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Economic and Tax Issues relating to Decommissioning in the UKCS: the 2016 Perspective

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Research in North Sea Economics has been conducted in the Economics Department since 1973. The present and likely future effects of oil and gas developments on the Scottish economy formed the subject of a long term study undertaken for the Scottish Office. The final report of this study, The Economic Impact of North Sea Oil on Scotland, was published by HMSO in 1978. In more recent years further work has been done on the impact of oil on local economies and on the barriers to entry and characteristics of the supply companies in the offshore oil industry.

The second and longer lasting theme of research has been an analysis of licensing and fiscal regimes applied to petroleum exploitation. Work in this field was initially financed by a major firm of accountants, by British Petroleum, and subsequently by the Shell Grants Committee. Much of this work has involved analysis of fiscal systems in other oil producing countries including Australia, Canada, the United States, Indonesia, Egypt, Nigeria and Malaysia. Because of the continuing interest in the UK fiscal system many papers have been produced on the effects of this regime.

From 1985 to 1987 the Economic and Social Science Research Council financed research on the relationship between oil companies and Governments in the UK, Norway, Denmark and The Netherlands. A main part of this work involved the construction of Monte Carlo simulation models which have been employed to measure the extents to which fiscal systems share in exploration and development risks.

Over the last few years the research has examined the many evolving economic issues generally relating to petroleum investment and related fiscal and regulatory matters. Subjects researched include the economics of incremental investments in mature oil fields, economic aspects of the CRINE initiative, economics of gas developments and contracts in the new market situation, economic and tax aspects of tariffing, economics of infrastructure cost sharing, the effects of comparative petroleum fiscal systems on incentives to develop fields and undertake new exploration, the oil price responsiveness of the UK petroleum tax system, and the economics of decommissioning, mothballing and re-use of facilities. This work has been financed by a group of oil companies and Scottish Enterprise, Energy. The work on CO2 Capture, EOR and storage was financed by a grant from the Natural Environmental Research Council (NERC) in the period 2005 – 2008.

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Economic and Tax Issues relating to Decommissioning in the UKCS: the 2016 Perspective

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Economic and Tax Issues relating to Decommissioning in the UKCS: the 2016 Perspective

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1. Introduction and Context

Decommissioning activity in the UK Continental Shelf (UKCS) is set to increase substantially. There are many estimates of the possible costs and their timing. Before the oil price collapse the present authors produced detailed estimates indicating that in the period 2014-2050 the cumulative costs could amount to £45 billion at 2014 prices with real long term oil and gas prices of $90 and 58 pence, and £42 billion with long term prices of $70 and 45 pence[1]. Such estimates are subject to much uncertainty. There is evidence that the costs were initially underestimated with respect to both the volume of work required and the prices of the equipment and services needed to undertake the work. As experience of the activity grows there should be a learning by doing effect which reduces the costs. The initiative taken by the Oil and Gas Authority (OGA) recently expressed in their report Decommissioning Strategy should also produce cost reductions. But currently there remains much uncertainty regarding their likely extent.

The current major oil price volatility adds to the uncertainties regarding the timing of cessation of production (COP) and the commencement of decommissioning work. When fields are operating at a loss as a result of an oil price fall there is an obvious incentive to cease production and then decommission the facilities. But in making such a decision, an operator

[1] See A.G. Kemp and L. Stephen, Price Sensitivity, Capital Rationing and Future Activity in the UK Continental Shelf after the Wood Review, North Sea Study Occasional Paper No.130, Aberdeen Centre for Research in Energy Economics and Finance (ACREEF), November 2014, pp.41 http://www.abdn.ac.uk/research/acreef/

could also consider the possible future oil price which might make it rational to tolerate current losses in the expectation of future profits with a higher oil price. He may also consider the benefit of postponing the time when he has to undertake substantial expenditures on the decommissioning activity. In sum he may estimate his remaining net present value (RNPV) which could be consistent with tolerating operating losses for some time.

In estimating RNPV the tax system applied both to the income from field production and the relief available for the decommissioning costs are relevant to decision-making. The relief available for the decommissioning costs can easily affect the timing of the COP decision and the maximisation of economic recovery including investment in late life incremental projects. The investor will make his calculation on the basis that his objective is to maximise his post-tax RNPV. This may or may not be consistent with the maximisation of pre-tax RNPV.

In this paper the operation of the complex tax system relating to late field life and decommissioning issues is elucidated with a high level objective being to examine whether the system is consistent with the attainment of maximum economic recovery. Investment incentives in incremental projects could be influenced by their effects on decommissioning relief. Late field life asset values can also be affected by decommissioning relief. This study seeks to elucidate the intricacies of the likely rates of relief.

2. The Tax Arrangements Relating to Decommissioning

As a general statement decommissioning costs are allowed as deductions for Petroleum Revenue Tax (PRT), Corporation Tax (CT) and Supplementary Charge (SC). For CT and SC the costs give rise to capital allowances which are available on 100% first year basis as for other investment costs. With PRT the decommissioning losses are clawed back and set against PRT income in earlier years. The PRT liability is then recalculated and refunds made. The refunds are subject to CT and SC in the year when the refunds are actually made. PRT refunds relate to periods earlier in field life. In recognition of this (simple) interest is given on the refunds. The interest rates applicable to the refunds have varied substantially through time depending on market conditions. In recent years they have been very low but in the 1980's and 1990's they were very much higher. The interest is tax free. For many years a cap has been placed on the size of the PRT refunds plus interest repaid. When PRT was at 75% the cap in any one year was 85% of the PRT loss attributable to that year. When the PRT rate became 50% the cap on the repayment was 60% of the loss, and when it was reduced to 35% the cap became 45% of the loss. When there is an overall field loss this can be set against PRT income in another field.

When the PRT loss is clawed back issues arise with their interaction with the oil allowance and safeguard. Thus the decommissioning losses carried back have to be set against earlier profits before use of the oil allowance and safeguard. This means that the decommissioning loss can displace the oil allowance and safeguard to a greater or less extent. For a large field which produces for a substantial time beyond the last period when the oil allowance was used there should be no displacement from decommissioning losses. But for medium and small fields there is a higher chance that the decommissioning losses displace the oil allowance. (It will be recalled that the volume allowance is generally spread over 10 years).

For CT and SC the general rules are that decommissioning losses in a field can be set against current income from other fields, carried forward against future income, or carried back against past income in the UKCS. Prior to 2008 losses could be clawed back for a maximum of 3 years. Since then they can be clawed back to 2002.

When the rate of SC was increased from 20% to 32% in 2011 a restriction on the rate of relief for SC to 20% was introduced. When the combined rate of CT plus SC exceeded 50% the rate of relief was curtailed to 50% for non-PRT fields. When the PRT rate was 50% and the top marginal rate on income was 81% the overall rate of relief for decommissioning on PRT fields was 75%. When the PRT rate was reduced to 35% and the SC became 20% the overall rate of relief on PRT fields became 67.5% and on a non-PRT fields it was 50%. In 2016 when the PRT rate became 0% and the SC rate 10% the rate of relief for decommissioning became 40%.

But there are further aspects which need to be considered. Over the last few years various Field Allowances, Brownfield Allowance, and an Investment Allowance have been introduced against the SC. When decommissioning losses are clawed back against past SC income they are utilised before the Investment Allowance or Field Allowance which can be displaced as a consequence. The effect on incentives to engage in late field life incremental projects is noteworthy and is examined in this paper.

It should be noted that the operation of the 0% rate of PRT is such that when decommissioning losses are clawed back to periods when the 0% rate applies the PRT taxable income in such periods is reduced to a minimum of £0 by the eligible loss. No relief is available in such a period because no PRT has been paid.

In this paper the objectives are to measure the effective rates of relief for both old fields subject to PRT and new ones which are non-PRT paying. Further objectives are to examine the effects of the tax system on the decisions to engage in late field life incremental investments and on the determination of COP dates.

3. Modelling Procedure

The modelling procedure adopted involved the selection of a number of representative fields to reflect the circumstances surrounding decommissioning of fields being developed in (1) the early 1990s and (2) in 2016. In each case a set of fields representative in terms of (1) size of reserves, (2) development and operating costs, and (3) decommissioning costs, was chosen. Decommissioning costs modelled as a percentage of the development costs at 1991 values were increased to reflect their real increase. A sensitivity analysis was also undertaken with respect to all the three categories of costs. Incremental projects of various sizes and costs undertaken in the mature years of the lives of the fields of both vintages were also modelled.

Financial simulation modelling was undertaken to calculate pre- and post-tax returns. The modelling calculated the economic limit for the lives of the fields and so estimated the maximum feasible economic recovery. Investment in the old fields started in 1991. Historic values for oil prices and inflation were employed for the periods up to and including 2015. For 2016 and subsequent years prices of $40, $50, and $60 in real terms were employed. In calculating the real returns 1991 was taken as the base year. Real net present values (NPVs) were calculated to this base year. The full tax system in place from 1991 onwards, and modified many times over the years, was incorporated in the economic model. For future years the current system reflecting the changes announced in Budget 2016 was employed.

Development of the new fields was assumed to start in 2016. Reflecting the most likely current situation the modelling of the tax system was undertaken on a project basis. Thus use of the Ring Fence Expenditure Supplement (RFES) for the SC was incorporated. Decommissioning relief was also calculated on a project basis. Thus losses were clawed back and taxes recalculated. For the new fields another scenario where decommissioning losses were set against income from other fields for CT and SC was also calculated.

In all cases the modelling highlighted the effective relief for decommissioning. The extent to which effective relief is curtailed through displacement of other allowances, such as Investment Allowance, and Field Allowances for SC, and oil and safeguard allowances for PRT, are highlighted. The potential effect of incremental investments in the mature years of field life in affecting effective relief both negatively and positively was calculated. The issue of whether any curtailment of effective relief can inhibit investment in incremental projects and so affect maximum economic recovery was investigated. The relationship between the effective relief for decommissioning and the effective rate of tax over the life of the field was also calculated. In this exercise the effective rate of tax over the life of the field was taken to be before decommissioning relief in order to highlight any differences.

In the results shown in Section 4 below the key assumptions for each field and incremental project are shown separately for the convenience of the reader.

4. **Results**

A. Old (1991) Fields

Field No.1: 50 mmbbls: Low cost: $50 future price

Real devex/bbl: $5.25 (1991 value)

Real opex/bbl: $5.46 (1991 value)

Real decommissioning cost: 15% of devex (1991 value)

On this field the economic limit was reached in 2010 with cumulative production of 50.5 mmbbls. No PRT was paid on the field and not all of the oil allowance was utilised. This resulted from the long period taken to recover investment costs and utilise the uplift for PRT in the 1990's given the relatively low oil prices and the modest annual production from the field. When decommissioning costs were clawed back there was no effective PRT relief. The losses displaced the oil allowance, but, as noted above no PRT was in any case paid on this field. Full relief for CT and SC was achieved giving a total of 50%.

Field No.2: 50 mmbbls: Medium cost: $50 future price

Real devex/bbl: $7.50 (1991 value)

Real opex/bbl: $6.44 (1991 value)

Real decommissioning cost: 15% of devex (1991 value)

On this field the economic limit is reached in 2010. No PRT is paid and the field does not use all its oil allowance. The decommissioning losses displace the oil allowance, but in any case there is no effective PRT relief. There is full relief for CT and SC at a combined rate of 50%.

Field No.3: 50 mmbbls: High cost: $50 future price

Real devex/bbl: $9.00 (1991 value)

Read opex/bbl: $7.73 (1991 value)

Real decommissioning cost: 15% of devex (1991 value)

On this field the economic limit was reached in 2010. No PRT was payable and thus no effective relief was obtained for this tax. Relief for CT and SC at a combined rate of 50% was obtained.

Field No.4: 200 mmbbls: Low cost: $50 future price

Real devex/bbl: $5.25 (1991 value)

Real opex/bbl: $5.69 (1991 value)

Real decommissioning cost: 15% of devex (1991 value)

The economic limit for this field was attained in 2018 with accumulated production of 204.7 mmbbls.

This field paid PRT of £306 million before decommissioning (at 1991 prices), but only achieved PRT relief of 13.5% because the decommissioning cost was substantially clawed back to years in which the PRT rate was zero. The relief for CT is at 30% and for SC 11.35% (reflecting the long period of claw back and the changes to the SC rate). When CT and SC tax or PRT refunds is taken into account the overall rate of relief is 50%.

Field No. 4b: 200 mmbbls: but with decommissioning costs increased to 25% of real devex at 1991 prices: $50 future oil price

As with Field No.4 PRT payments of £306 million at 1991 prices are made before decommissioning. PRT relief achieved is 28.12%. Relief for SC is 12.81% less the SC paid on PRT refunds and CT relief is 30% less CT paid on PRT refunds giving total relief at 60%.

Field No. 4c: Field No.4 except COP accelerated to 2015 to achieve higher rate of decommissioning relief: $50 future oil price

Accumulated production is reduced to 200 mmbbls but both pre-tax and post-tax NPVs are reduced. Effective decommissioning relief increases to 71%, but the cost is a reduction in the post-tax NPV.

Field No.4: 200 mmbbls: Low Cost: $40 future price

Accumulated production is 203.8 mmbbls and the economic limit is in 2017. PRT paid before decommissioning is still £306 million. Decommissioning relief for PRT is obtained at 26.12%. Full relief is obtained for CT and SC with the combined rate being 42.6% less the CT and SC paid on PRT refunds. Total relief is 59%. It was 50% in the case when the future oil price was $50.

Field No.4: 200 mmbbls: Low Cost: $60 future oil price

In this scenario the economic limit is in 2018. PRT payments before decommissioning are still £306 million at 1991 prices. There is no PRT relief in this case because all of the decommissioning costs are clawed back in years when the PRT rate is zero. Relief for CT and SC combined is at 40% compared to 50% at the $50 price.

The 3 cases of Field No.4 discussed above indicate that the rate of decommissioning relief is inversely related to future oil prices, revenues, and so NPVs. This is because the lower oil prices and revenues plus the earlier attainment of the economic limit result in more of decommissioning losses being clawed back into periods when the SC and PRT rates were higher and thus the rate of relief is also higher.

Field No.5: 200 mmbbls: Medium Cost: $50 future price

The economic limit is reached in 2017. Accumulated production is 203.8 mmbbls. In this case PRT payments of £43 million at 1991 prices are made before decommissioning. When PRT losses are clawed back they obtain relief at 27.4%. Some of the decommissioning costs are clawed back to years when the PRT rate is zero and there is some displacement of oil allowance. Full relief is obtained for CT and at 13.4% for SC giving an overall rate of relief of 56%.

Field No.5: 200 mmbbls: Medium Cost: $40 future price

In this case cumulative production is 203.8 mmbbls. PRT payments of £43 million are made before decommissioning. The field can use all of the oil allowance before decommissioning but not after. PRT relief is reduced to 36.4% because of displaced oil allowance and the cost being clawed back to some years when the PRT rate is zero. Full relief for CT at 30% (minus the CT paid on PRT relief) is available and for SC the effective relief is at 15.24% (minus the SC paid on PRT relief). The overall rate of relief is 58%.

Field No.5: 200 mmbbls: Medium Cost: $60 future oil price

In this case the economic limit is reached in 2018 when cumulative production is 204.7 mmbbls. PRT paid before decommissioning is again £43 million. The field can use all of the oil allowance before and after decommissioning, but PRT relief is only 18.18% because costs are clawed back in some years when the PRT rate is zero.

Relief for CT is at 30% and for SC at 11.8% minus the CT and SC paid on PRT relief. Total relief is 53%.

A comparison of the results for the 200 mmbbls field over the range of future oil prices shows that the rate of effective relief is inversely related to the oil price. At the lower oil prices the decommissioning losses are clawed back over a longer period because of the lower revenues and obtain relief at the higher historic SC and PRT rates.

Field No.6: 200 mmbbls: High Cost with devex $8.25/bbl (1991) and opex $8.94/bbl (1991): $50 future oil price

In this case the economic limit is reached in 2017. In this high cost case no PRT is paid on the field. Not all of the PRT oil allowance is used before decommissioning. Decommissioning relief for PRT is in any case ineffective because of the 0% rate and the displacement of some of the oil allowance. But no PRT was payable on the field. Full relief is available for CT and SC giving a combined rate of 47%.

At the $40 price the field does not pay PRT or use all of its PRT oil allowance before decommissioning. Decommissioning relief is ineffective because of the 0% PRT rate and some displacement of the oil allowance. But PRT paid is in any case zero. Full relief for CT and SC is obtained giving an effective rate of relief of 49%.

At the $60 price no PRT is paid. The oil allowance is still not fully utilised. Decommissioning relief for PRT is ineffective because of the 0% rate and some displacement of the oil allowance. Full relief for CT and SC is obtained at a combined rate of 46%.

A comparison of the rates of relief for the 200 mmbbls field under the 3 oil prices scenarios again indicates that the effective rate is higher with lower oil prices because the lower revenues result in losses being clawed back for longer periods and thus into periods when the SC rate was higher.

Field No.7: 500 mmbbls: Low Cost: $50 future oil price

In this scenario accumulated production to the economic limit is 503 mmbbls. COP is in 2023. Substantial PRT of £925m. in real terms at 1991 prices is paid. However, there is no decommissioning relief for this tax as all the costs are set against income when the PRT rate is 0%. Relief is obtained for CT and SC at a combined rate of 40%.

It is noteworthy that if a Decommissioning Relief Deed (DRD) were in place and PRT were abolished rather than set at 0% rate decommissioning relief would have been much higher at 71%. It was also found that if the decommissioning costs were very much higher the rate of relief under the present rules would remain at 40% with no PRT relief, because all the costs were set against PRT income taxed at 0% rate. All the costs were still clawed back and set against income generated from 2016 onwards.

Field No.7: 500 mmbbls: Low Cost: $40 future price

In this scenario the economic limit is reached in 2023. PRT paid is £925 million at 1991 prices. Total relief for decommissioning remains at 40% (CT 30% and SC 10%). All the costs are set against PRT income generated from 2016 onwards when the rate is 0%.

Field No.7: 500 mmbbls: Low Cost: $60 future price

In this scenario the economic limit is reached in 2024. PRT paid is again £925 million at 1991 prices. Decommissioning relief remains overall at 40% with no relief being available for PRT as all the costs are set against PRT income at the rate of 0%.

Field No.8: 500 mmbbls: Medium Cost: $50 future oil price

In this scenario accumulated production is 503 mmbbls with COP in 2023. Much less PRT is paid on this field (£262 million) compared to the low cost case, but there is no relief for this tax as the costs are all recovered against income subject to 0% rate. Relief for CT and SC combined is at 40%. Again, increases in the decommissioning costs would not change the rate of relief.

In this case if PRT had been abolished and a DRD were in place the overall decommissioning relief would have been 65%, consisting of PRT at 50%, CT 30%, and SC 10% minus the CT and SC paid on PRT refunds.

Field No.8: 500 mmbbls: Medium Cost: $40 future oil price

In this case there is still no relief for PRT although net payments of this tax are made. Decommissioning costs are clawed back but are set against income taxed at 0%. Relief for CT is at 30% and for SC at 10%

Field No.8: 500 mmbbls: Medium Cost: $60 future price

PRT of £262 million is paid on this field but there is no PRT decommissioning relief. The costs are clawed back and set against income taxed at 0%. Relief for CT is obtained at 30% and for SC at 10%.

Field No.9: 500 mmbbls: High Cost: $50 future oil price

In this case accumulated production is 500 mmbbls and COP is reached in 2022. No PRT is paid on the field because of the high costs. There is thus no PRT relief. The losses were clawed back and set against income subject to PRT at 0%. Relief for CT is at 30% and at 10% for SC.

Field No.9: 500 mmbbls: High Cost: $40 future price

In this case no PRT was paid on the field because of the high costs. Decommissioning costs were set against income taxed at 0%. Relief for CT at 30% and SC at 10% are obtained.

Field No.9: 500 mmbbls: High Cost: $60 future price

In this case PRT is still not paid because of the high costs. No PRT relief for decommissioning is received. The costs were set against income taxed at 0%. Relief for CT at 30% and SC at 10% are obtained.

B. Old (1991) Fields plus Incremental Investments

In this section the results of the interaction of the tax system relating to decommissioning with the introduction of an incremental investment in later field life are examined.

Field No.10: 50 mmbbls: Medium Cost Plus Incremental Investment with Reserves of c.10 mmbbls: Starting in 2004: Incremental Devex of $12/boe and Incremental Opex of $8.8/boe: $50 future oil price

The effect of the incremental project is to postpone the economic limit from 2010 to 2014. Total economic recovery is increased from 50.5 mmbbls to 60.5 mmbbls. The post-tax NPV@10% (1991 base) is increased by nearly £9m. Decommissioning relief is at 50% which is the same as for the field without the incremental project. No PRT is paid on the total field and the oil allowance was not fully used. But the extra revenues permitted more of the oil allowance to be utilised and less of it was displaced by decommissioning losses. The investment took place too early to be eligible for the Investment Allowance for SC and the costs were too low to obtain a Brownfield Allowance. Relief at

30% is obtained for CT and at 20% for SC. This is the same as for the field excluding the incremental project.

Field No.11: 50 mmbbls: Medium Cost Plus Incremental Project of c. 20 mmbbls starting in 2004: $50 future oil price

In this case the incremental project has reserves of c. 20 mmbbls. The economic life of the whole field is extended from 2010 to 2017. The post-tax NPV@10% is increased by £15.13m. No PRT is paid and the oil allowance is not fully utilised. But the extra revenues permitted more of the oil allowance to be utilised and less of it was displaced by decommissioning losses. There is no effective PRT relief for the decommissioning costs. They are set against income subject to the 0% rate, and subsequently they displace some of the oil allowance. For SC there is no Investment Allowance available and the level of the incremental costs was too low to obtain the Brownfield Allowance. In this case decommissioning relief is at 30% for CT and 10% for SC. The relief for SC is thus at a lower rate compared to the case without the incremental project when it was 20%, and compared to the smaller (10 mmbbls) incremental project, because decommissioning takes place at a later date. Thus, although the whole field post-tax NPV is increased by the incremental investment, the increase is reduced because of the decreased decommissioning relief.

Field No.12: 50 mmbbls: Medium Cost Plus Incremental Project of c. 30 mmbbls starting in 2004: $50 future oil price

With this larger incremental project of c. 30 mmbbls the economic limit of the field is extended to 2019 with cumulative production being 80.5 mmbbls. The aggregate post-tax NPV@10% is increased by over £21m. No PRT is paid on the whole field and it remains unable to utilise all its oil allowance. But the extra revenues permitted more of the oil allowance to be utilised and less of it was displaced by decommissioning losses. No relief is available for PRT as the losses are set against income when the rate is 0%. Full relief at 30% is obtained for CT. For SC no Investment Allowance was available for the incremental project and the costs were too low to obtain the Brownfield Allowance. Relief for SC for the whole field is at 10%. The total relief is thus 40%, while for the field without the incremental project it was 50%. The extended life of the whole field brought this result. Thus, although the whole field post-tax NPV is increased by the incremental investment, the increase is reduced because of the decreased decommissioning relief.

Field No.13: 200 mmbbls: Medium Cost Plus Incremental Investment of c. 30 bbls starting in 2012: Devex for Incremental Project $14/bbl: $50 future oil price

In this case the larger incremental project extends the economic limit from 2017 to 2027. Total recovery is increased from 200 mmbbls to 233.8 mmbbls. The effect of the incremental project is to increase the post-tax NPV@10% by over £25m. While PRT of £41 million was paid on the field there is no effective decommissioning relief for PRT because the losses are all set against income taxed at 0%. But the extra revenues permitted more of the oil allowance to be utilised and less of it was displaced by decommissioning losses. For CT full relief at 30% is achieved. For SC the project obtained the full benefit of the Brownfield Allowance. Relief for SC is at 10% with no displacement of this allowance. However, in the absence of the incremental project total effective relief was at 56% because it was obtained at a higher SC rate and included some PRT relief. Thus, although the incremental project increases the whole field post-tax NPV, by extending total field life, the increase is reduced by the decreased decommissioning relief.

Field No.14: 200 mmbbls: Medium Cost Plus Large Incremental Project of c. 50 mmbbls starting in 2012: $50 future oil price

In this case the whole field economic limit was extended from 2017 to 2030. Cumulative recovery becomes 253.8 mmbbls. The post-tax NPV@10% is increased by over £34m. PRT of £23.8 million at 1991 prices was paid before decommissioning. Decommissioning losses are clawed back against PRT income taxed at 0%. For CT relief is at 30%. For SC the incremental project qualifies for the Brownfield Allowance and receives the benefits. SC relief for decommissioning is at 10%. Excluding the incremental project relief for SC was at 13.4% and for PRT it was 27.4% due to the earlier COP date and higher rates of SC and PRT. Thus, although the overall field post-tax NPV is increased by the incremental project, the increase is reduced by the decreased decommissioning relief from 56% to 40%.

Field No.15: 200 mmbbls: Medium Cost Plus Very Large Incremental Project of c. 70 mmbbls starting in 2012: $50 future oil price

In this case the whole field economic limit was extended from 2017 to 2032. The post-tax NPV@10% is increased by almost £42m. When the incremental reserves are included the whole field can use its PRT oil allowance but a proportion comes after 2015 when PRT is at 0%. But the extra revenues permitted more of the oil allowance to be utilised and none of it was displaced by decommissioning losses. Decommissioning costs are clawed back but no effective PRT is received because the 0% rate applied to all the relevant years. Relief at 30% is obtained for CT. For SC the Brownfield Allowance is available and is used up by 2020. SC relief is thus at 10%. The total relief of 40% compares with 56% in the absence of the incremental project. Thus, although the whole field post-tax NPV is increased by the incremental project, the decrease in decommissioning relief reduces this increase. The earlier COP date in the absence of the incremental project meant that some relief for PRT was obtained and a higher rate of relief for the SC.

Field No.16: 500 mmbbls: Medium Cost with Large Incremental Project of c. 50 mmbbls starting in 2016 with Devex of $12 per bbl: $50 future oil price

In this case the economic limit is extended from 2023 to 2034 and the accumulated production is increased to 553 million bbls. The post-tax NPV@10% is increased by £28.53m. PRT paid on the field before decommissioning is £262 million. The whole field now uses all its PRT oil allowance. Decommissioning relief for PRT is at 0% because that is the rate applicable when losses are clawed back. For CT relief is obtained at 30%. For SC the Investment Allowance is available and is fully used. Relief for decommissioning at 10% is still fully available. In the absence of the incremental project decommissioning relief was also at 40%.

Field No.17: 500 mmbbls: Medium Cost with Large Incremental Project (c. 70 mmbbls) starting in 2016: $50 future oil price

In this case the economic limit of the field plus increment is 2036 compared to 2023 without the extra project. Accumulated production at the economic limit is 573 mmbbls. The post-tax NPV@10% is increased by £37.2m. as a consequence of the incremental project. PRT paid on the field before decommissioning is £262 million. The whole field uses all its oil allowance for PRT. Decommissioning losses obtain no relief for PRT because of the 0% rate. For CT relief is obtained at 30%. For SC the Investment Allowance is available and fully used. Decommissioning losses are relieved at 10% and there is no overlap with the Investment Allowance. Without the incremental project relief was also at 40%.

If PRT had been abolished rather than set at 0% rate and a DRD were in place the overall rate of relief would have increased from 40% to 66% as there would have been relief for PRT.

Field No.18: 500 mmbbls: Medium Cost with Very Large Incremental Project (c.100 mmbbls): First Devex 2016: $50 future oil price
In this case the very large incremental project extends the life of the whole field from 2023 to 2036. Accumulated total production is 603 mmbbls. The post-tax NPV@10% is increased by £50m. PRT of £262 million is paid before the reduction to 0% rate in 2016. There is no effective PRT relief for decommissioning as the losses are clawed back into time periods when the rate is 0%. CT relief at 30% is obtained. For SC the Investment Allowance is obtained and fully utilised. Relief for decommissioning is at 10% obtained in time periods after the allowance has been utilised. Without the incremental project relief was also at 40%.

It is again noteworthy that, if PRT had been abolished and a DRD were in place, the effective relief for decommissioning would have been higher at 66% including some PRT relief.

C. New Fields Developed from 2016

In this section the economic and tax aspects of the decommissioning of a set of new fields developed from 2016 are examined. Financial values are to base year 2016. The investor is again assumed not to have tax shelter from other field income.

Field No.19: 20 mmbbls: Low Cost with Devex of $10/bbl and Opex $9.72/bbl (2016 value): $50 oil price

In this case the field reaches its economic limit in 2031 when accumulated production attains 21.1 mmbbls. The RFES is available and used. Full relief for CT at 30% is obtained. For SC the Investment Allowance is available and utilised. Relief at 10% for decommissioning is obtained.

Field No.20: 20 mmbbls: Medium Cost with Devex of $18/bbl and Opex $15.9/bbl: $50 oil price

In this case the economic limit is reached in 2030. Cumulative production is 20.7 mmbbls. The field costs plus RFES benefits are received. For SC the benefits of the Investment Allowance are received to the extent of 93% before decommissioning. For CT relief is obtained at 30%. For SC there is considerable displacement of the Investment Allowance by the decommissioning losses clawed back. The net result is that the total relief is at the rate of 32.5%.

Field No.21: 20 mmbbls: High Cost with Devex $26/bbl and Opex $20.9/bbl: $50 oil price

In this case, in the unlikely event that the field were developed, the costs are recovered but only 23% of the eligible RFES benefits and none of the benefits of the Investment Allowance are received. No CT nor SC are paid and there is no decommissioning relief.

Field No.21: 20 mmbbls: High Cost: $60 oil price

In this case the field costs are recovered and the RFES benefits are received but only 13% of the Investment Allowance can be used before decommissioning. Decommissioning relief is at the rate of 27.5% overall with incomplete relief for CT as well as SC due to insufficient taxable income, and, for the SC, displacement of all the available Investment Allowance.

Field No.22: 50 mmbbls: Low Cost with Devex $10/bbl and Opex $10.16/bbl: $50 oil price

In this case the economic limit is reached in 2035 when 50 mmbbls have been recovered. There is full recovery of costs plus RFES benefits plus all the Investment Allowance for SC. Decommissioning relief is at 40% with full relief for both CT and SC.

These findings are repeated in the cases with future oil prices of $40 and $60 in real terms.

Field No.23: 50 mmbbls: Medium Cost with Devex $17/bbl and Opex $17.28/bbl: $50 oil price

In this case the costs are recovered and all the RFES benefits received. But only 87% of the Investment Allowance before decommissioning can be utilised. Decommissioning relief at 30% is achieved for CT but there is some displacement of the Investment Allowance for SC giving an overall rate of 32.4%.

For this field at the $40 oil price the field costs are deducted in full but only 58% of the RFES benefits are utilised and none of the Investment

Allowance for SC even before decommissioning. There is no decommissioning relief for CT nor SC. None was paid. At the $60 oil price all costs are deducted plus the RFES benefits and the Investment Allowance. In this case full relief for decommissioning costs at 40% is obtained.

<u>**Field No.24**</u>: <u>50 mmbbls</u>: <u>High Cost with Devex $25/bbl and Opex $21.4/bbl</u>: <u>$50 oil price</u>

In this case, while costs are deducted, only 21% of the potential RFES benefits are realised and none of the Investment Allowance (before decommissioning). There is no decommissioning relief. No CT nor SC are paid. The field is non-viable.

On this field at the $60 price the field costs are deducted and the full benefits of the RFES are received. But only 1% of the Investment Allowance is utilised before decommissioning. Only a very small amount of CT is payable and decommissioning relief is greatly constrained to 1.5% in total.

<u>**Field No.25**</u>: <u>100 mmbbls</u>: <u>Low Cost with Devex of $10/bbl and Opex $10.4/bbl</u>: <u>$50 oil price</u>

In this case total recovery is 102.9 mmbbls with COP in 2039. All costs are deducted, and the full benefits of the RFES and Investment Allowance are received before decommissioning. Full relief for decommissioning costs at 40% is obtained.

At the $40 price all costs are deducted and the full benefits of the RFES and Investment Allowance are received. Full relief for decommissioning costs at 40% is obtained. At the $60 price there is a similar pattern of results.

Field No.26: 100 mmbbls: Medium Cost with Devex $17/bbl and Opex $17.6/bbl: $50 oil price

In this case all field costs are deducted and all the RFES benefits are received, but only 98% of the Investment Allowance before decommissioning. For CT decommissioning relief is fully available at 30% but for SC there is substantial displacement of the Investment Allowance from 98% to 77%. The net result is that overall relief is 32.2%.

At the $40 price the field costs are deducted but only 58% of the RFES benefits are received and no Investment Allowance before decommissioning. There is no tax paid and thus no decommissioning relief.

At the $60 price all the field costs are deducted, and the full benefits of the RFES and Investment Allowance are received. Decommissioning relief is available in full at the combined rate of 40%.

Field No.27: 100 mmbbls: High Cost with Devex $24/bbl and Opex $22.7/bbl: $50 oil price

In this case the field costs are deducted but only 21% of the potential RFES benefits are received and none of the Investment Allowance. No CT nor SC are paid and there is no decommissioning relief. The field is non-viable.

With the $40 oil price only 85% of the costs are deducted with no RFES benefits and no Investment Allowance being attained. There is no decommissioning relief. With the $60 price the field costs are deducted and all the potential RFES benefits are received. But only 22% of the Investment Allowance can be utilised before decommissioning. Decommissioning relief for CT is available at 30% but for SC there is a substantial displacement of the Investment Allowance exceeding £211m. The result is that overall effective relief is at 32.8%.

D. New Fields plus Incremental Investments

Field No.28: 20 mmbbls: Medium Cost Plus Incremental Project of 5 mmbbls with First Devex in 2026: Low Cost with Devex $20/bbl and Opex $11.9 bbl: $50 oil price

In this case the economic limit is reached in 2032. All the field plus incremental project costs are deducted. All RFES benefits are received. Investment Allowances for the field and increment are utilised before decommissioning only to the extent of 98%. Relief for decommissioning is at 31.8% (similar to that for the field excluding the incremental project) due to substantial displacement of the Investment Allowance for SC. But the incremental revenues result in less of the Investment Allowance being displaced. The incremental project increases the post-tax NPV@10% by £9.72m.

With $40 price the field and incremental project costs are deductible and 88% of the RFES benefits are obtained. But none of the Investment Allowances for SC before decommissioning are obtainable. No tax is paid and there is no decommissioning relief. The post-tax NPV for the field and project combined are improved but show negative values.

With $60 oil price all field and project costs are deducted and full RFES benefits and Investment Allowance are obtained. Full decommissioning relief at 40% is obtained. The post-tax NPV@10% for the whole field is significantly enhanced by the incremental project.

Field No.29: 20 mmbbls: Medium Cost Plus 10 mmbbls Incremental Project Starting 2026 with Devex $20/bbl and Opex $15.6/bbl: $50 oil price

In this case the economic limit is reached in 2036. The mother field and incremental costs are deducted. Full RFES benefits are received and 97% of the Investment Allowances for SC. Decommissioning relief for CT and SC is obtained at 32.3% (similar to that for the field excluding the incremental project) due to a significant displacement of the Investment Allowance. But the incremental revenues result in less of the Investment Allowance being displaced. The post-tax NPV@10% for the whole field is significantly enhanced by the incremental project.

At $40 price the field and project costs are deducted. Ninety-eight per cent of the RFES benefits are received, but none of the Investment Allowances before decommissioning relief. No tax is paid and there is no decommissioning relief.

At $60 oil price all the field and project costs are deducted. Full benefits of the RFES and Investment Allowances are obtained. Full decommissioning relief at 40% is obtained. The incremental project significantly enhances the post-tax NPV@10% for the whole field.

<u>Field No.30</u>: <u>20 mmbbls</u>: <u>Medium Cost Plus 12 mmbbls Incremental Project Starting in 2026 with Devex $20/bbl and Opex $15.8/bbl</u>: <u>$50 oil price</u>

In this case the economic limit is reached in 2037. All the field costs are deducted. The full benefits of the RFES and 97% of the Investment Allowances are obtained. Decommissioning relief for CT and SC is at a combined rate of 32.1% (similar to that for the field excluding the incremental project) with some displacement of the Investment Allowance. But the incremental revenues result in less of the Investment Allowance being displaced.

At $40 oil price, while costs are deducted and RFES benefits are received, only 1% of the Investment Allowances before decommissioning are obtained. Only a tiny amount of CT is paid. Effective decommissioning relief is at 4% due to the lack of taxable income.

At $60 oil price the full costs are deducted, all RFES benefits are received, and the Investment Allowances are fully utilised. Decommissioning relief for CT and SC at a combined rate of 40% is received. The incremental project adds significantly to the overall post-tax NPV@10% of the whole field.

<u>Field No.31</u>: <u>50 mmbbls field</u>: <u>Medium Cost with Incremental Project of 10 mmbbls Starting in 2026 with Devex $20/bbl and Opex $15.6/bbl</u>: <u>$50 oil price</u>

The economic limit for this field plus project is reached in 2036. All the field and project costs are deducted. The full RFES benefits and 86% of the Investment Allowances are received before decommissioning. Decommissioning relief at the combined rate of 32.2% (similar to that for the field excluding the incremental project) is obtained with some displacement of the Investment Allowance. But the incremental revenues result in less of the Investment Allowance being displaced. The incremental project still adds significantly to the post-tax NPV of the whole filed.

At $40 price the field and project costs are deducted, but only 65% of the RFES benefits and none of the Investment Allowance before decommissioning are obtained. No CT and no SC are paid and no decommissioning relief is obtained.

At $60 price all the field and project costs are deducted and the full benefits of the RFES and Investment Allowance are received. Decommissioning relief is at 40%. The incremental project adds significantly to the post-tax NPV@10% of the whole field.

<u>**Field No.32**</u>: <u>50 mmbbls</u>: <u>Medium Cost with 20 mmbbls Incremental Project Starting in 2026 with Devex $20/bbl and Opex $15.6/bbl</u>: <u>$50 oil price</u>

In this case the economic limit is reached in 2039. The field and project costs are fully deducted and all the benefits of the RFES are received. But only 91% of the Investment Allowances are received. Decommissioning relief at 32.6% (similar to that for the field excluding the incremental project) is obtained with significant displacement of the Investment Allowance. But the incremental revenues result in less of the Investment Allowance being displaced. The incremental project adds significantly to the post-tax NPV@10% of the whole field.

At the $40 price the field and project costs are deducted but only 75% of the benefits of the RFES are obtained. None of the Investment Allowance benefits are obtained before decommissioning. No tax is paid and no decommissioning relief is received.

At the $60 price all costs are deducted and the full benefits of the RFES and Investment Allowance are obtained. Decommissioning relief is at 40%.

<u>Field No.33</u>: <u>50 mmbbls</u>: <u>Medium Cost with 30 mmbbls Incremental Project Starting in 2026 with Devex $20 per bbl and Opex $15.48/bbl</u>: <u>$50 oil price</u>

In this case the economic limit is reached in 2041. All the field and project costs are deducted and all the benefits of the RFES are received, but only 95% of the Investment Allowances. Decommissioning relief is at 32.2% (similar to that for the field excluding the incremental project) with some displacement of the Investment Allowance. But the incremental revenues result in less of the Investment Allowance being displaced. The project adds significantly to the post-tax NPV@10% for the whole field.

At the $40 price all the costs of the field and project are deducted, and 89% of the RFES benefits are obtained, but none of the Investment Allowances are utilised before decommissioning. No tax is paid and there is no decommissioning relief.

At $60 price all the costs are deducted and the full benefits of the RFES and Investment Allowance received. Decommissioning relief is at

40%. The incremental project makes a major contribution to the post-tax NPV@10% of the whole field.

Field No. 34: 100 mmbbls: Medium Cost with 30 mmbbls Incremental Project Starting in 2026 with Devex $20/bbl and Opex $15.48/bbl: $50 oil price

In this case the economic limit is reached in 2041. All the field and project costs are deducted and all the benefits of the RFES and Investment Allowance are received before decommissioning. Decommissioning relief at 33.7% is obtained. There is some displacement of the Investment Allowance. But the incremental revenues result in less of the Investment Allowance being displaced. The incremental project makes a significant contribution to the post-tax NPV@10% of the whole field.

At the $40 price all the field and project costs are deducted, but only 75% of the benefit of the RFES are obtained, and none of the Investment Allowance before decommissioning. No tax is paid and there is no decommissioning relief.

At the $60 price all field and project costs are deducted and the full benefits of the RFES and Investment Allowance are received. Decommissioning relief is at 40%. The incremental project makes a substantial contribution to the post-tax NPV@10% of the whole field.

Field No. 35: 100 mmbbls: Medium Cost with 50 mmbbls Incremental Project Starting in 2026 with Devex $20/bbl and Opex $15.28/bbl: $50 oil price

In this case the economic limit is reached in 2044. All the field and project costs are deducted and the full benefits of the RFES and Investment Allowance are received before decommissioning. Decommissioning relief is at 36.6% (compared to 32.2% for the field excluding the project) with a small displacement of the Investment Allowance. But the incremental revenues result in less of the Investment Allowance being displaced. The project makes a major contribution to the post-tax NPV@10% of the while field.

At the $40 oil price the field and project costs are deducted, and 91% of the RFES benefits are received. But none of the Investment Allowances are obtained before decommissioning. No tax is paid and there is no decommissioning relief5.

At $60 price all the field and project costs are deducted and all the RFES and Investment Allowance benefits are received. Decommissioning relief is at 40%. The incremental project makes a major contribution to the post-tax NPV@10% for the whole field.

<u>Field No. 36</u>: <u>100 mmbbls</u>: <u>Medium Cost with Incremental Project of 70 mmbbls Starting in 2026 with Devex $20/bbl and Opex $15.52 bbl</u>: <u>$50 oil price</u>

In this case the economic limit is reached in 2046. All the field and project costs are deducted, all the benefits of the RFES are received, and all of the Investment Allowances before decommissioning. Decommissioning relief is obtained at 38.8% (compared to 32.2% for the field without the project) with relief for SC being reduced because of a small displacement of the Investment Allowance. But the large incremental revenues result in less of the Investment Allowance being displaced compared to the position without the incremental project. The project makes a modest contribution to the NPV@10% for the whole field.

At the $40 price all the field and project costs are deducted and all the RFES benefits are received but only 5% of the Investment Allowances before decommissioning. Decommissioning relief is at only 13.3%. CT relief is only at 12.1% because of lack of taxable income. The relief for SC is very minor because of lack of taxable income and displacement of the Investment Allowance.

At the $60 price all costs are deducted and all benefits from the RFES and Investment Allowance are received. Decommissioning relief is at 40%. The project makes a major contribution to the post-tax NPV@10% for the whole field.

Detailed comparative charts showing decommissioning relief for all the fields in relation to prices, unit costs, and vintages of development and COP are shown in the Appendix.

E. Comparison of Investors Currently in Full Tax-Paying Position and those without Tax Shelter: A Case Study

The effectiveness of relief available to investors in oil and gas fields depends on several factors as has been highlighted above. Their current tax-paying position is an important factor. The analysis above has concentrated on the position of investors who are not currently able to obtain relief for expenditures against income from other fields. But some investors may be able to obtain tax shelter against other income from the UKCS. Potentially the difference between the extent of effective reliefs is significant. In this section the results of a detailed analysis is reported which measure these differences.

For this purpose the 20 million bbls field was chosen as being representative of the size of new fields in the UKCS. The analysis was conducted under the same low cost, medium cost, and high cost assumptions as employed in Section C. Similarly, oil prices of $40, $50 and $60 in real terms were employed. The investor currently in a tax-paying position obtains early relief for his initial investment against income from other fields in the form of the capital allowances for CT and SC. The Investment Allowance for SC is, however, constrained to the income from the new field. Decommissioning relief is obtained against the income from other fields. The effects of the difference in tax treatment are shown in terms of post-tax NPVs, rates of utilisation of the Investment Allowance, and rates of effective decommissioning relief.

In Table 1 these comparative effects are shown under the low cost and $50 price assumptions.

Table 1

Comparative Effects of Different Investor Tax Positions on Low Cost, 20 mmbbls field, $50 price

	Project Investor	Full Tax-Paying Investor
NPV@10% (£m. 2016)	130.0	133.1
NPV/I@10%	1.01	1.03
Investment Allowance used:		
a) pre-decommissioning	100%	100%
b) post-decommissioning	100%	100%
Effective decommissioning relief	40%	40%

In this case there is no difference in the rates of decommissioning relief nor of the utilisation of the Investment Allowance. The NPV is higher for the investor already in a tax-paying position because of the earlier relief for investment costs which, at the 10% real discount rate, is more valuable than the loss of the RFES which employs a discount rate of 10% in MOD terms. The cash flow to the investor is higher using the RFES allowance at low discount rates. It should be emphasised that the case in Table 1 reflects very low investment costs for the field ($10/bbl in real terms).

The above findings were repeated in the $40 and $60 oil price cases and are not shown here.

In Table 2 the results are shown for the medium cost case (investment cost of $18/bbl) at the $50 price. It is seen that there is a major difference in the post-tax position of the investors. The project investor receives decommissioning relief at 32.5%, involving significant displacement of the Investment Allowance. He was also unable to utilise all his Investment Allowance before decommissioning. The full tax-paying investor obtains decommissioning relief at 40% and was able to utilise all his Investment Allowance because of his ability to obtain relief for his field investment against other income and thus not have to rely on the RFES. The increase in NPV is significant and emanates from the early relief for the initial field investment.

Table 2

Comparative Effects of Different Investor Tax Positions on Medium Cost, 20 mmbbls field, $50 price

	Project Investor	Full Tax-Paying Investor
NPV@10% (£m. 2016)	32.4	40.8
NPV/I@10%	0.14	0.18
Investment Allowance used:		
a) pre-decommissioning	93%	100%
b) post-decommissioning	76%	100%
Effective decommissioning relief	32.5%	40%

In Table 3 the results are shown for the medium cost case with $40 oil price. The NPVs are negative for both investors, but it is seen that there is a major improvement when the investor is in a full tax-paying position. The project investor is unable to utilise his Investment Allowance at all, given that he is using the RFES and income is very constrained at this oil price. The investor who obtains tax relief for his initial investment against other income is able to utilise the Investment Allowance and, of course, obtains relief for decommissioning against other income.

Table 3

Comparative Effects of Different Investor Tax Positions on Medium Cost, 20 mmbbls field, $40 price

	Project Investor	Full Tax-Paying Investor
NPV@10% (£m. 2016)	- 33	-10.7
NPV/I@10%	- 0.14	-0.05
Investment Allowance used:		
a) pre-decommissioning	0%	100%
b) post-decommissioning	0%	100%
Effective decommissioning relief	0%	40%

Table 4

Comparative Effects of Different Investor Tax Positions on Medium Cost, 20 mmbbls field, $60 price

	Project Investor	Full Tax-Paying Investor
NPV@10% (£m. 2016)	85.5	92.2
NPV/I@10%	0.37	0.40
Investment Allowance used:		
a) pre-decommissioning	100%	100%
b) post-decommissioning	100%	100%
Effective decommissioning relief	40%	40%

In Table 4 the results are shown for the medium cost field with $60 oil price. It is seen that the difference in post-tax NPVs is not very marked. Full relief is available to the project investor for decommissioning as is full utilisation of the Investment Allowance before decommissioning.

In Table 5 the results are shown for the high cost field (investment costs of $26/bbl) at the $50 oil price. It is seen that the field is not commercially viable but the returns are significantly improved for the investor in a tax-paying position. He is able to set his capital allowances against income from other fields and still have sufficient income available to utilise his Investment Allowance. He also obtains full relief for decommissioning costs. The project investor does not have enough income available after using the RFES to utilise the Investment Allowance, and obtains no tax relief for the decommissioning costs.

Table 5

Comparative Effects of Different Investor Tax Positions on High Cost, 20 mmbbls field, $50 price

	Project Investor	Full Tax-Paying Investor
NPV@10% (£m. 2016)	- 95.5	- 44.7
NPV/I@10%	- 0.28	- 0.13
Investment Allowance used:		
a) pre-decommissioning	0%	100%
b) post-decommissioning	0%	100%
Effective decommissioning relief	0%	40%

Table 6

Comparative Effects of Different Investor Tax Positions on Medium Cost, 20 mmbbls field, $40 price

	Project Investor	Full Tax-Paying Investor
NPV@10% (£m. 2016)	- 178.8	- 96.4
NPV/I@10%	- 0.53	- 0.29
Investment Allowance used:		
a) pre-decommissioning	0%	100%
b) post-decommissioning	0%	100%
Effective decommissioning relief	0%	40%

In Table 6 the comparative positions of the two investors are shown under high cost conditions with $40 oil price. The investment is clearly not viable after tax, but it is seen that the returns to the investor in a tax-paying position are significantly higher. He is able to obtain early relief for his initial investment costs and still utilise the Investment Allowance and obtain full relief for decommissioning. The project investor obtains no relief for decommissioning and cannot utilise his Investment Allowance.

Table 7

Comparative Effects of Different Investor Tax Positions on High Cost, 20 mmbbls field, $60 price

	Project Investor	Full Tax-Paying Investor
NPV@10% (£m. 2016)	- 11.2	7.3
NPV/I@10%	- 0.03	0.02
Investment Allowance used:		
a) pre-decommissioning	13%	100%
b) post-decommissioning	0%	100%
Effective decommissioning relief	27.5%	40%

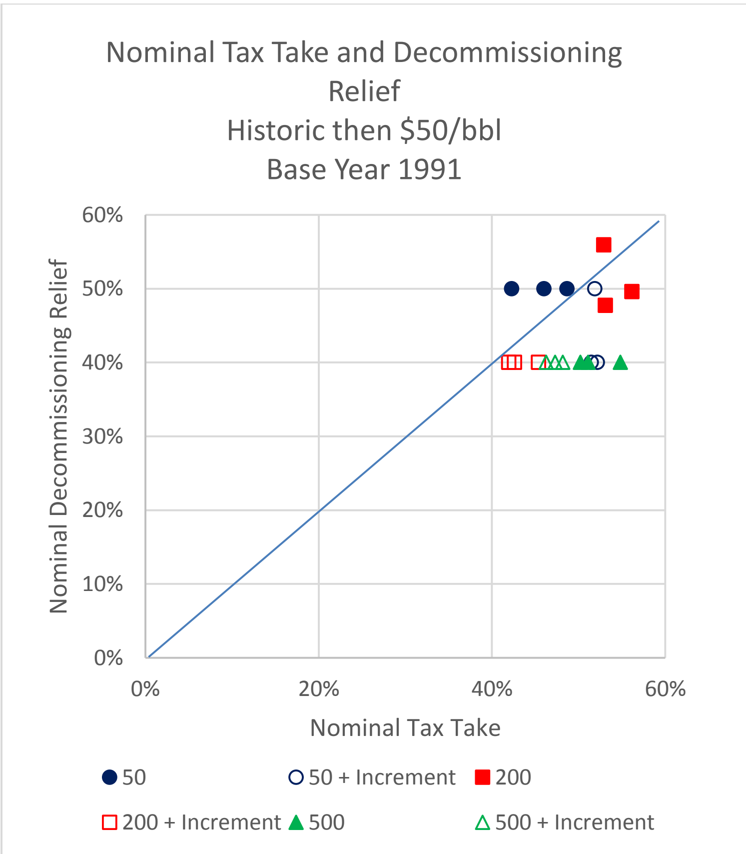
In Table 7 the results for the high cost field at $60 price are shown. The post-tax NPV@10% is seen to be negative for the project investor and positive for the investor in a full tax-paying position. The project investor obtains the RFES in full but can only utilise 13% of the Investment Allowance before decommissioning. There is no decommissioning relief and the losses displace all of the available Investment Allowance. The investor in a full tax-paying position not only utilises 100% of the Investment Allowance but also receives decommissioning relief at 40%.

There is a clear pattern to the results. The lower the post-tax profitability of the investment project the greater the difference in post-tax returns between the individual project investor and one who is in a full tax-paying position. The former may not be able to utilise all his Investment Allowance before decommissioning and faces the prospect of being unable to obtain effective decommissioning relief because of inadequate income and/or displacement of the Investment Allowance. The full tax-paying investor can readily be assured of decommissioning relief and has a greater chance of being able to utilise all his Investment Allowance. Correspondingly, when pre-tax profitability is high, the difference between the post-tax returns to the two types of investors becomes progressively less. The likelihood that the project investor will be able to obtain effective decommissioning relief and utilise all his Investment Allowance increases.

F. Relationship between Effective Tax Takes and Rates of Decommissioning Relief

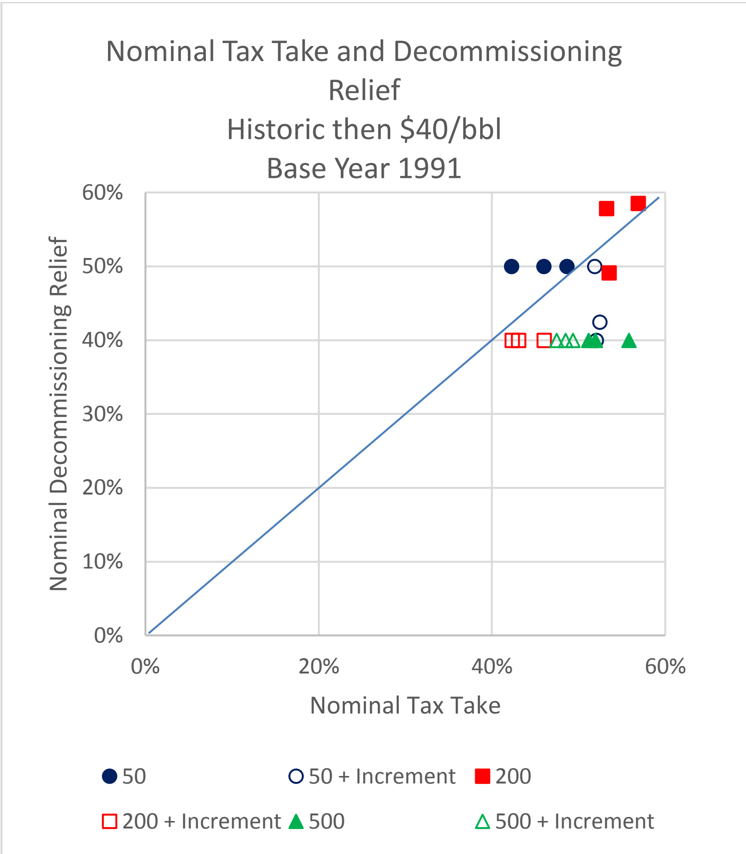
It was thought useful to compare the effective life time tax takes on the sets of representative fields with the rates of effective tax relief. For this purpose the effective rate of tax take was measured before decommissioning relief. For the old 1991 fields the modelling incorporates all the tax changes made since that base year. In Chart 1 the results are shown in nominal or MOD terms for the fields developed in the early 1990's under all cost assumptions. Future oil prices are $50 in real terms. Incremental projects developed are also included as extra cases and incorporated with the main field. In many cases the effective rate of relief is 40% while the effective rate of tax is within the range 42%-56%. On the 200 mmbbls field the effective rate of relief is within the range, and the effective rate of tax is within the range 53%-56%. On the other hand in the 50 mmbbls field the effective rate of relief is 50% in all cases while the effective tax rate is within the range 42%-49%. This latter result reflects the various tax allowances, particularly for PRT, which historically helped smaller fields relatively more than larger ones. Decommissioning relief for the 50 mmbbls field is also at a higher rate than for the 500 mmbbls cases because the former field reaches its economic limit earlier in time when tax rates for relieving decommissioning losses were higher than those from 2016 onwards.

Chart 1



In Chart 2 the results are shown in the case where future oil prices are $40 in real terms. There is one noteworthy difference in the pattern of results. The earlier attainment of the economic limit and the lower future production revenues for the 200 mmbbls field results in a higher rate of relief because the losses are clawed back further into periods where the tax rates are higher. At the same time effective tax rates are generally unchanged.

Chart 2



In Chart 3 the results are shown for the case where the future oil price is $60 in real term. In this case the main difference from the results in Charts 1 and 2 is that the effective rates of relief for the 200 mmbbls field are lower. This is because the production revenues are higher and the losses do not need to be clawed back so far into years when the tax rates were higher. Effective tax rates on the whole field remain unchanged.

Chart 3

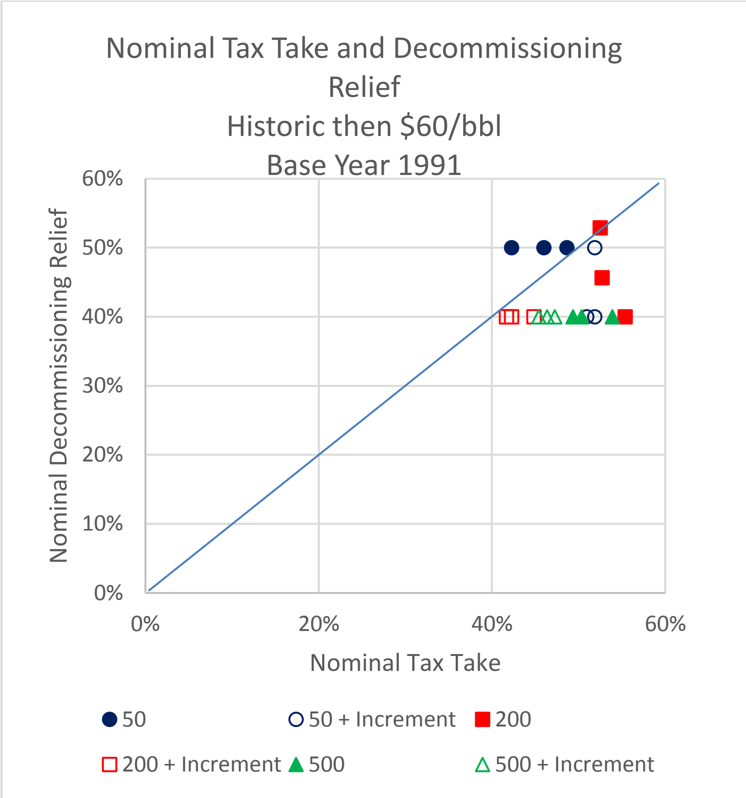
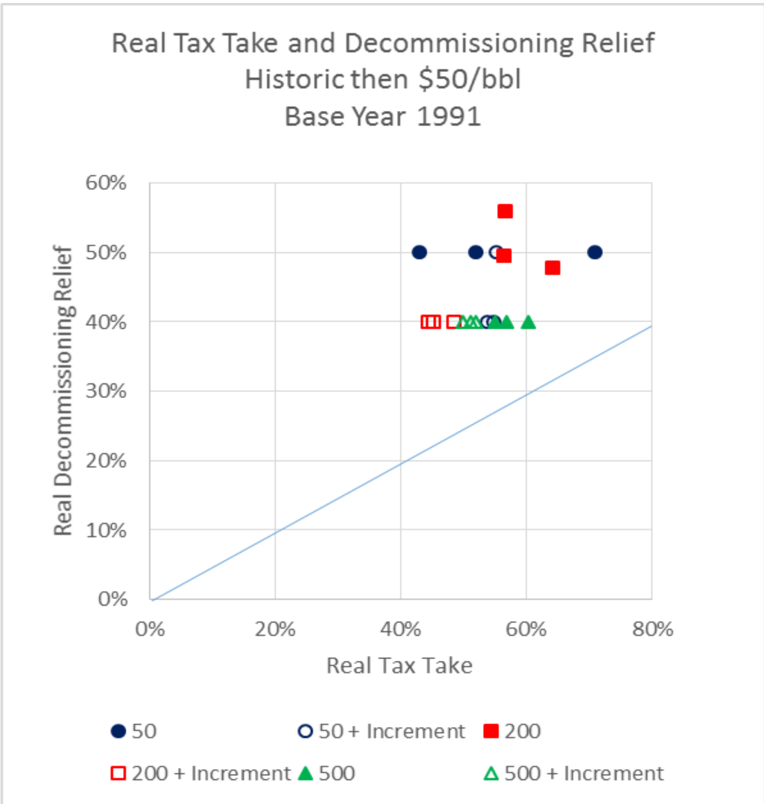


Chart 4



In Chart 4 the tax takes and rates of decommissioning relief for the 1991 fields are shown in real terms with future oil prices of $50. This takes account of the considerable inflation which has occurred since then. The main difference compared to the findings in MOD terms is that, measured in real terms, tax takes in many cases are significantly higher, while decommissioning relief rates remain largely unchanged. This finding is replicated in the case where future oil prices are $40 (Chart 5) and in the case where they are $60 (Chart 6).

Chart 5

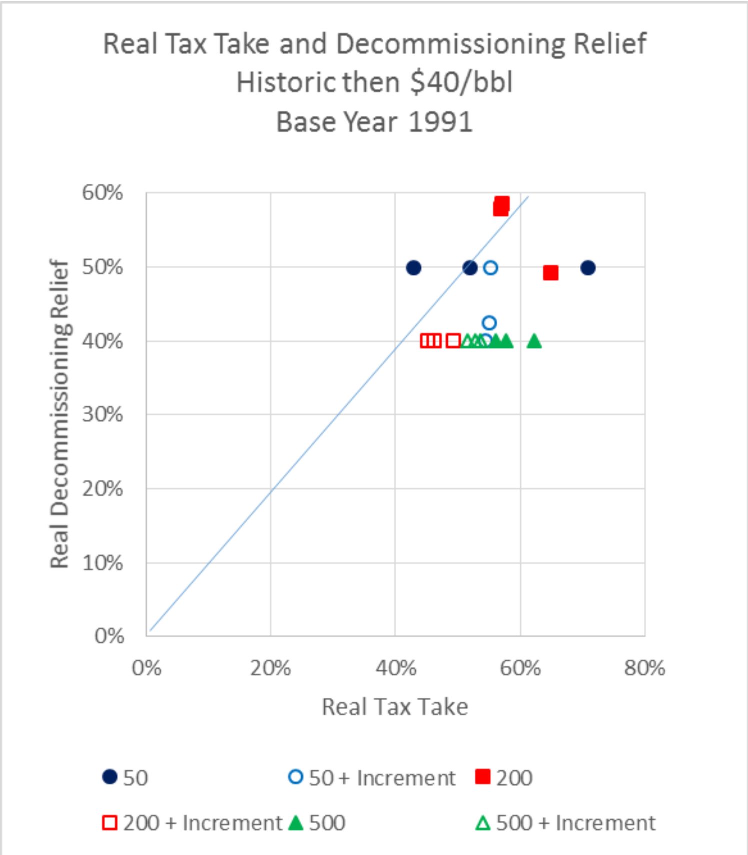
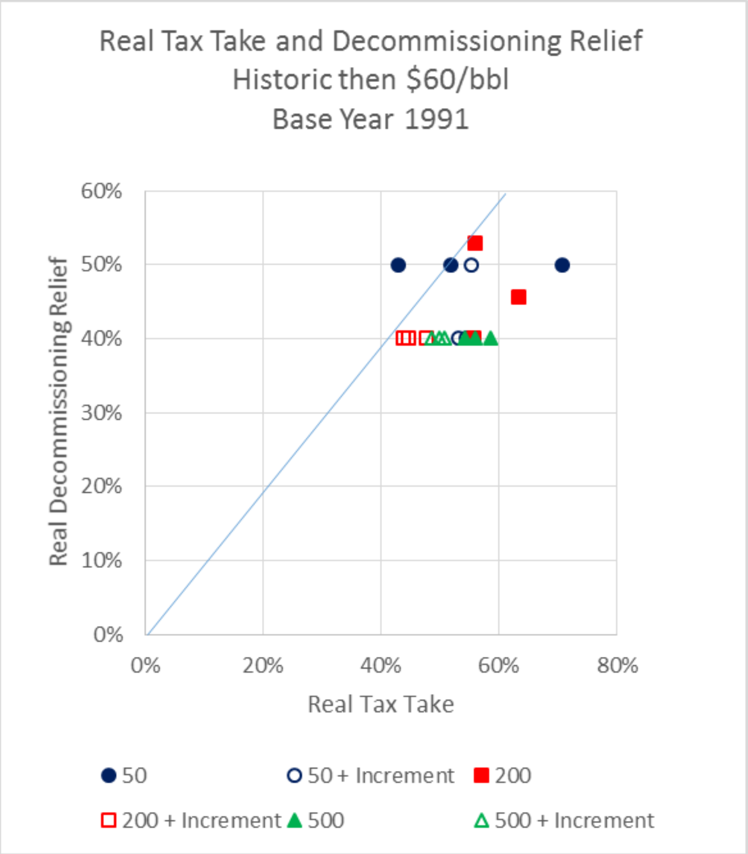


Chart 6



In Chart 7 effective tax rates and decommissioning relief rates in MOD terms are shown for the fields developed from 2016 where the oil price is $50 in real terms. It is seen that in the majority of cases effective rates of relief are in the 32%-36% range along with effective tax rates in the 20%-30% range. There are a few outlier observations reflecting situations of extremely low or substantial profitability.

Chart 7

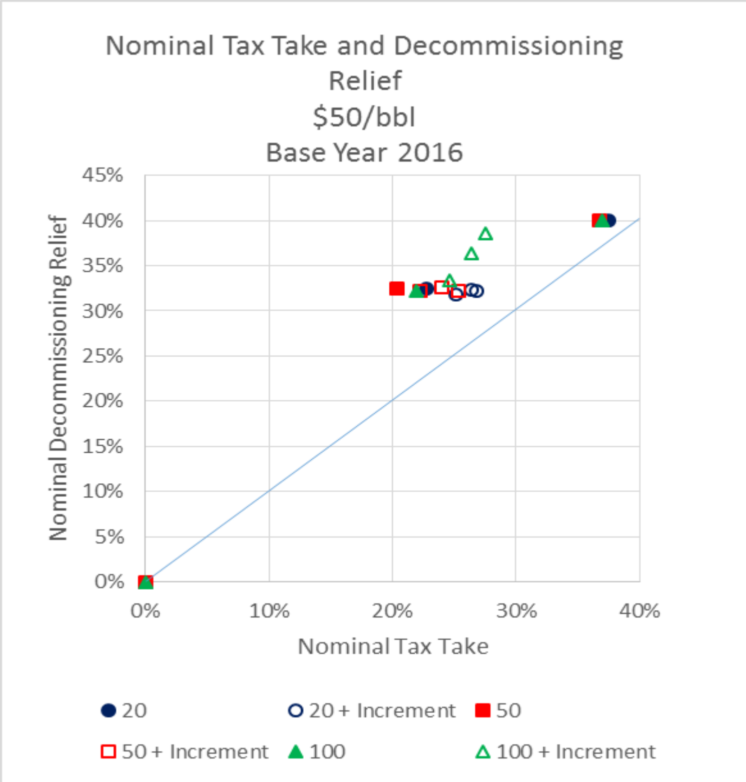
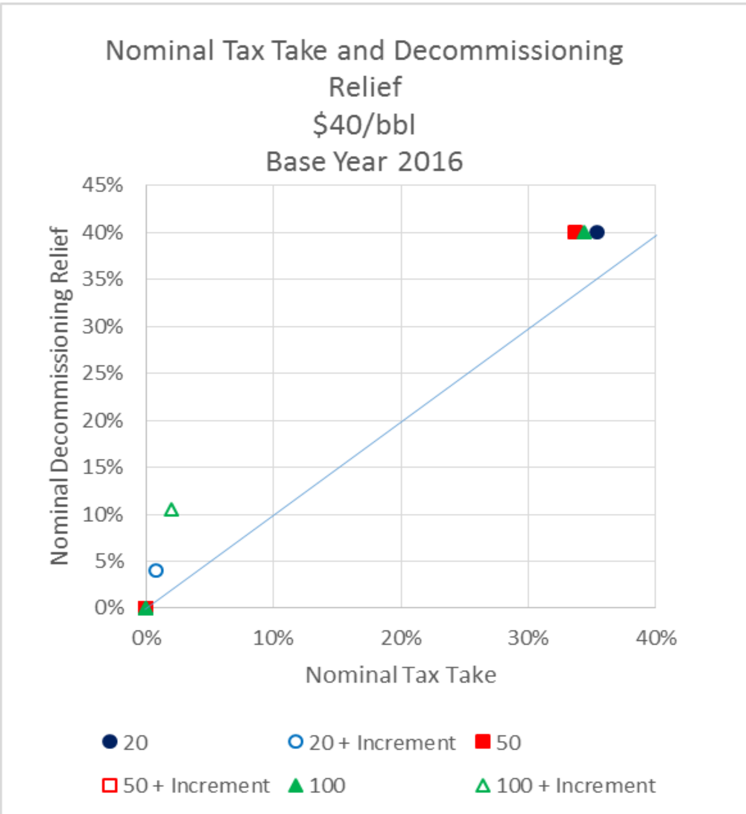


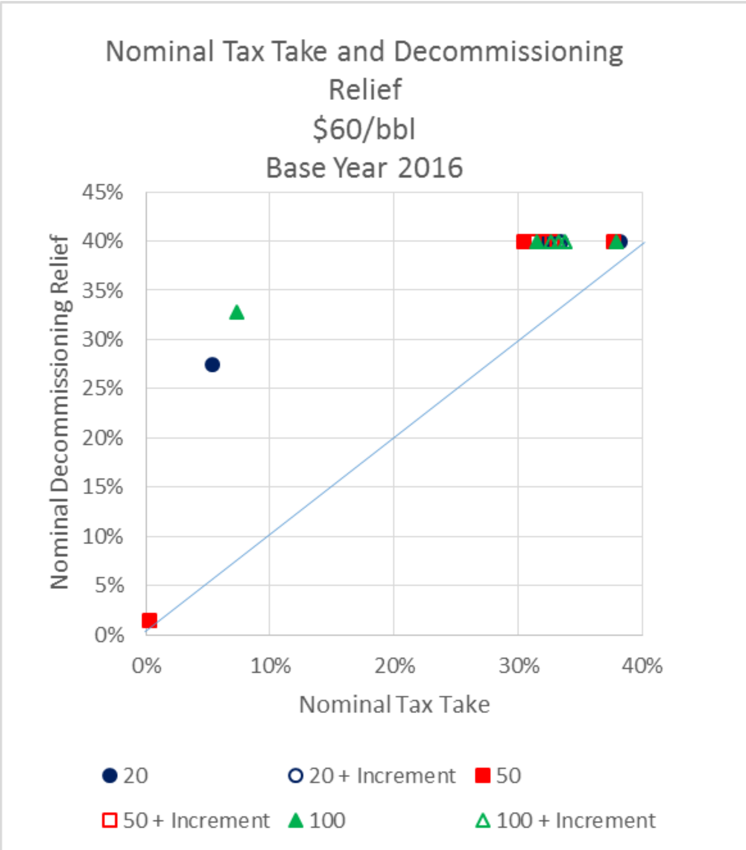
Chart 8



Under the $40 price case (Chart 8) extreme values were found with rates of effective tax and decommissioning along with relief at 0% being found. Only in exceptional cases were tax rates in the 30%-35% range along with decommissioning relief at 40% found. The investments are generally uneconomic.

At the $60 price a high proportion of the observations have decommissioning relief at 40% along with effective tax takes in the 30%-40% range (Chart 9). There are still cases where profitability is very low and so observations were found where very low effective tax rates and rates of decommissioning relief were experienced.

Chart 9



Tax takes and rates of decommissioning relief were also a calculated in real terms. The results for the oil price cases of $50, $40, and $60 are shown in Charts 10, 11 and 12. It is seen that they differ very little from those in MOD terms. This is because of the low rates of future inflation assumed in the modelling. This is in contrast to the experience of inflation in the historic period from 1991.

Chart 10

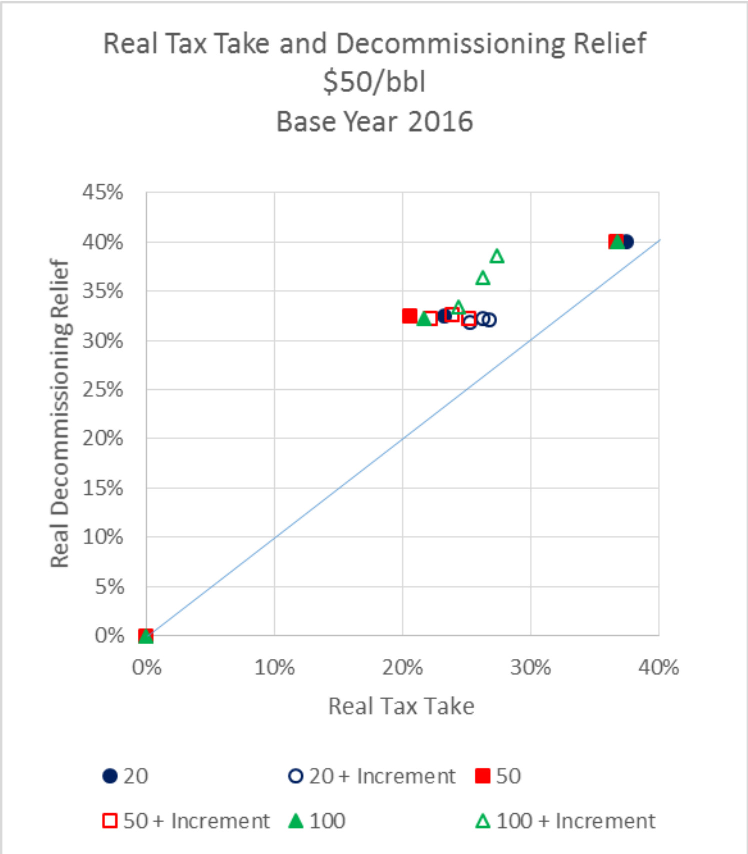


Chart 11

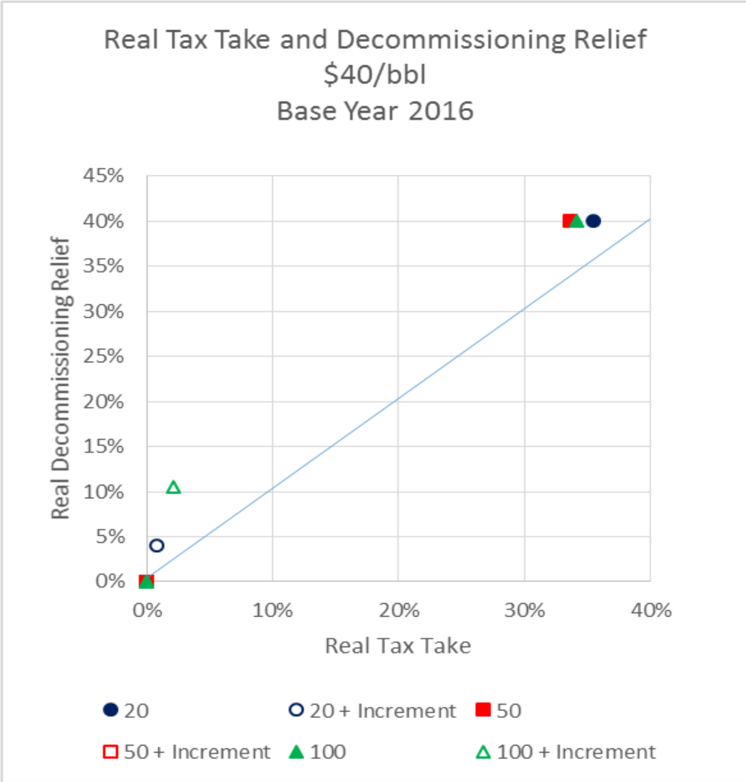
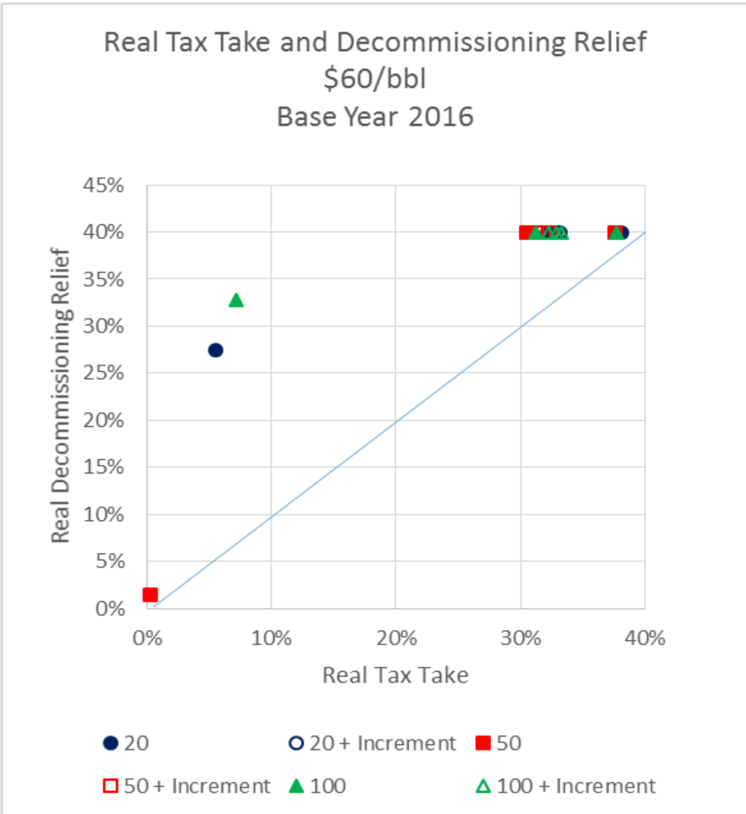
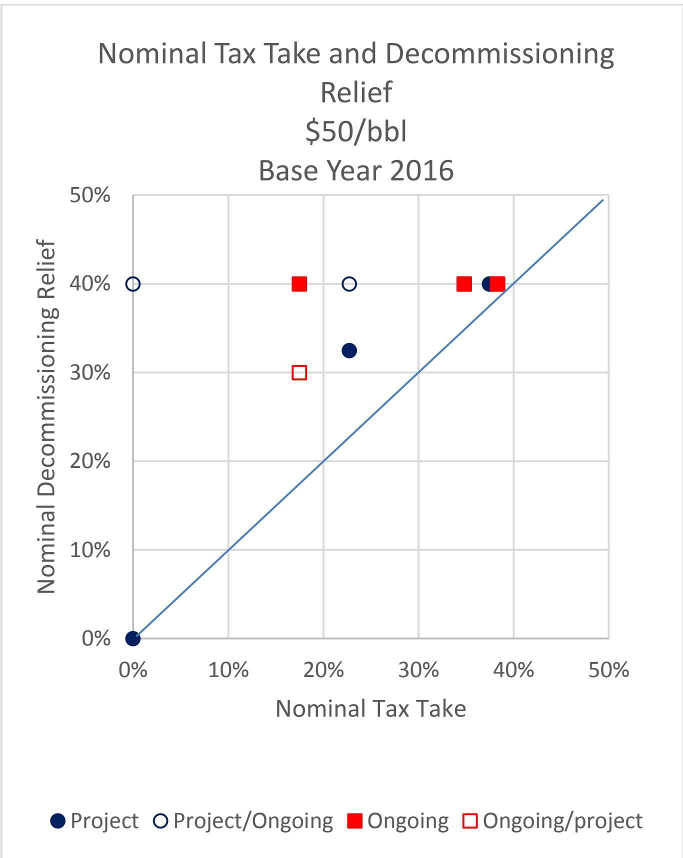


Chart 12



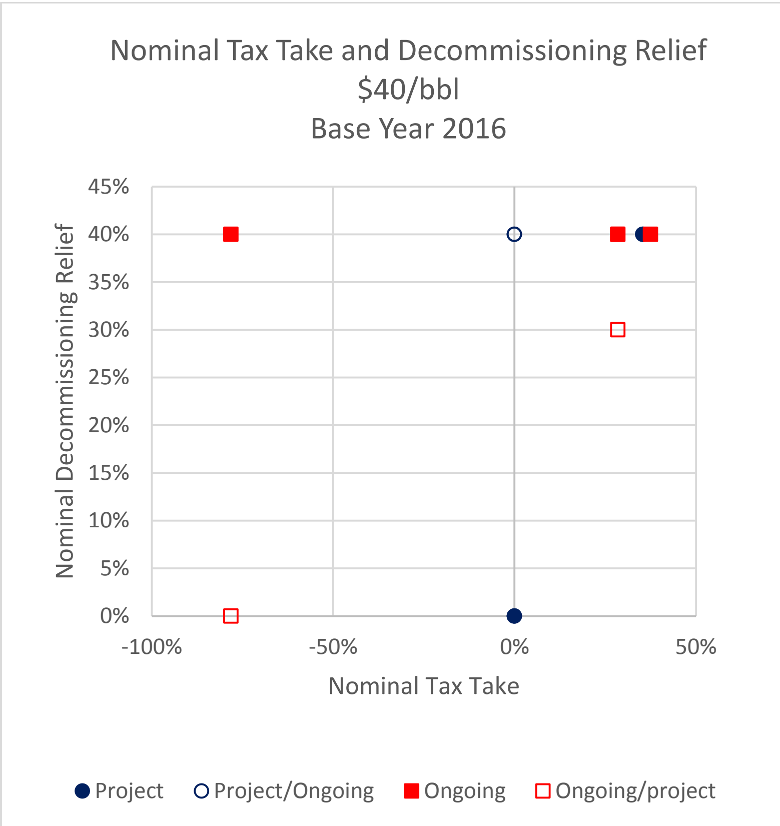
A comparison of the effective rates of tax and decommissioning relief was made between investors in a tax-paying position and those without tax shelter. The results for the $50 price are shown in Chart 13. Investors in a full tax-paying position (termed ongoing in Chart 13) can obtain tax relief on their initial investment and for decommissioning against other income from the UKCS, and in normal circumstances would obtain decommissioning relief at 40%, whereas investors without tax shelter can have restricted relief due to inadequate income and/or displacement of the Investment Allowance. Effective tax rates on the fields are generally in the range 18%-38% reflecting the reliefs against other field income and the Investment Allowance.

Chart 13



In Chart 14 the results for the $40 price case are shown. They are outliers in the sense that the investments are generally unprofitable and the negative rates of tax reflect relief against other income for investors with tax shelter as does the decommissioning relief.

Chart 14



In Chart 15 the results are shown for the $60 oil price. In the majority of cases decommissioning relief is at 40% and the tax takes are in the 30%-40% range.

Chart 15

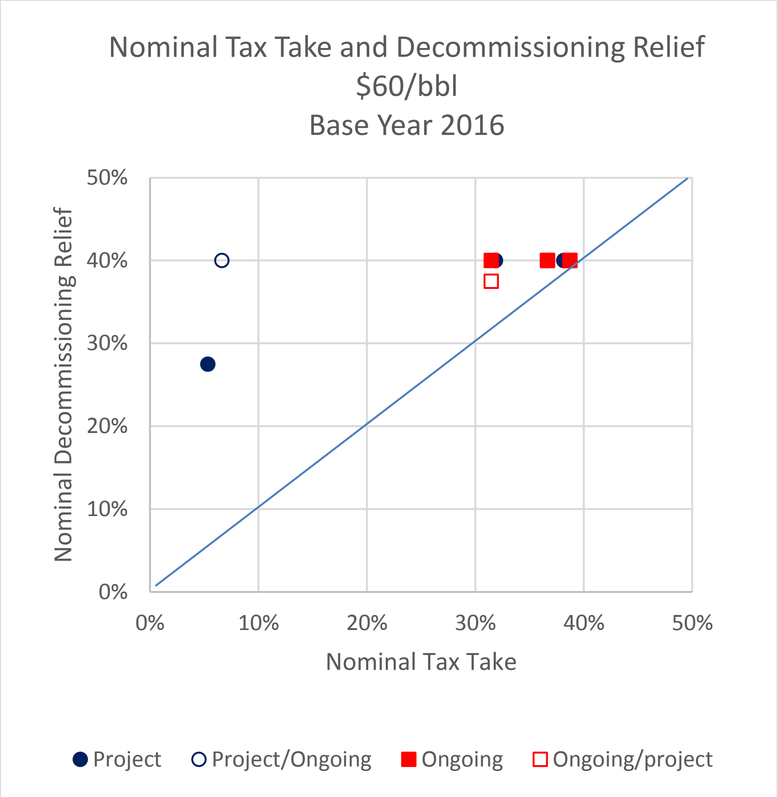
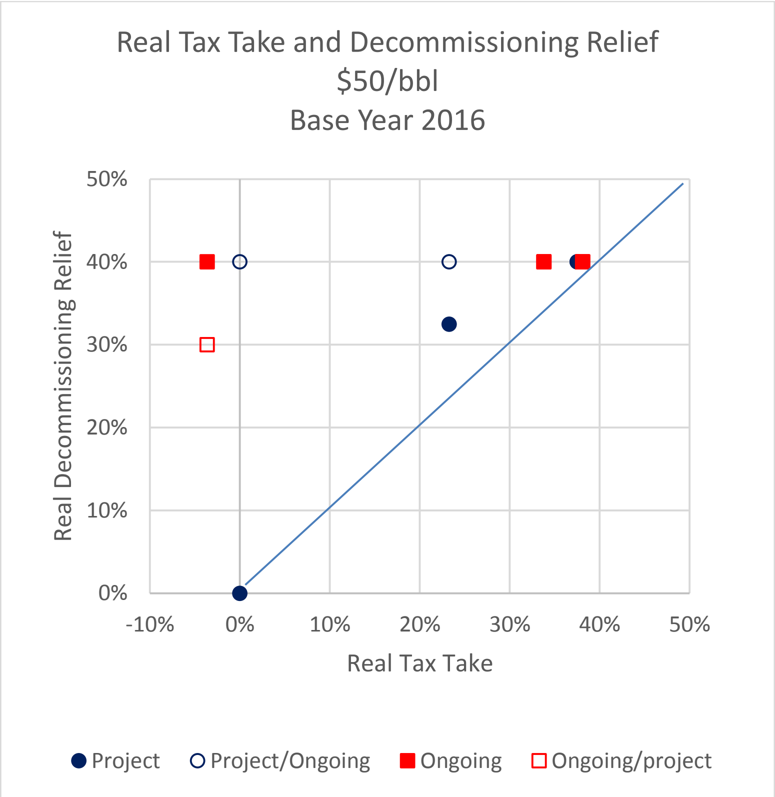
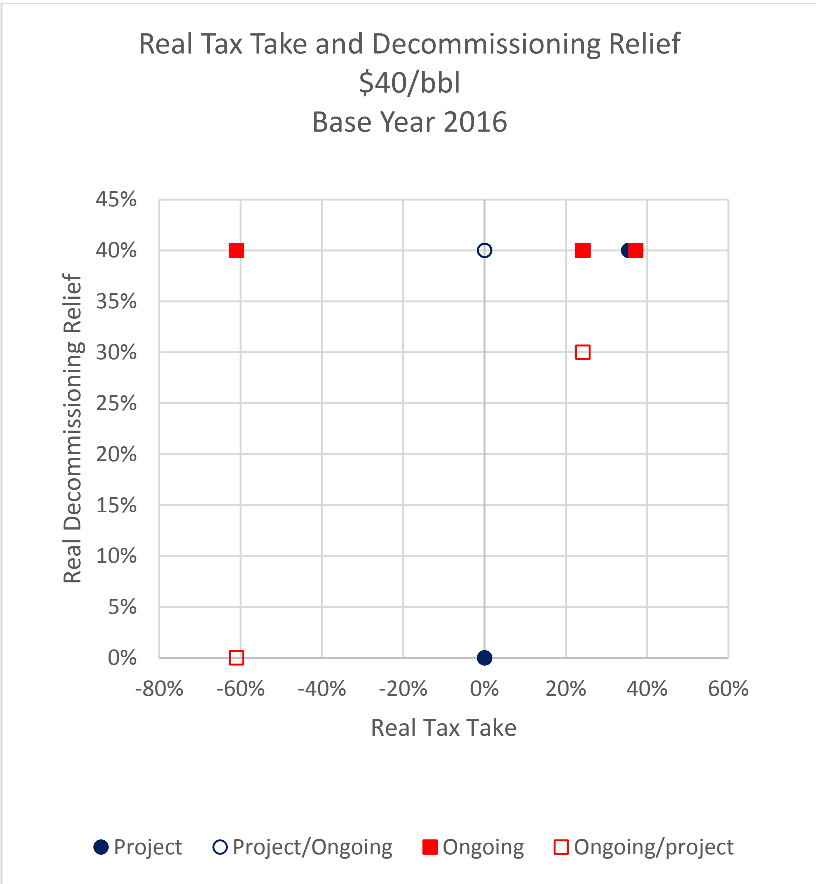


Chart 16



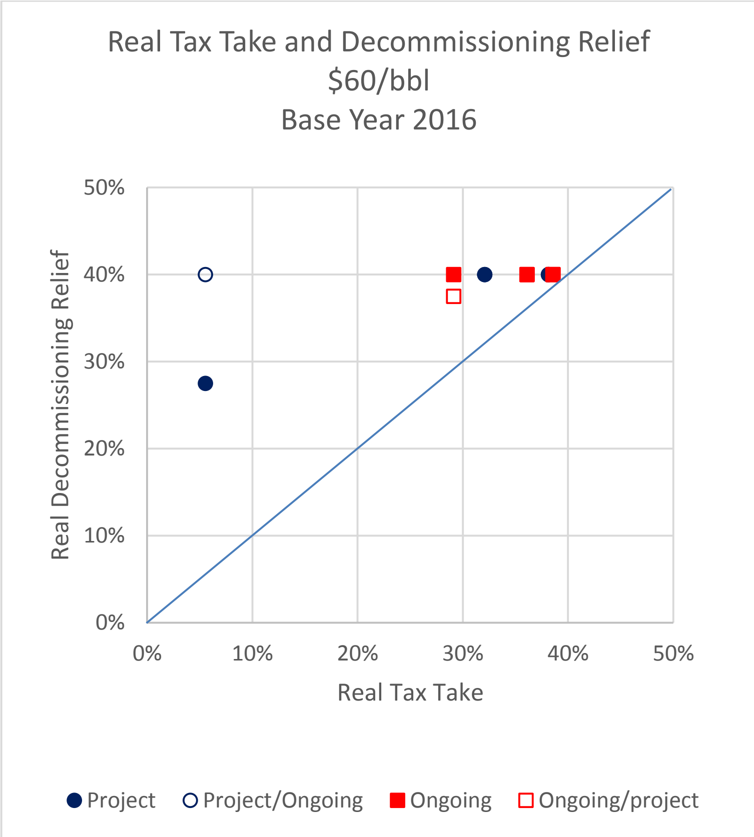
In Chart 16 the results are shown for the tax takes and decommissioning relief in real terms at the $50 price. Rates of decommissioning relief are generally unchanged compared to the results in MOD terms, but effective tax takes for investments of very low profitability are lower for investors with tax shelter due to the advantage of early relief for the investments.

Chart 17



In Chart 17 the real tax takes and decommissioning relief are shown for the $40 price case. The investments are mostly uneconomic and the low tax rates and rates of decommissioning relief reflect the tax advantages to investors with tax shelter.

Chart 18



In Chart 18 the results are shown for the $60 price case. In this case the pattern of results is very similar to those in MOD terms reflecting the higher profitability of the individual investments and the low inflation.

5. Summary and Conclusions

In this study the economic and taxation aspects of decommissioning fields in the UKCS have been examined. The twin objectives have been (1) to calculate decommissioning relief in the different plausible circumstances, and thus to elucidate the complexities of the tax arrangements relating to the activity, and (2) to assess whether they are consistent with the objective of procuring maximum economic recovery from the province. Thus incremental investments should not be discouraged and there should not be incentives via the tax system which could encourage the acceleration of cessation of production (COP) compared to the pre-tax economic limit. Ineffective relief for decommissioning should also not adversely affect asset values in late field life and inhibit asset transactions which are otherwise desirable to promote maximum economic recovery.

The study involved financial simulation modelling with a substantial number of representative oil fields in two main categories. The first category relates to fields developed in the early 1990's. The fields were designed to represent a typical range of sizes and costs of that vintage. The oil prices and inflation factors employed were those actually experienced in the historic period to 2015. Future oil price scenarios of $40, $50, and $60 in real terms were employed. The modelling incorporated all the complexities of the tax system, including PRT, CT and SC, and the many changes made since the early 1990's. The detailed tax arrangements for relief for decommissioning costs have been modified significantly over the years, and the modelling has incorporated all these changes. The second set of representative fields relates to new ones with first development in 2016. Their sizes and costs reflect the current realities.

For the two sets of fields representative incremental projects were also employed in the study. They were presumed to be developed in the mature years of the lives of the fields. The purpose was to discover how the tax reliefs relating to decommissioning would interact with the incremental projects and their associated allowances. Again, the projects chosen were representative of the sizes and costs of the two vintages.

The financial modelling calculated the pre-tax and post-tax returns to the fields and fields plus incremental projects with emphasis on NPVs. The effective rates of relief for decommissioning and the effective rates of tax on the fields were calculated and highlighted. Sensitivity analysis was undertaken to enhance understanding of the effects of the taxation arrangements.

On the old fields subject to PRT, CT, and SC it was found that the 50 mmbbls field reached its COP date in 2010 when positive PRT rates still existed, but did not pay the tax because of a combination of the investment capital allowances and uplift, and the oil allowance. There was no effective PRT relief because of the displacement of the oil allowance by the losses clawed back. On the 50 mmbbls representative field the overall rate of relief was found to be 50%. When incremental projects were introduced field life was extended into years when the PRT rate was 0%. Effective rates of decommissioning relief then fell to 40% (CT at 30% and SC at 10%). The overall field NPV was still increased by the incremental project but the increase was reduced by the lower rate of decommissioning relief.

The 200 mmbbls field has a COP date in the period 2017-2019 depending on cost and price assumptions. With the medium cost and $50 future oil price overall decommissioning relief was found to be 56%. Relief for PRT was held down not only by the 0% tax rate, but by some displacement of the oil allowance by the losses carried back. It was also found that with a higher future price of $60 field life was extended in time but the rate of decommissioning relief fell to 53% because a larger part of the decommissioning losses were relieved at the 0% PRT rate from the bigger revenues. Correspondingly, at the lower future oil price of $40 the COP date came earlier with the result that the rate of decommissioning relief was increased to 58% because a smaller part of the losses were relieved at the 0% rate, and greater amounts were relieved at the higher PRT rates.

When incremental projects were added to the 200 mmbbls field its overall life was extended to well beyond 2025 depending on the size of the project. This meant that all of the decommissioning losses were relieved at the 0% PRT rate. Consequently the overall rate of relief fell to 40% (CT at 30% and SC at 10%), even though substantial PRT payments had been made. The incremental projects still added to the overall post-tax field NPV but the increase was reduced as a consequence of the lower rate of relief.

The life of the large 500 mmbbls field extends well beyond 2025 depending on cost and oil price assumptions. Large PRT payments are made from this field but all the decommissioning losses are relieved at the 0% rate with relief received being at 40%. The additions of incremental projects extended overall field life and relief remained at 40%.

The results indicate that the rates of relief were broadly inversely related to the length of life of the field when major changes to the tax were also taking place.

On the new fields whose development stated in 2016 the expected rate of decommissioning relief is 40% with CT at 30% and SC at 10%. However, it was found that with fields of 20, 50, and 100 mmbbls, with medium assumptions regarding investment and operating costs, at the $50 real price decommissioning losses displaced the Investment Allowance for SC to a significant effect. On all 3 fields the effective rate of relief was reduced to 32%-33%. At the $60 real price the larger revenues ensured that relief was at 40% across all 3 fields.

When incremental projects were added it was found that at the $50 real price the rate of effective relief in most cases did not change significantly.

There was displacement of the Investment Allowance but the extra revenues also extended field life. When the size of the incremental project was substantial the extra revenues could mean that the displacement of the Investment Allowance was reduced. The overall rate of relief was then found to increase to 36%-39%. In all cases the incremental project added to the overall post-tax NPV.

In all cases it was found that at the $60 price relief was at 40% when the incremental projects were added.

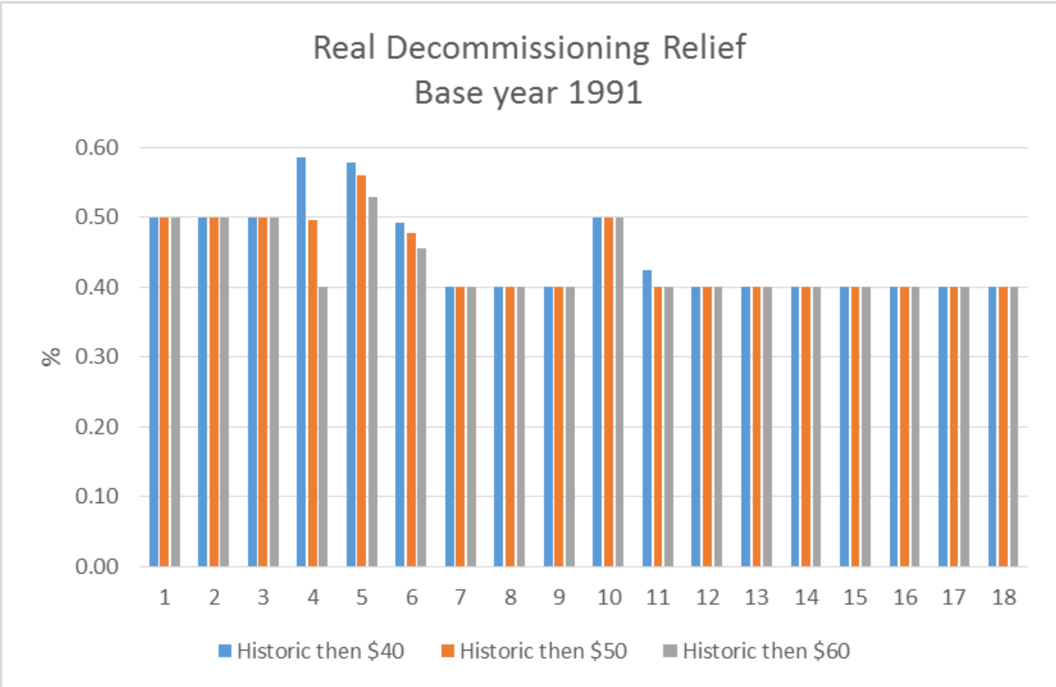
Relief for CT and SC can be obtained against income from other fields rather than clawed back against taxable income in the field being decommissioned. Currently many investors may not have such other income. If they did they could obtain decommissioning relief at 40%. This would often be higher than that available for the investor without other field income as indicated above. On small fields it was also found that the investor with existing tax shelter could obtain more effective relief for his initial field investment than the investor who had no tax shelter at the time of the investment.

In sum, this study has demonstrated that the effective rate of relief for decommissioning on both old and new fields can vary greatly depending on the interaction of the losses with other allowances and on whether the investor has tax shelter from income from other fields. Effective relief was also found to depend on the size of the field in question, its costs, and the prevailing oil price. Given the large costs of decommissioning this makes planning for the activity more difficult. Investments in incremental projects can clearly interact with the attainment of effective relief. The existence and prevalence of allowance displacement effects is an odd feature of the current tax system, and it is not obvious that one legitimate allowance should be displaced by another. The modelling found that generally incremental projects still added to the remaining NPVs and economic recovery, but in the current period of serious capital rationing it cannot be assumed that all such incremental projects would proceed. In old, PRT fields it was also found that the addition of the incremental project reduced the effective rate of decommissioning relief for the whole field. This in effect reduced the size of the increase in the whole field NPV from the incremental project. On new fields it was found that decommissioning relief was generally not reduced as a result of incremental projects.

Decommissioning relief is an important subject in relation to late field life asset transactions. Knowledge of the likely effective relief as discussed in this paper will affect the valuation of a mature asset to a material extent. Buyers will be anxious to discover what relief is available if they are to accept liability for the decommissioning activity. Sellers can more readily get such tax relief as they have the tax history for CT and SC as well as PRT. But they may not wish to retain the liability. In such circumstances the idea that the tax history of the seller could be transferred to the buyer deserves serious consideration.

Appendix

Chart A1

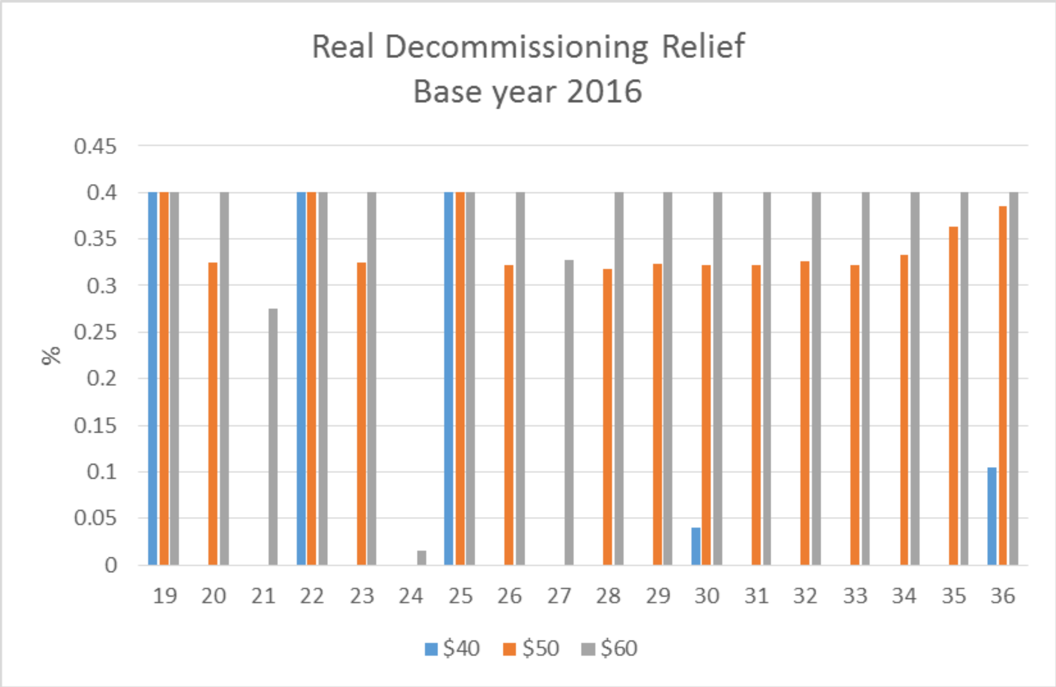


The level of decommissioning relief is affected by the oil price for fields 4, 5, 6 and 11. For field 4, at $40 production is lower, and, as the oil price increases there is less SC relief clawed back into periods with higher rates of SC, and more PRT relief occurs in periods when the PRT rate is zero. For field 5 there is more production at $60. At $60 there is no loss of oil allowance. The loss is higher with the $40 price than with the $50 price. For field 5, as the oil price increases there is less SC relief clawed back into periods with higher rates of SC and more PRT relief occurs in periods when the PRT rate is zero.

For field 6, there is less production at $40 and as the oil price increases the loss of oil allowance declines. For field 6, as the oil price increases there is less SC relief clawed back into periods with higher rates of SC and more PRT relief occurs in periods when the PRT rate is zero.

For field 11, as the oil price increases there is less oil allowance lost, more PRT relief occurs in periods when the PRT rate is zero, and at $40 the rate of relief for SC is higher.

Chart A2



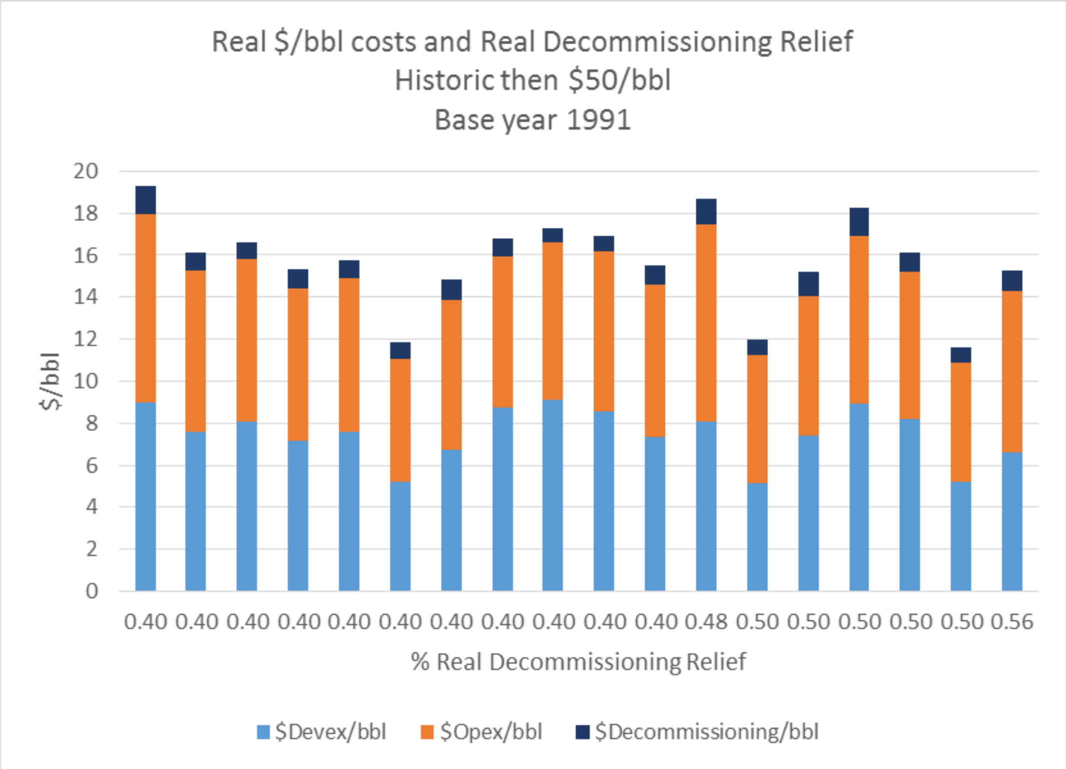
For fields 19, 22 and 25 the oil price has no effect on the rate of relief. All receive 40% relief.

At $40, fields 21, 24, 27 cannot recover their development costs so they pay no tax and fields 20, 23, 26, 28, 29, 31, 32, 33, 34 and 35 pay no CT or SC and cannot use all of the supplement. Fields 30 and 36 lose IA on decommissioning.

At $50, fields 21, 24 and 27 pay no CT or SC and cannot use all of the supplement. Fields 20, 23, 26, 28, 29, 30, 31, 32 and 33 cannot use all of their IA even before decommissioning, and fields 34, 35 and 36 lose IA on decommissioning.

At $60, fields 21, 24 and 27 cannot use all of their IA even before decommissioning.

Chart A3



From Charts A3, A4 and A5 it is seen that even relatively low cost fields fail to gain decommissioning relief at more than 50%.

The level of unit costs changes for a few fields with a change in the oil price (fields 4 and 6 have lower production at $40 and fields 5 and 7 have higher production at $60 and this changes the unit cost).

The decommissioning relief may change with the oil price. At $40, fields 4, 5, 6 and 11 have higher decommissioning relief (for field 4, 5, 6 and 11 there is more PRT relief before the PRT rate becomes zero). At $60, fields 4, 5, 6 have lower decommissioning relief because less relief is achieved in periods before the PRT rate becomes zero.

Chart A4

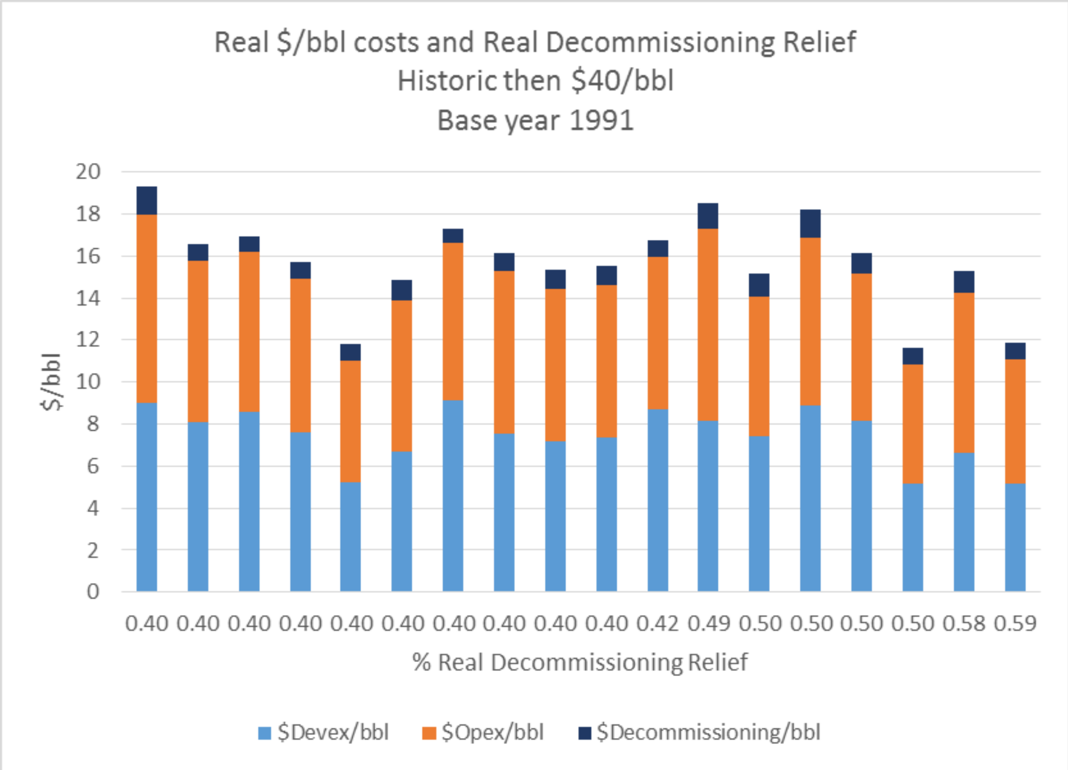


Chart A5

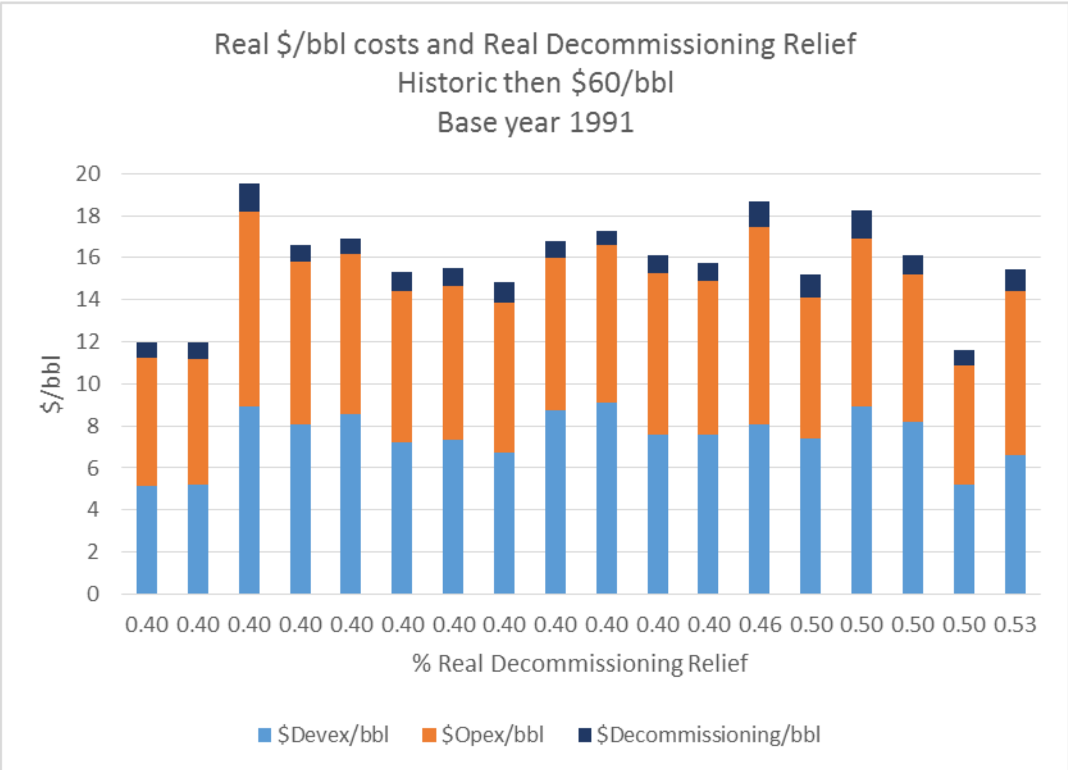
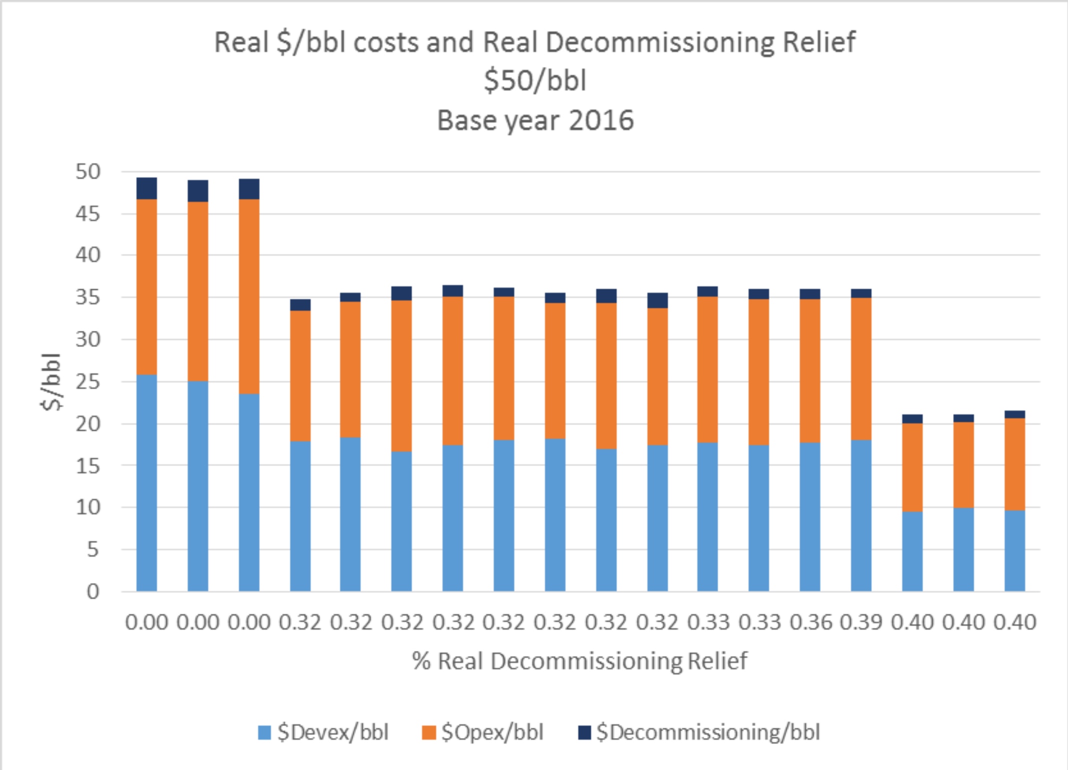


Chart A6



From Charts A6, A7 and A8 it is seen that higher cost fields may receive no relief at $50 or $40 and little relief at $60. At $40 only 3 low cost fields receive adequate relief. At $60 only the high costs fields fail to obtain adequate relief.

The level of costs changes for a few fields with a change in the oil price (fields 19, 25, 27 and 31 have lower production at $40 and fields 21, 26, 34, 35 and 36 have higher production at $60 and this changes the unit cost). The decommissioning relief may change with the oil price. At $40 only fields 19, 21, 22, 24, 25 and 27 maintain the same level of relief, but all the others have lower decommissioning relief (they are less able to use supplement or allowances). At $60, fields 19, 22 and 25 maintain their level of decommissioning relief, but all others have higher decommissioning relief (they are better able to use the supplement and IA).

Chart A7

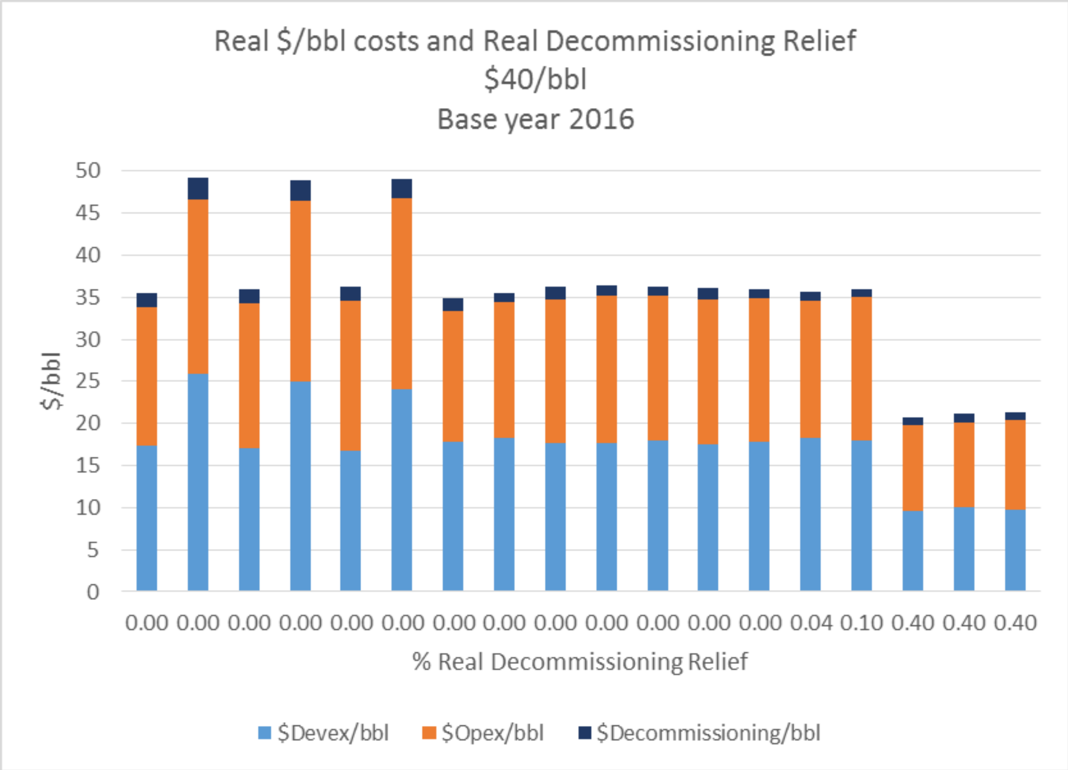


Chart A8