Defining innovation:
a consultation on the definition of R&D for tax purposes

July 2003

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Contents

FOREWORD

Innovation plays a key role in the growth of a modern, knowledge-based economy providing prosperity for all. The Government is committed to encouraging innovation as part of its overall strategy for improving Britain's rate of productivity growth and at the same time ensuring that the UK has an economic environment in which world-beating ideas can be turned into world-beating products and services.

The Government has created a sound macroeconomic framework within which innovative businesses can flourish, and has taken steps to ensure that smaller businesses have greater access to the risk capital they need to realise their ambitions. The Government also recognises the importance of more targeted measures for those companies investing in future success by undertaking research and development ('R&D').

R&D tax credits were introduced in 2000 for small and medium-sized companies and extended to large companies in 2002. Their introduction has been overwhelmingly welcomed by business – not least because of the level of consultation and dialogue, which has greatly enhanced the design and operation of the tax credit schemes.

At the time of their introduction, it was acknowledged that we would want to revisit the definition of qualifying R&D in the light of experience. To be effective in delivering the Government's objectives, the definition has to include all the target activities and be clear enough to provide certainty to those businesses that are engaged in R&D. Through this consultative process, we want to ensure that those objectives are met and that the R&D tax credit is soundly based, internationally competitive and will deliver a real incentive for new R&D.

Rt Hon. Gordon Brown MP

Rt Hon. Patricia Hewitt MP

Executive Summary

E.1 The UK has an excellent record in science and technology research but has historically fared less well in turning this research into innovative products and services. Whilst some UK companies are world leaders in innovation, the UK has in the past had a relatively low overall level of commercial research and development activities compared with its major competitors.

E.2 The Government is committed to promoting commercial research and development in the UK. It has introduced Research and Development ('R&D') Tax Credits for SMEs and large companies to support greater R&D investment by innovative companies, in recognition of the importance of innovation in driving productivity growth and company profitability.

E.3 This consultation paper focuses primarily on possible changes to the definition of R&D used for the purposes of the tax credits legislation. The definition is based both on normal accounting practice and on Guidelines published by the Secretary of State for Trade and Industry.

E.4 The paper considers the effectiveness of the current definition of R&D; in particular whether it remains consistent with technological developments and competitive internationally, whilst providing the clarity and certainty that those claiming and administering the credits require. In addition the consultation paper looks at how the credits might be applied to 'licences for advanced software' (and how such a term might be defined), as well as the effectiveness of the current definitions of 'consumable stores' and 'qualifying bodies'.

THE DEFINITION OF R&D

E.5 The current definition of R&D was drawn up, after a period of consultation, as part of the R&D tax credit regime for small and medium-sized enterprises ('the SME scheme'), which was introduced in 2000. Since that time a tax credit scheme for large companies has also been brought in, using the same definition of R&D as that for the SME scheme.

E.6 The Department of Trade and Industry Guidelines on the meaning of R&D for tax purposes, the UK's definition of R&D, have thus remained unchanged since 2000. The Inland Revenue has recently published a Commentary on the DTI Guidelines for the use of taxpayers and tax inspectors (both documents are included as Appendices to this consultation paper)[1] .

E.7 The Government has continued its dialogue with companies and their representative bodies after the introduction of the tax credits. A common message that has been received is that there is scope for improvement and clarification of the Guidelines. An improved set of Guidelines would provide greater certainty for companies as to what activities that they undertake will qualify for the credit, and thus what the financial benefit to them is likely to be.

[1] They can also be found at http://www.inlandrevenue.gov.uk/r&d/dti_guidelines.htm and http://www.inlandrevenue.gov.uk/r&d/commentary.htm

E.8 The DTI Guidelines themselves draw upon the OECD's definition of R&D – what is commonly referred to as the 'Frascati' manual[2]. This definition is one commonly adopted by many nations that have tax incentives for R&D, though there are variations from country to country. The consultation paper considers the effectiveness of the UK Guidelines in capturing the innovative activities that the Government wishes to promote – both in terms of their clarity and usability, and whether the boundaries are appropriately drawn between R&D and related activities. This paper includes a consideration of key terms in the Guidelines, such as 'novelty' and 'substantial improvement'.

E.9 In addition views are sought as to whether some extensions to the definition might be more appropriate to SMEs, given the particular market failures they face.

CONSUMABLE STORES

E.10 Companies can claim R&D tax credits on the cost of consumable stores, typically physical items that are stored and then consumed as part of the R&D process. 'Consumable stores' is an accounting term that has no statutory definition for tax purposes. The Inland Revenue has therefore published guidance on the sort of expenditure that falls within this category. The consultation paper seeks views as to the effectiveness of the Inland Revenue guidance on what qualifies as consumable stores and whether there are any areas either of uncertainty or ambiguity that need to be resolved.

LICENCES FOR ADVANCED SOFTWARE

E.11 R&D tax credits apply to two categories of expenditure – staff costs and consumable stores. A number of companies involved in R&D activities have noted that they incur considerable expenditure on buying in advanced software, under a time-limited licence, for use in their R&D processes. The Inland Revenue considers that such purchases do not currently fall within the meaning of 'consumable stores' and therefore do not qualify for the credit. However, where a company employs its own staff to write software of this type, the relevant staff costs may well qualify for the credit. The Government therefore wishes to remove this anomaly and to extend the R&D tax credits to the cost of licensing advanced software to use as part of an R&D project. The consultation paper considers how 'advanced' software might be defined, so that the credit can target appropriate forms of software.

QUALIFYING BODIES

E.12 Under the large company tax credit scheme introduced in 2002, the general principle is that large companies cannot claim the tax credit for the costs of work subcontracted to others. This can potentially leave a gap where the subcontractors themselves are unable to gain the benefit of the credit. The large company legislation therefore contains a specific rule which allows large companies to claim the credit, where work is subcontracted out to individuals, partnerships of individuals and 'qualifying bodies'.

E.13 Qualifying bodies are charities, higher education institutions, scientific research organisations and health service bodies. In addition the Treasury may define further bodies or classes of bodies as appropriate. The consultation paper considers two particular classes – non-UK universities and public sector research establishments – and whether an approach of individual designation or generic definition is more appropriate.

[2] The Measurement of Scientific and Technological Activities, Proposed Standard Practice for Surveys of Research and Experimental Development" ('The Frascati Manual') 1993. OECD Paris, 1994, ISBN 92 64 14202 9.

INTRODUCTION

The Government recognises the importance of research and development (R&D) as a driver of productivity growth. As an incentive to increase R&D spending, the Government has introduced R&D tax credits for companies. One important factor in the success of R&D tax credits in increasing innovation is the definition of R&D used – and the extent to which it provides companies with clarity and certainty as to what activities will qualify for the tax credits.

1.1 The Government introduced Research and Development ('R&D') tax credits for companies that are SMEs in 2000 and extended them to other companies in 2002. The designs of both schemes came about after extensive consultation with companies, representative bodies, academics and other interested parties – a dialogue which has continued as companies have started to claim the credits.

1.2 One of the key messages that arose from the consultation process was that if the tax credit scheme was going to influence R&D investment decisions, it had to be **simple to operate** and the benefit of the tax credit to the company should be **easy to calculate**. For these reasons the Government adopted a simple, volume-based approach for both the SME and large company schemes. The credit is given on each pound of qualifying current expenditure. This contrasts with incremental approaches, as used in the US for example, where any increase in spending on R&D attracts a tax credit, but the majority of expenditure does not.

1.3 The types of business expense that qualify for the UK credit are staffing costs and consumable stores (capital expenditure on R&D qualifies for the long-standing 100% first year Capital Allowance instead). The Government recognised that it was important to direct the credit at the main areas of current R&D expenditure, whilst ensuring that the rate remained high enough to give a genuine incentive to companies to increase their R&D spending. In addition, the Inland Revenue has made claiming the credit as simple as possible – it is done by way of a few additional entries on a company's annual Corporation Tax return.

1.4 But together with simplicity, the other key message from business about how to make R&D tax credits a success was that they wanted **certainty**. And that is something the Government is keen to provide as well. The purpose of the R&D tax credit is to stimulate more R&D, thereby increasing innovation and improving productivity. For companies to commit more funds, they need a good degree of certainty as to the likely level of benefit they will receive from the tax credit. For a large company paying tax at the main rate of 30%, the tax credit reduces the cost of qualifying R&D by 7.5%. For an SME paying tax at the small companies rate of 19% the tax credit gives a saving of 9.5% (or a cash benefit of 24% for those firms not yet in profit).

1.5 It is important that companies can factor in those projected savings (and therefore the opportunity to spend more on R&D) at an early stage. For that certainty to exist, there has to be a shared understanding, between companies undertaking R&D, their professional advisers and the tax inspectors responsible for considering the claims as to what is 'R&D' for tax credit purposes.

I.6 The legislation defines research and development by reference to normal accountancy practice[1] and to Guidelines published by the Secretary of State for Trade and Industry (see Appendix 1). The Inland Revenue commentary on these Guidelines (Appendix 2) further elaborates on how the definition of R&D for tax purposes is applied. However companies and their representatives have continued to express the view that there are areas of uncertainty within the Guidelines, where greater clarity would be beneficial. In addition there may also be areas where extension of the current Guidelines is appropriate, to fully capture the range of innovative activities being carried out by companies in the UK. The purpose of this consultation process is to identify those areas for improvement.

I.7 The introduction of R&D tax credits has been successful, based both on the level of uptake (albeit at an early stage) and the feedback the Government has received from business. The reaction to the schemes has been very favourable – especially because they are simple to use – and the Government has continued its dialogue with business on ways that the effectiveness of the credits can be improved.

I.8 It is important to build on this success. By its nature R&D changes rapidly. The current definition was introduced as part of the consultation for the SME scheme in 2000. The Government now wants to take stock of that definition, now that there is some operational experience of claiming the credits, to make sure it has kept pace with technological developments and to ensure it provides as much certainty and clarity as possible, so that the credits are simple to understand and straightforward to claim.

I.9 As any change to the definition brings with it the possibility of more activities qualifying for the credits, the Government needs to consider the likely cost implications. The Government is already committing considerable funds to the R&D tax credits, in addition to other measures to promote innovation. It will therefore have to consider whether any extension beyond the current level of qualifying activities should be limited initially to SMEs, but in doing so it is important that such a decision is informed by the views of all who have an interest in the successful operation of these credits.

Please send your responses, by 10 October 2003 to:

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London
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Or by email to rdconsultation@hm-treasury.gov.uk

Responses received will be made available, on request, unless respondents specifically ask for their comments to be treated as confidential.

[1] Statement of Standard Accounting Practice No. 13 ('SSAP 13'), The Institute of Chartered Accountants, 1989

2 Innovation and R&D Tax Credits

International evidence suggests that R&D tax credits can be effective in increasing levels of business R&D expenditure. The Government initially introduced R&D tax credits for small and medium-sized enterprises (SMEs) in 2000 and two years later brought in a tax credit scheme for large companies. Both schemes use the same definition of R&D – and one issue to be considered as part of the consultation is the extent to which some changes to the definition might be more appropriate for SMEs, given the particular market failures they face.

2.1 Productivity growth is fundamental to the UK's long-term economic performance and rising living standards. Historically the UK has experienced low rates of productivity growth by international standards – with macroeconomic instability and market failures restricting competition, enterprise and innovation, and discouraging long-term investment in capital and skills. The Government is pursuing a wide-ranging strategy to tackle the barriers to productivity growth.

2.2 Innovation is a significant contributory factor to improved productivity. A quarter of a century ago the UK's R&D intensity (R&D as a proportion of GDP) was broadly on a par with other major economies but by 1996 it had slipped and was the lowest of the Group of 5 Industrialised Nations. **Since 1998 the UK's R&D intensity of major firms in the UK has risen steadily from 1.8% to 2.2% in 2002**[1]. The total expenditure in the UK economy (by business, higher education and Government) has slightly risen from 1.8% to 1.9% of GDP in 2001.

2.3 Research by the Organisation for Economic Cooperation and Development (OECD) has shown that increases in both private and public R&D contribute to increases in productivity[2]. No firm researches or develops products in total isolation – there are links between public and private sectors, between companies operating in the same industry or same country, and regular publications of results for peer review. In addition, therefore, to the direct effect of R&D in raising productivity through technological change, that technology can also be adapted and used by other sectors in the economy, with the result that the return on the investment is not limited to the investor. In that respect R&D spending generates a double benefit, for the innovator and for those that can utilise the results of the innovators' R&D. **This also means that companies may under-invest in R&D, relative to the optimum level for the economy, precisely because the full rewards of that investment do not accrue to them**[3].

2.4 The extent to which private R&D generates public benefits prevents companies enjoying the full fruits of their R&D investments and therefore the market returns alone are not sufficient to produce the maximum supply of R&D required to raise productivity. This is the primary rationale for the patents regime, providing temporary monopoly rights to innovators. In recognition of the economic challenges facing the UK in improving its business innovation performance, and of the varying abilities of firms in different sectors to capture benefits through patenting, the Government has intervened further, through tax and general measures, to promote greater R&D spending by companies. The Government has clearly signalled its commitment to raise the levels of innovation. The Spending Review of 2002 increased the Science Budget by £1.25 bn, which will provide a sustainable financial basis for

[1] DTI R&D Scoreboard 2002 (www.innovation.gov.uk/finance)

[2] OECD Technology and Industry Performance (1996)

[3] Expressed in economic terms, as a result of spillovers and other externalities, the private rate of return to R&D is lower than the social rate of return. Econometric studies have found in some cases the social rates of return can be up to five times the private rates of return.

university research, a flow of trained scientists and engineers and new ideas for the rest of the economy. The 2002 Spending Review also increased funding to stimulate innovation across business and industry. The DTI is currently conducting a wide-ranging review of innovation policy to ensure that these resources are focused on raising UK business performance. And the R&D tax credits provide a further £500m of support to the UK's innovative businesses to promote greater investment in innovation.

Box 2.1 Scientific Research Organisations

This consultation on R&D will also take account of the ongoing review of the taxation of scientific research organisations – bodies which undertake scientific research on a not-for-profit basis – as outlined in the 2002 Pre-Budget Report. In the 2003 Budget, the Chancellor further announced that the Inland Revenue would report on further help for such organisations. Any improvement to the existing rules, to allow scientific research organisations to undertake a wider range of R&D activities while still maintaining their current tax exempt status, will be considered in tandem with any proposals for change which arise as a result of this consultation.

2.5 Academic evidence suggests that tax incentives can increase R&D spending by an amount equal to the loss in tax revenue – every pound spent on the credit generates an extra pound spent on R&D[4]. The UK Government is therefore delivering a significant part of its strategy for increasing innovation via the tax credit route and is not alone in doing so. Fiscal incentives for R&D have been adopted by many industrialised countries, to help raise levels of investment in business R&D. Other countries continue to develop their R&D tax credits. France, for example, has recently announced an ambition (but no immediate plans) to change from an incremental credit to a volume-based credit like the UK's.

THE DEFINITION OF R&D

2.6 The Government introduced R&D tax credits for SMEs in 2000 after a period of consultation with business[5]. As part of this consultation, views were sought as to the definition of 'research and development' that should be used. The resulting legislation draws on standard accountancy practice and the OECD Frascati definition of R&D, which are brought together within the Guidelines published by the Secretary of State for Trade and Industry (Appendix 1).

2.7 The majority of countries that have introduced R&D tax credit schemes have based their definitions of R&D on Frascati and whilst there are differences in detail between each country, all are broadly comparable in the way they describe the sort of activities that are innovative enough to qualify for tax credit support. (In contrast, the US and Japanese definitions are very different in style, though rather similar in practice.)

2.8 Further consideration of the current definition of R&D can be found in the Inland Revenue's Commentary on the meaning of R&D for tax purposes (Appendix 2), which should be read in tandem with the DTI Guidelines. **It is important to recognise that innovation can occur at any point in the R&D process.** Because companies are ultimately engaged in seeking to develop products for sale, there can be a tendency to look at R&D through the lens of the product development process.

[4] Bloom, Griffith and Van Reenen (2001) 'Do R&D Tax Credits Work?' IFS Working Paper

[5] A recent report to the European Commission by an Independent Expert Group 'Raising EU R&D Intensity' (2003), found as an example of good practice 'Understanding the likely uptake and demand for particular types of instrument is important. In the UK … government authorities engaged in extensive consultation with the business community … This was just one part of an extensive ex-ante evaluation exercise prior to the launch of the scheme.' The report can be found at http://europa.eu.int/comm/research/era/3pct/pdf/report-mixpublicsupport.pdf

2.9 At its simplest this notion can be expressed as:

'Bright Idea' → 'Research' → 'Development' → 'Product on the shelf'

2.10 There can be an assumption that the tax credit applies wholly to the 'Research' section and then partly in the 'Development' section, up to the point where all the uncertainty has been resolved and all that remains is what might be termed 'product development' prior to taking the product to market.

2.11 There are a number of reasons why this simplistic model does not reflect the reality of research and development work undertaken by companies, not least that many will seek to resolve technological uncertainties with no intention of entering into large-scale production themselves. Development of a patentable idea or other intellectual property that can be sold on and exploited by others can often be a means to an end for smaller innovative businesses. Furthermore, not all R&D results in products. Processes and services are also outputs of R&D.

2.12 But there is a more important reason for seeking to depart from this strict linear model. **The purpose of the tax credit is to support and reward innovation wherever it occurs and the definition seeks to follow this approach.** The intention is not to isolate two points on a continuum and state that everything within is qualifying R&D but rather to accept that 'bubbles' of innovative activity can emerge anywhere – in that respect there is no simple cut-off point where qualifying R&D can be expected to cease.

2.13 Companies should not assume that when a set of fundamental uncertainties have been overcome, the R&D process for tax purposes is complete. As products are developed to meet the requirements of commercial use or production, so further scientific and technological uncertainties may arise which need to be resolved – for example scaling up from a prototype to a saleable product or process. **It is also important that companies recognise that work undertaken on processes and services which breaks new ground in the field of science and technology can constitute R&D for tax purposes. It is not restricted to R&D carried out on 'a product'.**

2.14 There can therefore be a perceived mismatch between the models of linear development from 'blues skies to production line' and 'bubbles of innovation' arising at any time. The Government wishes to keep the focus on increasing innovation, but cannot entirely define away this mismatch by saying it will support work up to a given stage of the product development process but no further. Instead **the Government wants to do all it can to remove uncertainties over what qualifies (and what does not),** so that companies can identify where what they have done or intend to do is R&D for tax purposes.

ISSUES FOR SMEs

2.15 R&D tax credits were introduced for SMEs in 2000. One reason for bringing in a scheme limited to smaller companies, in advance of the tax credit for large companies, was recognition of the particular market failures that smaller companies face. In terms of total expenditure, most business R&D expenditure is carried out by large companies – smaller firms are less likely to undertake these activities because of a range of financial, technical and other constraints. They are less able to access the funding necessary to get them to the stage where they can financially exploit their innovative activities. In addition, they are more likely to focus on a limited range of products or processes. This leaves them exposed not only to stronger external market forces but also to the effects of commercially unsuccessful R&D on their ability to survive. It also limits their ability to derive 'spillover' benefits from R&D on one product area to another in their portfolio, thus increasing the gap between the social and private rate of returns of R&D compared with a larger firm.

2.16 It is for this reason that the rate of the SME credit is typically more generous than the large company credit. But more importantly it is why loss-making companies can cash in the SME credit. For many small innovative firms which are loss-making in their early years, there is no immediate benefit in having a tax credit that only adds to the tax losses they can carry forward to future years of profitability. That is why the payable element for loss-making companies is important: it gives the immediate cash reward of the tax credit to all SMEs, not only those currently in profit.

2.17 In 2002 the Government was able to introduce R&D tax credits for all companies, but recognises the continuing specific needs of SMEs in the special features of the SME scheme, a notified state aid for EC purposes, which seeks to assist small, innovative companies with the particular issues they face.

2.18 Whilst the rates of the credit differ for the SME and large company schemes, there are other material differences, one being that for the SME scheme the credit goes to the company paying for the R&D, whereas for the large companies the requirement is that the credit goes to the company actually undertaking the R&D. **However, the definition of R&D as encapsulated in the DTI Guidelines applies equally to the SME and large company schemes.** What constitutes R&D is the same for both.

2.19 One of the purposes of the current consultation is to consider whether the DTI Guidelines can be clarified to provide greater certainty for all, regardless of whether the boundaries of what constitutes R&D are also changed. The development of a clearer revised definition will benefit all companies and the Government would wish those clarifications to apply across the board.

2.20 Beyond that aim of greater clarity, Chapters 3 and 4 also consider potential extensions to the definition of R&D – going beyond the Frascati guidelines into areas such as the 'D' end of R&D; design and the level of novelty required. Extension of the definition by necessity means that more activities qualify for the credit and therefore the levels of credit claimed will increase. This has implications for Exchequer cost – early indications are that the costings of the schemes in the Budget reports, the so-called 'red book costs' (outlined in Table 2.1 below) were accurate and the uptake of the credits had been a success.

Table 2.1: Budget Estimates of R&D Tax Credit Exchequer Costs (£m)

Budget 2000	**2000-01**	**2001-02**	**2002-03**	**2003-04**	**2004-05**	**2005-06**
SME Tax Credit	**Negligible**	**100**	**150**	**ongoing**	**...**	**...**
Budget 2002						
Large Company Tax Credit			**200**	**400**	**400**	**ongoing**
Budget 2003						
Improvements to both schemes				**20**	**40**	**50**

2.21 The Government therefore has to consider whether extensions to the definition should, at least initially, be introduced for SMEs only.

Q2.1. ***Assuming that any changes to the Guidelines to provide greater certainty and clarity within the current boundaries will apply to all companies, what are your views on any extensions beyond this applying only to SMEs?***

2.22 This document also considers a number of potential changes or clarifications to the rules governing what can be claimed under the tax credit scheme; clarification of the definition of consumable stores (Chapter 5), the treatment of advanced software used in R&D (Chapter 6), and further defining which not-for-profit bodies a large company can subcontract work to and still have the benefit of the credit (Chapter 7).

R&D TAX CREDITS AND SIMPLIFICATION

2.23 It is the Government's view that for R&D tax credits to be a success in driving up the level of innovation in the UK, the activities that qualify for the credit should be clearly defined and the process of claiming the credit should be as straightforward as possible. One of the aims of this consultation process is to arrive at a definition of qualifying R&D which helps individual companies better judge what the value of the credit is likely to be for them, given their own specific circumstances. But issues of complexity can go beyond the interpretation of the definition by the company. It is inevitable that a measure which gives enhanced tax relief for certain activities will face some complexity issues at the boundaries of what does and does not qualify – and a redrawing of the boundaries may only have the effect of moving what remains a complex borderline. The focus of the credit remains on those activities that are R&D, not those ancillary to R&D.

2.24 Some companies have stated that they have found the process of claiming the credit to be complex. The Government has sought to make claiming the credit as simple as possible – with no pre-clearance requirement and integration of the claim into the annual Corporation Tax return. As part of the consultation process aimed at improving and clarifying the definition of R&D, the Government would also welcome any comments on measures that would remove unnecessary complexity – both in the process of establishing what activities actually qualify for the credit and the process of claiming the credit on the annual Corporation Tax return.

Q2.2 ***Are there any other factors (outside uncertainty around the meaning of the definition) which respondents feel add unnecessary complexity to the whole process of establishing which activities qualify for the credit and subsequently claiming the credit? What practical changes would simplify the process?***

3 Towards a Revised R&D Definition

The definition of R&D that is used for tax credits purposes has remained unchanged since the SME tax credits were introduced in 2000. The UK definition, in common with those used in many other countries with R&D tax credits, is based on the OECD Frascati model. This chapter considers how closely the UK definition mirrors Frascati – and the extent to which the definition should go beyond Frascati in encapsulating companies' innovative activities.

3.1 Chapter 2 sets out the rationale for R&D tax credits as a means for encouraging innovation and productivity growth, and describes the origins and aims of the UK's definition of R&D for tax purposes. This chapter seeks views on whether the UK definition achieves its intention of mirroring the principles of the OECD Frascati definition of R&D. Comments are also requested on possible areas in which the UK's definition might be extended beyond Frascati, in keeping with the overall aim of promoting innovation and further R&D.

3.2 This chapter and Chapter 4 therefore discuss possible changes to the UK's definition of what constitutes R&D, including clarifications on its application to software and how in practice to distinguish between genuine innovative work of the sort the Government wishes to incentivise and work which is the routine adaptation of existing materials, products, processes or services. Underlying all this is the desire to provide a simpler, clearer and more easily-applied definition of R&D for tax purposes.

THE DEFINITION OF R&D AND ELIGIBLE COSTS FOR R&D TAX CREDITS

3.3 The eligibility of a company's expenditure for R&D tax credits is fundamentally based on two factors:

- Definition: Whether the money was spent on R&D; and
- Scope: Whether tax credits are available for the particular type of expenditure (e.g. staff costs).

3.4 The UK definition of R&D for tax purposes is intended to define whether an activity is R&D or not, i.e. the first of these two factors. The rules for the individual tax credit measures govern the tax treatment of expenditure on R&D and thus the second factor: what types of expenditure attract what relief. Expenditure on staff directly engaged in R&D and on consumable stores used in R&D attracts R&D tax credits, for example. The definition of R&D is also used in deciding what capital expenditure qualifies for the 100% first year Research and Development Allowances and for certain other tax purposes.

ORIGIN AND RATIONALE FOR THE UK DEFINITION OF R&D

3.5 As stated previously, the UK's definition of R&D for tax purposes is by reference to normal accounting practice and Guidelines issued by the Secretary of State for Trade and Industry. Both are based on the meaning of 'research and experimental development' as set out by the OECD in the Frascati manual. The UK, like most other countries, excludes activities such as research in social sciences and the humanities from its definition of R&D for tax purposes.

3.6 Research and experimental development is defined in the Frascati Manual as "creative work undertaken on a systematic basis in order to increase the stock of knowledge... and the use of this stock of knowledge to devise new applications". Frascati goes on to subdivide R&D into three categories: basic research, applied research and experimental development.

3.7 **Basic research** is "experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts, without any particular application or use in view".

3.8 **Applied research** is "also original investigations undertaken in order to acquire new knowledge. It is however directed primarily towards a specific practical aim or objective".

3.9 **Experimental development** is "systematic work drawing on existing knowledge gained from research and practical experience, that is directed at producing new materials, products and devices; to installing new processes, systems and services; or to improving substantially those already produced or installed".

3.10 This breakdown is essentially repeated in the UK's current Guidelines, although the term 'development' is used in preference to 'experimental development'. There is no difference in treatment between the different sub-types of R&D.

3.11 Some have criticised the Frascati definition as over-emphasising basic research at the expense of development. This is not the Government's intention for the UK's definition; the aim is to incentivise all R&D activity equally across the spectrum from basic research to development. However, it is at the 'development' end of the R&D spectrum that it becomes most difficult to distinguish between activity that is R&D and activity that is not. The Guidelines therefore focus on defining this boundary in order to provide clarity for companies investing in R&D, and to ensure that the R&D tax credits are focused on the most innovative activities. This issue is explored in more detail later in Chapter 4.

3.12 How the current Guidelines are applied in practice is described in a Commentary on the Guidelines prepared by the Inland Revenue (reprinted in Appendix 2), which was developed with the help of questions and feedback from a number of organisations.

THE UK'S CURRENT POSITION

3.13 The UK is a better place to do R&D than ever before, as a result of increased investment in the science and engineering base and the introduction of R&D tax credits. However, it is important for the UK to retain this strong position and for this reason, the Government intends to prepare a revised definition based on the Guidelines, in line with the interpretation set out in the Commentary. These new Guidelines will reflect the comments made in this consultation. Feedback on the draft text of the new Guidelines will be sought before they are introduced.

Q3.1 ***Are there any areas in which the UK's definition of R&D does not follow the Frascati definition, or is significantly less favourable than other countries'? (Examples of any differences would be particularly helpful.)***

Q3.2 ***Do you envisage any problems arising from a revised definition of R&D based on the concepts articulated in the current Guidelines and Commentary on the Guidelines?***

Q3.3 ***In introducing a revised definition of R&D for tax purposes, which would be more important to you in providing clarity and certainty: continuity of language between old and new definitions (for example, retaining terms such as 'significantly improved') or the introduction of new language to reduce the scope for ambiguity? Would more examples or case-studies be beneficial?***

3.14 The Government also wishes to explore areas that the current definition currently excludes or is believed to exclude from R&D, but which still meet the fundamental criterion of involving significant elements of innovation in science and technology and where the extension of the credit would promote further R&D and wider benefits for the UK.

3.15 In particular, the Government wishes to ensure that the UK's definition of R&D is understood to cover development equally with research. It has been suggested that this is still not achieved by the current Guidelines, even with the clarifications provided in the Commentary. This issue, including the boundary between R&D and related activities, is discussed below in Chapter 4.

3.16 We also wish to look at the specific areas of **design** as part of technological innovation and of **software**, to ensure that these are adequately and clearly covered by the new Guidelines.

3.17 **Design** may be geared towards particular production processes and under Frascati would not in itself be classified as R&D – although some elements would be included. The role of design in the innovation process needs to be explored more fully to ensure that the development of innovative design techniques and/or design necessary to undertake R&D is properly encompassed in the definition. However, it is important to emphasise that this is about ensuring the R&D tax credit scheme reflects the role of design *in the R&D process* and R&D in design-related technology rather than extending the R&D tax credit to cover broader activity in the field of design.

Q3.4 ***Comments are invited on how to ensure design as part of the R&D process is fully reflected by the new Guidelines, while not extending the definition of R&D to cover design more generally.***

3.18 The Commentary on the current DTI Guidelines pays particular attention to **software**, recognising the difficulties in applying a generic definition of R&D to the processes of software design and using it within a more traditional R&D framework. Some concerns over interpretation have already been addressed in the Commentary, and the new Guidelines should therefore satisfy many of the concerns of the software industry about the extent to which their activities currently qualify for the credit. The Government wishes to ensure that the revised definition of R&D for tax purposes captures adequately the meaning of innovative software development, on an equal footing with other forms of R&D.

Q3.5 ***Comments are invited on how best to ensure the new Guidelines capture the essence of what constitutes R&D in and using software, and provide the UK with an internationally competitive definition of R&D in this field.***

3.19 When the existing Guidelines were developed, software was discussed specifically in a number of paragraphs. The aim was not to set different standards or principles for R&D involving software, but to address specific issues raised by software. However, in practice, it seems that some of this material has been assumed to imply exactly the opposite: that the degree of innovation required in software R&D is different from than that in other fields. Perhaps it would actually have been clearer not to address software specifically, beyond noting that it is to be treated on a par with other areas of R&D.

Q3.6 ***Do you think that the new Guidelines should include additional specific guidance on software?***

4 The Boundary Between R&D and Related Activities

A revised definition of R&D will attempt to be comprehensive, whilst at the same time providing certainty and clarity. In this respect it is important to find the right language that accurately conveys what the Government considers are the innovative activities that should attract the tax credit. Two areas are of particular practical interest – the standard required for 'novelty' and how 'improvement' is to be measured.

4.1 The previous chapter considered the UK's definition of R&D in the context of the OECD Frascati definition, how this compares with other countries that base their tax credit regimes on the Frascati model and the degree of importance of continuity of language in moving from the current definition to a revised one. This chapter focuses on what is the central issue for many businesses – how the definition distinguishes between activities which are R&D for tax purposes and those closely related activities which are not.

THE FRASCATI APPROACH

4.2 In considering the boundaries between R&D and related activities, Frascati notes that:

"the basic criterion for distinguishing R&D from related activities is the presence in R&D of an appreciable element of novelty and the resolution of scientific and/or technological uncertainty, i.e. when the solution to a problem is not readily apparent to someone familiar with the basic stock of common knowledge and techniques for the area concerned".

4.3 These two basic criteria form part of the UK's definition of R&D, and the Inland Revenue's guidance to its inspectors (the Commentary on the DTI Guidelines) makes use of this concept of a 'relevant expert', i.e. someone familiar with the basic stock of commonly used knowledge and techniques in the area concerned, in understanding whether scientific and/or technological uncertainty exists.

4.4 The Government believes that these basic criteria of novelty and the resolution of scientific and technological uncertainty remain the foundation of what characterises R&D. However, it is acknowledged that clear guidance is needed as to how much novelty or innovation is required to be "appreciable" or "substantial", or how much scientific or technological uncertainty must be present for work to be R&D. Another aspect of this issue is the way in which the current Guidelines regard periodic minor updates or modifications in a product or process as not being R&D; only attempts at "substantial" improvement are R&D. Again, a distinction is being made between innovative work which is R&D and routine work which is not.

4.5 The current definition of R&D defines the boundary of R&D and related activities partly by reference to "commercial development" activities which are outside R&D. This term is not explicity defined, but includes "pre-production development and product development" and various types of activity which are explicitly excluded from being R&D in SSAP 13 or the Guidelines. For example, work on obtaining patents, market research, and "activity, including design and construction engineering, relating to the construction, relocation, rearrangemenet or start-up of facilities or equipment other than facilities or equipment whose sole use is for a particular research and development project" are all excluded from being R&D in SSAP 13. The current Guidelines also state that "General commercial activities will not normally be R&D. These include:

- The range of commercial and financial steps necessary for innovation and the successful development and marketing of a new product, process or service.
- The production and distribution of goods and services.
- Administration and other supporting services not directly related to the R&D activity.
- General support services (such as transportation, storage, cleaning, repair, maintenance and security) not directly related to the R&D activity."

4.6 It should be noted that the beginning of commercial development is not a simple "cut-off" point for R&D; innovation is not a linear process and 'bubbles of innovation' can emerge at any time. One way in which the Government could attempt to provide greater certainty about when R&D is being done by explicity defining the "commercial development" activities which do not constitute R&D. The Government intends to retain the distinction between R&D and these activities, along the lines set out in the current Guidelines.

Q4.1 ***Would it be helpful in understanding what activities are R&D for tax purposes to have a more explicit definition of "commercial development" activities that are not R&D? Should such a definition be along the lines set out in paragraphs 4.5 and 4.6?***

BASIC PRINCIPLES

4.7 The kinds of work the Government is seeking to encourage are characterised by words such as "new", "innovative, "significant", "different", "enhanced", "novel" and "improved". The R&D tax credits seek to incentivise scientific and technological activities that share these qualities over work that is "routine", "straightforward", "imitative", "obvious" or "mundane". In articulating this principle for the purpose of a revised UK definition of R&D, the Government wishes to provide clarity about where the dividing line between "novel" and "non-novel" activities lies, and how firms can determine whether their activities are or are not "novel".

Standards for Novelty

4.8 The standard for novelty in the current Guidelines is that R&D must generate new knowledge or new or substantially improved products, processes, services or materials. 'New' in this context means 'new to the world' rather than 'new to the company concerned', although 'new to the sector of industry' is also acceptable (i.e. new applications of existing knowledge, such as adapting a process from automotive manufacturing to improve the production of packaging materials).

4.9 This definition represents the ideal that the Government is seeking to achieve. However, it is in practice difficult to establish absolute novelty. Furthermore, many 'relatively novel' activities still meet the criteria for adding value and wider benefit to the UK that the Government is seeking to achieve by R&D tax credits. In addition, although in practice the UK's definition is similar to other jurisdictions', in principle some other jurisdictions' requirements for novelty are less stringent than the UK's. On this basis, the Government wishes to consider whether the criteria for novelty can be refined to ensure the UK's definition is seen to be internationally competitive, and to ensure that the full range of innovative work in science and technology is adequately covered by the revised definition.

4.10 The principles the Government wishes to adhere to are as follows:

- Activity that generates knowledge which is new to the world is "novel". Discovering how to apply existing knowledge in a new context (e.g. in a sector where it has not been applied before) can also be innovative, ground-breaking and "novel".
- Activity that generates products, processes, services or materials which are new to the world or at the leading edge of science and technology development are "novel"
- Activity that improves products, processes, services or materials can be "novel", depending on how much innovation in science or technology was required to make the advance
- Where several companies are working at the cutting edge in the same field, and are doing similar work independently, this does not prevent the work that any one of these firms is doing from being "novel"
- Where work has already been done but this is not known in general because it is a trade secret, and another company repeats the work, this does not prevent the work that either of these firms is doing from being "novel"
- If it is known that something has been achieved, but the details of how are not publicly available, this does not prevent work to duplicate the achievement from being "novel"
- However, simple copying or routine adaptation of an existing product, process, service or material is not "novel"
- A company need not be a world-leader in its field to do work which is "novel", but work which simply brings a company into line with common practice within its industry sector or trade is not "novel", even though it may be completely new to the company.

4.11 The general sense of what the Government wishes to introduce as a definition of novelty is therefore:

- Activity is "novel" if it creates something new to the world (e.g. invents the widget), or if it appreciably improves something which already exists (e.g. a gizmo with 10% better performance), or if it duplicates an existing product, process, service or material in a new or appreciably improved way (e.g. a product which has exactly the same performance characteristics as existing models, but is built in a fundamentally different manner).
- It is recognised that not all activity aimed at achieving these outcomes succeeds in doing so. Activity aimed at a "novel" outcome is "novel". This includes work that is done in genuine ignorance of existing knowledge, either because that knowledge is not freely available (e.g. a system architecture which is commercially confidential or proprietary) or because it is not readily obtainable.
- Activity is not "novel" if it is routine, or is not aimed at achieving a "novel" outcome. It is recognised that often R&D projects are the sum of a series of routine tasks and "novelty" will be assessed – as it is currently – on the basis of the whole context rather than its component parts.

Q4.2 ***Do you agree that the Government should define "novelty" along the lines set out above?***

Assessing Novelty

4.12 Understanding whether an activity is "novel" or not is relatively intuitive. The professionals working on the activity should have a reasonable grasp of the state of knowledge within their particular field, and – following Frascati, and as set out in the Commentary – the Government intends to apply this test to whether an activity is novel. However, concerns have been raised as to how this will operate in practice. In other words, companies seek clarity as to what evidence they require in order to 'prove' novelty to the Inland Revenue, and therefore to have confidence in claiming the R&D tax credit.

4.13 In keeping with the UK's 'light touch' approach to R&D tax credits, the Government wishes to ask for the minimum necessary amounts of evidence from taxpayers. In essence, if a company takes reasonable steps to ensure its work is "novel", and can produce evidence of this if required by the Inland Revenue, then this should be sufficient proof of novelty.

4.14 The most compelling evidence of novelty is a tangible outcome (a functioning piece of software, or a peer-reviewed piece of research, for example). However, these outcomes necessarily lag any "novel" work that generates them, and therefore may not be available in time to use as evidence. Equally, "novel" activities do not always lead to such outcomes – they are not always 'successful' or may be embedded imperceptibly in the product.

4.15 In the majority of cases, evidence of "novel" outcomes will not be available. A company therefore needs to be able to demonstrate that it has taken reasonable care to assess the "novelty" of its activities. It is generally in a company's interest to ensure before commencing expensive and uncertain R&D work that an equivalent or competing product does not already exist. Evidence gathered in the course of this investigation should be sufficient proof of "novelty". The Government does not wish to be too prescriptive about the form in which this information should be recorded, or to require additional records to be kept, but elements that a company might reasonably assemble could include:

- Its justification for carrying out the work (e.g. investigations of whether a component was commercially available might generate emails or paper records of items deemed "not up to spec."; internal communications agreeing to develop a new component or adapt an old one on this basis).
- The results of a patent search, or the claims made in a patent application by the company[1].
- Articles or advertisements from trade journals which illustrate the 'state of the art' (for example, benchmarking tests for software), to be compared with the intended characteristics of a new product, process, service or material.
- Project timetables or test results indicating progress against the intended outcome (e.g. creation and testing of thousands of chemicals which are potentially new active compounds; results of prototypes tested against a desired specification).

4.16 In order to present this evidence to a tax inspector who is not a professional in the field of science or technology, some interpretation or explanation may be necessary. Documents written for non-technical personnel – for example, potential investors or board members – may be better evidence than detailed technical justifications in the first instance.

Q4.3 ***What evidence might companies reasonably be expected to have and produce to justify calling an activity "novel" against the criteria outlined above?***

[1] Any such details provided to the Inland Revenue are treated with the strictest confidence and do not impact upon the consideration of any application for a Patent.

4.17 The concept of novelty is applied to a project or activity as a whole. A programme of work that is "novel" may also give rise to a number of other non-"novel" applications. This may be the case for a stream of work that is tapped to produce some products that are not themselves "novel", for example. It is recognised both that the R&D process can be slow, and that companies will wish to make the most of any opportunities that arise from it. It is still necessary to separate out the costs of the R&D activity from those relating to the product development.

Judging "appreciable improvement"

4.18 Sufficiently improved products, processes and services are "novel". Just as it is difficult – and probably counterproductive – to set hard and fast rules for what constitutes "novel" activity, in general it is hard to answer definitively the question "How much improvement is sufficient improvement?" The term used in the current Guidelines is "substantial improvement"; this is contrasted to "incremental improvement". It has been suggested that these two terms are not necessarily opposites: in some fields of science and technology, particularly established ones, an improvement can be in some sense 'incremental' but nonetheless substantial. Furthermore, it has been argued that the nature of some R&D is such that over the period of several years consecutive incremental changes from an ongoing process of R&D amount to a larger, indubitably significant change. In the light of these representations, this document follows Frascati in using the term "appreciable improvement" to capture the original intention of excluding work which is insufficiently novel from being R&D.

Q4.4 ***Does "appreciable improvement" (as contrasted with "non-appreciable improvement") represent a more accurate and helpful term than "substantial improvement" (as compared to "incremental improvement")? Is there another term that would make this distinction better or more clearly?***

4.19 "Appreciable improvement" means to change or adapt something to the point where it is obvious to a competent professional that the "improved" version is different from and in some way 'better' than the original. In some "novel" work, this improvement may be in a directly measurable characteristic (for example, an increase in the effective range of a mobile phone handset). In other "novel" work, the improvement may be indirectly measurable (e.g. a new design for a radio which operates to exactly the same standard as an existing device, but uses fewer components and is therefore cheaper than the original radio). Often there will be both tangible and intangible improvements to the same product, process, service or material.

4.20 "Novel" activity implies that it is in some way an advance of knowledge. For something to be an "appreciable improvement" it must in some way extend the collective knowledge or ability of the trade or sector in which it is made. If something falls well within the current capability of a trade or industry sector as a whole, then even if it is a major improvement on a previous version, work aimed at developing it by a company is not R&D – it is in effect "routine" for a competent professional.

4.21 It is important to stress that appreciable improvement is not limited to companies at the very leading edge of R&D activity in a trade or sector. As long as the work represents innovation relative to the sector as a whole, it is "novel". For example, the existence of high-fidelity audio equipment does not prevent activity to create improved-performance equipment from being R&D (for example, through technological advances leading to lower cost through innovative circuit design or speaker construction). However, if a company is simply catching up with the general state of the industry the work will not be R&D. Equally, just because a change is made to a product, process, service or material, this does not mean that it is appreciably improved.

4.22 How big a change is necessary to constitute an appreciable improvement depends on the state of knowledge and technology in a particular field, trade or industrial sector; expectations in some newer or faster-moving sectors can differ from those in more established or constrained ones. For example, it has long been accepted that the power of new computers roughly doubled every 18 months[2], so a chip which was 1% faster might not be considered much of an improvement (all other things being equal), but an increase of 1% in the efficiency of electricity generation from, say, a wind turbine might well be a 'substantial improvement'. Indirect indicators of improvement such as price operate in the same way; how big a reduction in price indicates an appreciable improvement depends on conditions prevailing in the particular sector.

4.23 As with assessments of novelty more generally, the company claiming R&D tax credits needs to be able to produce credible evidence as to what constitutes "appreciable improvement" within the sector. This could for instance include examples of new applications made possible by the improved version, such as devices made practical by markedly lighter batteries, as well as the kinds of evidence mentioned in paragraph 4.13 as indicative of "novelty" in general.

Q4.5 ***What evidence might companies reasonably be expected to have and produce to justify calling something an appreciable improvement against the criteria set out above?***

Sector-specific guidance

4.24 One possible way in which companies could achieve greater certainty in understanding the parameters of what constitutes novelty is sector-specific information. The Government is sympathetic to the possibility of industry groups consulting with the Inland Revenue to agree a set of detailed parameters that tax inspectors might use to assess claims in a particular sector. The Government would prefer to have a short, generic definition of R&D for tax purposes, as at present, with any detailed sectoral agreements being supplementary and subject to the overall Guidelines.

Q4.6 ***Should the Government encourage the use of sectoral or technology-specific agreements to improve certainty as to the availability of R&D tax credits for particular types of activity?***

Q4.7 ***Is the use of a 'core' statutory definition of R&D for tax purposes plus ad-hoc sectoral or technology-specific agreements the best model for providing more detailed guidance to companies? Or would respondents prefer greater use of examples/case studies as a way of demonstrating the key elements of R&D in particular technologies/sectors?***

[2] The so-called Moore's Law, named after Gordon Moore, co-founder of Intel.

5 Consumable Stores

As well as staffing costs, the other area of current expenditure that presently qualifies for R&D tax credits is that of "consumable stores" – essentially physical items which are stored and consumed as part of the R&D process. This chapter considers the extent to which the current view on what constitutes "consumable stores" needs amplifying or clarifying.

5.1 The R&D tax credit regime gives relief for expenditure on consumable stores. Qualifying expenditure is that which would be treated as consumable stores in accordance with normal accounting practice. In addition, the consumable stores must be employed directly in the R&D.

5.2 The term 'consumable stores' is taken from Statement of Standard Accounting Practice (SSAP) 9, which identifies consumable stores as an element in the valuation of stock and work-in-progress. It is not further defined. The R&D tax reliefs have given significant prominence to the term and we wish to bring a greater degree of certainty and clarity as to what expenditure can be regarded as consumable stores.

5.3 In so doing, the opportunity could be used to widen the range of qualifying expenditure. This would have implications for Exchequer cost.

5.4 The current Inland Revenue view is set out in their Corporate Intangibles and Research and Development Manual[1] and is reproduced below.

Expenditure on consumable stores is expenditure on materials and equipment used up in the R and D activity, but which are not in themselves incorporated or reflected in the product of the R and D. Supplies, materials, or equipment used only indirectly in the R and D effort e.g. related to general overheads such as administration will not qualify.

Consumable stores are, by their nature comparatively short-lived, and spending on them will be revenue expenditure. For example, the consumable stores of a chemistry-based R and D project may include such items as disposable laboratory equipment (flasks, test tubes) and chemicals used in the R and D process, etc. This spending will be revenue expenditure and could qualify for R and D tax relief. But expenditure on a centrifuge will usually be on capital account, and, if so, will not qualify.

The consumable stores that go into the making of prototypes would qualify, but specially commissioned parts are excluded. For example, a company may be working on a solar powered cordless toaster incorporating groundbreaking sensor technology. The cost of the materials used to make a prototype would qualify insofar as they are not specially commissioned, as would the bread used to test its effectiveness.

Some consumable stores are recyclable; for example, it may be economically viable to sell the waste products from chemicals used in an R and D activity. The whole cost of such items can be claimed as qualifying for the R and D tax relief.

Expenditure on heat, light, power, rent, rates, interest, lease payments, books and journals are not consumable stores. Payments for the rights to use software are not consumable stores. Furthermore the cost of IT hardware does not qualify, unless exceptionally the hardware is an integral part of a prototype.

[1] This manual can be found at http://www.inlandrevenue.gov.uk/manuals/cirdmanual

5.5 However, the absence of a formal definition of consumable stores can leave companies and their representatives with uncertainty. This can be addressed in several ways:

- The Inland Revenue could provide further guidance.
- A statutory definition could be adopted with or without reliance on SSAP 9, based on the current understanding.
- A statutory definition with or without reliance on SSAP 9 could be adopted extending the current understanding.

Q5.1 ***What would be the most effective means of ensuring greater clarity on qualifying expenditure on consumable stores?***

5.6 Whatever method is chosen it will be necessary to identify the categories of expenditure that qualify as consumable stores employed directly in the R&D. It is not intended to extend relief to general overhead costs such as heat, light and power. But it would be useful to know what costs are regarded as essential and integral to R&D activity that could be brought within any revised definition. These could include costs that clearly fall within the current definition, those that are subject to ambiguity and those that fall outside. Examples of expenditure that currently does not qualify include books, journals, library subscriptions and patent application costs.

Q5.2 ***What types of expenditure should be included in "consumable stores"?***

5.7 As explained above, the term consumable stores is interpreted by reference to normal accounting practice. In other countries no such link exists. For example in Canada relief is given for the "cost of materials consumed or transformed" and in Australia feedstock expenditure qualifies. This is defined as "…expenditure incurred by the company in acquiring or producing materials or goods to be the subject of processing or transformation by the company in R&D activities." It may be appropriate to replace the term consumable stores with an alternative to reflect the type of qualifying expenditure.

Q5.3 ***Should the term consumable stores be replaced and the link with normal accounting practice be severed?***

Q5.4 ***If the term is to be replaced, what should take its place?***

5.8 Under the current rules the costs of the materials used to make a prototype qualify insofar as they are not specially commissioned. It has been suggested that this distinction between consumables that are stored and those that are commissioned puts high technology R&D at a disadvantage.

Q5.5 ***Should the relief be extended to the costs of all materials used in the construction of prototypes?***

6 Licences for Advanced Software

Currently two categories of business activity qualify for the R&D tax credit (excluding capital expenditure which qualifies for R&D Allowances) – staffing costs and consumable stores. Increasingly companies are using advanced computer software in their R&D processes. To the extent that 'staff' of the company have produced such software, it will qualify for the credit. However bought-in software is unlikely to qualify under the heading of 'consumable stores'. This chapter considers the options and issues around increasing the scope of qualifying expenditure to include advanced software acquired under licence.

6.1 Increasingly, research and development relies on computers and software tools as well as, or instead of, physical materials and staff time. Computers are used, for example, to run complex simulations, reducing the need for physical testing, or to explore problems where physical testing is either impossible in principle, prohibitively expensive or not feasible in the time available.

6.2 The nature of R&D is such that, to support each successive generation of R&D, this advanced software will need to replaced or upgraded frequently. Often such software will be purchased under licence and the licence will be time limited, or perhaps limited to a number of runs. In terms of its life cycle for the company, such software is therefore similar to consumable stores – it is paid for, used and after a limited period, is of no further use in the R&D.

6.3 Two categories of costs are currently eligible for R&D tax credits: staff costs (including the costs of externally provided workers, which it is proposed to add in the current Finance Bill) and consumable stores.

6.4 Although it may be similar in role to consumable stores, the Inland Revenue's view is that advanced software does not qualify as consumable stores under the present scope of allowable costs for the R&D tax credit. The term consumable stores, used for all the tax credits, was taken from UK accounting standards. It is not, however, defined there and the Revenue has taken the view that in adopting the term Parliament would have intended it to have its common sense, everyday meaning. So to count as "consumable stores" something must be physically stored, and physically consumed.

6.5 In this sense, computer software is not consumed, even if it can be argued that it is stored on particular media, which are themselves consumable.

6.6 The DTI Guidelines define R&D in a way such that where a company employs its own staff to write software to be used as part of an R&D project, those staff costs would qualify (even if the production of the software in isolation from an R&D project would not, in itself, qualify: this is an example of how an R&D project is made up of a large number of activities which are themselves routine and not "novel").

6.7 As it does not wish to treat companies which buy software with which to conduct R&D unnecessarily differently from those which produce their own software for this purpose, the Government has therefore announced its willingness, in principle, to include such software in the credit.

Q6.1 ***Do you agree that "bought-in" advanced software for R&D should qualify for the R&D tax credits?***

6.8 However, this is subject to being able to define the kinds of software that should be included. Views are sought on what kinds of software might be included - and which should be excluded, but the Government is minded to set a dividing line broadly in accordance with the other features of the R&D tax credits.

6.9 For example, staff costs are only included when the staff are working "actively and directly" on R&D. Support staff would not qualify, in general. And no allowance is made in the credits for overheads such as power and other utilities or facilities costs.

6.10 The Government's view is therefore that software that is not directly focused on R&D should not qualify. For example, payroll or personnel or other management information systems or web servers used to support the business would not qualify, nor would a database used to track stores used for the R&D.

Q6.2 ***How close to the R&D should software be to qualify for the credit?***

6.11 The argument for the inclusion of software depends on its being in some way "advanced" and (which is a closely related concept) having a short useful life. The Government's view is that this should usually exclude, for example, operating systems and office applications such as word processors or spreadsheets. They might though be included in certain exceptional circumstances – for example if a company licenses a cutting edge operating system optimised to run a large parallel system.

Q6.3 ***What views do respondents have on defining "advanced"? Alternatively, what examples can they suggest of the sorts of "advanced" software that might be included?***

6.12 As well as being advanced, the case for including software depends on it having some parallel with consumable stores in the sense that they are used up ('consumed') as part of the R&D process. The software may be required at a particular stage of an R&D activity or may be integral to one project but the assumption is that it does not have an enduring value. This does not necessarily have to be time limited – some software may only run three times, even if those three runs are several months apart. So whilst one approach would be to set an upper time limit on the expected useful life of qualifying software, the definition would need to take account of the range of ways software can be said to be 'short-lived'.

6.13 However, one of the main objectives of the R&D tax credits is to provide certainty and the Government wishes to provide a definition which clearly defines the advanced, short-life software which businesses often have to buy in and use as part of the R&D process – and which after a period of weeks or months has no value to them and must be replaced or upgraded if the work is to continue.

Q6.4 ***Is "advanced" software invariably short lived – either in terms of the length of licence of number of times it can be run? Do respondents think that setting a clear time limit and/or number of uses limit is the best approach - or is there a more useful generic definition of such software that would provide the clarity that is necessary?***

Q6.5 ***If respondents prefer definite time limits and/or limited number of uses, what would the appropriate limits be?***

7 Subcontracted Work and Qualifying Bodies

Under the large company R&D tax credit scheme, the tax credit is given to the company actually undertaking the R&D. Large companies cannot claim the credit where they contract the work out to others. This can throw up anomalies where the subcontractor cannot claim the credit either (this would include universities, health service bodies, individuals etc.). In such circumstances the benefit of credit may not accrue to either party and this could act as a disincentive to large companies entering into such arrangements. The large company rules allow the large company to claim the credit where the work is subcontracted to a 'qualifying body', as defined by the legislation. This chapter considers two classes of R&D subcontractor that could be included within the category of 'qualifying bodies'.

7.1 The R&D tax credits for companies which are small or medium-sized enterprises (SMEs) and for large companies work in different ways where subcontracted work is concerned. The SME credit (Schedule 20 Finance Act 2000) allows a company to claim credit on the cost of R&D work that it subcontracts to someone else (typically, another company, but including organisations such as universities or Government laboratories, or indeed individuals such as consulting engineers or physicists). Conversely – to prevent the possibility of double credit – companies cannot claim this credit for work which they do, as a subcontractor, for someone else, or for work whose costs are covered by some other person.

7.2 The large company credit (Schedule 12 Finance Act 2002 (FA 2002)) is different. Large companies are more often part of international groups, and R&D work in the UK may well be funded from elsewhere within the group (whether or not it is formally subcontracted). Applying the same rules as for SMEs would prevent such work from qualifying. So large companies are in general able to claim for the costs of work they carry out themselves regardless of how this is funded, i.e. they can claim for work they do as subcontractors, and also for work they do whose costs are covered by others.

7.3 Conversely, large companies cannot claim for the costs of work subcontracted by them to others.

7.4 Without further rules, this would leave a gap where the subcontractor is unable in principle to benefit from the credit. For example, universities, Government laboratories or individuals are unable to benefit from the R&D tax credits themselves, for various reasons. So there is a risk of R&D work falling outside the tax credits.

7.5 The solution adopted in the tax credit legislation is to make an exception for the main types of potential sub-contractor that cannot, by themselves, benefit from the credit. Schedule 12 FA 2002 specifies that these sub-contractors are individuals or partnerships of individuals (neither of which would themselves be able to claim the credits, since only companies can claim) and "qualifying bodies."

7.6 "Qualifying bodies" are charities, higher education institutions, scientific research organisations and health service bodies. All of these are defined according to UK law (cited at paragraph 18(2) Sch 12 FA 2002). Additionally, the Treasury may by Order define further bodies, or classes of bodies, if necessary (see paragraph 18(1)(e) Sch 12 FA 2002).

7.7 This power was included to enable the inclusion both of foreign organisations similar to those listed above, and of any other entities unable to benefit from the credit themselves but which are not included in any of the categories listed at paragraph 18(2).

7.8 The Government is now seeking views on which sorts of organisations ought to be included by virtue of paragraph 18(1)(e) and whether this should be done by using an overarching definition (or definitions) or by designating particular entities.

7.9 The Government is aware of two particular classes of R&D subcontractor that might be included.

FOREIGN UNIVERSITIES

7.10 As in the United Kingdom, universities abroad frequently carry out research and development for companies, either formally as subcontractors or under more open collaborative arrangements.

7.11 While it was feasible to define a "university" (more strictly, an institution of higher education) in the UK by reference to statute when FA 2002 was drafted, this was not possible to do so more widely in the time available. In particular, the Government was concerned that too loose a definition would create risks of abuse with companies able to claim the credit for payments to entities that had little real existence and whose primary purpose was the avoidance of UK corporation tax.

7.12 The current approach is therefore for companies to be able to make requests for particular institutions to be designated. To date there have been few such requests. It may be that in practice there is little such activity - or it may be that companies are unaware of the need or ability to seek designation for this class of subcontractors.

Q7.1 ***Are respondents aware of any foreign universities that carry on contract R&D for UK companies?***

7.13 Given the importance of partnership R&D carried out with universities (and other educational institutions) the Government is now considering whether it would be better to set out a general definition of such entities - and if so, what should be included.

Q7.2 ***Are respondents satisfied with the present procedure for designating particular institutions - or would they prefer a more general definition?***

7.14 In formulating a definition, the Government would be concerned not to create opportunities for abuse of the credits. But any definition ought also to capture the full range of institutions that actually carry on R&D for UK companies while being broadly comparable to the UK definition.

7.15 The features of such a definition could include:

- The organisation is an institution of higher education (excluding, for example, schools) and
- It has an effective exemption from tax.

Q7.3 ***If respondents favour a general definition, what sorts of entities should be included? What should be excluded?***

PUBLIC SECTOR RESEARCH ESTABLISHMENTS

7.16 For consistency, the Government considers that the definition of a qualifying body should also be extended to what are collectively termed 'Public Sector Research Establishments'. Broadly, these are research bodies operating on a not-for-profit basis with substantial public sector funding and involvement – although the degree and form of this varies considerably between bodies.

7.17 A number of such organisations exist in the United Kingdom. One option for tax credit purposes would be to publish a list of all such organisations that the Government will recognise as PSREs for tax purpose. An alternative option would be to attempt to arrive at a generic term that encapsulates the 'not-for-profit' and 'substantial public sector funding/involvement' nature of PSREs. Both approaches have some potential difficulties. A comprehensive list would require regular updating to take account of the creation, name-changes, organisational changes or demise of specific PSREs. Creating a generic term runs the risk of omitting or including bodies in a way which runs counter to the broader policy aims.

Q7.4 ***Which would respondents find more useful for determining whether a body was a PSRE for R&D tax credit purposes – a comprehensive list of PSREs or a generic term describing such organisations?***

8 Partial Regulatory Impact Assessment

Purpose and Intended Effect

8.1 This consultation document seeks detailed views on the following changes to the R&D tax credit schemes for both SMEs and large companies:

- Revising the definition of R&D for tax purposes in the DTI Guidelines, to:

  make it clearer (in particular by drawing upon the discussions with industry that led to the publication of Inland Revenue guidance – the "Commentary");

  align it more closely with commercial practice, recognising that companies are principally concerned with product development and that the credit is focused specifically on innovation within (and beyond) product development, so that it is easier for companies to see where their activities fall within it;

  make it easier for companies to provide evidence that they are conducting R&D.

- Introducing a definition of advanced, short life software, to support inclusion of such software within qualifying expenditure for the purposes of the R&D tax credits.

- Clarifying the definition of "consumable stores".

- Clarifying which entities large companies may pay for subcontracted work and still receive the credit.

Risks

8.2 The aim of the proposal is to promote productivity by improving the R&D definition so that it is clearer and easier to use. Take-up of R&D tax credits has been encouraging but there is a risk that use of a definition which is unclear adds complexity to claims and inhibits uptake of the tax credits.

Options and benefits

8.3 There are two options: retain the existing R&D definition ("do nothing") or revise it.

8.4 The benefit of a revised definition would be improved clarity enabling companies to understand more easily when they qualify for the credits, a degree of certainty when making investment plans and so giving a clearer incentive to carry out the qualifying activity. Improved clarity should also reduce administrative costs for companies by, for example, minimising correspondence with the Inland Revenue to establish what qualifies.

Implementation costs

8.5 Any change to the R&D definition would clearly result in a small increase in one off costs as companies apply the revised definition to their businesses but greater clarity should lead to reduced costs over the long term. We would be grateful for views on the scale of this, and the balance of advantage between retaining some of the key terms used in the existing definition and replacing them.

Other impacts

8.6 The market affected by the proposal comprises businesses undertaking R&D in the UK. A large number of companies invest in R&D in the UK, including virtually all sectors of the economy and businesses of all sizes. We have performed the competition filter test and no adverse impact of the proposal on the competition in the affected market has been identified at this stage.

8.7 R&D tax credits are available to all businesses and all sectors on the same basis (with more generous provision for SMEs) and, as the changes in the proposal would likewise apply equally to all companies and all sectors, there should also be no distortion of competition. Indeed, by promoting R&D and thus innovation, the proposal may have a positive impact on competition by encouraging more innovative behaviour in the long term.

8.8 Specific changes in the proposal are relevant to particular sectors (for example, the software industry) in recognition of particular problems faced by those sectors in identifying qualifying R&D. The reduction of such sector-specific barriers should have a positive impact on competition by promoting more certain and equal access to R&D tax credits across all sectors.

Small Business

8.9 At present the same R&D definition applies to all companies. SMEs may have greater difficulty in accessing information, beyond the DTI Guidelines and Inland Revenue Commentary, which will enable them to decide whether their activities constitute R&D. A clearer definition may therefore reduce their compliance costs.

8.10 The Government is also seeking views in this consultation on whether any extensions to the definition should apply only, at least initially, to companies that are SMEs. As was discussed in Chapter 2, SMEs face particular market failures in terms of lack of access of finance, cash-flow difficulties in the early stages of R&D projects and reduced spillover benefits from one R&D project to another, compared with larger companies. For these reasons the SME credit offers a more generous rate and is payable to loss-making SMEs. An extension of the definition that only applied to SMEs would provide further support to such companies to help redress the market failures they face.

A1 Appendix: DTI Guidelines on the meaning of R&D for Tax Purposes

These Guidelines are issued by the Secretary of State for the Department of Trade and Industry for the purposes of Section 837A Income and Corporation Taxes Act 1988.

Introduction

1. Science is the systematic study of the nature and behaviour of the material and physical universe, and technology is the practical application of science, especially in industry and commerce. The process by which new scientific and technological information is discovered, gathered and used involving theoretical conjecture, observation, experiment, measurement and deduction, is referred to as 'research and development' (R&D). R&D is now defined for tax purposes in Section 837A Income and Corporation Taxes Act 1988.

2. This definition, extended by S.837B ICTA 1988 to include oil and gas exploration and appraisal, replaces the former definition of "scientific research" in S.139(1)(a) CAA 1990.

Definition of R&D

3. The overarching definition of R&D for tax purposes follows that used for the purposes of normal accountancy practice for UK companies in Accounting Standard SSAP 13. The definition in SSAP 13 is itself based on the definition developed by the OECD for the purposes of statistical surveys of R&D (commonly referred to as "Frascati"). Frascati defines R&D as comprising "creative work undertaken on a systematic basis in order to increase the stock of knowledge … and the use of this stock of knowledge to devise new applications". But the humanities are excluded because they do not fall within the fields of science or technology.

4. SSAP 13 identifies activities that would normally be, or would not normally be R&D, but the boundary between qualifying and non-qualifying activities is less explicitly defined and open to interpretation. The statutory definition of R&D provides greater certainty by imposing a second test for the purposes of the tax legislation. To qualify as R&D, the activity must not only be R&D as defined by SSAP 13, but it must also satisfy the conditions set out in these Guidelines, which are issued for tax purposes by the Secretary of State.

5. SSAP 13 defines R&D in terms of research and development. Research is further divided into pure (or basic) and applied research. Thus, R&D covers the following related activities:

a. pure (or basic) research: Experimental or theoretical work undertaken primarily to acquire new scientific or technical knowledge for its own sake rather than directed towards any specific aim or application;

b. applied research: Original or critical investigation undertaken in order to gain a new scientific or technical knowledge and directed towards a specific practical aim or objective;

c. development: Use of scientific or technical knowledge in order to produce new or substantially improved materials, devices, products or services, to install new processes or systems prior to the commencement of commercial production or commercial applications, or to improving substantially those already produced or installed.

6. SSAP 13 distinguishes R&D activity from non-research activity by the presence or absence of an appreciable element of innovation. If the activity departs from routine and breaks new ground it should normally be included; if it follows an established pattern it should normally be excluded.

7. SSAP 13 lists various activities which would normally be included in R&D:

- experimental, theoretical or other work aimed at the discovery of new knowledge, or the advancement of existing knowledge;
- searching for applications of that knowledge;
- formulation and design of possible applications for such work;
- testing in search for, or evaluation of, product, service or process alternatives;
- design, construction and testing of pre-production prototypes and models and development batches;
- design of products, processes, services or systems involving new technology or substantially improving those already produced or installed;
- construction and operation of prototypes and pilot plants.

8. SSAP 13 lists various activities that would normally be excluded from R&D:

- testing analysis either of equipment or product for the purposes of quality or quantity control;
- periodic alterations to existing products, services or processes even though these may represent some improvement;
- operational research not tied to specific research and development activity;
- cost of corrective action in connection with break-downs during commercial production;
- legal and administrative work in connection with patent applications, records and litigation and the sale or licensing of patents;
- activity, including design and construction engineering, relating to the construction, relocation, rearrangement or start-up of facilities or equipment other than facilities or equipment whose sole use is for a particular research and development project;
- market research.

The Boundary of R&D and Other Related Activities

9. Identifying the boundary between R&D and non-R&D activities can sometimes pose practical difficulties. But an activity will be R&D if carried on in the field of science or technology and undertaken with a view to the extension of knowledge.

10. R&D is thus characterised by work which breaks new ground and the novelty of what is being created in an atmosphere of scientific or technological uncertainty, and if successful will result in the extension of scientific or technical knowledge (although it is recognised that R&D will not always be succesful). R&D should be founded on the investigation and exploitation of a scientific principle. This may be in pursuit of the creation or development of, for example, new liquids, substances, materials, software, designs, products, processes, technology or knowledge. R&D may result in intangible as well as tangible outputs.

11. Within this context, activities will be R&D if they consist of:

- the application of new scientific or technological principles in an existing area of investigation; or
- the application of existing scientific or technological principles in a new area of investigation.

12. Care must be taken to distinguish R&D from other activities that may be part of the wider innovation process. R&D will not include activities based upon the use of well-established products or processes, which may be new to the user but do not represent any departure from common knowledge or practice for the industry sector concerned. Neither will R&D include any activity that is not intended to lead to a scientific or technical advance or which did not break new ground intended to lead to substantial improvement for the business's products, processes or services.

13. Experimental development falls within R&D, but commercial development, including pre-production development and product development is outside R&D. There may still be difficulties in distinguishing these activities. The basic rule is to look at the primary objective of the work undertaken. If the primary objective of the development is to test the viability of the R&D, or to make further technical improvements on the product or process, then the work comes within the definition of R&D (subject to the basic requirement that R&D has to include an appreciable element of novelty). On the other hand, further development is not R&D if the product, process or approach is substantially set, or the technological uncertainty has been resolved, even though the development may be related to the design or bringing on of a product. Similarly, pre-production planning, or work to get a production or control system working smoothly is not R&D. Thus, R&D would include novel work which draws on or creates a new source of knowledge which might lead to the breaking of new ground or a technical advance and which might subsequently entail the creation or development of a new or substantially improved product, process or service.

14. This means that work on the periodic updating or modification of a product will not be R&D if it does not involve an appreciable element of innovation and does not break new ground. However, a programme of R&D may result in incremental improvements to a product, service or process.

15. The commercial development of a product may start before all the technical uncertainties have been resolved. In this situation, although activities directed towards commercial exploitation will not be R&D, related activities carried on primarily to resolve continuing technological uncertainties would still count as R&D if they contain an appreciable element of novelty. Similarly, new technical problems may emerge after a new product or process has been turned over to production, and the resolution of these problems may require new R&D to be carried out. However, the detection of faults in, or the modification of equipment or processes will normally involve minor modifications of standard equipment or processes and this will not be R&D.

16. Normally research in the humanities and social sciences is excluded. But it is recognised that some aspects of the fields of natural or applied science require consideration be given to the humanities, for example the development of effective man-machine interfaces in virtual reality, or ergonomic considerations for new forms of communications. Where such research forms an integral part of the natural or applied R&D it may be included.

17. It therefore follows that the activities in SSAP 13 listed in paragraph 7 above will be R&D if they are carried on as, or as part of a scientific or technological investigation, or as pre-production development, to break new ground and increase knowledge or resolve technological uncertainty. Similarly, the activities from SSAP 13 listed in paragraph 8 will not be R&D.

R&D Boundaries – Examples

18. The boundaries of R&D are illustrated by the following examples. They are not intended to be exhaustive.

In medicine, routine testing (such as body scanning, autopsies or blood tests) is not R&D. But a special investigation to determine the effectiveness of a certain type of cancer treatment that requires, for example, certain tests to generate a data set for the programme of research would be R&D.

For physical phenomena, routine monitoring such as daily records of temperature and pressure variation or quality control on material composition and properties is not R&D. But a programme of work to investigate the effects of climate change, to devise new or substantially improved methods or instruments for measuring temperature and pressure, or for developing new materials and evaluating their properties all of which require the collation and analysis of data would be R&D.

In engineering disciplines, R&D generally includes the development of a piece of fundamental research up to the start of the production stage. This may include incremental developments where they arise from a programme of research designed to result in substantial improvement. For example, design, drawing and operating instructions for the setting up and operation of pilot plant and prototypes primarily to test R&D hypotheses would constitute R&D. However, design and drawing work for the preparation, execution and maintenance of production standardisation (e.g jigs and tools), or to promote the sale of products would not constitute R&D.

19. The treatment of prototypes and pilot plant can illustrate the boundary between experimental development R&D and pre-production work. A prototype is an original model constructed to have all of the technical characteristics of the anticipated new product. The design, construction and testing of prototypes would fall within R&D where this falls at the end of an R&D investigation. But once any modifications necessary to reflect the test findings have been made to the prototypes and further testing satisfactorily completed, the R&D phase has been completed and pre-production has begun.

20. Similarly, pilot plant constructed to evaluate R&D hypotheses, develop new product formulae, establish new product specifications, design special equipment and structures and prepare operating instructions or manuals on the process will fall within the R&D activity.

Software

21. Software may qualify in two respects (i) as the object of the R&D and (ii) as the means to achieve the R&D. Software should be given equal treatment to other forms of technological activity. That is to say, for a project to be classified under case (i) as 'a software R&D project' it must seek to achieve a scientific and/or technological advance, and the whole or part of a project to resolve scientific and/or technological uncertainty on a systematic basis.

22. Software R&D might include investigations in such areas as theoretical computer science, new operating systems, new programming languages, significant technical advances in algorithms, new or enhanced query languages, or object representations, software engineering methodologies for improved computer programmes and artificial intelligence. In this context, artificial intelligence might cover technical advances in such areas as machine vision, robotics, expert systems, neural networks, the understanding of natural language and automatic language translation. The development of, say, a new natural language interface for a computer game could qualify as R&D, although the game may be a mature product and represent non-R&D activity in most other respects.

23. Even so, software-related activities of a routine nature are not considered to be R&D. Such activities include work on system-specific or programme-specific advancements which were publicly available prior to the commencement of the work. Technical problems which have been overcome in previous projects on the same operating systems and computer architecture are excluded as are activities such as:

- supporting existing systems;
- converting/and or translating computer languages;
- adding user functionality to application programmes;
- de-bugging of systems;
- adaptation of existing software;
- preparation of user documentation.

24. These do not involve scientific and/or technological advances, and are not classified as R&D.

25. Software based, case (ii) projects involve the development or use of software within a larger R&D project. There may be no technical advance to the software per se, but the software element of the project may still qualify as R&D, if the nature of the application includes a significant degree of novelty.

26. For example, a project to develop a new product using virtual reality simulation and computer aided engineering is most likely to use an existing computer aided engineering (CAE) package and simulation software. This would not constitute an advance to the software. However, experimental development directed towards producing a new product/process or a substantial improvement to an existing product/process aided by such computer software may still constitute R&D.

27. Software based R&D activities of this kind will be wide ranging. They may, for example, entail experimentation in the design of new drugs, or the development of novel aerospace concepts. The use of existing computer software and finite element analysis to simulate say the aerodynamics or fluid dynamics and strength of a new vehicle, aerofoil or structure is unlikely to involve software R&D. However, the underlying research, design and development programme in these areas involving theoretical simulation, experimentation and the correlation of one with the other could.

28. Software development intended for the analysis of, for example, market research data, which was not expected to result in the development of a scientific advance to the software, such as a new algorithm, would not be considered R&D.

Qualifying Indirect Activities

29. Supporting activities that will qualify if part of a larger R&D project are:-

- scientific and technical information services, insofar as they are conducted for the purpose of R&D support (such as the preparation of the original report of R&D findings);
- indirect supporting activities such as maintenance, security, administration and clerical activities, and finance and personnel activities, insofar as undertaken for R&D;
- certain ancillary activities essential to the undertaking of qualifying R&D (e.g. taking on and paying staff, leasing laboratories and maintaining research and development equipment including computers used for R&D purposes);
- training required to directly support an R&D project;
- research by students and researchers carried out at universities;
- research (including related data collection) to devise new scientific or technological testing methods, survey methods or sampling methodologies;
- feasibility studies to inform the strategic direction of a specific R&D activity.

Exclusions from R&D

30. R&D must be distinguished from a wide range of related activities. In addition to the activities listed in paragraph 8 above, the following are examples of activities that would be excluded from R&D, except insofar as they have been specifically included as potentially qualifying indirect activities at paragraph 29:-

- general education and training;
- scientific and technical information services;
- general purpose data collection;
- calibration of standards and routing testing and analysis of materials, components, products and processes;
- the acquisition of rights in, or arising from, R&D;

- routine computer maintenance or software development;
- specialised (routine) medical care;
- policy studies.

Other General Exclusions

31. A major source of difficulty in classifying work as R&D occurs at the interface between genuine R&D and activities related to the innovation process. General commercial activities will not normally be R&D. These include :-

- the range of commercial and financial steps necessary for innovation and the successful development and marketing of a new product, process or service;
- the production and distribution of goods and services;
- administration and other supporting services not directly related to the R&D activity;
- general support services (such as transportation, storage, cleaning, repair, maintenance and security) not directly related to the R&D activity.

Department of Trade and Industry Notes (not forming part of the Guidelines)

Application of the Definition of R&D

The definition of R&D in S.837A ICTA 1988 applies to chargeable periods ending on or after 1/4/2000 (corporation tax) and years of assessment 2000/01 onwards (income tax). The definition, extended to include oil and gas exploration and appraisal, applies for the purpose of R&D capital allowances (scientific research allowances) in Part VII Capital Allowances Act 1990 . It also applies to provisions in Section 82A ICTA 1988. These permit a revenue deduction for expenditure on R&D related to the trade of the person incurring it that would not otherwise be allowed for tax purposes. These provisions were formerly contained in S.136(a) CAA 1990. The definition of research and development, but without the extension for oil and gas exploration and appraisal, also applies to the following provisions:

- enterprise investment scheme, in relation to shares issued on or after 6 April 2000
- venture capital trusts, in relation to shares or securities issued on or after 6 April 2000
- corporate venturing scheme · enterprise management investment
- R&D tax credits.

Oil & Gas

Oil and gas exploration and appraisal do not qualify as R&D under either SSAP 13 or Frascati, and it is specifically excluded from the general definition of R&D in the new Section 837A ICTA 1988. But oil and gas exploration and appraisal, as defined in new Section 837B ICTA 1988, is included within the definition of R&D for the purposes of research and development capital allowances by special provision in Section 139(1)(a) CAA 1990. The eligibility criteria are discussed in more detail in Chapter 3 of the Inland Revenue Oil Taxation Ring Fence CT Manual.

A2 Appendix: Inland Revenue Commentary on the DTI Guidelines

Introduction

1. Research and development (R&D) tax credits are a positive measure, intended to focus support on innovative activities that benefit UK industry and indeed, deliver wider benefits for the UK. For this to be successful it is necessary that a boundary be drawn between activity that qualifies and activity that does not – so a definition of "research and development" is required.

2. For tax purposes, what constitutes R&D is defined by reference to accounting standards, which are set out in Statement of Standard Accounting Practice 13 (SSAP 13), and to the 'Guidelines on the Meaning of R&D for Tax Purposes' issued by the Secretary of State for the Department of Trade and Industry ('the Guidelines'). This Commentary is intended to help in the interpretation of the Guidelines; it does not supersede them. Paragraph references in this document are to paragraphs of the Guidelines unless otherwise indicated. Not all the paragraphs in the Guidelines require further comment and as such several do not feature in this Commentary.

3. The Guidelines and this Commentary must both be read in their entirety in order to understand their meaning and intent. This is because many concepts in the definition of R&D are interrelated and cannot be applied in isolation. Taking extracts out of context can produce misleading conclusions.

4. Paragraphs 1 to 10 of this Commentary are introductory. Paragraphs 11 to 78 of this Commentary are extracted from the Corporate Intangibles and R&D (CIRD) Manual, which has been prepared for the staff of the Inland Revenue. They are being published for the information of taxpayers and their advisors in accordance with the Code of Practice on Access to Government Information.

5. It should not be assumed that the CIRD manual in general or this Commentary in particular are comprehensive, nor that they will provide a definitive answer in every case. The staff of the Inland Revenue are expected to use their own judgement, based on their training and experience, in applying the guidance to the facts of particular cases. In particular difficult or complex cases they are able to obtain further guidance from specialists in Head Office.

6. The CIRD manual is based on the law as it stood at date of publication. The Inland Revenue will publish amended or supplementary guidance if there is a change in the law or in the Department's interpretation of it. The Inland Revenue may give earlier notice of such changes through Tax Bulletin or a press release.

7. Subject to these qualifications, readers may assume that the guidance in this Commentary given will be applied in the normal case; but where the Inland Revenue considers that there is, or may have been, avoidance of tax the guidance in this Commentary will not necessarily apply.

Tax reliefs for R&D

8. Prior to the introduction of the R&D tax credits in April 2000, tax relief was given for expenditure on 'scientific research'. Claims were concentrated in the area of pure science. The introduction of the Guidelines made clear that R&D for tax purposes is undertaken in other sectors such as engineering and software.

9. Most current R&D expenditure qualifies for a deduction – that is, it receives 100% tax relief. In addition, there are three special types of relief for expenditure on R&D.

- R&D Allowances give 100% relief for virtually all capital expenditure on R&D.
- R&D tax credits for SMEs, introduced in April 2000, give an extra 50% relief (making 150% in all) for current R&D expenditure on staff costs, consumable stores and some sub-contract costs.
- R&D tax credits for large companies, introduced in April 2002, give an extra 25% relief (making 125% in all) for current R&D expenditure on staff costs and consumable stores.

10. 'Staff costs' are defined in the R&D tax credit legislation to include only those staff working actively and directly on R&D. The indirect activities listed at paragraph 29 of the Guidelines do not qualify for the R&D tax credits.

Commentary on the Guidelines

11. Paragraph 3 sets out the basic principles of what constitutes R&D activity for tax purposes, which are then expanded upon in the rest of the Guidelines. To be R&D, an activity must be:

- creative work i.e. non-routine work, work containing novel elements or outcomes
- undertaken on a systematic basis i.e. excluding one off or 'lucky' discoveries. Novelty, innovation or uniqueness in the product or process are not sufficient to demonstrate technological or scientific advancement. It is how such attributes arise that is important. An effort to achieve scientific or technological advancement will be accompanied by experimentation or analysis in a situation where there is scientific or technological uncertainty about whether or how the advance can be achieved.

Of course many important advances have resulted from fortuitous discoveries (for example, penicillin and saccharine), and a subsequent effort to exploit such a chance discovery could be R&D. For example, a laboratory doing routine analyses of chemical samples to assure the quality of a production process discovers a new and potentially useful substance in one of its samples, arising from a defect in the production process. The discovery of this substance does not mean that the analysis work can be reclassified as R&D. However, if a separate programme of work is then carried out to determine how the new substance was formed and what its properties are, then this would be R&D.

- to increase the stock of knowledge not just the knowledge within the company or to use the stock of knowledge to devise new applications etc. R&D activity can lead to the creation of a new product, but the creation of a new product is not necessarily the result of R&D. In a business context, this means that when

a new or improved product or process is created, it must embody a scientific or technological advancement to be qualifying R&D. For the avoidance of doubt, this means that development work can qualify on an equal basis with research work.

- within the fields of science or technology, excluding the humanities and social sciences. See paragraph 16 for the treatment of activities outside the scope of science and technology but which are integral to an R&D project.

12. Paragraph 4 sets out the relationship between the accountancy definition of R&D in SSAP 13 and the Guidelines. To be R&D for tax purposes an activity must meet the requirements of both, but in this regard, only that part of SSAP 13 to do with defining qualifying activities should be considered. The remainder relating to accountancy treatment (for example the treatment of subcontracted R&D) has no relevance in this context.

13. Paragraph 5 outlines the three basic categories of R&D. Of these, 'development' requires the most clarification of its nature and limits for tax purposes, including the need to establish what constitutes substantial improvement.

14. The key question in a number of sectors, such as engineering, where technology generally advances by small amounts at a time, is 'What constitutes substantial improvement?'

15. Substantial improvement means to change or adapt something to the point where it is obvious to a competent professional user that the 'improved' version is different to the original. As with all R&D, work aimed at substantial improvement must be creative (contain novel elements, involve innovation) and involve scientific or technological advance. If something falls well within the current capability of the industry sector as a whole, then even if it is a major improvement on a previous version, work aimed at developing it by a company is not R&D (but see also paragraphs 19 and 20 of this Commentary).

16. It is important to stress that substantial improvement is not limited to companies at the very leading edge of R&D activity in a field or sector. As long as the work represents innovation relative to the sector as a whole, it may be R&D. For example, the existence of high-fidelity audio equipment does not prevent activity to create lower-performance equipment from being R&D (for example, through technological advances leading to lower cost through innovative circuit design or speaker construction). However, if a company is simply catching up with the general state of the industry the work will not be R&D.

17. Paragraph 6 identifies the presence of an appreciable element of innovation as a requirement for an activity to be R&D for tax purposes. We interpret "appreciable" as meaning "significant or perceptible" i.e. a non trivial advance. In this context innovation is the creation or the attempted creation of a new device, product or process resulting from study and experimentation or the introduction of something novel.

18. It is not sufficient that something is novel or innovative to the company. The work must be more than merely duplicating what has been done before.

19. It can be difficult on occasions to establish and verify whether something is novel or innovative. But we accept that there can be innovation where several companies are working at the cutting edge in the same field, and are doing similar work independently.

20. There can also be circumstances in which companies are carrying out genuine innovation unaware that someone else has already covered the same ground. Where work has already been done but this is not known in general because it is a trade secret, and another company repeats the work, this would not be barred on the grounds of duplication. Nor would it be barred if it were known that something has been achieved, but the details of how were not publicly available. In judging such circumstances we would have regard to whether or not a competent scientist or engineer, or R&D manager, in the relevant field ought to have been aware that the ground had already been covered (for example, if the information could have been obtained by a search of the Patent Office databases.)

21. Paragraph 7 comments on qualifying activities listed in SSAP 13.

22. Testing will fall within the Guidelines up to the point of resolution of scientific or technological uncertainty, discussed below in the context of paragraph 10. Testing which does not form part of the resolution of scientific or technological uncertainty is almost always a routine activity and hence is not R&D.

23. A prototype is an original model on which something new is patterned, and of which all things of the same type are representations or copies. It is a basic experimental model possessing the essential characteristics of the intended product. The design, construction, and testing of prototypes generally fall within the scope of R&D for tax purposes. This applies whether only one or several prototypes are made, and whether they are made at the same time, or one following the other. Constructing several copies of a prototype after successfully testing the original is not part of R&D for tax purposes. The role of prototypes in development is further discussed in the Commentary on paragraph 19 of the Guidelines. The use of prototypes in the software field is covered in the Commentary on paragraphs 21 – 28 of the Guidelines.

The boundary of R&D and other related activities

24. In paragraphs 9 to 20, the Guidelines explore the dividing line between R&D and other related activities

25. Paragraph 10 outlines the importance of the concepts of 'novelty' and scientific or technological uncertainty in determining whether an activity is R&D. For work to be R&D it must both be novel and involve the resolution of scientific or technological uncertainty. (This should be understood in the context of the basic principles set out at paragraph 5.)

26. 'Novelty' means that work must be intended to lead to a scientific or technical advance or substantial improvement of a product, process or service. In other words, for activity to be R&D, it must be aimed at creating something – which need not be tangible; new knowledge is a legitimate aim of R&D – or at improving substantially something which already exists. Periodic changes to existing products, services or processes – even though they may represent some improvement – would normally be excluded from R&D, unless they involve an appreciable element of innovation and either break new ground or represent technical advances (paragraph 14). Note that R&D requires only that the aim of work should be substantial improvement; if the result of such work is incremental improvement then it is still R&D (paragraph 18). Work which aims to make only incremental improvements is not R&D, but there are likely to be activities which, taken as a whole, result in incremental improvements, but which include some elements of much more significant development. Such activities would count as R&D.

27. It follows also that a rolling programme of R&D, intended to lead, over the years, to substantial improvements but which is exploited during that time to produce successive (incremental) improvements to products, should qualify.

28. R&D also includes 'novel work which draws on or creates a new source of knowledge which might lead to the breaking of new ground or a technical advance and which subsequently might entail the creation or development of a new or substantially improved product, process or service' (paragraph 13).

29. 'Scientific or technological uncertainty' means whether there is reasonable doubt whether something is scientifically possible or technically feasible, or how to achieve a desired technological advance. It is presumed that those carrying out the work will have the appropriate skill, experience and knowledge. Where such a person is able to specify, with reasonable confidence, how to achieve the advance, the activity would be routine and not R&D.

30. The uncertainty may derive from a number of sources, such as the need to engineer to a particular set of constraints or specification, or the need to make a complex system of components function effectively. (Note however that the converse is not true: the need to meet a particular specification does not of itself mean that there is any technological uncertainty.) It is assumed that a company would be able to list the technological uncertainties being resolved (or that have been resolved) in the course of the R&D project.

31. In engineering and software engineering, technological uncertainties will typically arise from turning something that has already been established as scientifically feasible into a cost effective, reliable and reproducible product or process. In the case of software projects, for example, uncertainties may arise due to system complexity, feature interaction and software conflicts.

32. Scientific and technological uncertainty applies at the level of the project as a whole: individual tasks contributing to the overall project need not themselves be subject to technological uncertainty, as long as the whole project is aimed at resolving technological uncertainty (paragraphs 13-15, 25-27). In other words, routine tasks that are required to help resolve the overall scientific or technical uncertainty are R&D for tax purposes if the project viewed as a whole is R&D. This includes the writing of software to assist in carrying out the work (paragraphs 25-27) – and the use of research in the humanities and social sciences where it has bearing on resolving the technological uncertainty (paragraph 16). For example, the testing of a prototype device or system (including a software prototype) may itself be straightforward, but it will count as R&D if done as part of a project to develop a novel device. Because of the structure of the R&D tax regime a subcontractor carrying out a routine task as part of a larger project e.g. testing, may not qualify for the tax credits even though the activity would qualify if the client company undertook it directly.

33. The scope of the term "project" in the previous paragraph of this Commentary may not be obvious. Consider a company which designs and manufactures petrol engines for cars. At one extreme, it may wish to develop improved spark plugs for an existing engine. The technological uncertainty associated with this work is resolved once prototype plugs have been fully tested in the engine: the "project" therefore comprises the work up to the end of that testing (including work which would, considered alone, be "routine" – such as the testing). At the other extreme, the company may require an engine incorporating new spark plugs, a new combustion chamber design, lighter materials and other improvements such that the overall engine is substantially improved (for example, using less petrol to achieve slightly greater performance, generating less pollution). In this case, not only the work on the spark plugs, but also development of the engine through to testing the prototype is a "project".

34. Work done before tackling a technological uncertainty (e.g. pre-production planning or bringing a firm's level of expertise up to the norm or beyond for the sector) does not count as R&D (paragraph 12). Work done after the technological uncertainty is resolved is not R&D (paragraphs 13-15). Work not relevant to resolving the technological uncertainty but still relevant to the project (for example, cosmetic or marketing-related changes to a product's design, or work on intellectual property rights connected with the product) is not R&D (paragraph 13).

35. Technical and scientific planning activities directly supporting an R&D project can qualify as part of that project. These may include defining scientific or technological objectives, assessing scientific or technological feasibility, identifying scientific or technological uncertainties, estimating development time, schedule, and resources, and high-level outlining of the scientific or technical work, as well as the detailed planning and management of the work. Other elements of a company's planning activity relating to a project but not directly contributing to the resolution of scientific or technological uncertainty, such as examination of the project's financial, marketing, and legal aspects, are not R&D within the meaning of the Guidelines.

36. The set of activities directly contributing to the resolution of the overall scientific and technological uncertainty at the project level are R&D, within the meaning of the Guidelines (as long as the project as a whole is novel, in the sense described above).

Scientific and Technological uncertainty arising from complex systems

37. Scientific and technological uncertainty may result from the complexity of a system rather than uncertainty about how its individual components behave. For example, in electronic devices, the characteristics of individual components or chips are fixed, but there can still be uncertainty about the best way to combine those components to achieve an overall effect. However, simply assembling a number of components (or software sub-programs) to an established pattern or following routine, known methods for doing so involves little or no uncertainty and is therefore not R&D.

38. Similarly, work on combining standard technologies, devices, and/or processes can be R&D if non-trivial combinations of established, known technologies and principles for their integration carry a major element of technological uncertainty; this may be called a 'system uncertainty.' If the technological specifications or objectives to resolve the 'system uncertainty' are such that the basic design of the underlying technologies must be changed to achieve the integration, the overall project may be R&D. (In both cases, the intended outcome of the work must be novel if it is to be R&D.)

39. In contrast, if R&D is done to develop a new component to slot into an existing system, or a system which is substantially the same as an existing system, there is unlikely to be significant system uncertainty. Assuming that use of the new component in the existing system constitutes a substantial improvement to the system, then necessary development work on closely-related components are also R&D. If substantial change to the system is required to incorporate a new component or components, and the work is intended to create a new or substantially improved product, process or service, this is also R&D.

40. Paragraph 12 refers to the requirement that the activity must be intended to lead to a substantial improvement in the business's products, processes or services.

41. 'Substantial improvement' – mentioned in the notes on paragraph 5 of the Guidelines above – means to change or adapt something to the point where it is obvious to a competent professional user that the 'improved' version is in some way 'better' than the original. How big a change is necessary to achieve this depends on the state of knowledge and technology in a particular industrial sector; expectations in some newer or faster-moving sectors can differ from those in more established or constrained ones. For example, historically, it was long accepted that the power of new computers roughly doubled every 18 months, so a chip which was 1% faster might not be considered much of an improvement (all other things being equal), but an increase of 1% in the efficiency of electricity generation from, say, a wind turbine may well be a 'substantial improvement'.

42. Scientific and technological improvement is not limited to physical properties: reducing the production cost (and hence the price) for a product could be a substantial improvement, but again how big a reduction counts depends on conditions prevailing in the particular sector.

43. 'Substantial improvement' in the context of engineering and other development is contrasted by the Guidelines with 'incremental' development (paragraph 18). Simply changing or updating a product, process or service is not of itself sufficient to qualify as substantial improvement (paragraph 14). If a product, process or approach is substantially set then any further changes to it are not R&D (paragraph 13).

44. In judging whether there was intent to make 'substantial improvement' of a product, process or service, we would have regard to the nature of the improvement or improvements sought by the R&D project, and arguments as to why they would constitute a substantial improvement. (This could for instance include examples of new applications made possible by the improved version, such as devices made practical by markedly lighter batteries.)

45. Paragraph 13 introduces the phrase 'experimental development' to emphasise that not all work that a company might view as development is necessarily R&D in the meaning of the Guidelines. 'Experimental development' should therefore be read as meaning 'activity which is development and hence R&D within the meaning of the Guidelines', i.e. work which is subject to technological uncertainty and aimed at creating new or substantially improved materials, devices, products, processes and services.

46. This contrasts with 'Commercial development' involved in turning a functioning prototype into a final commercial product is not R&D; this exclusion for example covers some items such as market research which are specifically excluded from R&D by SSAP 13 (paragraph 8) and the activities outlined in paragraph 31. However, it may be necessary to undertake further R&D before a product can be manufactured and sold; paragraph 58 of this Commentary gives some examples of the kind of work that may be required.

47. Paragraph 13 highlights that R&D is still taking place while the (scientific and technical) viability of earlier R&D is being established or further technical improvements are being made, as long as the overall requirement for novelty is also fulfilled. Once work moves on from eliminating technological uncertainty (i.e. the product, process or approach is substantially set) then further work on 'finishing' the product, process or approach is not R&D.

48. Paragraph 14 distinguishes R&D from periodic updating

49. Work on periodic updating is not R&D for tax purposes unless it involves an appreciable element of innovation (see paragraph 6). As discussed above, the outcome of a programme of R&D may be an incremental or series of incremental improvements.

50. Periodic updating includes activity that is directed at changing the physical appearance or superficial characteristics of a product without altering its utility, efficiency or function.

51. Paragraph 15 covers the border between R&D and subsequent commercial development. It is recognised that after the initially-identified uncertainty has been resolved there may be situations where further R&D is required.

52. A project is complete when the activities associated with resolution of the scientific and/or technical uncertainty are complete.

53. When the technological character of the product or process is substantially set, and the primary objective is to develop markets, to do pre-production activity, or to get a production or control system working smoothly, then the work is no longer R&D for tax purposes. However, if further scientific and/or technological uncertainty exists under these circumstances, then work on studies to resolve these scientific and/or technological problems may still be R&D for tax purposes.

54. Paragraph 16 excludes humanities except as part of a wider qualifying R&D project. For example in the development of night vision on-screen instrumentation for pilots it may be necessary to conduct ergonomic and psychological testing as part of the wider project.

55. Paragraph 17 draws out the idea that it is the context or aim of activities rather than the activities alone that determines whether they amount to qualifying R&D, as discussed in the Commentary on paragraph 10 of the Guidelines.

56. Paragraphs 19 & 20 refer to the use of prototypes and pilot plant as a guide to identifying the end of the R&D activity

57. In many cases the process or product is developed to the prototype or pilot stage for experimental or technical-trial purposes. That is, prototypes are used to test the feasibility of the concept or hypothesis. Possibly, the construction of a whole series of pilots or prototypes may be involved, as problems are met and either overcome or bypassed. It may be that, in this phase of the development, the original objectives have to be modified significantly or perhaps even changed entirely, depending on the technological opportunities that become apparent. Such work would fall within R&D for tax purposes

58. Subsequently the product or process is developed to meet the requirements of commercial use or production. This may involve activities such as scaling up from pilot plant size to commercial size, certification, or developing an economical means for commercial production. In some cases, the technologically successful prototype may have been fabricated using methods or materials that are too expensive to be practical for commercial use. Such activities are not necessarily of themselves R&D for tax purposes but if they require scientific or technological uncertainties to be resolved, then further R&D may take place. For example, in scaling up a process, it may become clear that the behaviour of a substance in bulk is markedly different from its behaviour in the pilot plant in a way which can only be understood by carrying out new R&D.

Software (paragraphs 21-28)

59. The Guidelines distinguish between two sorts of software activity which may qualify as R&D: (i) software as the aim of the R&D (i.e. work aimed at creating software or knowledge about software engineering), and (ii) software used as a means of achieving an R&D goal, within a larger R&D project (paragraphs 25-28). In both cases, software is given equal treatment to other forms of technological activity (paragraph 21).

60. It is recognised that functionality is often implemented in products using software rather than hardware. The technological uncertainties that have to be addressed in creating software are the same in concept as those faced by engineers seeking a physical implementation of a product or process. In the case of software projects technological uncertainties may arise, for example, from system complexity, feature interaction and software conflicts.

Software as the aim of the R&D (paragraphs 21-24)

61. For a project to be software R&D (i.e. R&D in sense (i) above), it must fulfil the same criteria as any non-software activity to qualify as R&D:

- Scientific or technological uncertainty, which will be resolved if the R&D project is successful; and
- 'Novelty', which in the context of development means seeking to create new or substantially improved materials, devices, products, services or systems.

62. The Guidelines include some examples of work in the software field that might qualify as R&D (paragraph 22) and of software-related work which is considered to be routine/non-novel and therefore does not qualify as software R&D (paragraphs 23 and 24). This is meant as an illustration of how the fundamental tests might apply to software, rather than a hard and fast rule.

63. For example, an 'enhanced query language' (paragraph 22) would need to constitute a significant improvement on the original query language to be 'novel', while extensive 'adaptation' of software could in some circumstances require development of new functionality and new technical knowledge, and therefore could fulfil the uncertainty and novelty criteria and hence count as R&D – it would in effect create a substantially improved product, service or system.

64. Software R&D is usually aimed at resolving technological rather than scientific uncertainty. This can include (paragraph 7):

- design of products, processes, services or systems involving new technology or substantially improving those already produced or installed;
- testing in search for, or evaluation of, product, service or process alternatives;
- design, construction and testing of pre-production prototypes and models and development batches; and
- construction and operation of prototypes.

65. 'Prototypes' in this context can be read as 'builds' of the software in question, for example, alpha and beta stages of the normal development and testing process prior to commercial release although the criteria for the end of R&D still apply: once the scientific or technological uncertainty is resolved, or the structure and functionality of the software is substantially set (paragraph 13). As with all R&D, if, subsequently, unforeseen problems (e.g. system and software conflicts) arise, resolving them may constitute an additional phase of eligible R&D.

66. Projects aimed at developing the initial release of saleable software which is 'leading edge' in some technological way are often R&D for tax purposes. To develop software at the leading edge of today's technologies generally requires the developer to come up with new constructs, such as new architectures, algorithms or database management techniques (i.e., make substantial technological advance), and there can be specific uncertainties as to the viability of these. If the software's competitive edge stems merely from advance in an area other than technology, such as business management, or improvements in financial management techniques, the project is unlikely to be eligible unless implementation requires technical innovation.

67. As with any other product, simply claiming to have developed the first or best software suite for a given purpose does not in itself prove that the taxpayer has made a technological advancement. A new and unique software suite can be built using only well known combinations of constructs, tools and methods without technological advancement. This is analogous to designing and building a unique and complex office building without making any advances in the field of civil engineering.

68. Note that an advance in technology can rarely be described by listing software functions and features at an 'end-user' level. Advances are typically made through innovation in software architectures, designs, algorithms, techniques or constructs.

69. There is always some uncertainty about anything. In software development, as in other scientific and technological fields, uncertainties that can be resolved through brief discussions with peers, or simply through a few lines of analysis, are routine design uncertainties rather than technological uncertainties. Likewise there is routinely the need to calibrate or optimise or clean up new software. These challenges are not technological uncertainties unless it can be shown there is a fundamental problem with the technologies that must be addressed. Refer to paragraph 29 of this Commentary.

70. In engineering or software, as in other fields, to determine whether or not R&D is taking place the test to be applied to a particular project (see paragraph 33 of this Commentary for a definition of 'project') is whether persons of appropriate skill and expertise would be able to specify, with reasonable confidence, how to achieve the desired advance. Where such a person is able to specify, with reasonable confidence, how to achieve the advance, the activity would be routine and not R&D.

71. As with other forms of R&D, the scope of the overall R&D project is defined by the technological uncertainty: once the uncertainty is substantially resolved (for example, once the overall structure/architecture of the software and of its key component routines and engines is resolved and functioning) the R&D is over. Subsequent tasks such as the preparation of user documentation will not be R&D. Refer to paragraph 29 of this Commentary.

72. As with R&D in general, not every component of or activity involved in a software R&D project needs to be novel in order for the whole project to be novel.

Software used as a means of achieving the R&D goal (paragraphs 25-28)

73. Software is frequently used as a tool or mechanism to help resolve technological uncertainty, i.e. to conduct research and development. The Guidelines refer to this as 'Software-based R&D', but 'Software-using R&D' is probably a more accurate general description. Again, software has equal treatment with other forms of technological activity and is treated just like any other tool or equipment used to further an R&D project. Individual tasks contributing to the overall project need not themselves be subject to technological uncertainty, as long as the whole project is aimed at resolving technological uncertainty (paragraphs 13-15, 25-27).

74. This includes the use of existing or slightly-customised software to assist in carrying out the work (paragraph 25). Paragraphs 26 and 27 give examples of situations where software is used as a tool as part of a larger R&D project. Note that the larger project must itself be R&D. Also note that the cost of acquiring or obtaining access to such software is not qualifying expenditure for the R&D tax credits

75. Paragraph 28 describes a situation where a project (analysis of market research data) lies outside the scope of science and technology, and hence would not be R&D. For this reason, developing software for the purpose would not constitute software-based R&D. However, if the software development was expected to result in a significant scientific or technological advance such as a new query language, then the work contributing to that advance would be software R&D, but in the sense (i) described above (relating to paragraphs 21-24).

Use of Software in Engineering

76. Functionality in technological products is often implemented through software. As long as there is technological uncertainty to be resolved, both software and hardware implementations of function would be R&D in the context of the overall project. It is conceivable that a situation might arise in which implementing a hardware solution was routine (and as a result technological uncertainty was at an end) while a software solution still had significant uncertainty associated with it, or vice versa. In this case, work on the 'uncertain' solution would be R&D while work on the 'routine' solution would not, because all of the technological uncertainty associated with the project had been resolved. However, in practice there will usually be continuing technical uncertainty associated with the project regardless of how function is implemented.

Qualifying indirect activities

77. Paragraph 29 lists a number of qualifying indirect activities. For the purposes of the R&D tax credits, only staff costs of those actively and directly engaged in R&D, consumable stores and certain sub-contracting costs are allowable. The list in the Guidelines does not overrule the tax legislation prescribing qualifying expenditure.

78. Paragraphs 30 & 31 list a number of exclusions. R&D would normally exclude work on:

- market research or sales promotion;
- calibration of standards and quality control or routine testing of materials, devices, products, or processes;
- routine data collection;
- research in the social sciences or the humanities;
- the commercial production of a new or improved material, device, or product, or the commercial use of a new or improved process;
- style changes;
- periodic alterations to existing products even though they bring about some improvement;
- operational research not tied to specific R&D activity;
- corrective action in connection with break-downs during commercial production;
- legal and associated work on patent applications, records and litigation;
- acquisition of rights in, or arising from, R&D
- construction, relocation etc. of facilities or equipment other then those used solely for R&D
- education and training and provision of scientific or technical information;
- routine computer maintenance or software development;
- specialised, but routine medical care;
- policy studies.

A3 Appendix: Summary of Consultation Questions

Chapter 2 – Innovation and R&D Tax Credits

Q2.1 *Assuming that any changes to the Guidelines* ***to provide greater certainty and clarity within the current boundaries*** *will apply to all companies, what are your views on any extensions beyond this applying only to SMEs?*

Q2.2 *Are there any other factors (outside uncertainty around the meaning of the definition) which respondents feel add unnecessary complexity to the whole process of establishing which activities qualify for the credit and subsequently claiming the credit? What practical changes would simplify the process?*

Chapter 3 – Towards a Revised Definition of R&D

Q3.1 *Are there any areas in which the UK's definition of R&D does not follow the Frascati definition, or is significantly less favourable than other countries'? (Examples of any differences would be particularly helpful.)*

Q3.2 *Do you envisage any problems arising from a revised definition of R&D based on the concepts articulated in the current Guidelines and Commentary on the Guidelines?*

Q3.3 *In introducing a revised definition of R&D for tax purposes, which would be more important to you in providing clarity and certainty: continuity of language between old and new definitions (for example, retaining terms such as 'significantly improved') or the introduction of new language to reduce the scope for ambiguity? Would more examples or case studies be beneficial?*

Q3.4 *Comments are invited on how to ensure design as part of the R&D process is fully reflected by the new Guidelines, while not extending the definition of R&D to cover design more generally.*

Q3.5 *Comments are invited on how best to ensure the new Guidelines capture the essence of what constitutes R&D in and using software, and provide the UK with an internationally competitive definition of R&D in this field.*

Q3.6 *Do you think that the new Guidelines should include additional specific guidance on software?*

Chapter 4 – The Boundary between R&D and Related Activities

Q4.1 *Would it be helpful in understanding what activities are R&D for tax purposes to have a more explicit definition of 'commercial development' activities that are not R&D? Should such a definition be along the lines set out in paragraphs 4.5 and 4.6?*

Q4.2 *Do you agree that the Government should define 'novelty' along the lines set out in paragraphs 4.8-4.11?*

Q4.3 *What evidence might companies reasonably be expected to have and produce to justify calling an activity 'novel' against the criteria outlines in paragraphs 4.12-4.16?*

Q4.4 *Does "appreciable improvement" (as contrasted with "non-appreciable improvement") represent a more accurate and helpful term than "substantial improvement"(as compared to "incremental improvement")? Is there another term that would make this distinction better or more clearly?*

Q4.5 *What evidence might companies reasonably be expected to have and produce to justify calling something an appreciable improvement against the criteria set in paragraphs 4.19-4.23?*

Q4.6 *Should the Government encourage the use of sectoral or technology-specific agreements to improve certainty as to the availability of R&D tax credits for particular types of activity?*

Q4.7 *Is the use of a 'core' statutory definition of R&D for tax purposes plus ad-hoc sectoral or technology-specific agreements the best model for providing more detailed guidance to companies? Or would respondents prefer greater use of examples/case studies as a way of demonstrating the key elements of R&D in particular technologies/sectors?*

CHAPTER 5 – CONSUMABLE STORES

Q5.1 *What would be the most effective means of ensuring greater clarity on qualifying expenditure on consumable stores?*

Q5.2 *What types expenditure should be included in "consumable stores"?*

Q5.3 *Should the term consumable stores be replaced and the link with normal accounting practice be severed?*

Q5.4 *If the term is to be replaced, what should take its place?*

Q5.5 *Should the relief be extended to the costs of all materials used in the construction of prototypes?*

CHAPTER 6 – LICENCES FOR ADVANCED SOFTWARE

Q6.1 *Do you agree that "bought in" advanced software should qualify for the R&D tax credits?*

Q6.2 *How close to the R&D should software be to qualify for the credit?*

Q6.3 *What views do respondents have on defining "advanced"? Alternatively, what examples can they suggest of the sorts of "advanced" software that might be included?*

Q6.4 *Is "advanced" software invariably short lived – either in terms of the length of licence of number of times it can be run? Do respondents think that setting a clear time limit and/or number of uses limit is the best approach – or is there a more useful generic definition of such software that would provide the clarity that is necessary?*

Q6.5 *If respondents prefer definite time limits and/or limited number of uses, what would the appropriate limits be?*

CHAPTER 7 – QUALIFYING BODIES

Q7.1 *Are respondents aware of any foreign universities that carry on contract R&D for UK companies?*

Q7.2 *Are respondents satisfied with the present procedure for designating particular institutions – or would they prefer a more general definition?*

Q7.3 *If respondents favour a general definition, what sorts of entities should be included? What should be excluded?*

Q7.4 *Which would respondents find more useful for determining whether a body was a PSRE for R&D tax credit purposes – a comprehensive list of PSREs or a generic term describing such organisations?*

Please send your responses, by 10 October 2003 to:

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Responses received will be made available, on request, unless respondents specifically ask for their comments to be treated as confidential.