculations and reports for Chanter oil field under a 10 per cent real discount rate gives number of reports, one of these reports is the Annual Summary Cash Flow, and this is presented in the following diagram.

Wood Mackenzie GEM - Chanter-United Kingdom-base.XLS

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A1 = Field Name:

	A	B	C	D	E	F	G	H	I	J	K	P
1	Field Name:			Chanter						Created On:	27-Jun-05	
2												
3	Calculation Mode:			Real	Paid							
4												
5	Year		Production		Gross	Op	Capital	Royalty	SPD/	PRT	Corp.	Total Field
6			Liquids	Gas	Revenue	Costs	Costs		APRT		Tax	Cash Flow
7			000t/yr	bcf/yr	£M	£M	£M	£M	£M	£M	£M	£M
8												
9	1991		0.0	0.0	0.0	0.0	23.7	0.0	0.0	0.0	0.0	-23.7
10	1992		0.0	0.0	0.0	0.0	8.5	0.0	0.0	0.0	0.0	-8.5
11	1993		225.0	0.0	23.6	6.2	5.6	0.0	0.0	0.0	0.0	11.9
12	1994		100.0	0.0	9.6	5.9	4.1	0.0	0.0	0.0	0.0	-0.3
13	1995		100.0	6.9	23.2	10.3	0.0	0.0	0.0	0.0	0.0	12.9
14	1996		115.0	3.8	20.9	7.5	7.7	0.0	0.0	0.0	0.0	5.8
15	1997		90.0	0.9	10.8	5.1	0.0	0.0	0.0	0.0	1.4	4.3
16	1998		31.3	0.2	2.3	3.3	0.0	0.0	0.0	0.0	1.5	-2.5
17	1999		21.8	1.0	4.0	3.0	0.0	0.0	0.0	0.0	-0.5	1.5
18	2000		9.3	0.0	1.4	1.3	0.0	0.0	0.0	0.0	0.1	0.0
19	2001		7.8	0.0	1.0	1.0	0.0	0.0	0.0	0.0	-0.1	0.1
20	2002		4.7	0.0	0.6	0.5	0.0	0.0	0.0	0.0	-0.1	0.1
21	2003		1.3	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	-0.1
22	2004		2.1	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0
23	2005		132.5	0.0	14.1	2.1	5.2	0.0	0.0	0.0	1.3	5.5
24	2006		80.7	0.0	7.2	1.4	0.0	0.0	0.0	0.0	2.4	3.4
25	2007		46.1	0.0	4.1	0.8	0.0	0.0	0.0	0.0	1.8	1.5
26	2008		28.8	0.0	2.6	0.6	0.0	0.0	0.0	0.0	1.0	1.0
27	2009		17.3	0.0	1.6	0.4	0.0	0.0	0.0	0.0	0.6	0.5
28	2010		5.8	0.0	0.5	0.2	0.0	0.0	0.0	0.0	0.3	0.0
29	2011		0.0	0.0	0.0	0.0	7.9	0.0	0.0	0.0	-0.6	-7.3
30	2012		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.6	0.6

Annual Summary Cash Flow | PV Table | Annual Expanded Cash Flow | Annual Pre-Tax Cash Flow | Annual Govt Take Cash Flc

Project: Wood Mackenzie Read-Only Data

By using the Annual Summary Cash Flow from the GEM (2004), the Cross Field Allowance scenario could be applied as the following example.

The above report was extracted from the GEM (2004) for Chanter oil field under its base mood, 'original fiscal conditions'. The report shows the capital costs, which represent the development costs. This field obtained development consent in December 1987, and should have benefited from the Cross Field Allowance, development expenditure started in 1991 as can be seen from the above report. The following table shows the calculations.

Year	Development Costs £M	10 % of the Development Costs £M	75% of the 10% Development Costs £M
1991	23.7	2.37	1.7775
1992	8.5	0.85	0.6375
Total £M	32.2	3.22	2.415

The fourth column shows the benefit of the Cross Field Allowance to a receiving field. This benefit will be used to adjust the benefiting field's costs, which will be reflected as an increase in the field's cash flow and IRR.

Using the data tab in the GEM (2004) to amend Chanter's data, reducing the yearly development costs by the above-mentioned figures, and then running the calculations gives the required scenario. The following diagrams show these steps.

By clicking on open, we move to the following screen:

Now, figures under Field Capex, 'capital expenditure', can be amended by reducing them by the results we obtained in the above table. By saving the work under a certain name and running the calculations just as normal under a 10 per cent real discount rate, the scenario will be applied and all the required results will be arrived at including IRR, annual cash flow, and annual Government cash flow for Chanter oil field.

Offshore Oil Fields Discovered Before 1987, but Developed After that Date

Oil Fields Discovered Before 1987 but Developed After this Date (85 Fields)							
Field name	Discovery date	Field name	Discovery date	Field name	Discovery date	Field name	Discovery date
Hewett	Nov-66	Pierce	Mar-76	Heley	Feb-81	Scott	Jan-84
Gannet F	Mar-69	Machar	Apr-76	Ettrick	Apr-81	Marnock-Skua	Feb-84
Arbroath	Dec-69	Renee	Apr-76	Joanne	May-81	Markham	Jul-84
Montrose	Nov-71	Skene	May-76	Puffin	Sep-81	Alba	Dec-84
Kingfisher	Jun-72	Columba 'E'	Jun-76	Kittwake	Sep-81	Rubie	Mar-85
Beryl 'A'	Sep-72	Thelma	Jul-76	Emerald	Oct-81	Brimmond	Jun-85
Dunlin	Jul-73	Don	Jul-76	Ross	Dec-81	Staffa	Jul-85
Dunbar	Nov-73	Columba 'B'	Nov-76	Everest	Mar-82	Guillemot NW	Aug-85
Heather	Dec-73	Captain	May-77	Iona	Mar-82	Chanter	Sep-85
Osprey	Feb-74	Clair	Jul-77	Gannet 'E'	Jun-82	Orion	Oct-85
Andrew	Jun-74	Toni	Aug-77	Gannet 'C'	Sep-82	Birch	Oct-85
Nevis	Aug-74	Otter	Oct-77	Vanguard	Nov-82	Neptune	Nov-85
Galley	Oct-74	Gannet A	Apr-78	Clipper North	Feb-83	Sedgwick	Dec-85
Tartan	Jan-75	Bressay	Sep-78	Miller	Mar-83	Ensign	Dec-85
Mable	Feb-75	Guillemot N	Nov-78	Angus	Mar-83	Larch	Mar-86
Strathspey	Mar-75	Buckland	Mar-79	Barque	May-83	Penguin 'D'	Apr-86
Crawford	Apr-75	Medwin	May-79	Blair	Jun-83	Ness	May-86
Lyell	Jun-75	Tiffany	Jul-79	Keith	Aug-83	Chestnut	Oct-86
Penguin 'c'	Jul-75	Gannet 'B'	Sep-79	Leven	Oct-83	Fyne	Dec-86
Pelican	Aug-75	Guillemot A	Dec-79	Cook	Nov-83		
Britannia	Sep-75	Stirling	Mar-80				
Murchison	Sep-75	Carnoustie	Apr-80				
Penguin 'a'	Dec-75	Columba 'D'	May-80				
Source: DTI (1999a), appendix 3.							

Appendix 4-2

Annual Summary Cash Flow for All fields in the UKCS

Wood Mackenzie GEM - allfields-United Kingdom-base.XLS

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	A	B	C	D	E	F	G	H	I	J	K	P
1	**Company Name:**			**allfields**						**Created On:**	13-Jun-05	
2												
3	Calculation Mode:			Real	Paid							
5	Year		Production		Gross	Op	Capital	Royalty	SPD/	PRT	Corp.	Cash
6			Liquids	Gas	Revenue	Costs	Costs		APRT		Tax	Flow
7			000t/yr	bcf/yr	£M	£M	£M	£M	£M	£M	£M	£M
9	1965		0.0	0.0	0.0	0.0	85.5	0.0	0.0	0.0	0.0	-85.5
10	1966		0.0	0.0	0.0	0.0	584.3	0.0	0.0	0.0	0.0	-584.3
11	1967		0.0	8.2	11.2	29.7	579.1	0.0	0.0	0.0	0.0	-597.6
12	1968		3.2	71.7	110.5	80.4	815.3	0.0	0.0	0.0	0.0	-785.2
13	1969		13.1	181.0	264.1	135.3	590.0	5.9	0.0	0.0	0.0	-467.1
14	1970		35.4	398.1	545.8	172.4	708.9	5.2	0.0	0.0	0.0	-340.7
15	1971		59.2	657.0	777.2	184.9	715.3	50.0	0.0	0.0	0.0	-173.0
16	1972		160.6	940.2	1162.9	232.6	885.2	79.4	0.0	0.0	0.0	-34.3
17	1973		210.8	1024.5	1336.9	252.1	1520.3	100.0	0.0	0.0	0.0	-535.5
18	1974		258.2	1235.4	1524.0	250.7	3944.4	129.2	0.0	0.0	0.0	-2800.3
19	1975		1410.8	1315.2	1730.7	349.8	7470.1	140.4	0.0	0.0	0.0	-6229.6
20	1976		12044.2	1387.2	4713.4	832.7	9888.2	357.7	0.0	0.0	0.0	-6365.2
21	1977		38888.1	1424.7	11483.1	1355.6	9620.8	1125.4	0.0	0.0	0.0	-618.8
22	1978		55044.5	1354.7	13276.7	1664.0	8224.8	1164.3	0.0	742.4	0.0	1481.2
23	1979		78866.9	1376.7	21811.3	1976.0	5927.5	1839.8	0.0	2813.5	0.0	9254.6
24	1980		81295.1	1243.6	29065.7	2150.2	6278.5	2923.5	0.0	6357.7	0.0	11355.7
25	1981		90950.7	1240.5	35081.5	2612.2	6937.7	3698.2	3954.1	6690.1	3305.7	7883.5
26	1982		101784.8	1334.6	36905.3	3153.4	7462.6	3828.0	5396.6	7389.6	4493.2	5181.9
27	1983		114059.6	1278.4	40928.2	3682.9	6447.0	4232.7	5762.5	9612.8	4226.7	6963.5
28	1984		125472.6	1256.1	48192.3	4350.3	6322.0	5100.3	4771.4	11694.1	5531.8	**10422.5**
29	1985		127939.2	1382.1	45694.7	4825.3	6109.4	4727.7	4124.7	12088.1	7131.1	**6688.3**
30	1986		127914.9	1436.4	22965.8	4557.0	6107.8	2000.1	1262.6	6249.7	6382.4	**-3593.7**
31	1987		125323.2	1565.0	23883.9	4438.2	4685.3	2070.7	-297.4	5701.2	2660.6	**4625.4**
32	1988		117029.2	1439.9	16967.0	2713.0	4046.7	1328.2	-510.1	6207.3	2289.8	892.0

Annual Summary Cash Flow | PV Table | Annual Expanded Cash Flow | Annual Pre-Tax Cash Flow | Annual Govt Take Cash Flow

Project: Wood Mackenzie Read-Only Data

Appendix Five

Appendix 5-1

Calculating oil and gas companies and fields liabilities to PRT per tonne of oil equivalent over the period 1990-2000.

BP					
Year	Production			Tax Payments	
	Oil mt/y	Gas bcf/y	mtoe	PRT £M	PRT £/t
1990	19.6596	250.1	25.54	857.5	33.6
1991	18.1837	260.1	24.30	887.2	36.5
1992	19.4166	249.6	25.28	684.6	27.1
1993	20.0465	310.5	27.35	691.9	**25.3**
1994	23.4147	317.1	30.87	539.2	**17.5**
1995	21.9803	327.6	29.68	527.5	**17.8**
1996	22.5669	427.8	32.62	783.2	**24.0**
1997	21.1183	420.2	31.00	643.5	**20.8**
1998	25.0208	378.2	33.91	368	**10.9**
1999	29.6981	490.8	41.23	260	**6.3**
2000	27.1553	607.9	41.44	639.2	**15.4**

Exxonmobil					
Year	Production			Tax Payments	
	Oil mt/y	Gas bcf/y	mtoe	PRT £M	PRT £/t
1990	11.0924	150.8	14.64	547.1	37.4
1991	13.6118	186.2	17.99	273.5	15.2
1992	14.3759	218.7	19.52	299.6	15.4
1993	14.717	227.3	20.06	345.6	17.2
1994	15.2078	185.5	19.57	89.1	4.6
1995	16.2583	187.7	20.67	110.6	5.4
1996	16.6505	246.8	22.45	203.7	9.1
1997	15.0823	276.4	21.58	290.8	13.5
1998	15.7746	283.6	22.44	132.9	5.9
1999	15.5355	356.6	23.92	68.6	2.9
2000	16.3709	590.9	30.26	344	11.4

ChevronTexaco					
Year	Production			Tax Payments	
	Oil mt/y	Gas bcf/y	mtoe	PRT £M	PRT £/t
1990	3.9892	7.3	4.16	159.4	38.3
1991	3.4501	6.9	3.61	140.7	39.0
1992	3.316	8	3.50	106.5	30.4
1993	3.0471	7.7	3.23	104.4	**32.3**
1994	3.8401	7.8	4.02	66.2	**16.5**
1995	3.7285	7.3	3.90	80.9	**20.7**
1996	2.4393	7.4	2.61	52.5	**20.1**
1997	1.9318	6.2	2.08	45.2	**21.8**
1998	1.8689	18.9	2.31	23.9	**10.3**
1999	2.0536	71.9	3.74	10.7	**2.9**
2000	1.8247	76.6	3.63	30.7	**8.5**

Premier					
Year	Production			Tax Payments	
	Oil mt/y	Gas bcf/y	mtoe	PRT £M	PRT £/t
1990	0.3228	0.1	0.33	0.3	0.9
1991	0.5089	0.4	0.52	-0.4	-0.8
1992	0.6499	0.5	0.66	0	0.0
1993	0.5482	0.4	0.56	0	**0.0**
1994	0.65	0.6	0.66	0	**0.0**
1995	1.0901	2	1.14	24.8	**21.8**
1996	1.1961	3	1.27	24.4	**19.3**
1997	1.1518	3.8	1.24	25.3	**20.4**
1998	1.0025	2.8	1.07	14.7	**13.8**
1999	0.8759	2.4	0.93	13.2	**14.2**
2000	0.7753	1.9	0.82	22.8	**27.8**

Shell					
Year	Production			Tax Payments	
	Oil mt/y	Gas bcf/y	mtoe	PRT £M	PRT £/t
1990	11.0924	150.8	14.64	543	37.1
1991	13.6118	186.2	17.99	271.4	15.1
1992	14.3759	218.7	19.52	295.5	15.1
1993	14.7129	227.3	20.06	341.8	**17.0**
1994	15.2005	185.5	19.56	88.8	**4.5**
1995	16.2826	187.7	20.69	110.6	**5.3**
1996	16.643	246.8	22.44	203.7	**9.1**
1997	15.134	276.4	21.63	290.8	**13.4**
1998	17.0488	283.5	23.71	132	**5.6**
1999	17.9318	345.5	26.05	67.9	**2.6**
2000	16.6607	396.4	25.98	283.5	**10.9**

Viking					
Year	Production			Tax Payments	
	Oil mt/y	Gas bcf/y	mtoe	PRT £M	PRT £/t
1990	0.0497	57.3	1.40	5.1	3.7
1991	0.0248	38.3	0.93	16.8	18.2
1992	0.0248	43.8	1.05	1.4	1.3
1993	0.0248	26.5	0.65	-2.3	**-3.6**
1994	0.0248	24.1	0.59	14.6	**24.7**
1995	0	19.2	0.45	1.9	**4.2**
1996	0	23.7	0.56	1.8	**3.2**
1997	0	23.9	0.56	1.3	**2.3**
1998	0	14.9	0.35	-0.9	**-2.6**
1999	0	19.3	0.45	-1.7	**-3.7**
2000	0	16.4	0.39	0	**0.0**

Appendix 5-2

Date: Thu, 8 Sep 2005 10:43:48 +0100

From: "Earp Mike (Mr HMJ)" <Mike.Earp@dti.gsi.gov.uk>

To: 'H Abdo' <ecp02ha@sheffield.ac.uk>

Subject: RE: poster

Hafez

As I said before, I don't know the details of any of the decisions so I can't say for sure if or how the tax change in March 1993 affected the companies' plans. It does, though, seem unlikely that they could come forward with a worked-up plan in just a few months, especially for a major investment.

Mike

-----Original Message-----

From: H Abdo [mailto:ecp02ha@sheffield.ac.uk]

Sent: 07 September 2005 18:13

To: Earp Mike (Mr HMJ)

Subject: RE: poster

Dear Mr Mike

thank you very much for these valuable information. so can I not consider that the redevelopment decisions of the 10 fields I mentioned in the previous email were not taken because of the 1993 petroleum tax reforms because such decisions need long time of discussion between oil companies and the DTI, and they cannot come quickly as a respond to such a tax reform.

thank you one more

yours,

Hafez

Quoting "Earp Mike (Mr HMJ)" <Mike.Earp@dti.gsi.gov.uk>:

Hafez

Not sure why you chose (only) the fields you mentioned. I'm not at all surprised at what you found about the Brent redevelopment. Our approval comes at the end of a sometimes-long period of preparation of plans. I'd be surprised if any of your projects came forward quickly as a result of a tax change - but I have no detailed knowledge of any of them and i doubt if anyone in DTI (or the companies concerned!) does now. It's easier for tax to stop a project in the short term. You'd be better off looking at projects

in the years after 1993 (and 1994).

Mike

-----Original Message-----

From: H Abdo [mailto:ecp02ha@sheffield.ac.uk]

> Sent: 02 September 2005 17:37

To: Mike.Earp@dti.gsi.gov.uk

Subject: RE: poster

dear Mr Mike

thank you for your email.

One of the 1993 petroleum tax relaxation rationales was "create incentives for oil companies to invest in old fields".

I understand the reinvestment in old fields as extension or redevelopment to these fields to extend their producing lives. I found that in 1993-94 ten oil fields were revised and obtained development consents from the DTI. What I am trying to find now is a link between the 1993 tax relaxation and the decisions for redevelopments of these fields. There is scarcity in information available here and there regard this matter. However, I found that the redevelopment decision of Brent field was made in 1992, which means the 1993 tax relaxation was not the reason for this reinvestment. I am now trying to track the other fields, and wish I will find some help and guidance from you.

thank you ever so much for every help you give to me, which I lways highly appreciate.

yours,

Hafez

Quoting <>:

Hafez

Colin has passed your e-mail on to me. I'm not clear what information you're after regarding these fields. I suspect that much of it would be commercially confidential. We explain on the web (at http://www.og.dti.gov.uk/regulation/guidance/reg_offshore/index.htm) our procedures for approving field development programmes (including addendums to them when there are significant changes to the approved development programme).

All the best,

Mike

This e-mail has been sent by:

M J Earp

Senior Economist - North Sea Tax and Infrastructure
Energy Markets Unit
Department of Trade and Industry
1 Victoria Street
London
SW1H 0ET
Tel: +44 (0)20 7215 5271
Fax: +44 (0)20 7215 5228
e-mail: Mike.Earp@dti.gsi.gov.uk

-----Original Message-----
From: H Abdo [mailto:ecp02ha@sheffield.ac.uk]
Sent: 02 September 2005 12:33
To: colin.cranfield@dti.gsi.gov.uk
Subject: poster

Dear Sir/Madam

I am a PhD student at Sheffield University. my topic is about the UK petroleum fiscal regime. I saw your poster regard "extension of field life and prevention of premature COP" on the internet..

I am interested to know more about reinvesting in old fields, as part of my research is looking at reinvestment in offshore oils after 1993 in the UKCS. I figured out ten redevelopments in Wytch Farm, Brent, Tern, Scott, Claymore, Scapa, Brae South, Osprey South West and Magnus.

I will be grateful if you can guide me to any information and resources regard the above fields redevelopment consents decisions and plans, also to the DTI views of these redevelopments.

thank you in advance.

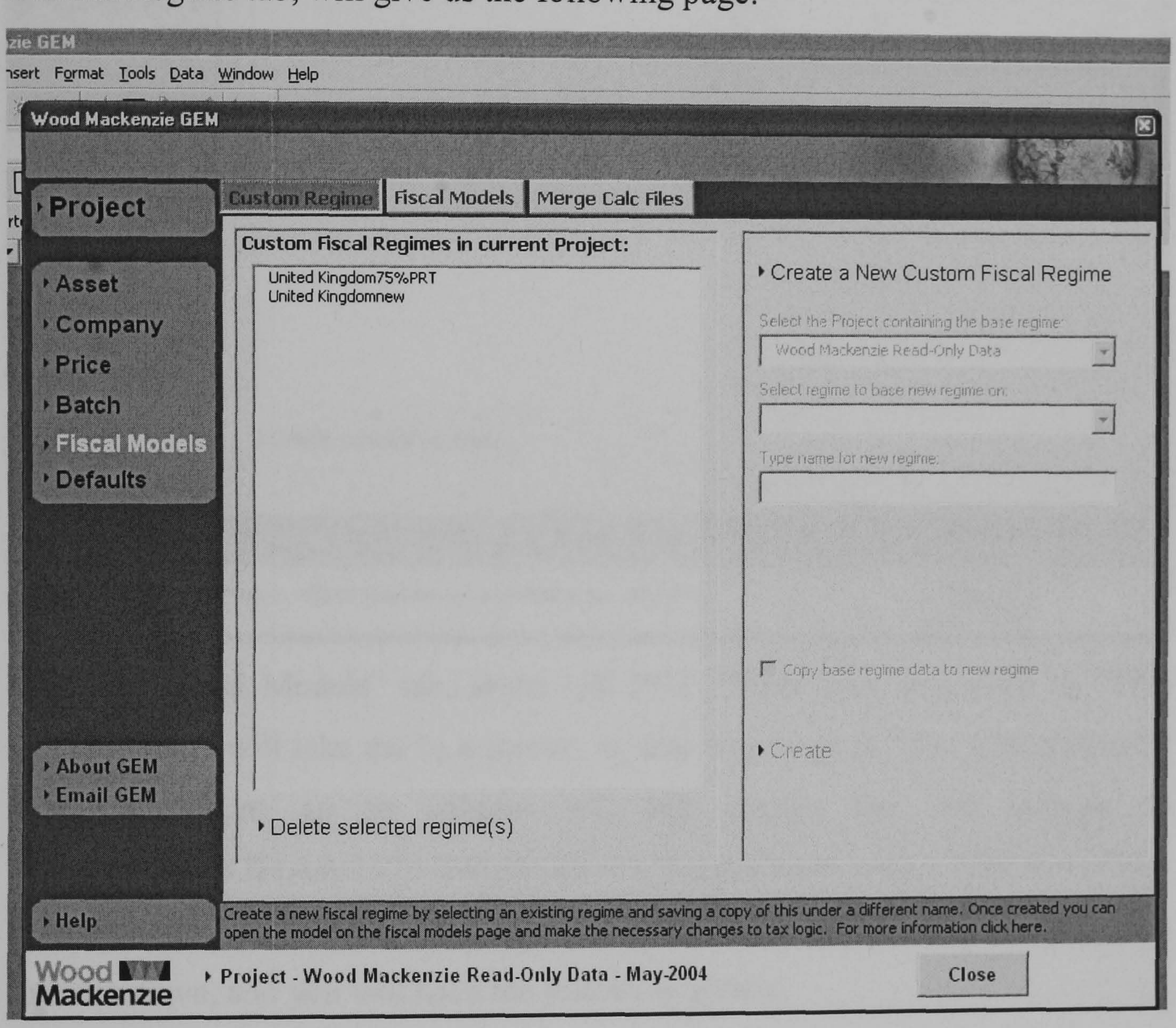
yours,

Hafez Abdo

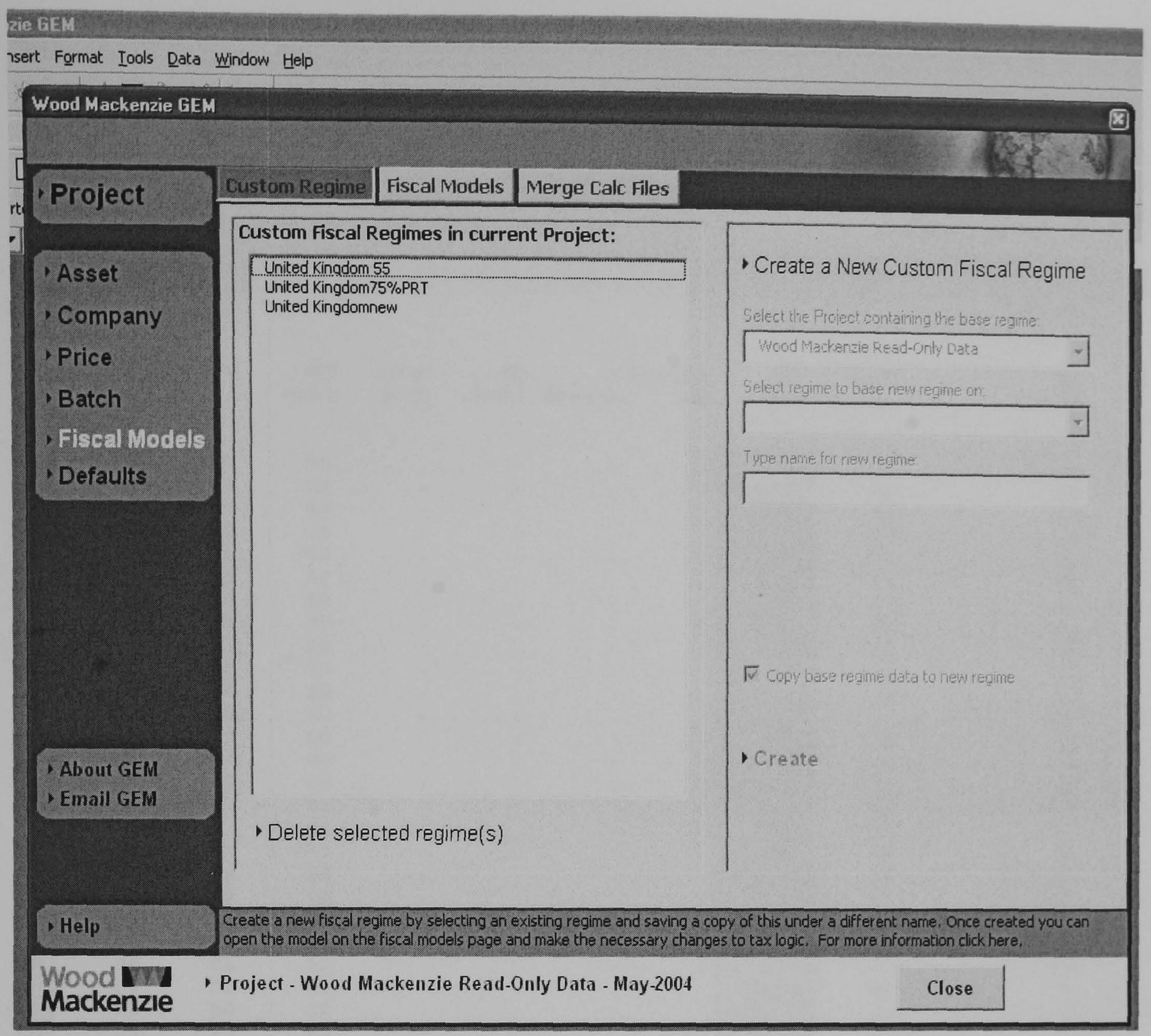
Appendix 5-3

A- *Applying a PRT scenario at 75 per cent rate using the GEM (2004) by following the next steps*:

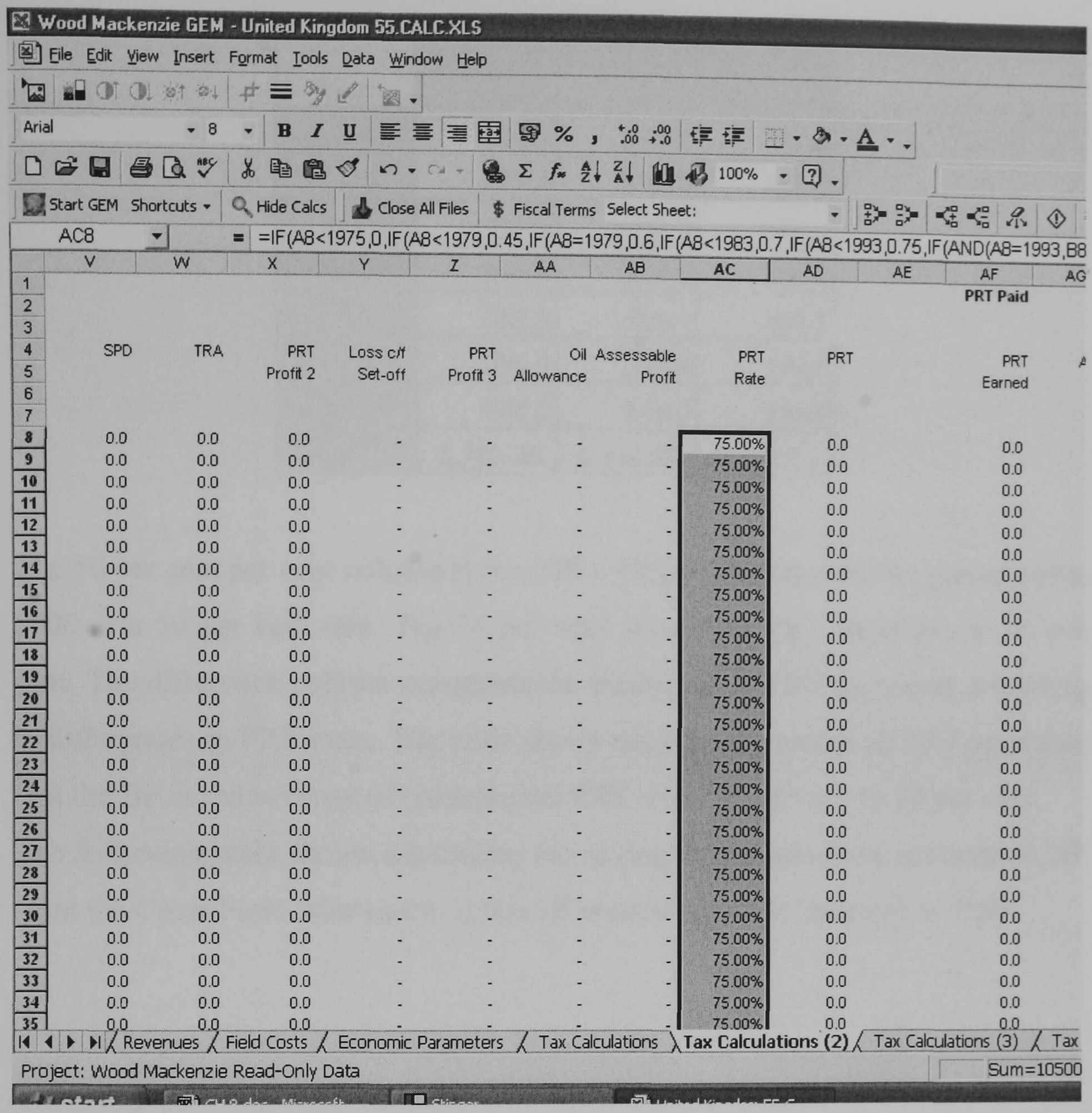
By selecting the "Fiscal Module" from the main page of the GEM, clicking on Custom Regime tab, will give us the following page:



Then clicking on Create a New Custom Fiscal Regime, and selecting United Kingdom to base the new regime on, typing anew regime name i.e. UK PRT 75 per cent, check "Copy base regime data" and select create. This will move me to the following screen:



Click on “fiscal Models” tab, select UK PRT 75 per cent, and click on “Edit Fiscal Model” will take me to a screen, on that screen go to “Tax Calculation 2” sheet, and then go to column AC and change the cell formula to =IF(A8<1975,0,IF(A8<1979,0.45,IF(A8=1979,0.6,IF(A8<1983,0.7,IF(A8<1993, 0.75,IF(AND(A8=1993,B8=1),0.75,0.75))))))*FiscalSensFactor2, copy the formula down, and you will have the following screen.



Select "close all files" button, then YES on save.

This will create a new fiscal model on the GEM with a PRT rate 75 per cent beyond the 1993. Using this fiscal model for calculating the assets and companies will allow having results of these calculations based on a 75 per cent PRT.

B- *Calculating the differences in PRT payments based on 75 per cent and 50 per cent rates.*

Data were obtained from the GEM (2004) by running company calculations at different PRT rates. Data presented in the Annual Summary Cash Flow table of the GEM (2004).

Year	BP- PRT £M		
	50%	75%	Difference
1994	539.2	910.2	371.0
1995	527.5	814.0	286.5
1996	783.2	1132.5	349.3
1997	643.5	949.5	306.0
1998	368.0	567.1	199.1
1999	260.0	399.8	139.8
2000	639.2	974.0	334.8
Totals	3,760.45	5,746.95	1,986.51

The 50 per cent per cent column shows BP's PRT payments over the period 1994-2000 at a 50 per cent rate. The 75 per cent shows the PRT payments at 75 per cent. The difference column represents the difference in PRT payments according to differences in PRT rates. The table shows the total difference in PRT payments that the BP saved because of reducing the PRT from 75 per cent to 50 per cent. The following table shows calculating the saving that would have occurred to BP from the Cross Field Allowance, if this allowance were not removed in 1993.

BP Savings From the Cross Field Allowance for the Period 1994-2000 Based on the Assumption that this Allowance was Removed in 1993

Year	Miller	Leven	Medwin	Machar	Andrew	Harding	Foinaven	Monan	Mungo	MagSouth	schiehallion	Brimmond	Cross Field Allowance caculations
1994	40.7	0.0	5.9	16.4	54.1	162.7	27.0	0.0	0.0	0.0	0.0	0.0	
1995	26.3	2.0	0.0	6.6	236.3	230.4	117.6	0.0	0.0	0.0	6.5	0.0	
1996	25.6	0.0	0.9	60.6	89.8	25.6	357.9	0.0	139.9	32.0	178.1	5.1	
1997	31.1	0.0	0.0	62.0	24.8	37.3	328.7	61.8	105.5	0.2	486.9	0.0	
1998	0.0	0.0	0.0	162.7	24.1	24.1	144.4	78.4	108.3	0.0	208.0	4.9	
1999	0.0	0.0	0.0	35.5	0.0	23.6	17.7	0.0	88.6	0.0	111.3	0.0	
2000	4.6	9.1	0.0	17.2	0.0	0.0	28.9	0.0	68.9	0.0	57.6	0.0	
Total	128.2	11.1	6.8	361.1	429.2	503.7	1022.3	140.2	511.2	32.2	1048.4	9.9	4204.3
10 per cent of the Total Development Expenditure													420.43
75 per cent of the above 10 per cent													315.32

Figures in the table represent the development expenditure for each field, the 'Total' raw shows the total development expenditure for each field over the period 1994-2000. The Cross Field Allowance column shows the application of the methodology that was used to calculate the Cross Field Allowance benefits for oil companies of their offshore benefiting fields. The table also shows the total Cross Field Allowance benefit for BP over the period 1994-2000.

From the above two tables it can be seen that the BP would have saved more money on PRT payments from the reduction of the PRT rate that it would have done from benefiting from the Cross Field Allowance.

Annual Summary Cash Flow Table for Argyll Oil Field

Wood Mackenzie GEM - ARGYLL-United Kingdom-base.XLS

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S18 =

	A	B	C	D	E	F	G	H	I	J	K	P
1	**Field Name:**			**Argyll**						**Created On:**	27-Jun-05	
2												
3	Calculation Mode:			Real	Paid							
5	Year		Production		Gross	Op	Capital	Royalty	SPD/	PRT	Corp.	Total Field
6			Liquids	Gas	Revenue	Costs	Costs		APRT		Tax	Cash Flow
7			000t/yr	bcf/yr	£M	£M	£M	£M	£M	£M	£M	£M
9	1973		0.0	0.0	0.0	0.0	52.5	0.0	0.0	0.0	0.0	-52.5
10	1974		0.0	0.0	0.0	0.0	124.0	0.0	0.0	0.0	0.0	-124.0
11	1975		500.0	0.0	123.0	40.6	74.5	8.8	0.0	0.0	0.0	-0.9
12	1976		1125.0	0.0	298.2	72.0	14.2	28.4	0.0	0.0	0.0	183.7
13	1977		850.0	0.0	220.4	69.2	25.0	19.6	0.0	0.0	30.6	76.0
14	1978		700.0	0.0	145.6	57.3	21.1	11.4	0.0	0.0	49.1	6.7
15	1979		850.0	0.0	212.7	51.5	41.7	20.5	0.0	0.0	25.6	73.5
16	1980		800.0	0.0	267.5	45.6	39.2	28.0	0.0	0.0	42.4	112.3
17	1981		500.0	0.0	179.4	60.2	13.4	16.2	0.0	0.0	68.7	20.9
18	1982		800.0	0.0	270.2	54.5	34.7	28.2	0.0	1.6	41.2	110.1
19	1983		750.0	0.0	253.3	75.7	32.9	25.4	0.0	4.6	73.5	41.3
20	1984		425.0	0.0	151.7	36.4	16.6	15.9	0.0	-1.6	55.2	29.2
21	1985		525.0	0.0	172.8	37.2	0.0	18.5	0.0	0.0	35.8	81.3
22	1986		500.0	0.0	75.4	32.1	0.0	6.7	0.0	0.0	46.0	-9.4
23	1987		450.0	0.0	70.9	27.0	0.0	6.7	0.0	0.0	12.7	**24.5**
24	1988		350.0	0.0	39.1	23.0	0.0	2.9	0.0	0.0	12.3	**0.9**
25	1989		300.0	0.0	41.9	25.5	0.0	3.0	0.0	0.0	4.2	**9.2**
26	1990		235.0	0.0	35.5	17.4	0.0	3.0	0.0	0.0	4.2	**10.9**
27	1991		200.0	0.0	24.5	16.3	0.0	1.7	0.0	0.0	4.8	**1.7**
28	1992		200.0	0.0	22.6	15.6	2.8	1.5	0.0	0.0	2.1	**0.6**
29	1993		0.0	0.0	0.0	0.0	9.8	0.0	0.0	0.0	0.8	-10.6
30	1994		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-3.1	3.1
31	1995		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32	1996		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Annual Summary Cash Flow | PV Table | Annual Expanded Cash Flow | Annual Pre-Tax Cash Flow | Annual Govt Take Cash Flc

Project: Wood Mackenzie Read-Only Data

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