Presented to the Staple Inn Actuarial Society

on 13th February 1990

MANAGING XSE – THE FORGOTTEN ASSET?

by

J. P. Bannon

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1 INTRODUCTION

1.1 Many of the decisions a life office's management take today will affect that office's tax liabilities for many years to come. It is a responsibility of the actuary in an office's management team to evaluate these effects; indeed an actuary is uniquely qualified to do this provided he has a clear understanding of the way in which future tax computations will be made.

1.2 There are many factors relevant to the management of the future tax position of a life office and access to a suitable model office is obviously important. Measures which are relevant include:

i) The amount of tax payable
ii) Unrelieved management expenses
iii) Deferred acquisition expenses
iv) Case VI losses
v) Case I losses
vi) Notional Case I losses
vii) Realised capital losses
viii) Capital allowances

Whilst all these measures can be important in particular cases the most important is almost always unrelieved management expenses (hereinafter referred to as XSE) together with its companion-to-be, deferred acquisition expenses. This paper therefore concentrates on the management of XSE.

1.3 XSE is an item which does not appear in a life office's statutory accounts or DTI returns. Furthermore it is an item which now appears in the tax computations of many life offices although in the past it was generally confined to "new" life offices. It is fair to say that whilst a number of life offices carefully manage their XSE, some companies do not, for instance because:

i) They don't appreciate the value of XSE
ii) They don't know it can be managed
iii) It hasn't been managed in the past
iv) It is no-one's responsibility.

Hence the reference in the title to XSE as a "forgotten asset".

1.4 This paper discusses the taxation background to XSE in Section 2 and how XSE may be managed in Section 3. The Guaranteed Income Bond has become an important tool in the financial management of XSE. Section 4 describes and discusses this product.

2 TAXATION BACKGROUND

2.1 This section outlines the basis of taxation applicable to life offices in the UK and the recent changes brought in by the 1989 Finance Act. It is not intended to represent a summary of the UK life office taxation rules but to show how XSE emerges and to highlight some of the changes under the 1989 Finance Act as they impact on the incidence and value of XSE.

2.2 A life office is taxed on a trading profits basis (under Schedule D Case I) or on the excess of investment income over expenses (the I minus E basis) if a higher tax charge arises.

If the Schedule D Case I (generally known as Notional Case I) basis applies expenses brought into the I minus E computation are restricted so that the I minus E computation gives the same result as the Notional Case I computation. Unrelieved expenses or "Excess Expenses" (XSE) (i.e. expenses not brought into the computation) are carried forward to future years until they can be relieved against investment income.

Similarly, if Notional Case I does not apply and expenses exceed investment income XSE may be carried forward to future years.

2.3 To the extent that XSE may be set against investment income for tax purposes at some date in the future, and hence reduce the tax payable at that date, XSE has a value. It is a real asset of the life office, even though it may not be shown as such in the Statutory Accounts. XSE will normally be allowed for in the embedded value of a life office.

2.1 The 1989 Finance Act introduced a number of new rules for the taxation of life offices, to be effective from 1st January 1990. Further provisions, to be included in the Finance Bill 1990 but effective from 1st January 1990, were announced in December 1989. The changes in the rules for life office taxation include the following:

a) Relief for acquisition expenses (including renewal commission) is to be spread over seven years (rather than applying in the relevant accounting period, as has previously been the case). There is to be a four year transitional period for this change. A new taxation item, deferred acquisition expenses, therefore arises. Deferred acquisition expenses, like XSE, will have a value to a life office and will be included in any embedded value calculations. Deferred acquisition expenses differ from XSE in that they "vest" in a precise year at which time they obtain relief or become XSE. Deferred acquisition expenses will be a factor in any projections to consider the incidence/utilisation of XSE.

b) Management expenses relating to general annuity business and pensions business are to be included in the respective Case VI ("profits") computations rather than brought into the I minus E computation, as has previously been the case. This change is often referred to as "ring-fencing". Whilst XSE relating to 1989 and previ-

ous years will still be able to be set against all taxable income (including Case VI profits), XSE arising from 1990 may only be set against taxable income arising from Basic Life Assurance Business (i.e. long term business excluding general annuity, pensions and PHI business).

c) The rates of tax have been changed; the policyholders' proportion of unfranked income and gains are to be taxed at the basic income tax rate of 25%, the shareholders proportion at the full corporation tax rate of 35%.

2.5 A general result of the new rules will be that XSE emergence is likely to be deferred, and less XSE will be generated than would otherwise have been the case. Reports of the impending extinction of XSE are however over-exaggerated! The continuing sales of high commission/high expenses/low investment income products, general high levels of commission, and increasing costs resulting from the Financial Services Act are among the factors likely to ensure that XSE will continue to be generated by a substantial number of life offices. For example tranches of flexible whole life policies, with high lapse rates, may generate XSE practically in perpetuity.

2.6 One of the further provisions to be included in the Finance Bill 1990 allows for continuity for tax purposes where life assurance business is transferred to another company under Section 49 of the Insurance Companies Act 1982. XSE which could previously have been "lost" on transfer will in future be transferred with the corresponding life assurance business.

3 THE MANAGEMENT OF XSE

3.1 A number of offices still take a passive view to the management of XSE. They regard XSE as a fact of life, they debate whether it is good or bad, and may project it forward as part of the process of forecasting future revenue accounts and balance sheets; they will probably (but not always) take XSE into account in pricing new products.

Other offices have recognised that XSE is an asset which can be managed in a number of ways, including:

i) pricing products to encourage/discourage production of various lines
ii) preferring higher coupon gilts
iii) arranging reinsurance on original terms instead of risk premium bases
iv) bed-and-breakfast transactions to realise capital gains/losses
v) selling income bonds.

Such an office may also decide to preserve its XSE and use it

i) to enable a gross rate of interest to be employed in part of the actuarial valuation
ii) to reduce future tax liabilities.

Management of XSE should be carried out on a basis which is consistent throughout the different departments of the life office, and easily understood by all those involved. The model put forward in this paper is to consider XSE as an asset which is sold to, or purchased from, those responsible for activities which increase or decrease XSE. This price (which might be in the region of 10% to 15% for "current" XSE) essentially replaces the normal tax rate (25% to 35%) in exercises such as product pricing. In this section the following points are discussed:

i) The business decisions that should be influenced by the price of XSE.

ii) How the price for "current" XSE (e.g. XSE arising from initial expenses in respect of business about to be written) should be set.

iii) How the price for "future" XSE (e.g. XSE arising from renewal expenses in respect of business about to be written) should be set.

3.2 In order to distinguish between the various interests and activities in relation to XSE within a life office, some of which may be the responsibility of the same individual, it is useful to identify a number of "managers". Each "manager" role should be the responsibility of a specified person within a life office; if no one takes on a particular role the responsibility will go by default with probable negative consequences.

3.3 The XSE Manager

The central responsibility of the XSE manager is for managing and pricing marginal XSE as a commodity. His function is effectively to make a market in XSE within the life office, and to manage his "book".

For instance:

i) It is proposed to sell a new whole life policy which adds to the office's XSE. The product development manager will ask the XSE manager to quote a price for the XSE generated in respect of initial expenses and a further price for the XSE arising subsequently.

ii) It is proposed to sell a Guaranteed Income Bond which consumes XSE. The product development manager will ask the XSE manager how much to charge for the XSE consumed.

iii) The investment manager compares two fixed interest securities of the same mean term, one of which produces more I than the other. He will need to know the price at which the I will consume E in order to make a valid comparison.

3.4 The XSE manager therefore provides a central service by providing information to his "customers" to enable them to make management decisions for current XSE (i.e. XSE about to be generated or extinguished). He helps management to understand the process by making the mechanism visible and transparent. At a practical level the XSE manager has to try to avoid changing prices too frequently,and, before any change, he has to think through the effects within the office. He will, however, always be dealing on the margin and the prices quoted will be marginal prices. He may decide to quote XSE prices to include a bid/offer spread to cover risk (and costs). He will decide on prices having tested his potential market; the prices should represent a balance recognising the different interests of his customers. If at a certain price he gets no customers the implication is that he has got the price wrong and needs to reprice until customers emerge.

He will decide on prices for future XSE (i.e. XSE expected to be generated or extinguished in the future) on the basis of the expected interests of his customers.

The XSE manger will act more as a coordinator than a profit centre. If XSE matters are not coordinated inconsistent decisions may be made.

3.5 **The Tax Manager**

The tax manager is the person responsible (amongst other matters!) for estimating tax liabilities in the current and future years. He will also provide the XSE manager with estimates of the future incidence of XSE. If he identifies a situation where tax liabilities are likely to emerge in future years (excluding the effect of XSE) he may wish to enter into what is essentially a forward commitment to utilise certain amounts of XSE at certain dates.

3.6 For example, if projections (on a best estimate, open fund basis) show that marginal XSE carried forward at 31st December 1989 may be expected on average to be set against investment income for tax purposes in ten years time the present value at 31st December 1989 would be equal to the consequent tax reduction (i.e. the amount of the XSE multiplied by the appropriate tax rate) discounted for ten years at the required risk rate of return. It is debatable whether the risk rate of return used should be the risk rate of return consistent with that applicable for profit

testing or a different rate (equal to that obtainable on UK government fixed interest securities plus a margin?) reflecting the associated risk.

3.7 For example XSE of £1 million might be carried forward as at 31st December 1989. If XSE could be set against investment income immediately the value of the XSE would be £1 million multiplied by the appropriate tax rate (say 25%) giving a value of £250,000. If it could only be utilised in ten years time,discounting at 15% per annum, the value of the asset would fall to £61,800.

3.8 The tax manager will decide whether or not to "reserve" XSE on the grounds of his own calculations of the present value of XSE (for the purposes of meeting future tax liabilities) compared to the price at which XSE is offered by the XSE manager. If the latter price is higher than the tax manager's valuation and he therefore does not deal the XSE manager may decide to review his price, in the absence of other buyers.

3.9 **Group Tax Manager**

The group tax manager is defined as the person within a group of companies responsible for optimising the tax position of the group. If a life office is part of a group of companies the group tax manager of the group may have an interest in the XSE to the extent that there may be (indirect) opportunities for group relief. Whilst XSE itself may not be group relieved the fact that XSE exists in the life office may make group relief of other items advantageous. For instance life charges may be group relieved resulting in XSE being extinguished at the rate offered by the Group Tax manager.

3.10 **The US GAAP Reporting Manager**

The US GAAP reporting manager is responsible for reporting and interpreting UK results to the US on a US GAAP basis.

US GAAP does not treat XSE logically and a number of UK companies which are required to report to their US parent on a GAAP basis have shown XSE at face (i.e. non-discounted) value for GAAP purposes. Such an approach may impose a constraint on the company; for instance the company may decide not to sell XSE at a price lower than face value as US GAAP figures would then show a corresponding loss. In such cases the US GAAP reporting manager, by preventing the active utilisation of XSE, is effectively preventing the XSE manager from fulfilling his function. If nothing else, the discipline of thinking along the lines of this paper will help management understand the value of XSE and quantify the cost of a passive attitude to XSE management.

3.11 **Product Development Manager**

The product development manager is responsible for pricing the life office's products. He will need to know for each product the price at which the XSE generated by that product may be sold, both in the short term and throughout the term of the policy. Normally he will consider each product on a "marginal policy" basis and price that product accordingly.

The product development manager who can sell his XSE at a non-discounted value (i.e. where the office is in a net tax position) is able to price his products more competitively, and/or profitably, than the product development manager of a similar office who can only sell his XSE at a discount (i.e. where the office is in a gross, or XSE, tax position).

For example, a life office in a position where XSE can only be sold at a price of 10% would have to load a product with initial gross expense of £200 for net expenses of £180. A life office in a net tax position need only load the same product for net expenses of £150.

The product development manager of a life office in a gross tax position will be able to buy cheap XSE. He will be particularly interested in products which produce substantial net I (i.e. an excess of I over E) and hence generate more profit or support higher expenses. Single premium investment bonds and Guaranteed Income Bonds both fulfil this requirement.

Guaranteed Income Bonds present a number of interesting questions which are considered in further detail in Section 4.

The product development manager of an office which is in a seemingly permanent gross tax position (i.e. is continuously producing XSE) should nevertheless take into account the price of "current" and "future" XSE offered by the XSE manager.

These prices may be low, but the XSE generated will have a value; it could for instance be sold by writing Guaranteed Income Bonds. To price a product on a "gross interest, gross expenses" basis throughout the term of the product would effectively be "giving away" the XSE to the policyholders. Such pricing could also result in valuation strains to the extent that a gross interest, gross expenses valuation basis could not be used (because future XSE cannot be anticipated for statutory valuation bases).

"Current" and "future" XSE prices are clearly important factors to be taken into account by the product development manager.

3.12 **Investment Manager**

The investment manager is responsible for investment selection and should have regard to tax consequences in implementing his policy. Effectively he is a consumer of E; he will need to know at what price he will be able to purchase E in order to make investment decisions with a view to maximising the net of tax return, subject to the constraints of risk and matching.

The investment manager in selecting fixed interest stocks will need to compare stocks according to redemption yields, where the redemption yield is calculated taking into account taxation and in particular the price of XSE offered by the XSE manager. Taking taxation and the XSE price into account can have a significant effect on stock selection (compared with selection on a fully gross or fully net basis); this is an area where opportunities are frequently lost.

The investment manager will also take into account the price of the XSE which will be consumed by realising a gain and such considerations may affect the timing of investment sales in respect of non-linked assets; decisions on linked assets should of course be made purely on investment merit.

3.13 **Reinsurance Manager**

The reinsurance manager is responsible for arranging the life office's reinsurance affairs in accordance with the office's risk management strategy, capital requirements and tax position.

Any reinsurance arrangement which involves the relative reduction/increase of I and E will have XSE implications for an office in a gross tax position. Examples include:

a) The reinsurance on original terms of products which generate high levels of E (relative to I).

b) The reinsurance inwards of Guaranteed Income Bond business, generating high levels of I relative to E.

In comparing different reinsurance structures (e.g. risk premium vs original term) he will need to take into account the price of any XSE consumed or generated.

It should be noted that the Inland Revenue is considering further changes in taxation with reference to reinsurance.

3.14 **The Valuation Actuary**

The valuation actuary may wish to "earmark" XSE, i.e. effectively make a forward commitment to utilise XSE in order to be able to justify a higher valuation interest rate (or rates) than would otherwise have been the case (subject of course to reserves not falling below surrender values). There would hence be a release of capital. The valuation actuary would weigh the cost of servicing that (released) capital against the cost of the forward commitment.

3.15 The valuation actuary would need to ensure when determining bonuses that any "allocation" of XSE for valuation purposes was applied on a basis equitable between participating/non-participating sub-funds.

3.16 **The Accountant**

The accountant may wish to make a forward commitment to utilise current XSE in order to avoid having to set up reserves for corporation tax on unrealised capital gains. Again there would be a release of capital; the accountant would weigh the cost of servicing that (released) capital against the cost of the forward commitment.

4 GUARANTEED INCOME BONDS

4.1 Product Description

Guaranteed Income Bonds (GIBs) typically provide to the policyholder annual (or more frequent) "income" payments (coupons) plus a return of capital after five years. They are normally written as non-qualifying single premium endowments with guaranteed cash bonuses. Generally the sum assured on death is equal to the single premium, with or without accrued "income".

4.2 Guaranteed Growth Bonds (GGBs) are effectively zero coupon GIBs with the "income" accumulated to provide a single payment at maturity. The sum assured on death is generally equal to the single premium or the surrender value if greater. In the rest of this paper reference to GIBs is intended also to refer to GGBs unless GGBs are mentioned separately.

4.3 GIBs costed as if investment income was fully taxed (at say 25%), and loaded for a standard profit margin would not normally be marketable. In practice, GIBs are generally priced using a notional rate of tax on Investment Income, and are not loaded for any additional profit margin. Thus the gain to the life office is that XSE is reduced and surpluses emerge equal to the XSE utilised multiplied by the notional rate of tax. Writing GIB business effectively reduces to "selling" XSE to the policyholder for a price which should be higher than its "natural" discount value.

In terms of the model of Section 3 of this paper, the "semi-net" rate of interest can be considered as the gross rate less a charge which relates to the cost of purchasing the required XSE. If cheap XSE were not available the policyholder could only be offered a product based upon a fully net rate.

4.4 Pricing

To price GIBs accurately it is necessary to construct a model which tracks the cash flows of the product and the incidence of dividends, redemption payments and tax relief (allowing for any delay in actually obtaining relief).

Such a model is similar to standard model offices except that details of investment cash flows need to be modelled much more precisely. GIB business typically involves substantial cash flows in and out over a relatively short period (usually a maximum of five years) and a difference in timing between a dividend and payment of a GIB coupon can result in the office having to resort to costly short term finance. Such timing/matching problems must be recognised in the model if accurate pricing is to be achieved.
Column headings for such a model might be as follows:

Month

A. **Policy cash flows**
Premium
Gross expenses
Gross initial commission
Surrenders
Deaths
Income/Coupon payment
Maturity payment
Reserve increase
Cost of servicing solvency margin

B. **Investment cash flows**
Cost of investment
Net investment income
Tax reclaim on investment income
Redemption payment on investment

C. **Aggregate results**
Amount of XSE utilised
Cash flow for month
Present value of future profits

The model may be used to solve for:

i) the price at which XSE may be sold (if no additional explicit profit margin is required) or

ii) the coupon that may be paid to policyholders (given the "price" of XSE), or

iii) the maximum investment purchase price (at which the premium must be invested in order to obtain the target "price" for XSE consumed).

4.5 In practice GIBs may be priced on an approximate basis using the following formula to solve for the yearly income to the policyholder:

$SP = SA.v^n + Ia_n + E(1-t) + R(1-t)\, a_n$ where:

(i) SP is the single premium.
(ii) SA is the sum assured, equal to the return of capital on maturity (equal to SP).
(iii) I is the yearly income payment to the policyholder.
(iv) E is initial expenses (including commission).
(v) R is renewal expenses.
(vi) n is term of bond.
(vii) t is the price at which XSE is to be sold to the policyholders.
(viii) The discount rate is equal to the yield that may be obtained on appropriate investments multiplied by (1-t).
(ix) The a_n factor is calculated at an interest rate which reflects the rate at which renewal expenses are assumed to inflate.

Generally mortality is not explicitly allowed for, given that the sum assured on death is equal to the single premium with no allowance for "accrued" income.

A similar formula can be used for GGBs.

An approximate basis such as set out above may be used to provide rates to be profit tested, as described in 4.4.

4.6 **Capacity**

A life office's current capacity to write GIB business is that amount of such business which will generate investment income over the term of the business equal to the XSE available (i.e. not allocated elsewhere) at the time of calculation. An office may however write less than its capacity because the marginal value of XSE will increase as the amount of XSE reduces. The marginal value may reach a level when it may be better utilised elsewhere.

4.7 If an office is in a position where it is likely to be generating XSE in significant volumes in the future it may decide to anticipate future XSE and exceed the capacity as defined above.

Such a course of action might be appropriate if it was considered that marketing conditions for GIBs were particularly attractive at a certain time.

The disadvantages of anticipating XSE include the following:

i) The office is at risk that future XSE may not arise due to unforseen circumstances. In this case the office would make a loss to the extent that tax would be payable on the investment income whilst policyholders would be obtaining a better than net of tax rate of return.

ii) Valuation strains will arise (see 4.28 below).

The cost of servicing the additional capital required should be reflected in the price at which the "future" XSE is to be sold to the policyholders.

4.8 **Investment**

GIB's are generally matched with high coupon fixed interest investments of equal term; gilts, local authority stocks, or Eurobonds. Financial instruments offered by banks may be available offering rates higher than those available on more common investments.

4.9 Ideally GGBs would be matched with zero coupon guaranteed investments but such stocks are not available in the UK. Matching theory implies the mean term to redemption of the investments should be somewhat longer than the mean term to maturity of the GGBs. It is evident that investing "long" would result in the office being able to sell the investments at a profit at the maturity of the GGBs, should interest rates fall. If interest rates rise the loss on sale at the maturity of GGBs may be offset to the extent that higher reinvestment returns have been achieved.

4.10 If GGBs represent part of a portfolio of GIBs and GGBs the problem of matching may be reduced; indeed it may be possible to achieve fairly close investment matching overall.

4.11 In the selection of fixed interest investments the following criteria apply:

i) Redemption yields (net of tax at the appropriate rate) to be as high as possible, allowing for actual incidence of stock coupon and recovery of tax.
ii) Security.
iii) Liquidity.
iv) Admissibility requirements.
v) Currency matching.

4.12 Cash flow matching is discussed in 4.31 to 4.33 below.

4.13 Anomaly switching opportunities (whilst maintaining immunisation) may arise : close communication between the actuary responsible for GIB business and the investment manager is necessary in order to ensure that the consequences of any mismatching are understood and allowed for. Deliberate mismatching may be considered given that the cost of additional capital is understood and compares favourably with potential gains.

4.14 It is possible, by investing through an off-shore investment house, to receive investment income gross, rather than net of tax as is the case if investment is carried out in the UK. Delays in recouping tax deductions can be thus avoided, and (given that the same yields may be obtained off-shore as in the UK) a better return to policyholders may be offered, or XSE may be sold at a better price (by the office).

4.15 Pre-investment in respect of GIBs may give rise to matching problems. If an office pre-invests (i.e. buys the matching assets before writing the business) it is exposed to the risk of a rise in interest rates which will result in the amount invested falling in value. Following such a rise little or no GIB business is likely to be written on the originally planned terms because the GIB rate which was calculated on the basis of the original redemption yield of the investment will no longer be competitive. Ideally investments should therefore be made on a continuous basis in line with sales of GIBs. One approach is to pre-invest in respect of pre-determined tranches of GIB business. The amount of each tranche will depend on the estimated volume of GIBs that can be sold in a certain (short) period of time and the investment manager's view as to interest rate stability. This plan of action is a practical way of approximating to investing on a continuous basis.

4.16 If an office does not pre-invest it can be exposed to the risk of a fall in interest rates and must therefore monitor interest rates on a continuous basis.

4.17 If an office does not pre-invest it is essential that the life office reserves the right to change or withdraw its GIB terms without notice. Sales literature should state that an offer is limited and may be withdrawn without notice.

4.18 **Surrender Values**

GIB surrender values must not of course be guaranteed (unless a suitable asset with guaranteed early redemption terms can be found!); to do so would expose the life office to the risk that at a particular time the matched assets could be of insufficient value to cover the guaranteed surrender values.

4.19 A common method is for surrender values to be calculated as the present value of outstanding cash payments under the bond, discounted at the then current redemption yield on the appropriate matching assets with no allowance for tax (i.e. using a gross rate of interest). In view of the fact that LAUTRO requires specimen surrender values, and bearing in mind policyholders' "reasonable expectations", no further surrender penalties are normally included. In practice relatively few surrenders of GIB policies generally occur.

4.20 **Marketing**

Large brokers can be particularly effective in selling large volumes of GIBs in short periods of time. Newspaper advertising has also been successful.

4.21 There are times when there is no market for GIBs and other times when it is possible to sell large volumes quickly (particularly when building societies are offering lower returns than offices may be able to offer on GIBs).

4.22 It is important to ensure that the sales and marketing divisions of a life office appreciate the relative profitability of GIB and other classes of business and are not "distracted" from other business by the large volumes of GIB business that may be written. It is nevertheless also important to recognise the non-quantifiable value of GIB business in terms of name awareness, staff morale and broker connections.

4.23 **Reinsurance**

It may be possible to reinsure-in some GIB business from another office, avoiding the need to market the product and reducing administrative costs. In this case opportunities to market other products at the same time and to increase "name awareness" are of course lost by the accepting office.

4.24 GIB business may be reinsured on a deposit back basis, whereby the office writing the GIB business effectively retains investment control of the GIB premiums.

4.25 Original terms reinsurance premiums are paid to the reinsurer in the normal way. The reinsurer then deposits back with the ceding office an amount determined according to an agreed basis. The ceding office pays interest to the reinsurer in respect of the deposit, and repays the deposit when the GIBs mature. The liability to repay the deposit is included as a "long term liability" for solvency margin purposes.

4.26 There are a number of advantages for the ceding office in deposit back reinsurance arrangements.

i) The ceding office benefits from any investment profits over and above the return assumed for the purposes of the reinsurance arrangement.

ii) The ceding office may be protected to some extent (depending upon the terms of the treaty) against the reinsurer becoming insolvent.

iii) The ceding office may be able to set deposit interest against profits of any other company within the same group, or against general branch business in the case of a composite.

4.27 The accepting reinsurer may look for better terms on a deposit back arrangement than would otherwise apply to the extent that deposit back reinsurance results in the loss of opportunity to generate investment profits.

4.28 **Valuation**

GIBs may be valued effectively on a gross basis as long as there is sufficient XSE at the valuation date to cover the investment income to be generated during the remainder of the term of the GIBs. The valuation rate of interest used (given correct matching) must not exceed the gross yield to redemption multiplied by 0.925 (the interest margin required under the Insurance Companies Regulations 1981). There will normally be no strain because the interest margin will be covered by the "profit" (i.e. the price paid for XSE utilised) and any excess may be released immediately.

4.29 If there is insufficient XSE available that part of the GIB business which is not covered must be valued on a net of tax basis. Given that the GIB business has been priced on a basis somewhere between net and gross under these circumstances a strain will arise which could be substantial.

4.30 Similar valuation considerations as detailed above apply for Guaranteed Growth Bonds, but release of "profit" may be delayed to the extent that conservative reinvestment assumptions are used in the valuation basis.

4.31 The valuation actuary will need to carry out two sets of mismatching calculations. He will test the effect of a 3% increase or reduction in the yield of the matched assets, and calculate any additional reserve required on this basis, Reserve A.

4.32 He will also test the adequacy of the assets on a cash flow basis. The cash flow of the GIB portfolio may be modelled on a monthly basis. Disinvestment may be assumed to be at prices reflecting a rise in interest rates of x% whilst reinvestment may be assumed to be at prices reflecting a fall in interest rates of y%. It can be argued that to take x=y=3 would be unrealistic and over-conservative in that effectively one is assuming a particularly disadvantageous change in yields each time there is disinvestment or reinvestment. Values of x and y lower than 3 may be considered to be more appropriate. Reserve B is calculated as that additional amount required to ensure the total assets are sufficient to meet cash flow requirements.

4.33 The mismatching reserve will be the greater of Reserve A and Reserve B.

5 CONCLUSION

5.1 It is hoped that this paper will demonstrate how tax considerations impact on very many of the management decisions made from day to day within a life office, the importance of XSE and how Guaranteed Income Bonds can play an important part in an office's financial management.

5.2 My thanks are due to those who have assisted me in preparing this paper. I do however accept full responsibility for any remaining errors.