

# MARKET BULLETIN

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<b>Title</b>	Run-Off Syndicates: 2008 ICA Minimum Standards and Guidance
<b>Purpose</b>	To update the ICA guidance for syndicates in run-off
<b>Type</b>	Scheduled
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<b>Deadline</b>	28 September 2007
<b>Related links</b>	Agents with live syndicates should also read market Bulletin <a href="#">Y3971</a>

## 2008 ICA guidance for syndicates in run-off

The enclosed document sets out the minimum standards and guidance for the ICA submissions of syndicates in run-off for 2008. It applies to all syndicates in run-off except those with significant active member participations (active run-off syndicates). Such syndicates must comply with the timescales prescribed for active syndicates in Market Bulletin Y3971 of 2 March 2007. Agents managing active run-off syndicates will be informed of the need to meet these deadlines.

Lloyd's has aimed to follow, wherever possible, the guidance given to active syndicates. The confidence level basis for run-off syndicates has changed, as explained below. Other changes bring run-off ICAs into line with the active ICAs and Lloyd's Society ICA, which is explained below. Further changes, as for active syndicates, relate mainly to minimum standards which have been rationalised to aid clarity and avoid duplication. The document also reflects updated FSA requirements which are now contained in [GENPRU](#) and [INSPRU](#)

## Basis for 2008 ICAs

The most important change for 2008 is that agents are required to adopt a confidence level for syndicates in run-off of 99.5% to ultimate. This brings run-off syndicates into line with the active market and also the level at which the Society ICA is set. This follows changes to the Release Test for ceased members, announced in Market Bulletin Y3949 on 16 January 2007 and brings the basis of capitalisation into line with that used for the release of capital.

As last year, the ICA should be calculated to natural expiry of the run-off with no allowance for RITC or other closure method.

Agents should be aware that Lloyd's does not expect the ICA necessarily to mirror reductions in reserves. The ICA should change only in response to changes in risk and lower reserves will generally be statistically more volatile than larger ones.

### **Minimum standards**

This year, all agents will be required to submit a mapping to the minimum standards, cross referenced to their ICA submission and a Word version of this document is available from Team Leaders on request.

### **2008 Process and timetable**

All run-off ICAs need to be submitted by 28 September 2007. Agents with active syndicates may opt to submit their run-off ICAs alongside their active syndicates, subject to the agreement of Lloyd's. If they do so, they must follow the timetable prescribed for active syndicates, which adopts a two-stage submission process. Agents wishing to avail themselves of this option should inform their ICA Team Leader by 31 May 2007. Lloyd's will review all ICAs submitted together simultaneously, where possible.

Lloyd's review process will remain as for 2007 and Lloyd's will continue to use the RBC model as a benchmark.

Run-off ICA submissions will not be made through the market returns website this year. Submissions should be emailed to Open Years Management by the deadline, in PDF format and submitted in two hard copies by the same deadline. The pro-forma is included for guidance and an Excel version will be made available for download by agents shortly. A completed pro-forma for each syndicate should be submitted with the ICA.

### **Guidance for active syndicates**

Agents may also find it helpful to refer to Market Bulletin Y3971 issued on 2 March 2007 which contains guidance for active syndicates.

This bulletin is being sent to all managing agents, members' agents and recognised accountants and will be made available to other professional advisers. If managing agents have any questions on this bulletin or the attached guidance document, they should contact Eric Allman in Open Years Management ([eric.allman@lloyds.com](mailto:eric.allman@lloyds.com), tel. 020 7327 6772) in the first instance.

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# ICA

## **2008 MINIMUM STANDARDS AND GUIDANCE FOR SYNDICATES IN RUN-OFF**



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# INTRODUCTION

## Background

The FSA's requirements for Individual Capital Adequacy Standards (ICAS) for insurers are set out in the General Prudential Sourcebook (GENPRU) and the Prudential Sourcebook for Insurers (INSPRU). GENPRU sets out the FSA's prudential requirements applying generally to banking, investment and insurance firms whilst INSPRU sets out specific prudential requirements for insurers and Lloyd's. These requirements apply directly to managing agents in relation to the syndicates they manage and should be referred to by agents in addition to this guidance document.

GENPRU and INSPRU focus on the FSA's three sub-principles of ICAS which are :

- there must be a coherent and complete assessment of the risks faced by the business
- there should be a clear common definition of survival, ensuring that there is a 99.5% confidence level over a one year timeframe that the value of assets exceeds the value of liabilities
- the assessment must be sensible and document the underlying reasoning and judgements

The FSA has placed clear responsibilities upon Lloyd's within the ICAS regime. Lloyd's must be able to justify the reliance which it places on a syndicate ICA by being able to demonstrate that it has carried out appropriate checks.

Lloyd's continues to work closely with the FSA in order to ensure that the FSA can build on Lloyd's work and thus avoid duplication of effort wherever possible. Whilst syndicate ICAs may meet the FSA's requirements, as a mutual society, Lloyd's has an obligation to rigorously review syndicate ICAs to ensure that no syndicate poses an undue risk to the central fund. Lloyd's review will therefore seek to focus on risk mitigation in addition to capital. As member level capital setting is dependent on the syndicate ICAs, Lloyd's must ensure that they are all consistent for this purpose. Finally, the overall security of Lloyd's rests on the level of central assets and in determining these, Lloyd's depends on syndicate ICAs as a key source of information.

The best mitigant for this risk is for both Lloyd's and the FSA to be confident that syndicate ICAs are set at the right level. Given the subjectivity of the review process however, Lloyd's cannot exclude the possibility that the FSA may apply individual capital guidance (ICG) assessments to syndicates' ICAs in line with its own risk-based approach.

## Lloyd's Review

Our aim is to be proportionate in our review which will take into account the structure and business profile of the individual syndicate. To this extent, Lloyd's requires that agents highlight and rank their most significant risks and explain how these have been addressed within the ICA.

Lloyd's general approach to reviewing ICAs is to consider the reasonableness of the calculation methodologies and assumptions used

## THE FSA'S REQUIREMENTS FOR ICAS ARE SET OUT IN GENPRU AND INSPRU

## THE FSA HAS PLACED CLEAR RESPONSIBILITIES UPON LLOYD'S WITHIN THE ICAS REGIME

## LLOYD'S REVIEW WILL SEEK TO FOCUS ON RISK MITIGATION IN ADDITION TO CAPITAL

as well as the results derived by application of those methodologies and assumptions. Lloyd's keeps an open mind on the majority of calculation approaches used by agents, placing the onus on them to satisfy us that their particular approach is appropriate to their individual circumstances. Lloyd's recognises that not all syndicate ICAs will need to be prepared with the same degree of modelling complexity and the level of sophistication of the calculations should be commensurate with the materiality and nature of the underlying risks.

Our assessment is essentially high level and does not constitute a line by line audit of the calculations. This underscores the importance Lloyd's places on an agent's senior management taking responsibility for their syndicate ICAs.

Lloyd's review of syndicate ICAs will consider both quantitative and qualitative issues. Where Lloyd's considers the level of capital to be less than adequate it has a responsibility to increase the ICA to a level which is adequate. Similarly, if the ICA does not adequately address the minimum standards, Lloyd's may be unable to rely on the ICA to set capital levels.

## **LLOYD'S REVIEW WILL CONSIDER BOTH QUANTITATIVE AND QUALITATIVE ISSUES**

### **Scope of Guidance**

This guidance relates solely to the preparation of the ICA being the minimum regulatory capital required and does not cover additional requirements for the Economic Capital Assessment (ECA). Syndicates should also refer to GENPRU and INSPRU as additional sources of information.

This guidance document is split into four main sections as follows:

- this introduction which sets out the required basis and scope for 2008 syndicate ICAs and Lloyd's overall approach to its review work
- a minimum standards section which sets out in brief the main issues and minimum standards required. This should be read by all involved in the ICA process, including the Board members and senior management who are responsible for signing off the ICA
- a detailed technical section split by risk group containing guidance for those responsible for preparing the ICA
- appendices containing formats for the ICA document, minimum standards mapping and the additional pro-forma information required. Although the suggested ICA structure is not mandatory, a submission in this layout will facilitate our internal ICA review and comparison across ICAs. Any agent seeking reduced submission requirements going forward should set out their 2008 ICA in this format. Completion of both the full pro-forma and minimum standards mapping document is a requirement for all syndicates (details are in Appendices 1, 2 and 3)

*This version of the ICA Minimum Standards and Guidance applies to all syndicates in run-off without material active member participations. Differences between this guidance document and that issued to active syndicates are generally highlighted in this document by the use of italics.*

## **ALL AGENTS MUST COMPLETE FULL PRO-FORMA AND MINIMUM STANDARDS MAPPING**

## Solvency II

The full implications for capital setting under Solvency II are not yet known. Although there will be a strong linkage with the current ICAS framework, agents should be aware that there is likely to be some capital impact. Consultation within the EU on Solvency II is ongoing and Lloyd's will keep agents informed as details become available.

## Basis for ICA

*For 2008, all syndicate ICAs must be prepared at a 99.5% confidence level. The revised basis for run-off syndicates is as follows:*

- the ICA must provide for all losses, modelled to ultimate, arising after 1 January 2008 on the syndicate's 2008 and prior years of account at a 99.5% confidence level - this includes all losses arising on business earned from 1 January 2008 and the risk that claims reserves as at 31 December 2007 for business earned up to that date prove to be inadequate.
- this basis represents the equivalent of minimum regulatory capital and does not represent the economic capital which is the level of capital required to support and maintain Lloyd's ratings
- agents must prepare a separate ICA for each syndicate covering all years of account of the syndicate combined
- the assumptions used in the ICA must be consistent with those used in the *Run-Off Closure Plan (ROCP)* and *FPP (Financial Planning Pack)* for syndicates in run-off
- the ICA must be based on planned income, not scaled to stamp capacity
- the ICA must be prepared on the assumption that all profits have been distributed and all losses collected or fully receivable
- *the ICA for syndicates in run-off should be prepared on the basis of run-off to natural expiry. There should be no allowance made for the costs or benefits of early closure by reinsurance-to-close or any other means*

Lloyd's central assets and risks (eg New Central Fund and subordinated debt) and any Funds at Lloyd's (FAL) are outside the scope of a syndicate's ICA and must not be included.

The ICA must be prepared on an ultimate basis and may make appropriate allowance for future investment income. It does not need to recognise reserving strains that would arise in the future under annual accounting.

Agents must consider all the FSA risk groups in accordance with the minimum standards set out in this document. All minimum standards must be addressed within the ICA and where an agent considers they do not apply or do not necessitate any capital allocation, this must be clearly stated and explained.

In their ICA submission, agents must also explain the following:

- the approach to deriving the ICA and how it links together the business plan, key risks inherent in the business, related risk management processes and practices and the capital required by the risks
- why the methodology chosen is appropriate to the syndicate's business, taking account of its risk profile, risk appetite, track record with respect to

**THE ICA MUST PROVIDE FOR ALL LOSSES TO ULTIMATE AT A 99.5% CONFIDENCE LEVEL**

**AGENTS MUST EXPLAIN THE KEY PRINCIPLES UPON WHICH THE ICA IS BASED**

risk experience and exposure and the key principles upon which the ICA is based

- the approach adopted towards the quantification of risk and the rationale for this approach
- the stress and scenario tests used and why they are appropriate for the business
- the sensitivity of key assumptions
- the overall ICA figure split by major risk category, before and after diversification

The ICA must set out clearly the allocation of capital across risk groups and the rationale and method used to derive the figures for each. All components, including non insurance risks, must be calculated and the allocation clearly explained.

Where an ICA was produced for 2007, agents must provide an analysis of change as part of the 2008 submission. This should provide a commentary per risk group explaining any changes in methodology or number and should include any significant changes in the allocation between risk groups.

## **AGENTS MUST PROVIDE AN ANALYSIS OF CHANGE AS PART OF THE 2008 ICA SUBMISSION**

### **Lloyd's charges**

When considering Lloyd's central charges in calculating future expenses, agents should plan that members' subscriptions, *where relevant*, will be 0.5% of capacity, central fund contributions 1% of capacity for 2008 and run-off levy 0.1% of audited net insurance liabilities. These assumptions will be updated in April 2007.

Agents should assume that the syndicate loan will be repaid on the expected date and annual interest payments will be paid. No stress testing of these assumptions is required.

### ***Calls on the New Central Fund***

*Agents should assume that all calls made on the New Central Fund (NCF) will be met on a timely basis. This assumption need not be stress tested.*

### **Consistency with ROCP**

It is essential that the assumptions used in the ICA are consistent with those used in the ROCP, *except where this guidance specifically indicates otherwise. In particular, the requirement to base the ICA submission on a run-off to natural expiry may not be consistent with the ROCP.*

## **ESSENTIAL THAT ASSUMPTIONS USED IN THE ICA ARE CONSISTENT WITH THOSE IN THE ROCP**

### **Enhanced Capital Requirement (ECR)**

It is an FSA requirement for syndicates to calculate an ECR and for ICA purposes, the ECR should be calculated as at 31 December 2007. Whilst the ECR is a factor based calculation and therefore not necessarily directly comparable with the ICA, agents must include a comparison of the two within their submission and provide an explanation in support of any material differences

Agents are also required to include details of the ECR requirement as at 31 December 2006 based on final year end data as part of the pro-forma information.

## **AGENTS MUST EXPLAIN THE BASIC ASSUMPTIONS AND KEY DRIVERS FOR THE ICA**

## **AGENTS SHOULD CLEARLY DEMONSTRATE THE LINK BETWEEN THEIR RISK FRAMEWORK AND THE ICA**

## **STRESS TESTS ARE NEEDED EVEN WHERE A MODEL HAS BEEN USED**

### **Approach and Methodology**

Agents must ensure that there is a clear audit trail from the impact of any financial calculations to the relevant risk capital allocation in the ICA, whatever modelling approach is adopted. Agents must also include an explanation of the basic assumptions and key drivers for the ICA in their submission.

Where considerations of particular risk issues have been made, an agent must state specifically the issues considered, how it considered them and the reasons behind the conclusions and findings.

#### **Link to risk framework**

Three key objectives of the ICAS regime are; to ensure that senior management focus on risk management; that there is a link between risk and capital-setting; and that this is demonstrated through clear documentation of all prudential risks, processes and controls.

In making an assessment of capital adequacy, agents should first identify the significant risks facing their business and subsequently quantify how much capital is required. Central to this process should be the agent's risk management framework. In calculating a syndicate's ICA, agents must clearly demonstrate the link between their risk framework and the ICA calculation.

#### **Franchise Standards**

Lloyd's has recently introduced management standards in a number of areas including underwriting, claims and risk management. Agents should ensure that where they do not fully meet these standards, any associated risk is captured within the ICA.

#### **Stress and scenario vs modelled ICAs**

There are two broad approaches available to agents when calculating a syndicate ICA, namely:

- stress and scenario tests
- economic capital models (also known as stochastic models or Dynamic Financial Analysis (DFA))

Although these are significantly different in application, they are not in principle different as a stochastic model is based on stress and scenarios weighted by probabilities. In a DFA model, stress tests are generated automatically and often cannot be "seen". Both methods are acceptable for the 2008 ICAs.

It takes time to develop a stochastic model that is sufficiently robust. It is also important that management understands and "buys in" to the model. Even where a stochastic model has been used, stress tests are needed to validate the model output for reasonableness and help with calibrating assumptions. Lloyd's expects agents to demonstrate within the ICA that checks or reasonableness tests have been performed on the outputs in addition to the detailed review of the model inputs. Agents must ensure that the stress and scenario tests which they undertake are relevant to their business and sufficiently extreme to represent the 1:200 level.

Example stress tests for "reasonableness checks" are set out in the detailed sections on each risk group where applicable. This list is not exhaustive and is not a substitute for stress tests relevant to each

individual business. The schedule is not prescriptive, however, where Lloyd's is unable to get comfortable with the stress tests used by an agent, these are example stress tests that Lloyd's may require the agent to perform to support the conclusions in the ICA.

### **Parameter uncertainty**

Uncertainty in the parameters used to assess the capital required has many potential sources, but the most common is lack of credible relevant data on which to base the main assumptions.

Agents should ensure that sufficient data over and above a syndicate's own data is considered where appropriate. Additional stress tests should also be performed on uncertain assumptions.

Agents should highlight within their submission any assumptions or areas of modelling which are deemed to be prudent. The adoption of prudent assumptions in the ICA will be taken into account in Lloyd's review and will increase the credibility of the assessment.

Where agents are aware of areas of weakness or optimism in the submission, these should be explicitly addressed. Agents should not make a general statement that these are offset by prudence elsewhere.

### **Sensitivity analysis**

As a minimum standard and part of the validation and sign off process, all ICAs must be subject to sensitivity analysis.

Given the uncertainty surrounding parameters, agents should not view the final set of assumptions as somehow 'correct'. Management should understand the uncertainty in setting parameters and agents will be expected to have undertaken sensitivity testing and for sensitivity analyses to have been communicated to the Board and senior management. The ICA submission should identify which of the parameters are the most critical to the ICA value, and give indicative movements in the ICA value for the most sensitive parameters.

### **Board understanding and challenge**

A significant issue for both Lloyd's and the FSA in reviewing ICAs is the integration of capital and risk management, particularly the level of involvement of senior management and the Board in deriving and challenging the capital assessment.

Consequently, Lloyd's requires agents to describe how they have engaged their senior management and the Board in the process, and in particular, the steps they have taken to educate the Board so that they are able to provide informed challenge as part of the sign-off process. This is particularly key where an external model has been used or part of the ICA has been outsourced to external consultants. *The ICA must have full Board approval and sign off prior to submission to Lloyd's.*

*Agents managing both run-off syndicates and active syndicates may opt to submit their run-off ICAs in accordance with the guidance and timetable for active syndicates, subject to approval from Lloyd's.*

## **Reporting Requirements**

The following documents will be required for each ICA submission:

**ALL ICAs SHOULD BE  
SUBJECT TO SENSITIVITY  
ANALYSIS**

**SENIOR MANAGEMENT  
AND BOARD MUST BE  
INVOLVED IN DERIVING  
AND CHALLENGING ICA**

- ICA document with full mapping and audit trail (see appendix 1)
- minimum standards mapping document (see appendix 2)
- pro-forma information summary (see appendix 3)

*A syndicate ICA is required for all run-off syndicates produced either in accordance with this guidance or the guidance for active syndicates.*

Where the last open year of a syndicate is expected to close into another as at 31 December 2007 (the 'as at' date of the ICA calculation) then agents may choose not to produce an ICA for the closing syndicate year provided that:

- the ICA of the receiving syndicate includes the risk exposure of the closing syndicate
- the agent intends that the closure/merger will take effect by the year-end. If there is material doubt as to the closure taking effect then the agent should produce a separate ICA

Separate ICAs are not required for quota share syndicates or parallel syndicates but agents must include any exposure within the main syndicate ICA. This is subject to the "host" syndicate providing an ICA that includes sufficient information to cover both the "host" and quota share syndicate.

Where the business underwritten by a special purpose syndicate differs significantly from the "host" syndicate, a separate ICA may be required and agents should contact their ICA review team leader in the first instance to determine requirements.

Agents should seek clarification from their ICA review team leader if they are unsure as to whether a syndicate counts as a quota share or parallel syndicate for ICA purposes.

## **AGENTS MUST KEEP ALL KEY ICA RISKS AND DRIVERS UNDER REGULAR REVIEW**

### **Ongoing reporting requirements**

In line with the principles of the FSA's ICAS regime, Lloyd's considers it an agent's responsibility to keep all key risks and drivers under regular review and assess their impact on the syndicate's capital requirement. Where the risk profile of the syndicate has changed materially or a new ROCP is submitted during the year, the agent must provide an amended ICA to Lloyd's. Minimum filing requirements for re-submissions are as follows:

- revised ROCP
- ICA pro-forma summary information
- ICA summary of change document

The summary document must provide details of the change(s) impacting capital needs and set out clearly an analysis of change from the previous ICA. Any amended ICA is subject to the same Board approvals as the original submission.

### **Remaining adequately capitalised**

The free funds available to a member to meet its capital requirements may fall below the required level for two reasons:

**THE BOARD SHOULD  
ENSURE THAT THE  
SYNDICATE REMAINS  
ADEQUATELY CAPITALISED**

- increases to syndicate ICAs following a material change to the risk profile of the business
- the erosion of funds due to losses

Board and senior management should ensure that this is kept under continuous review and that the syndicate remains adequately capitalised.

In either case, the timetable for recapitalisation and the intervention by Lloyd's will depend on the extent of the shortfall. All members are subject to bi-annual Coming into Line (CIL) in June and November, where members are required to hold free funds at their economic capital level. Lloyd's has powers to require members to meet their ECA at all times, but will normally permit recapitalisation in accordance with this bi-annual timetable, provided that members' free funds remain above their ICA.

Where a member's funds fall below their ICA level, Lloyd's would expect members to inject additional capital outside of the normal CIL timetable. Where there is material exposure to the central fund and policyholder security, underwriting restrictions or other measures may be imposed to mitigate the risks until capital is lodged at Lloyd's.

In accordance with the continuous solvency regime, where a member's free funds fall below the level of regulatory solvency (underwriting losses plus required minimum margin), the existing powers to immediately suspend underwriting or take any other measures deemed appropriate by Lloyd's may be used.

*Where a member is likely to be unable to meet cash calls resulting in a material liability to the NCF, the agent should inform its ICA Team Contact as soon as possible..*

## MINIMUM STANDARDS

### AGENTS ARE REQUIRED TO CONSIDER AND ADDRESS ALL MINIMUM STANDARDS

This section of the guidance gives an overview by risk group and advises agents of the minimum required standards to be considered when calculating the capital requirements for each risk group. Agents must consider and address each of these and further explanations as applicable are contained in the detailed sections of the guidance for each risk group. Where an agent considers that any of these areas is not applicable to their business, the justification for this must be clearly set out within the ICA

Some risk groups will, by default, cross over with and pick up risks from other groups, eg credit risk and insurance risk, operational risk and insurance risk. Agents should provide details and cross reference these where applicable.

### Insurance Risk

#### Definition

Insurance risk is defined as the risk of loss arising from the inherent uncertainties about the occurrence, amount and timing of insurance liabilities and premiums.

#### Scope

Insurance risk includes the risk of loss arising from prospective underwriting, *which should not normally impact run-off syndicates beyond existing delegated underwriting authorities*, and the development of prior years. It should also cover the risk associated with potential for increased operating expenses. Whilst there are numerous dependencies between these risks and other risk groups, such as credit risk and operational risk, the assessment of insurance risk can be considered under the headings of underwriting, reserving and reinsurance. *For most run-off syndicates, reserving risk, including the associated reinsurance, will be the major component of insurance risk and typically the ICA as a whole.*

These three components are mutually dependent, and this must be recognised. Agents should also recognise the link between operational risk and insurance risk and this is explained in more detail within the operational risk section.

The assessment of reinsurance as part of insurance risk should relate to mismatch, dispute, exhaustion etc and not the associated credit risk which should be identified separately as part of the assessment of credit risk within the ICA.

#### Underwriting

Within insurance risk, underwriting risk relates to losses arising from business earned from 1 January 2008 for all 2008 and prior years of account business. The risk of loss is to ultimate.

This definition will assist Lloyd's in its benchmarking and review work to provide a consistent allocation by syndicates between "underwriting risk" and "reserving risk".

*Many run-off syndicates include residual underwriting risk within reserving risk, but this is only acceptable where the risk is minimal. Otherwise, underwriting risk should be separately identified within the ICA.*

### UNDERWRITING RISK, RESERVING RISK AND REINSURANCE RISK ARE MUTUALLY DEPENDENT

### UNDERWRITING RISK RELATES TO LOSSES ARISING ON BUSINESS EARNED FROM 1.1.08

## Minimum Required Standards

When assessing underwriting risk, agents must consider and address, as a minimum, each of the areas listed below in addition to those under insurance risk above:

- unexpired risks on 2007 and prior years of account (YOA) and 2008 YOA risk (2008 risks will fall back to the last open year for syndicates in run-off)
- catastrophe losses
- large individual risk losses
- attritional loss experience
- operational risks associated with insurance risk

## Reserving

Reserving risk is the risk that claims reserves set as at 31 December 2007 for business earned up to that date prove to be inadequate. The ICA must consider the ultimate position.

Reserving risk includes reserving inadequacy and over-reserving if it causes a loss. Any requirement under GAAP to hold technical provisions which exceed the best estimate of ultimate provisions may be ignored. As the ICA models all risks to ultimate, the GAAP reserving basis only affects intermediate assessments, not the final position.

## Minimum Required Standards

When assessing reserving risk, agents must consider and address, as a minimum, each of the areas listed below in addition to those under insurance risk above:

- modelling (eg bootstrapping)
- reserve margins
- discounting
- latent claims
- regulatory changes
- unexpired risks on 2007 and prior years of account (YOA) and 2008 YOA risk
- catastrophe losses
- large individual risk losses
- attritional loss experience
- new classes of business
- application of reinsurance programme
- operating expenses
- use of syndicate data and benchmarking
- allowance for trends such as inflation
- dependence between underwriting years
- operational risks associated with reserving risk

**RESERVING RISK RELATES TO THE ADEQUACY OF CLAIMS RESERVES FOR BUSINESS EARNED SET AS AT 31.12.07**

## **REINSURER FAILURE SHOULD BE INCLUDED IN CREDIT RISK**

### **Reinsurance**

Agents must consider the risks associated with the use of, and potential reliance on, reinsurance linked with underwriting and reserving risk within insurance risk. *Specific risks occur and should be taken into account when syndicates are in run-off as reinsurers may be more reluctant to pay and brokers less willing to provide service where no future trading relationship will exist.* The ICA must cover the areas set out below but should not include the risk of reinsurer failure which falls into credit risk

### **Minimum Required Standards**

Agents must consider and address, as a minimum, each of the areas listed below:

- non matching reinsurance
- exhaustion
- post loss impact on cost and availability
- concentration of reinsurers
- dispute
- structured and/or multi year reinsurance policies
- Industry Loss Warranties (ILW)/Original Loss Warranties (OLW) basis risk
- *Impact of run-off on reinsurance*

### **Credit Risk**

#### **Definition**

Credit risk refers to the risk of loss if another party fails to perform its obligations or fails to perform them in a timely fashion. For syndicates, key counterparties include reinsurers, brokers, insureds, reinsureds, coverholders and investment counterparties.

#### **Scope**

Any financial transaction with a counterparty may expose a syndicate to credit risk. Agents should take into consideration all potential areas of credit risk, in particular reinsurers, brokers and coverholders. When considering reinsurance credit risk, agents should not include exhaustion and dispute; these should fall into insurance risk. Agents should however consider the dependency between dispute risk and credit risk.

When assessing the appropriate level of capital for credit risk, agents should exclude credit risk in respect of central assets, including Additional Securities Ltd, Joint Asset Trust Fund and other regulatory deposits as these are covered in the overall Lloyd's ICA.

### **Reinsurance Credit Risk**

Reinsurance credit risk is usually the largest component of credit risk and deals with the potential bad debt on reinsurance assets. Although in principle, reinsurance credit risk should be shown separately from insurance risk, Lloyd's recognises that this is difficult to do in some models. In practice, showing reinsurance credit risk within insurance risk has not caused any difficulties therefore Lloyd's does not necessarily require agents to split out the reinsurance credit risk in this way. However, Lloyd's may request as a sensitivity test for this, agents to

## **REINSURANCE EXHAUSTION AND DISPUTE RISK SHOULD BE INCLUDED IN INSURANCE RISK**

## REINSURANCE CREDIT RISK MUST BE MODELLED TO ULTIMATE

calculate the insurance risk assuming no credit risk compared to the actual assumptions and justify the difference.

Reinsurance credit risk within the ICA relates only to potential bad debts beyond those already provided for in the accounts at 31 December 2007. Reinsurance credit risk must be modelled to ultimate.

### Minimum Required Standards

Agents must consider and address, as a minimum, each of the areas listed below:

- gross and net losses
- link increased probability of reinsurance failure to extreme losses
- concentration risk
- reinsurance failure rates should allow for the risk of downgrade
- duration of recoveries
- treatment of reinsurance placed with other Lloyd's syndicates
- treatment of any intra group reinsurance

### Other Credit Risk

Agents are reminded that FAL is outside the scope of ICAs and does not need to be addressed in assessing credit risk.

### Minimum Required Standards

Agents must consider and address, as a minimum, each of the areas listed below:

- brokers
- coverholders
- third party claims administrators
- banks and investment counterparties.

## Operational Risk

### Definition

Operational risk refers to the risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events.

### Scope

The following two approaches are considered appropriate by Lloyd's when looking at operational risk:

- operational risk is considered as a completely distinct risk category that includes all operational failures due to people, processes, systems or external events that can cause losses; or
- given that people, processes and systems are important elements of each risk category, operational risk is modelled as part of each risk category, with the operational risk category only consisting of the balance of operational risk not dealt with elsewhere.

Where agents use the second approach and model operational risk as part of each risk category, Lloyd's would ask that best efforts are made to

## FUNDS AT LLOYD'S ARE OUTSIDE THE SCOPE OF ICAs

## THE ICA SHOULD INCLUDE ALL RISKS OF OPERATIONAL FAILURE

## THE RISK FRAMEWORK UNDERPINS THE MANAGEMENT AND MEASUREMENT OF OPERATIONAL RISK

split out an overall operational risk figure for use in the pro-forma which will assist Lloyd's benchmarking process.

Lloyd's recognizes that the assessment of operational risk both on a qualitative and quantitative basis is a challenging area for agents.

The implementation of a risk framework underpins both the management and measurement of operational risk. Once a basic risk framework is in place, the focus should then be on updating and maintaining the risk framework and working to ensure that it is embedded in the business. Senior management must demonstrate how their risk management framework can identify key operational risks and its link to business decision making. In measuring operational risk for ICA purposes, it is important to distinguish between risks in the risk register that are used to assist management in the day to day running of the business and those risks which, when extreme event scenarios are applied to them, result in a capital requirement.

The lack of historical operational risk data can cause some difficulty, particularly where agents are modelling operational risks. A robust approach in the absence of additional data is to perform detailed stress and scenario testing to support any available operational risk data.

Agents should be taking active steps to understand better the nature of their own risks and uncertainties over time which will result in senior management being better equipped to run their business in the context of the risks that it faces.

### Minimum Required Standards

Agents must consider and address, as a minimum, each of the areas listed below:

- mapping to the risk register
- categorisation
- quantification
  - an arbitrary loading will not be considered an appropriate methodology when calculating operational risk, no matter how prudent the level of capital allocated.
- reliance on systems and controls
- consideration of the following specific areas where appropriate to the syndicate's business
  - delegated underwriting
  - *transfer of run-off to new service provider or agent*

## Market Risk

### Definition

Market risk refers to the risk that arises from fluctuations in values of or income from assets, in interest rates or in exchange rates.

## AN ARBITRARY LOADING WILL NOT BE CONSIDERED AN APPROPRIATE METHODOLOGY

## MOVEMENTS IN ONE ASSET CLASS ARE LIKELY TO HAVE IMPLICATIONS FOR OTHERS

## Scope

Market risk includes exposures arising from variations in exchange rates, interest rates and investment returns. Market risks tend to be inter-dependent, such that movements in one asset class are likely to have implications for other asset classes. For example, fluctuations in interest rates will usually have an impact on equities, bonds and exchange rates.

Market risk should be considered in conjunction with insurance risk, credit risk and liquidity risk. In principle, credit risk in investments should be considered separately but Lloyd's recognises that it may fall into the modelling of market risk. Whilst it will assist Lloyd's benchmarking and review process if agents break down market risk into 'true' market risk and market risk with credit risk included, Lloyd's recognises that this may be difficult and does not therefore require agents to do this. However, where the allocation between risk groups differs greatly from benchmark information available, Lloyd's may ask agents to provide this breakdown as a sensitivity test.

Lloyd's considers that assets cannot be held on a basis perfectly matched to the underlying liabilities of a syndicate in both term and currency since the timing and extent of liabilities are uncertain. Consequently, Lloyd's would expect an allocation of capital to market risk in all ICAs. In particular, under extreme conditions, claims inflation is likely to exceed income from investments.

**LLOYD'S EXPECTS AN ALLOCATION OF CAPITAL TO MARKET RISK IN ALL ICAS**

## Minimum Required Standards

Agents must consider and address, as a minimum, each of the areas listed below:

- exposures arising from variations in exchange rates, interest rates and investment returns
- the volatility of asset prices and the correlation of investment types
- the correlation between investment and insurance risk following extreme loss events
- where the expected investment return is higher than the risk free rate
- discounting of reserves

## Group Risk

### Definition

Group risk refers to the potential impact of risk events, of any nature, arising in or from membership of a corporate group.

### Scope

Agents that are part of a group should consider risks arising as a result of the group structure and operations.

Past experience has shown that events occurring elsewhere in the group can have a significant impact on a syndicate. Although many agents consider that there are capital advantages to being part of a wider group structure, reputational risks affecting the parent company can indirectly affect the syndicate.

**EVENTS OCCURRING ELSEWHERE IN THE GROUP CAN HAVE A SIGNIFICANT IMPACT ON A SYNDICATE**

Whilst Lloyd's recognises that group risk is not likely to result in as significant an allocation of capital as other risk categories, it is important that agents clearly explain their assessment of group risk capital requirements within their submission.

Agents should exclude consideration of any group risk arising from trading under Lloyd's umbrella but should address any risk arising from managing multiple syndicates.

### Minimum Required Standards

Where agents are part of a group they must consider and address, as a minimum each of the areas listed below:

- capital
- group reinsurance arrangements
- shared platform
- management resources
- *strategic decisions impacting run-off business*

## Liquidity Risk

### Definition

Liquidity risk refers to the risk that sufficient financial resources are not maintained to meet liabilities as they fall due.

### Scope

Agents should consider the ability to manage unplanned changes in both funding sources and market conditions as well as a syndicate's access to other sources of funding and any regulatory capital tied up (eg SLTF, CRTF).

Liquidity risk should also be considered in conjunction with both insurance risk and market risk, particularly in relation to the impact that various stress and scenario tests may have on a syndicate's cash position and its ability to pay claims.

*Where a run-off syndicate has one or more members supported by the New Central Fund it should be assumed that any cash calls will be met by the NCF on a timely basis. Agents should calculate liquidity risk as normal but not allocate capital to the proportion expected to be met by the NCF. Such risks must still be included in the ICA submission, along with the associated cashflows, and the capital requirement assessed but any capital needed will be combined with that of other NCF-supported syndicates and held centrally.*

### Minimum Required Standards

Agents must consider and address, as a minimum, each of the areas listed below:

- planning and cashflow
- unexpected events

**LIQUIDITY RISK SHOULD BE  
CONSIDERED IN  
CONJUNCTION WITH  
INSURANCE AND MARKET RISK**

- post loss environment
- *cashflows applying to the NCF*

## Diversification

### Definition

Diversification reduces the risk as the capital required for two or more risks taken together is generally less than the sum of the capital requirements of the individual risks. This applies at many levels – between policies in a portfolio, between different types of portfolio, across time, between risk types, and so on. It is a fundamental principle of insurance.

Dependency affects this reduction; the more interdependent the risks, the less the reduction in risk from diversification. Dependency refers to an increased probability of an event given that another event is known to have occurred. It is not necessary for there to be a direct causal link. For example, reinsurance failure and high gross claims may be dependent because both can in some cases be caused by the same weather events; and a higher frequency of losses may present evidence that severity will also be higher, with no causal chain.

Correlation is one specific measure of dependency, but it does not capture the whole picture and in a sophisticated model the impact on “tail dependency” should be considered. In a model without explicit tail dependency, correlations should be set using appropriate judgement to reflect the dependency in the tail.

The dependency can increase in the more severe scenarios. For example, when there are large losses, higher reinsurance failure or dispute are more likely than in “normal times”. Adverse claims experience can arise in several parts of the portfolio at once, together with inadequate pricing of risks going forward.

In stress test only ICAs, a correlation approach can be used to bring together different stress tests into a total provided certain other assumptions can be justified. Other methods such as chains of potential cause and effect or “ripple effects” should also be considered, again allowing for the possibility that losses which might have little dependency in normal times can become much more dependent in adverse scenarios, and that dependency can arise even when there is no direct causal link.

As well as considering the inputs to the assessment of dependency, agents should consider the outputs, ie what is the effect of the chosen assumptions on the result.

### Scope

Includes all allowances for diversification. Agents will be asked to show results at certain specified levels of aggregation to allow Lloyd’s to see the effect of diversification between these levels.

Within the ICA submission agents must explain fully how they have considered and addressed the following:

- the level and method of aggregation chosen must be appropriate to the basis of the ICA and the syndicate’s tail risk
- agents must ensure that the post diversification number is reasonable

**DIVERSIFICATION IS A  
FUNDAMENTAL PRINCIPLE  
OF INSURANCE**

**CORRELATION IS ONE  
SPECIFIC MEASURE OF  
DEPENDENCY**

**AGENTS MUST ENSURE  
POST DIVERSIFICATION  
NUMBER IS REASONABLE**

- an agent's own data is unlikely to be sufficient for full calibration
- stress tests are vital to substantiate assumptions

# DETAILED GUIDANCE SECTION



## APPROACH AND METHODOLOGY

Irrespective of the modelling approach taken by agents, they must ensure that there is a clear audit trail from the impact of any financial calculations to the relevant risk capital allocation in the ICA. The ICA must:

- outline clearly the approach adopted in respect of operational risk
- ensure that the material risks under each risk group are identified clearly along with an explanation as to how they contribute to the ICA value
- document the way in which any risks have been incorporated in the modelled element of ICA calculations (eg by using particular assumptions or changing certain parameters)
- list significant risks where no capital has been included because the controls over the inherent risks are such that the level of residual risks is considered low enough to warrant their exclusion from capital calculations. The extent of this control reliance should be outlined and the effectiveness of these controls clearly demonstrated.

### Assumptions used in ICA

*The ICA should reflect the same management assumptions on the coming year as the business plan and the onus will be on agents to reconcile any discrepancies and demonstrate consistency with the ROCP. In particular, agents will be expected to show that the reserve estimates in the ICA are consistent with those in the ROCP and FPP.*

Agents should justify in their submission the rationale for choice of assumptions where appropriate and should clearly state where they believe these assumptions, if any, are particularly prudent.

*Lloyd's expects agents to use a combination of realistic and prudent assumptions. The latter would be appropriate where there is uncertainty and will then increase Lloyd's confidence in the overall ICA, provided agents explicitly state where they consider the assumptions to be prudent.*

### Time Horizon

The need for a consistent basis of calculation is particularly important for ICAs that are based on stochastic models, and in particular regarding the degree and manner to which models look beyond the immediate future year.

One year models will continue to be acceptable for the 2008 ICA submission.

#### One year time horizon

Agents must calculate the capital required to ensure that all liabilities attaching to the 2008 and prior years of account could be paid as they fall due at a 99.5% confidence level. In these cases, they should use a prudent best estimate basis but should then apply stress tests to their assumptions to allow for the risk of softening rates.

Future liabilities should include claims payments, future expenses and future reinsurance costs, on an ultimate basis. All underwriting and reserving risk must be modelled to ultimate for all risks attaching to the 2008 and prior years of account.

**IDENTIFY MATERIAL RISKS AND EXPLAIN HOW THEY CONTRIBUTE TO THE ICA VALUE**

**THE ADOPTION OF PRUDENT ASSUMPTIONS WILL INCREASE THE CREDIBILITY OF THE ICA**

**ENSURE THAT ALL LIABILITIES COULD BE PAID AS THEY FALL DUE AT A 99.5% CONFIDENCE LEVEL**

Allowance may be made for asset returns over the payment period, and these should be assessed allowing for asset and timing risks (to the extent that these are not included in the non-insurance headings of the ICA).

### Multi Year Time Horizon

Since a multi year model is not required at present, Lloyd's has not set out a required basis for such a model. Agents intending to use or develop multi year models should ensure that they contact Lloyd's to discuss this.

## Modelled Approach

The following comments relate to stochastic models.

### Loss modelling

The level of detail adopted in the loss modelling should be appropriate to the characteristics of the underlying business. All major classes of business should be explicitly modelled. Territories or currencies should also be modelled separately if the size of the group warrants this. Within each class, it is common for models to split loss modelling between attritional losses, large claims and catastrophe claims, although for smaller syndicates or where the risk in the class is incidental, then consolidation of these groups may be appropriate. For example, attritional losses may follow an aggregate claims distribution, whilst large claims and catastrophe losses could be split between a frequency and claim amount distribution.

The chosen statistical distribution should have an appropriately heavy 'tail'. A normal (Gaussian) distribution may not be appropriate for aggregate losses or claim amounts. Similarly, a poisson distribution for frequencies may be considered to be too thin-tailed. Agents should provide justification and rationale within the ICA for the distributions chosen and why they are deemed to be appropriate.

Direct use of external catastrophe models, with an array of scenarios, is good practice. However, the ICA should allow for the possibility of model error and for events not included within the catastrophe model library. Actual loss experience in 2005 highlighted that catastrophe models alone are not always sufficient.

External catastrophe models tend to focus on certain types or elements of natural catastrophes only. Syndicate ICAs should not understate the potential exposure from other natural catastrophe events, liability or man-made catastrophes.

*The implied distribution should be consistent with the syndicate's realistic disaster scenario (RDS) submission where this remains relevant and with the syndicate's ROCP and FPP if appropriate. .*

Lloyd's recognises that different catastrophe models are in use across the market and agents should include within their submission details of the model used as well as how this has been adapted to suit their particular exposures. Details should include:

- modelling software used and version number
- any alterations made to standard model assumptions and settings
- details of data used in model and any alterations made for 2008

**ICAs SHOULD INCLUDE EXPOSURE TO CATASTROPHE EVENTS NOT INCLUDED IN MODELS**

**AGENTS SHOULD INCLUDE DETAILS OF LOSS MODELLING SOFTWARE USED AND HOW ADAPTED**

Lloyd's will also look for an analysis of the output of the model against actual loss experience and the use of models by agents in their business.

### **Parameter Setting**

To enable Lloyd's to review an ICA sufficiently, the submission should contain information as to how parameters have been chosen together with the logic of the model that brings the assumptions together. The choice of parameters should be carefully considered by agents and analysis should be sufficiently tested.

There will be sensitivity of results to various parameters and agents should highlight within their ICA the key parameters driving the result.

Whilst agents should seek to use a syndicate's own data to parameterise the model, in most cases this data is unlikely to have sufficient statistical credibility in terms of both size and history. Reference to market data will often be required, adjusted to reflect syndicate specific characteristics. As noted below, when assessing volatilities (standard deviations) at a market level, adjustments should be made to reflect that the observed market volatility for a class of business, representing the pooled experience of many syndicates, will tend to be lower than the volatility of a stand-alone syndicate.

Whether the parameters have been based on a syndicate's own historic data or market data, the ICA submission should contain details of the analysis undertaken and where and how judgement has been used. The ICA should also contain an explanation as to the relative balance between the syndicate's own data, market data and judgement.

Models are based on past experience and it is likely that over time this experience will become out of date due to all manner of trends. When such trends start to emerge, agents should consider their impact on the results. It is not acceptable to wait until the effects of the trend are well understood before commenting on the possible implications. Agents should consider the validity of past data and assumptions within the model and ensure that these remain appropriate for calibration, particularly with regard to actual experience (eg following the 2005 US windstorms). Agents should also consider scientific evidence on climate change with regards to parameter setting. The ICA should explain where this has been considered and has resulted in a change of parameters being used.

### **Credibility of syndicate data**

Agents should consider carefully the extent to which they may be overstating the credibility of their own experience, and where the model parameters are driven largely by the syndicate's own experience, a margin in the parameters will often be appropriate. Alternatively, the parameters should reflect a wider market experience.

Credibility applies not only to history, but also to the size of the dataset. Small syndicates, in particular, may not have the scale to have a credible dataset, and should not place over reliance upon their own data.

It is worth noting two technical points that are frequently mistaken when setting parameters:

**THE ICA SHOULD  
HIGHLIGHT THE KEY  
PARAMETERS DRIVING  
THE RESULT**

**AGENTS SHOULD  
CONSIDER THE VALIDITY  
OF PAST DATA AND  
ASSUMPTIONS**

- a smaller portfolio will have a larger standard deviation (SD), as a percentage, than will a larger portfolio. As a result, the SD of a syndicate should be set higher than the observed SD of the whole market. This is the principle of pooling or the law of large numbers. It affects not just the SD itself but also the estimate of the mean (average), which is more uncertain for a small portfolio
- if observations are not independent then the usual formula for the SD needs to be amended. If (and this is likely to be a key hypothesis supporting the use of syndicate specific data) the observations are positively correlated with each other, the estimate of the SD will be too low unless the formula is adjusted.

As a rule of thumb, a 10% correlation results in a 5% underestimate of the standard deviation and a 50% correlation results in a 30% underestimate.

### Parameter uncertainty

A statistical model, at best, is a fair representation of the underlying reality. At worst it is a biased and incorrect view of the risk. Invariably, there is insufficient data to be totally confident of the parameters or model, and some degree of parameter and model error is unavoidable. To compound matters, parameters themselves may not be fixed and might follow their own distribution. Sophisticated ICAs will therefore include some allowance for parameter uncertainty.

This is clearly an area that is difficult to quantify. However, Lloyd's considers it is important that syndicates recognise the issue and that the uncertainty is adequately communicated to senior management and addressed within the ICA.

As part of embedding the ICA process Lloyd's considers it appropriate for agents to review regularly the key parameters to ensure their continued applicability. Examples of the types of modelling uncertainty that should be explicitly considered include:

- **Parameter error** – ie the error of selecting the incorrect parameter due to insufficient relevant historical information
- **Simulation error** – ie the potential for producing erroneous results because they have used a limited set of random numbers
- **Reserving error** – the extent to which any potential historic under-reserving has resulted in over-optimism on the new business projections
- **Model error** – ie the error in output caused by matters such as incorrect distributional or aggregation assumptions

Lloyd's considers it important for agents to test the key assumptions for reasonableness. This would enable a broad high-level reasonableness assessment of the parameters, and indicate potential areas of significant under/over estimation. The submission should also give commentary on the potential parameterisation error and model error, stating what adjustments have been made to cover such errors.

Agents should highlight within their submission any assumptions or areas of modelling which are deemed to be prudent. However, where agents are aware of areas of weakness or optimism in the submission, these should be explicitly addressed. Agents should not make a general statement that these are offset by prudence elsewhere.

## ICAs SHOULD INCLUDE ALLOWANCE FOR PARAMETER UNCERTAINTY

## USE OF PRUDENT ASSUMPTIONS IN ONE AREA SHOULD NOT BE USED TO OFFSET AREAS OF OPTIMISM ELSEWHERE

## STOCHASTIC MODELS SHOULD HAVE ALL PARAMETERS CLEARLY IDENTIFIED AND JUSTIFIED

Lloyd's considers that there are risks in using a "smoothed" dataset as it is likely to contain "survivor bias" and may lack the extremes that should drive the ICA assumptions.

The ICA should also demonstrate that sufficient sensitivity tests of the model have been carried out and that these sensitivities are understood by the Board and senior management. Lloyd's may also request the overall loss distribution of the model as part of its ICA assessment.

### Features of a 'good' stochastic model

A good stochastic model should:

- have all parameters clearly identified and justified
- be structured and documented so that it can be understood by senior management and Board members who do not have actuarial expertise
- be rigorous and self-consistent
- be consistent with realistic adverse scenarios
- reflect actual circumstances of the syndicate
- be sufficiently detailed to deal adequately with the key risk areas and capture homogenous classes of business, but not excessively complex
- be capable of being run with changed parameters for sensitivity tests
- where simulations are used, include at least 10,000 (so at least 50 simulations exceed capital level). Agents should ensure that the number used produces a stable result and ideally more than 10,000 should be used
- have a robust software platform

### Stress and Scenario Test Approach

*Lloyd's recognises that a stress and scenario test approach will often be more appropriate for a run-off syndicate than a sophisticated stochastic model, especially as the run-off becomes mature and risk may be concentrated in a small number of material issues. Under these circumstances a statistical approach may not produce good results, especially at extreme probabilities.*

Where agents rely on individual stresses and scenarios to derive an ICA, or to substantiate the output of a model, these should be based on the risks identified and documented in their risk register. The more complete, accurate and embedded the risk register, the more Lloyd's will be able to take comfort from the scenarios selected.

Agents should ensure that the stress and scenario tests used are at a suitably extreme level for determining a 1:200 capital assessment and are at a consistent level to allow aggregation.

Stress and scenario tests should be based upon a detailed analysis of potential outcomes within a scenario. One of the weaknesses in adopting a solely stress and scenario testing approach is in the aggregation of risks to arrive at an overall capital figure.

Two common approaches to reflect aggregation of risk are:

- specification of a correlation matrix between each scenario
- 'ripple effects'

## STRESS AND SCENARIO TESTS USED MUST BE AT A SUITABLY EXTREME LEVEL

Under the first approach, a range of stress tests is considered and quantified in isolation. A correlation matrix is then specified between risk categories/stress tests (judgementally: high/medium/low correlation) and then aggregated to derive an overall capital figure.

Under the second approach a range of scenarios is chosen, and for each one the associated 'ripple effects' resulting from that scenario are also quantified (eg a large loss event leading to reinsurer failure). An extension of this approach is a 'cause and effect' table, where for each defined scenario, the knock-on effect of losses from other pre-defined events is also derived. However, because dependency does not require cause and effect, a cause and effect approach is unlikely to be sufficient without adjustment.

Aggregation of scenarios will depend on the complexity of the stress tests. In some cases, using the maximum value of the scenarios may be appropriate, or alternatively aggregation may be achieved through a correlation matrix approach. This issue is covered in more detail in the section on diversification.

### **Features of a robust stress and scenario approach**

A robust stress and scenario test approach should:

- ensure that stress tests cover all risk aspects
- ensure that stress tests used are severe enough at the 1:200 level otherwise combination of less severe impacts must be aggregated (eg two 1:15 events occur in the same year)
- allow for dependencies (eg gross loss and reinsurance failure)

**A ROBUST STRESS AND  
SCENARIO TEST  
APPROACH SHOULD  
COVER ALL RISK ASPECTS**

## INSURANCE RISK

This section sets out the technical issues to be considered within insurance risk. It has been split into three sections to cover underwriting risk, reserving risk and reinsurance issues linked with insurance risk.

### Underwriting

*It is likely that the majority of run-off syndicates will not have any material underwriting risk remaining, but where appropriate, the following should be considered.*

#### Unexpired risks on 2007 and prior years of account (YOA)

*Agents are requested to provide an analysis of remaining exposure for the syndicate as a whole and by open year, unless it is not material.*

#### Catastrophe losses

Syndicate ICAs should use scenarios that identify the peak exposures within their portfolios (which may or may not be identified by the existing realistic disaster scenarios (RDSs)) and which represent sufficiently extreme events to be relevant to requirements at the 99.5% percentile (which will be beyond the level of some of the existing RDSs).

*Lloyd's recognises that the prescribed RDS scenarios may no longer be useful in the context of a run-off, especially a mature run-off with mainly liability exposure remaining. Specifically designed scenarios and stress tests may be the only approach available to agents, in which case this should be explained in the ICA submission.*

#### Lloyd's Realistic Disaster Scenarios confidence level

Lloyd's RDSs are a well established means of measuring aggregate exposures within syndicates and across the market as a whole. However, there are some aspects of their basis and design that may need to be adapted by agents when developing suitable stress and scenario tests to support their ICA assessment.

Some of Lloyd's RDSs are considered to be more extreme than the 1:200 level of likelihood, but others are not. Agents must adapt or combine their RDSs for use in the ICA to achieve a sufficiently extreme level of confidence and be able to demonstrate the rationale for the level chosen.

The prescribed RDSs are chosen to reflect the risk at market level and may not be at the required confidence level for individual syndicates. In particular, it is expected that more targeted and/or more extreme scenarios will be used by agents where their exposure is markedly different from the insurance industry's or where the recommended RDSs are not sufficiently extreme for a particular segment of its underwriting portfolio.

One limitation is that the RDSs measure exposure levels using only one, or two, possible outcomes. The dangers of this are that a syndicate may have a very different distribution of exposures to those of the insurance industry and the RDSs will 'miss' those exposures, giving the impression that less risk is being accepted. A full test of exposures in a particular region is best supported by a probabilistic assessment against a full range of possible events. It is for this reason that exceedance probability curves are more appropriate where a syndicate's exposure profile does not follow the insurance industry's.

**AGENTS MUST ADAPT OR  
COMBINE THEIR RDSs FOR  
USE AT THE 1:200 LEVEL IN  
THE ICA**

Although a probabilistic approach can be applied to natural catastrophe risks, it is not practical to model against a full range of possible events for those risks where belief and opinion underlie the assessment of likelihood. Instead, careful consideration should be given to ensuring that the selected events are focused on the actual exposure profile of the syndicate. A number of the 'de-minimis' RDSs and the two 'alternative' RDSs, in particular require agents to identify and test their syndicates' peak exposures.

Agents should also take account of the recent industry and meteorological studies into the effects of sea temperature, the current cycle of hurricane development, and possible dependence between one or more hurricanes occurring on similar paths.

#### **Large individual risk losses**

Agents should ensure when assessing large claims that the parameters used are sufficiently severe and reflect both their own experience and benchmark data. Historical experience can be used where relevant, with allowance for terms and conditions as well as inflation.

#### **Attritional loss experience**

Syndicate ICAs should address separately the risk of experiencing adverse loss ratios as a result of:

- higher than expected claims frequency and/or severity
- *emergence of new types of claim which fall within policy wordings of unexpired risks*

When projecting attritional claims, agents must consider the extent to which inflation, rate changes, definition of large claims and other external factors can impact the historic development data. Where an ICA has implicitly assumed that the volatility of future inflation will be in line with that in the historic data, this should be supported by clear examples on how appropriate this assumption is.

#### **Operational risks associated with underwriting risk**

##### **Operation of binders and delegated underwriting authorities**

Where part of a syndicate's book of business is underwritten through binders or other types of delegated underwriting authorities, agents should explicitly address the risks associated with this in the ICA, eg:

- agent may not be aware of poor experience and binder continues (eg renews at 1 January and new policies enter until 31 December). This leads to syndicate exposure continuing until 31 December of the following year and the possibility that the binder continues to deteriorate
- *cessation of a poorly performing binder can exacerbate the situation and may pose a "moral hazard" where risks continue to be written in the knowledge that binder will not be renewed. This is a particular problem in early run-off when all binders are effectively not renewable.*

Agents should also consider the effects of multi-year deals and reinsurance matching on delegated underwriting authorities.

##### **Timeliness of management information (eg reporting of binder income and losses incurred)**

## **LARGE LOSS PARAMETERS USED MUST BE SUFFICIENTLY SEVERE AND REFLECT EXPERIENCE**

## **THE ICA SHOULD EXPLICITLY ADDRESS RISKS ASSOCIATED WITH DELEGATED UNDERWRITING AUTHORITIES**

Agents should consider the reporting and procedures in place for monitoring loss development, binder income etc and any potential time delays in being aware of significant risks arising.

#### Modelling at a sufficiently granular level

Agents should ensure that modelling of risks is at a sufficiently granular level to capture homogenous classes of business.

### Reserving

Agents should consider carefully the risk of deterioration of prior year reserves within the ICA. When assessing reserving risk agents should consider the exposure to potential reserve deterioration and consider all aspects of the reserve portfolio individually.

#### Modelling (eg bootstrapping)

Reserving risk parameters are often measured using actuarial analyses such as “bootstrapping”, although it is not essential to take this approach. Even where there is an actuarial analysis, stress tests on reserves should be performed. A pure actuarial model such as bootstrap is not sufficient on its own and agents should consider the following if using a model:

- add in shock losses
- benchmark, allowing for size of portfolio
- consider gross volatility as well as net (as a benchmark)
- measure and either justify or adjust implied volatility at year end overall level

Where data is adjusted to remove anomalies or ceased classes of business, there are two important shortcomings:

- data for any continuing business will contain “survivor bias”
- if data is smoothed, the situation is likely to be exacerbated since “smoothed” data lacks the extremes that should drive the ICA assumptions.

Lloyd’s considers that a “smoothed” dataset is unlikely to be appropriate since any dataset with adjustments will not capture the volatility required for extreme reserve deteriorations.

It is acceptable to measure reserve volatility using actuarial analysis of the syndicate’s own data. However, this data is unlikely to contain examples of 1:200 reserve deterioration so agents need to adjust and consider other sources. One approach is to add in “as if” losses and explain clearly the basis and rationale for these and choose parameters, not just measure and use blindly. Another is to boost output parameters.

Agents should also check that the implied deterioration is large compared to actual failures elsewhere (eg: in failed companies).

#### Reserve margins

Where best estimate reserves are used as the basis for the ICA, these may, or may not, be the same as the booked reserves. Where a syndicate is assuming a best estimate below the booked reserves, Lloyd’s will require evidence that the implied surplus is appropriate.

**A PURE ACTUARIAL MODEL SUCH AS BOOTSTRAP IS NOT SUFFICIENT ON ITS OWN**

**A “SMOOTHED” DATASET IS UNLIKELY TO BE APPROPRIATE TO ASSESS RISK OF RESERVE DETERIORATION AT 1:200 LEVEL**

Lloyd's would not normally expect to allow more than 50% of the margin held over best estimate reserves to be offset within the ICA. Any credit taken may only be offset against reserving risk, pre-diversification and should take no account of discounting.

<b>Example (assuming 50% credit allowed):</b>	<b>£m</b>
Held reserves (undiscounted)	120
Best estimate reserves (undiscounted)	100
Implied margin	20
<b>Offset against reserving risk</b> (pre-diversification)	<b>10</b>

### **ADDED BURDEN OF PROOF ON THE AGENT TO DEMONSTRATE THAT RESERVE MARGINS EXIST**

An assumed surplus in reserves is the difference between one estimate and another and therefore Lloyd's will not consider it as an asset or permit a bottom line adjustment to the ICA. Whilst Lloyd's does not wish to discourage prudent reserve levels, there will be an added burden of proof on the agent to substantiate any credit taken. This burden of proof increases yet further with respect to classes with significant reserves as a proportion of ultimate claims. Lloyd's will examine assumptions with great attention and agents should ensure:

- there is clear identification of any margins against those risks that are included in the measurement of capital and of the capital required where those margins are insufficient
- margins are in line with the agent's documented description of how it accounts for assets and liabilities, including the methods and assumptions for valuation
- there is objective evidence and a track record to support margins being maintained. There is an added burden of proof on the agent to demonstrate that such margins exist

Agents should also consider the impact of continuing a prudent reserving policy if adverse loss experience erodes the margin (eg the need to rebuild margins to maintain reputation).

### **Discounting**

Liabilities may be reduced to reflect the investment income that will be earned on assets held against reserves.

Agents should apply discounting only by reference to the assets actually held, and not to the value of assets which may be called to meet future claims arising at the 1:200 confidence level. Lloyd's considers that taking credit for future income on additional assets implies taking credit for investment income on FAL, where FAL is outside the scope of syndicate ICAs. The interest rate used should be based on the relevant risk-free yield curves less an expense margin, or on the actual forecast investment income for the syndicate if lower. A stochastic investment return can also be used to discount liabilities. The approach taken should be consistent with the agent's assessment of market risk.

The ICA should take into account any increase in market risk that arises because of the discounting approach and should make clear the

### **AGENTS SHOULD APPLY DISCOUNTING ONLY BY REFERENCE TO THE ASSETS ACTUALLY HELD**

relationship between market risk and discounting. Where a higher rate of return has been assumed in assessing market risk, agents must still use the risk-free rate for discounting reserves.

Agents should ensure that their overall modelling approach takes account of the uncertainty of both investment income and the timing of claims payments, and that adequate market risk is allowed for. In practice, it is acceptable to assume either or both of investment income and settlement pattern are deterministic, although this in principle overstates the discount so a margin for parameter uncertainty should be taken in the assumptions.

Agents should also consider the treatment of reserve margins when discounting and avoid any double counting of margins. The ICA must set out clearly the discounting calculation applied.

#### **Latent claims**

Latent claims are by their nature unexpected and therefore are not necessarily reflected in actuarial projections, but the ICA should reflect the risk that they will emerge. Two approaches are:

- adjust the data in the actuarial projections, or the projections themselves 'as if' latent claims of assumed materiality had emerged
- load the assumptions directly – increase the correlations between years and the volatilities, or increase the stress tests and the dependency between them

Agents should apply at least one, preferably both methods and should examine the impact on the assumptions and results, making their assumptions clear.

#### **Regulatory changes**

Agents should ensure that they consider within the ICA the risk of changes to regulation or legislation affecting their reserves. In the UK, the introduction of the "Ogden tables" is an example of such a change. The approach may be similar to that for latent claims.

#### **Unexpired risks on 2007 and prior years of account (YOA) and 2008 YOA risk**

Reserving risk should not include any unearned exposure on the 2007 YOA which should be assessed within underwriting risk.

#### **Catastrophe losses**

The ICA should include adequate reserve risk arising from catastrophes that have already occurred, such as WTC and the 2005 US hurricanes. Lloyd's will consider carefully the reserve risk for syndicates with unpaid catastrophe losses.

#### **Large individual risk losses**

The ICA should take account of the reserve risk arising from large losses. This should include where appropriate:

- historical large losses - these may deteriorate suddenly as disputes are started or resolved. This uncertainty at a gross level can be even greater at the net level

**THE ICA SHOULD REFLECT THE RISK THAT LATENT CLAIMS WILL EMERGE**

**ICA SHOULD INCLUDE ADEQUATE RESERVE RISK ARISING FROM CATASTROPHES THAT HAVE ALREADY OCCURRED**

- late advices - large claims can be notified late or the large size of a claim may only suddenly and belatedly become apparent
- “reserved at limits” - claims may be described as reserved to limits when on a probable basis there is no further cover, but theoretically cover could still exist. The ICA should include the risk that deteriorations beyond what is probable can take place
- *withdrawal from a class or a syndicate entering run-off - this can generate or bring forward speculative claims*

#### **Attritional loss experience**

As well as considering the impact of large and catastrophe losses on reserves, agents should also consider the impact of attritional losses and general reserve deterioration. The ICA should allow for unexpected adverse movements including new trends or the continuation of existing adverse trends. If the number of claims turns out to be higher than expected, the ICA should allow for any consequences such as sideways reinsurance exhaustion or lack of claims staff/external advisors (eg demand surge following 2005 US hurricanes)

#### **New classes of business**

In assessing reserving risk for new classes of business, the parameters used should reflect the appropriate level of uncertainty and risk. Lloyd’s would expect agents to use prudent assumptions and also consider the additional volatility. Where little or no historical data exists agents should refer to benchmarking or market data.

#### **Application of reinsurance programme**

The ICA should allow for the risk of exhaustion and dispute, and should allow for the possibility that the relationship between the syndicate and its reinsurer will deteriorate especially if gross claims are high. *This risk is a particular feature of run-off and agents should address it in their ICA submissions.*

#### **Operating expenses**

Syndicate ICAs should address potential exposure to financial loss from higher than expected costs and expenses not directly related to claims.

#### **Use of syndicate data and benchmarking**

Own reserve run-off experience does matter but agents should consider other benchmarks as well. Benchmarks should include market-level reserve volatilities and agents can use data from market (or from failed firms if available).

#### **Allowance for trends such as inflation**

Agents should consider these trends, not only at best estimate level, but also where there is a deterioration of the trends.

#### **Dependence between underwriting years**

Agents can consider all years together or look at individual years separately. In either case, the ICA should allow for dependence between years and a total figure for all years is required.

**PARAMETERS USED SHOULD REFLECT THE APPROPRIATE LEVEL OF UNCERTAINTY AND RISK**

**THE ICA SHOULD ALLOW FOR DEPENDENCE BETWEEN UNDERWRITING YEARS**

### Operational risks associated with reserving risk

Agents should include an explanation of how operational risks associated with the following have been addressed when assessing reserving risk.

#### Systematic under reserving/miscoding

Agents should include operational risk error eg systematic under assessment of reserves, miscoding, late notification of claims.

#### Timeliness of management information (eg reporting of binder income and losses incurred)

Agents should consider the reporting and procedures in place for monitoring reserve deterioration and any potential time delays in being aware of significant developments arising.

#### Modelling at a sufficiently granular level

Agents should ensure that modelling of risks is at a sufficiently granular level to capture homogenous classes of business.

#### Implications of entering run-off

*In the case of a new run-off, agents should consider the potential impact on reserves of entering run-off, e.g. inability to obtain timely data, loss of claims lead, etc.*

## Reinsurance

Syndicate ICAs should consider the risks associated with the use of, and potential reliance on, reinsurance in respect of both underwriting and reserving risk. This should cover the areas set out below but should not include the risk of failure which falls into credit risk.

Lloyd's recognises however that where agents are running sophisticated models it may fall into insurance risk. Although in principle, reinsurance credit risk should be shown separately from insurance risk, Lloyd's recognises that this is difficult to do in some models. In practice, showing reinsurance credit risk within insurance risk has not caused any difficulties therefore Lloyd's does not necessarily require agents to split out the reinsurance credit risk in this way. However, Lloyd's may request as a sensitivity test for this, agents to calculate the insurance risk assuming no credit risk compared to the actual assumptions and justify the difference.

We are aware that this may make it difficult for a specific allocation pre diversification to reinsurance credit risk, but it will assist Lloyd's benchmarking and review process if agents make this as clear as possible.

Details of material current and prospective reinsurance protecting the syndicate should be provided in the ICA, or by cross reference to the SBF or other submission to Lloyd's. The ICA should also state assumptions with respect to cost and availability of reinsurance.

The ICA should reflect the potential adverse impact on underwriting (eg prudential gross pricing and risk selection) of the availability of reinsurance or of the advanced costs incurred in purchasing reinsurance, in particular, when the underwriting of a given class is materially dependent on reinsurance.

### Non-matching reinsurance

**ICAs SHOULD CONSIDER THE RISKS ASSOCIATED WITH THE USE OF REINSURANCE**

**DETAILS OF MATERIAL CURRENT AND PROSPECTIVE REINSURANCE SHOULD BE PROVIDED**

Agents should consider the risks arising as a result of:

- long term, non-cancellable inwards policies written by the syndicate where there is a material reliance on reinsurance of shorter duration, and where there is no certainty over renewal pricing of such reinsurance (particularly in a post loss scenario), or where known renewal terms and conditions would impose an additional cost
- reinsurance covering Losses Occurring During (LOD), rather than Risk Attaching During (RAD), the period of cover and where there is no certainty over renewal pricing of such reinsurance (particularly in a post loss scenario), or where known renewal terms and conditions would impose an additional cost
- gaps in coverage as a result of a change in the basis of cover, eg moving from LOD to RAD cover
- the use of fixed currency rates of exchange for programme deductibles / limits
- a lack of an appropriate or the expected level of risk transfer under financial engineering products, including finite reinsurance. The ICA should explain the extent to which financial engineering has been used, for what purpose, and the impact on both assets and liabilities
- failure to complete the placement of reinsurance prior to the occurrence of a material loss
- the operation of reinsurance exclusions, or a poorly worded reinsurance contract, whereby the syndicate would retain an unexpectedly larger proportion of a significant loss
- potential for different legal jurisdiction to apply on inwards business compared to outwards reinsurance

#### **Exhaustion**

Syndicate ICAs should consider exhaustion of reinsurance cover and risks arising as a result of:

- the occurrence of multiple losses at a level requiring material reinsurance support, ie the purchase of insufficient horizontal coverage
- the erosion of cover as a result of losses from other classes where reinsurance protects more than one class of business
- the risk associated with projecting the appropriate amount of reinsurance cover to purchase, eg in long tail lines of business, requiring a longer term assessment of the potential for the erosion of cover over time

#### **Post loss impact on cost and availability**

Syndicate ICAs should consider the post loss impact on reinsurance and risks arising as a result of:

- the effect of contractual conditions, eg additional premiums, 'payback' and coverage restrictions
- potential unavailability or uneconomic pricing of reinsurance
- material changes to reinsurance programme structure, eg increased programme deductibles, restricted vertical or horizontal cover, changes to terms and conditions, or to the basis of coverage
- *the impact of being in run-off on availability and pricing of cover*

### **ICAs SHOULD INCLUDE RISK ARISING FROM EXHAUSTION OF REINSURANCE COVER**

### **ICAs SHOULD CONSIDER THE POST LOSS IMPACT ON REINSURANCE**

## **AGENTS SHOULD EXPLAIN STEPS TAKEN TO MITIGATE REINSURANCE DISPUTE RISK**

### **Concentration of reinsurers**

Agents should address any concentration of particular reinsurers within their portfolio. This will affect other risks, particularly credit risk and dispute risk.

### **Dispute**

A reinsurer's unwillingness to pay may lead to a dispute over losses presented under a reinsurance contract. Agents should articulate what steps are taken to mitigate reinsurance dispute risk. The impact of delays in payment and pressures on management time should be considered. The tail of the account should also be considered as the class of business may lead naturally to more disputes, ex gratia settlements and turnover of reinsurers year on year.

*Lloyd's considers that reinsurance disputes are inherently more likely to occur when a syndicate is in run-off. Agents should consider the impact this may have on their ICA and address the risk within the submission.*

### **Structured and/or multi year reinsurance policies**

Agents should consider the economic value of structured and/or multiple year reinsurance contracts particularly any with an aggregate limit for the policy period that is less than the sum of the annual limits. Any calculation of credit for a multi-year reinsurance should apply the contract's lifetime expected premium against the annual limit available.

Lloyd's will review credit taken for any recoveries under stop loss policies on an individual basis.

### **Industry loss warranties (ILW)/Original loss warranties (OLW) basis risk**

The ICA should specifically address any material basis risk, for example in respect of ILW or OLW forms of cover in which a recovery is triggered in the event of a specified amount of industry loss. This may expose the syndicate to material losses which would normally be reinsured if the total industry loss does not reach the specified amount.

### **Impact of run-off on reinsurance**

*Agents should consider the impact on reinsurance when a syndicate is in or enters run-off. Reinsurers may be more reluctant to pay and brokers less willing to provide service where no future trading relationship will exist.*

*Lloyd's also considers that disputes are more likely to occur where a syndicate is in run-off and would expect to see more prudent assumptions about the capital required for this risk in run-off syndicates than in active syndicates.*

### **Example Stress Tests**

The suggested stress tests below may be used when assessing insurance risk. This list is not exhaustive and is not a substitute for stress tests relevant to each individual business.

The schedule is not prescriptive, however where Lloyd's is unable to get comfortable with the stress tests used by an agent, these are example stress tests that Lloyd's may require the agent to perform to support the conclusions in the ICA.

- **two largest RDSs combined**
- **more than 100% increase in run-off reinsurance costs**
- **multiple loss of disputes with lead reinsurer leading to 40% shortfall in reinsurance recoveries**
- **40% deterioration on reserves**
- **largest two year-on-year reserve deteriorations in syndicate's history**

Agents should be aware that Lloyd's will require explicit sensitivity testing on ULRs and reserve deterioration as part of the pro-forma. Full details of these are given in the notes to that document (appendix 3).

## CREDIT RISK

This section sets out and explains the technical issues regarding the assessment of credit risk.

### Reinsurance Credit Risk

When considering credit risk, agents should differentiate between underwriting and reserving elements. Reserve credit risk is on a known asset whereas underwriting credit risk is an uncertain loss on an uncertain asset with uncertain security and there may be a greater dependence between gross losses and credit risk for underwriting risk than for reserving risk. There may well be a dependence between extreme gross reserve development and the associated reinsurance credit risk.

In a good practice approach, the main components of a syndicate's proposed, current and prior years of account reinsurance programme should be identified and modelled explicitly.

In addition to their own data, agents should use credit ratings and reinsurer specific risks; eg small and specialist will be riskier than large and diversified even if rated the same. Agents should also test data against their own worst experiences.

#### Gross and net losses

When a model is used, gross losses as well as net should always be considered and mapped through the relevant reinsurance programmes. Where syndicate reinsurance programmes are complex, Lloyd's recognises that this calculation will be difficult to perform explicitly. In such cases, the agent should make allowance for the operational risk inherent in the complexity of the programme. Where reinsurance programmes change materially year on year, this should also be considered, particularly how they may apply to legacy business with run off exposures.

#### Link increased probability of reinsurance failure to extreme losses

The ICA should also take into consideration the increased risk of reinsurance failure in extreme loss scenarios. Lloyd's considers that correlations increase in many of the extreme loss scenarios. In modelling terms, this would involve correlating reinsurance failure rates with large loss scenarios.

#### Concentration risk

In determining the capital requirement for reinsurance credit, the ICA should reflect both the concentration risk and financial strength of the reinsurer. Where a syndicate has a significant concentration to individual reinsurers (including intra group) the ICA should consider this.

#### Reinsurance failure rates should allow for the risk of downgrade

Agents should allow for downgrading of reinsurers when assessing credit risk and not refer only to standard default rates or current ratings. A weakness in using standard default rates is that a market average rate is not always applicable to an individual syndicate's reinsurers or to the scenarios for which reinsurance is being relied upon. Reinsurance assets

**AGENTS SHOULD DIFFERENTIATE BETWEEN UNDERWRITING AND RESERVING ELEMENTS**

**INCREASED RISK OF REINSURANCE FAILURE IN EXTREME LOSS SCENARIOS**

**ICA SHOULD REFLECT THE CONCENTRATION RISK AND FINANCIAL STRENGTH OF THE REINSURER**

are very likely to be much larger in the stress scenario than in non-stress conditions.

In addition, the factors are derived from historical corporate bond default rates, which do not have any direct relationship to future reinsurer default rates.

Therefore these tables should be used as a benchmark only. Lloyd's considers it good practice for syndicates to consider reinsurance default with specific reference to the actual reinsurers not just reinsurers banded by S&P ratings, whether stressed to a one or multiple "notch" downgrade.

## **THERE IS A HIGHER PROBABILITY OF DEFAULT ON A MORE DISTANT RECOVERY**

### **Duration of recoveries**

Agents should explicitly consider the duration of liabilities when considering reinsurance credit risk as there is a higher probability of default on a more distant recovery.

### **Treatment of reinsurance placed with other Lloyd's syndicates**

Lloyd's does not wish to indirectly influence the placement of reinsurance as a result of the ICA process. Therefore, agents should treat policies placed at Lloyd's on a similar basis to another reinsurer with a comparable financial strength.

### **Treatment of any intra group reinsurance**

Agents that belong to wider insurance groups should not treat reinsurance placed with the parent group more favourably than reinsurance placed with an unrelated insurer with similar financial strength.

## **Other credit risk**

Issues to be considered when assessing non reinsurance credit risk areas are covered below:

### **Brokers**

Agents should consider the failure of their largest broker - this may be considered remote but the ICA must be assessed in the context of a 1:200 event. Additional areas to be considered under brokers would include premiums receivable from broker, claims paid to broker but not yet to insured and commissions not recovered when policies are cancelled and premiums returned or never received.

### **Coverholders**

Agents should consider the following issues:

- where premiums not received but policies bound
- claims paid but not passed on
- commission paid but policies cancelled and premiums returnable.

### **Third Party claims administrators**

Agents should consider the risk of claims paid to a third party administrator but not passed on to policyholders. Where third party claims administrators hold claims floats, agents should consider the possible effects of misappropriation of funds or failure of the third party administrator.

## **AGENTS SHOULD CONSIDER THE FAILURE OF THEIR LARGEST BROKER**

**Banks and Investment counterparties**

Agents should consider the risk where significant balances are held with banks and/or investment counterparties.

**Example Stress Tests**

The suggested stress tests below may be used when assessing credit risk. This list is not exhaustive and is not a substitute for stress tests relevant to each individual business.

The schedule is not prescriptive, however where Lloyd's is unable to get comfortable with the stress tests used by an agent, these are example stress tests that Lloyd's may require the agent to perform to support the conclusions in the ICA.

- **failure of the largest broker**
- **failure of the syndicate's largest reinsurer (taking account of both reserve and underwriting credit risk)**
- **one (or multiple) notch downgrade of all reinsurers based on a reinsurance asset as the largest proportion of gross reserves that it has been for agent since 2000; or twice current if higher**
- **default by syndicate's most significant corporate investment counterparty**



## OPERATIONAL RISK

This section sets out and explains the technical issues regarding the assessment of operational risk.

When assessing operational risk, agents should ensure that all potential sources of operational risk are considered. The table below has been designed to assist agents to identify operational risks in their business by providing a (non exhaustive) breakdown of potential causes and data sources for each of the four types of operational risk, ie:

- people
- processes
- systems
- external events

Cause	Potential Causes	Potential Data Sources
<b>People</b>	<ul style="list-style-type: none"> <li>○ Manual input error</li> <li>○ Error in use of model / system</li> <li>○ Lack of management supervision</li> <li>○ Inadequate staff training</li> <li>○ Inadequate staffing levels</li> <li>○ Process / procedure not followed</li> <li>○ Lack of escalation to management</li> <li>○ Internal theft or fraud</li> <li>○ Recruitment screening failure</li> <li>○ Miscommunication - internal</li> <li>○ Miscommunication - external</li> <li>○ Other unauthorised activity</li> <li>○ Other unintentional error</li> </ul>	<ul style="list-style-type: none"> <li>○ Staff turnover / sickness rates, number of contract staff</li> <li>○ Dependency on key staff / underwriters</li> <li>○ Loss experience on insurance contracts</li> <li>○ Extremes of over / underperformance / known conflicts of interest</li> <li>○ Typical notice periods and contract terms</li> <li>○ Strength of succession planning</li> <li>○ Level of complaints</li> </ul>
<b>Processes</b>	<ul style="list-style-type: none"> <li>○ Inadequate segregation of duties</li> <li>○ Inaccurate / incomplete management information</li> <li>○ Lack of adequate processing control</li> <li>○ Inadequate functionality - supporting software</li> <li>○ Inadequate / inappropriate policies</li> <li>○ Inaccurate / Incomplete standing data</li> <li>○ Failure in corporate governance</li> <li>○ Other process failure</li> <li>○ Other control failure</li> </ul>	<ul style="list-style-type: none"> <li>○ Rapid expansion of business lines / high moral hazard business areas</li> <li>○ Number and extent of binders written</li> <li>○ Nature and extent of manually intensive processes</li> <li>○ Exception reporting (eg business outside plan) and key indicators</li> <li>○ Management monitoring reports (eg policy or claims backlogs)</li> <li>○ Level of complaints / reinsurance disputes / adverse press comment</li> <li>○ Outstanding external and internal audit / compliance / regulatory report points / frequency of regulatory intervention</li> </ul>

Cause	Potential Causes	Potential Data Sources
<b>Systems</b>	<ul style="list-style-type: none"> <li>○ Hardware failure</li> <li>○ Software failure</li> <li>○ Network / telecommunications failure</li> <li>○ Third party provider failure - IT</li> <li>○ Inadequate virus protection</li> <li>○ Inadequate system security / information risk management</li> <li>○ Insufficient processing capacity</li> <li>○ Insufficient / untested business continuity processes</li> <li>○ Inadequate change / release management</li> <li>○ Other system error</li> </ul>	<ul style="list-style-type: none"> <li>○ Number and complexity of MIS reports and papers</li> <li>○ Outstanding internal / external audit points on MIS</li> <li>○ Number and complexity of IT systems / planned IT upgrades</li> <li>○ Records of system outage / security breaches / virus attacks</li> <li>○ DRP implementation costs / replacement costs of IT hardware / realistic business interruption costs</li> </ul>
<b>External events</b>	<ul style="list-style-type: none"> <li>○ Natural disaster</li> <li>○ Man made disaster</li> <li>○ Third party provider failure - other</li> <li>○ External theft or fraud</li> <li>○ External breach of system security</li> <li>○ Power outage</li> <li>○ Other external event</li> </ul>	<ul style="list-style-type: none"> <li>○ Number and complexity of 3rd party users</li> <li>○ Terms and conditions of service level agreements</li> </ul>

Irrespective of the approach adopted to modelling operational risk, all material risks should be considered in the ICA. Agents should clearly articulate where within the ICA submission the material risks to the business have been considered.

Agents should consider operational risk linked with other risk categories as well as risks such as business continuity, loss of premises and loss of staff. Lloyd's appreciates the boundaries between operational risk and the other risk categories are imprecise, as operational risk can arise from a range of operational controls spanning all risk categories. The sections below show some examples of key operational controls under each of the other five risk categories. Consideration should be given to the risk that (as an extreme event) these controls are not fully effective.

## AGENTS SHOULD CONSIDER OPERATIONAL RISK LINKED WITH OTHER RISK CATEGORIES

### Insurance risk

- periodic actuarial input, for example ULRs, to assess the appropriateness of possible business plan outcomes
- documented business plan which sets out the parameters, classes, limitations and profitability expectations of the underwriting teams for the forthcoming year
- comprehensive procedures in place to conduct formal due diligence on significant new policyholders and classes of business on both a qualitative and quantitative basis
- regular exceptions reporting identifying all items that exceed pre-determined limits. Escalation procedure in place for significant exceptions
- pre-transaction testing by IT system to ensure that quotations, actual written lines or amendments to existing risks are within underwriting

authority limits for each underwriter. IT system blocks or refers attempts to create or amend risks which are outside of authorities

- regular formal process of experienced independent review, to challenge the assumptions and performance of current and past underwriting. Formal escalation process in place for immediate concerns to be addressed
- comprehensive and documented recruitment procedure. Documented training and development programme
- regular, formal meetings to review underwriting performance against plan expectations and potential profitability in the immediate future. Formal escalation procedures in place for any immediate concerns to be addressed
- formal written and signed underwriting authorities tailored to the specific skills of the individual and linked to the business plan, amended for any business plan changes and updated at least annually
- formal procedures to ensure contract certainty before inception and for the checking and assessment of policies/slip wordings
- regular, timely, formal process of peer review to provide forum for discussion of risks written (which may include terms and conditions and/or wording) with clearly documented action points and follow up
- formal procedures to set out the approach to underwriting and underwriting controls, such as procedures to refer items written 100% for review, prior to acceptance, for due diligence / pricing analysis
- procedures setting out the approach to claims management including service standards, complaints handling and the use of third party experts
- procedures for the regular review of dormant or non moving claims.
- documented business plan which clearly sets out the reinsurance purchase requirements by class, type, security
- regular formal process for independent expert and management review which is appropriately timetabled around key dates for reinsurance purchase, security concentration and utilisation
- Board approved and monitored requirements for maximum net losses to major events
- regular formal reporting of reinsurance utilisation to the Board or properly designated committee
- formal modelling capability to assist in determining what levels and price reinsurance should be bought at to maximise return whilst restraining risk within manageable levels. Timely analysis of different options and sensitivity to class and syndicate aggregate exposures

#### **Credit risk**

- an established credit risk committee, with clear terms of reference, which reviews and updates the credit ratings of reinsurers, brokers and coverholders on a regular basis
- formal procedures for reinsurance purchasing, identifying the individuals responsible
- formal policy and procedures for the evaluation, usage and monitoring of new and existing reinsurance security.

- formal policy and procedures for the evaluation, usage and monitoring of new and existing brokers
- review of concentrations within individual custodians, group companies, or geographic locations
- investment policy with clear limits and guidelines appropriate to the business
- regular aged debt reporting
- internal audit reviews of controls over third party credit risk
- a plan for managing cashflows / liquidity following a major catastrophe

#### **Market risk**

- investment policy with clear limits and guidelines appropriate to the business
- annual review of benchmarks and revision in light of changes to business strategy
- formal investment management / custodian mandates and agreements, including details of reporting to be provided and performance benchmarks
- regular reporting on investment portfolio, including value of the portfolio by investment asset class, sales and purchases made in the period and cash movements
- monitoring of the portfolio against the limits established in the investment mandate
- regular reconciliations of investment holdings
- regular monitoring of the credit worthiness of counterparties and issues
- periodic reviews of controls operated by counterparties

#### **Liquidity risk**

- credit control policy and procedures to target outstanding premiums and reinsurance recoveries for collection
- stress testing modelling to review liquid assets against unexpected events
- regular formal cashflow forecasting, showing the cash position by month and currency and reflecting the likely effect of a RDS / catastrophe events
- monitoring actual levels of liquid assets against a benchmark
- the maintenance of sufficient (liquid) assets to meet expected / reasonable changes in regulators' financial requirements, or contingency plans to raise sufficient funds
- formal agreements in place for borrowing facilities / funding arrangements
- credit control policies and procedures to target outstanding premiums and reinsurance recoveries for collection
- personnel with sufficient skills and knowledge of the cash call process

#### **Group risk**

- formal group reinsurance agreements
- documented terms of reference where group functions are shared

## **DEMONSTRATE THAT THE RISK MANAGEMENT FRAMEWORK IS EMBEDDED WITHIN THE ORGANISATION**

- formal agreements in place for intra group borrowing facilities / funding arrangements.

### **Mapping to the risk register**

Agents should undertake an operational risk assessment that is mapped clearly to the risk register of the syndicate and supported by a robust risk management framework. The ICA should include a clear explanation of which risks in the risk register have been considered in the assessment of operational risk.

Senior management should be able to demonstrate that the risk management framework is embedded within the organisation and provides a representative feed into the ICA submission. When preparing the ICA, agents should consider whether any material risks have arisen since the last formal risk assessment that should be taken into account in the ICA.

Key features of a robust and dynamic risk management framework are as follows:

- regular self-assessment of potential exposure to operational risk, considering all significant operational risks stemming from the syndicate's objectives, processes, systems and activities, as well as the nature of its customers, products and the external business environment
- assignment of 'owners' for each of the significant operational risks identified. Risk owners must have some control over their risks and have the influence to be able to effectively manage them
- regular review of operational risks in the risk register, showing challenge by appropriate personnel to those risks identified
- regular review and update of the impact and probability scores for each of the operational risks in the risk register
- regular assessment of controls or control failures that require remedy, not restricted to controls currently operating within the business, rather those controls that may be needed to further mitigate risks to the required risk appetite levels
- development and implementation of action plans for unacceptable levels of risk and/or the remediation of control weaknesses
- monitoring Key Risk Indicators (KRIs) to assist in identifying potential operational risk hotspots that could result in operational risk losses. KRIs are intended to:
  - identify the syndicate's key operational risk exposures
  - enable the agent to monitor and manage proactively the underlying causes of the syndicate's key operational risk exposures
  - use thresholds aligned to the agent's appetite for operational risk and enable risk based decision making
  - be commensurate with the nature of the operational risk exposure
  - complement other sources of operational risk self-assessment and loss data.

### **Categorisation**

Operational risk may be treated as a stand alone risk category or may include elements of operational risk as part of other risk categories (or

## THE ICA SHOULD EXPLAIN CLEARLY THE APPROACH TO THE QUANTIFICATION OF OPERATIONAL RISK

any combination of these). The ICA should explain clearly the approach adopted.

### Quantification

The ICA should explain clearly the agent's approach to the quantification of operational risk.

An arbitrary loading will not be considered an appropriate methodology when assessing operational risk, no matter how prudent the level of capital allocated. Due to the level of judgement involved, this is a challenging area within the ICA submission and can be tackled in one of two ways:

### Modelling approach

The following approaches are commonly used when modelling operational risk:

- Monte Carlo simulations of elements of operational risk modelled within underwriting, reserving and investment risk
- cumulative probability distribution modelling by means of stochastically modelling the operational risks in the risk register to build up a cumulative frequency distribution and required capital at a 99.5% confidence level
- normal distribution modelling, eg mean £1m, standard deviation £1.25m, and drawing conclusions based on this
- as part of an overall economic capital model.

Where a modelling approach is undertaken this must be supported by appropriate stress and scenario tests to validate modelled output. In addition the model should be sense checked by altering one or more of the parameters and observing the effect of this on the modelled results.

### Stress and Scenario test approach

Where a stress and scenario approach is taken, agents should consider the following:

- management should apply judgement in selecting stress and scenario tests that are pertinent to the business, with each scenario being a sufficiently extreme event linked to risks within the risk register
- a clear distinction should be made between risks in the risk register that are used to assist management in the day to day running of the business and those extreme event scenarios used to quantify the capital requirement. Lloyd's appreciates that not all material day-to-day risks have material capital requirements and that capital is not an appropriate mitigant for each and every risk. A range of scenarios should be considered which on a combined basis ensure that all key operational risks have been considered somewhere within the capital assessment for the agent. The way in which the chosen scenarios capture the risks within the risk register should be discussed amongst appropriate personnel who understand the nature of the risks that they have responsibility for
- scenarios should be broad enough to encompass any ripple effects such as effect on reputation
- the selected scenarios should be combined to derive an overall capital charge for operational risk. A common aggregation method is to use a correlation matrix. This method has the advantage of being simple and

## EACH SCENARIO MUST BE A SUFFICIENTLY EXTREME EVENT LINKED TO RISKS WITHIN THE RISK REGISTER

## **PAST EXPERIENCE IS NOT ALWAYS AN ACCURATE INDICATOR OF FUTURE LOSSES**

transparent, however judgement is required in the selection of correlations. This approach also requires all stresses to be assessed at one common confidence level (ie 1:200) which is difficult in practice. An alternative approach, which does not require each individual stress to be at the 1:200 level, is to consider a range of extreme scenarios and then apply an impact to each. Once assessed for impact, the likely frequency can be derived. Combinations of scenarios can then be considered and the combination with the worst combined impact and probability of at least 0.5% is selected as the capital requirement.

### **Loss data**

Whether using a modelling or a stress and scenario based approach, agents should bear in mind that past experience is not always an accurate indicator of future losses. Therefore, management may wish to consider a number of data sources in order to take into account the full spectrum of loss potential.

#### **External loss databases:**

- external loss data can provide an indication of the size, frequency and sources of losses experienced by others and is therefore a useful reference when assessing potential risk exposures. The principal value of such data would be to prompt discussion of the most extreme potential future scenarios that historic data may be unable to show. From a day to day management perspective these scenarios may not be relevant, however when considering extreme events these may warrant inclusion for ICA purposes
- loss databases can also provide additional data which may potentially assist with the modelling of operational risk capital requirements. However, careful judgement is needed on the relevance of such data, in view of different industry or industrial sector data sources, differences in operational scale, control systems, cultures and the likely completeness of the data

#### **Internal loss databases:**

- this involves systematic tracking of actual, potential and 'near miss' operational risk losses
- losses could be as a result of a new risk giving rise to a loss or due to the failure or lack of a control in relation to a previously identified risk
- Lloyd's would encourage agents to track their internal loss data in order that management is able to measure risk exposure more accurately, identify trends and lessons to be learned over time and therefore use this loss data as an input for capital calculation

Whichever approach is adopted to the quantification of operational risk, it should be clearly explained in the ICA submission. Where operational risk is included in other risk categories, in particular insurance risk, it is difficult to quantify separately the amount of capital allocated to operational risk. In these cases agents should ensure that they explain which elements of operational risk they believe to be incorporated in the model, for example by mapping to the risk register.

## AGENTS SHOULD CONSIDER THAT CONTROLS MAY NOT OPERATE AS INTENDED IN A STRESSED SCENARIO

### Reliance on systems and controls

Management should assess any potential change to the syndicate's business and operational controls following an extreme event, for example taking into account that controls may not operate as intended in a stressed scenario. A capital allocation in respect of a failure of controls under a stressed scenario does not necessarily indicate a poor control environment, rather this is merely appreciating the magnitude of the extreme scenario.

Agents should consider whether capital is needed in respect of current known weaknesses in controls, for example where identified by internal or external audit or an FSA ARROW visit.

An agent may consider that investigating operational weaknesses and corrective action is a more appropriate response than holding capital or that a certain degree of operational risk is within its pre-defined risk appetite. However, until the agent corrects any identified deficiencies, it should consider capital as an interim response to the risk.

### Consideration of the following specific areas where appropriate to the syndicate's business:

#### Delegated Underwriting

Agents should consider all aspects of the risks associated with delegated underwriting including:

- data quality issues (eg claims notification and settlement)
- the impact of controls on the residual scoring of the risk
- due diligence processes
- selection criteria

#### Transfer of run-off to new service provider or agent

*For run-off syndicates, the risk of transfer of the run-off to a new run-off service provider or agent will be the largest operational risk and experience shows that over the population of run-off syndicates, it is not a negligible risk. It should therefore normally form part of the ICA under operational or possibly group risk. If not, then as a minimum it should be considered as a stress test for the ICA.*

### Stress and scenario tests

This section sets out a number of example stress and scenario tests for operational risk. This is designed to assist agents in developing scenarios at a sufficiently extreme and detailed level. These examples are illustrative and agents should ensure that they use scenarios which are specific to their business.

The schedule is not prescriptive, however where Lloyd's is unable to get comfortable with the stress tests used by an agent, these are example stress tests that Lloyd's may require the agent to perform to support the conclusions in the ICA.

Preparatory work should involve linking extreme scenarios to the risk register. A practical way to then further develop scenarios is to organise workshops involving senior managers and experts from relevant departments to comment on the scenarios chosen. Stress and scenario

## AGENTS MUST USE SCENARIOS WHICH ARE SPECIFIC TO THEIR BUSINESS

testing should also be used to validate stochastic modelling, where applicable.

#### **Scenario 1 - Bomb in the City of London**

Bomb explosion in the City of London, causing major damage to both the agent's office and the Lloyd's building. Access to the Lloyd's building denied for a prolonged period, affecting operations. Loss of life of senior executive(s) and key staff.. BCP / DRP invoked. The syndicate is not running at full capability.

#### **Scenario 2 – Contract certainty/dispute**

Due to a wording dispute a major claim is conceded. A number of policies underwritten using the same wording thereby exposing the syndicate to further unexpected claims. Staff levels at agent not sufficient to process the level of claims being received resulting in an over-worked workforce. Senior claims manager leaves to go to a competitor and a replacement cannot be found for 12 months.

#### **Scenario 3-Loss of run-off service provider**

*The agent must replace the run-off service provider at short notice. If the run-off is conducted in-house, then it must be outsourced at short notice. Alternatively, consider the problems arising from major systems and control failures at a major outsource provider, leaving it unable to meet the required standards. This scenario might include disputes with the service provider and its replacement.*



## MARKET RISK

This section sets out the technical issues regarding the assessment of market risk.

Lloyd's considers that assets cannot be held on a basis perfectly matched to the underlying liabilities of a syndicate in both term and currency since the timing and extent of liabilities are uncertain. Consequently, Lloyd's would expect an allocation of capital to market risk in all ICAs. In particular, under extreme conditions, claims inflation is likely to exceed income from underlying investments.

*There may be some exceptions for run-off syndicates whose members are largely or wholly reliant on the NCF. In such cases, investments may be minor or managed by Lloyd's Treasury and invested in very low risk securities. The risk is then run by Lloyd's centrally, rather than by the syndicate. Lloyd's Treasury normally issues guidance to client agents before the ICA is due for submission.*

The correlations between market risk and insurance risk should be considered in the ICA as in an extreme loss it is likely that there will be an impact on asset values. The correlation between market risk and liquidity risk should also be considered particularly where assets may be realised at unusually high costs or where the timing is such that unusually low valuations are realised.

The sensitivity of the ICA to changes in the underlying asset mix should be considered. This should include not only the current asset mix but also deviations from this so far as possible within the syndicate's investment policy.

### **Exposures arising from variations in exchange rates, interest rates and investment returns**

Agents should ensure that sufficiently extreme movements in returns and exchange rates are used to assess market risk at the 99.5% confidence level. Agents should consider the position on the yield curve as well as the impact of both upwards and downwards movements in interest rates.

### **The volatility of asset prices and the correlation of investment types**

Historical volatility should be considered when making assumptions about future volatility and, therefore, the riskiness of a syndicate's investment portfolio. The correlation of the various investment types within the portfolio should be assessed in order to reflect realistic conditions.

Where agents invest in corporate debt, they should also consider the impact of changes in credit spread.

### **The correlation between investment and insurance risk following extreme loss events**

Agents should assess the impact that a particular insurance disaster will have on investment portfolio returns if it has a detrimental effect on the financial markets.

### **Where the expected investment return is higher than the risk free rate**

Where the expected investment return used is higher than the risk free rate, Lloyd's would expect this to result in an increased market risk as

**IT IS LIKELY THAT THERE WILL BE AN IMPACT ON ASSET VALUES IN AN EXTREME LOSS EVENT**

**THE ICA SHOULD CONSIDER THE RISK OF ASSETS NOT EARNING THE ASSUMED RATE**

riskier investments are needed to produce the higher return. This risk should be addressed and agents should also consider the risk of assets not earning the assumed rate leaving a capital shortfall.

#### **Discounting of reserves**

Where reserves have been discounted at the risk free rate (in line with Lloyd's guidance on reserving risk), agents should consider the timing and duration of payments and potential for rate changes over this period. Agents should also address the potential that assets do not earn the assumed discounting rate leaving a capital shortfall.

#### **Example Stress Tests**

The suggested stress tests below may be used when assessing market risk. This list is not exhaustive and is not a substitute for stress tests relevant to each individual business.

The schedule is not prescriptive, however where Lloyd's is unable to get comfortable with the stress tests used by an agent, these are example stress tests that Lloyd's may require the agent to perform to support the conclusions in the ICA.

- **50% fall in equity prices**
- **interest rate rise of 300 basis points on bonds**
- **US dollar exchange rates or major settlement currency move adversely by 40% with extreme losses reported**

## GROUP RISK

This section sets out the areas which should be considered by agents who are part of a group when assessing their group risk capital requirement.

### Capital

Agents should consider events occurring elsewhere within the group that may have an impact on the capital requirement including:

- a change in group strategy
- parent company exerting undue influence on the strategy of the syndicate
- withdrawal of a major capital provider resulting in a fall in syndicate capacity
- regulatory action against another group member
- financial pressure upon syndicate / agent from elsewhere in the group, which adversely impacts the syndicate
- the likelihood and financial consequences of both insolvency and credit downgrading of the parent company
- losses in another group entity, followed by a downgrade of that company's security rating to a level below secure by the major rating agencies

### Group reinsurance arrangements

Where a syndicate is a party to a group reinsurance arrangement, whether through a shared programme with another group entity or intra group reinsurance, agents should consider the risk associated with the arrangements.

In particular, senior management should be able to demonstrate that the arrangements in place will be sufficient in an extreme event. The risk of failure to realise reinsurance recoveries from group reinsurances may also be considered within the credit or insurance risk sections.

### Shared platform

Where an agent shares services with other group entities, they should consider the risks associated with these arrangements including:

- the availability of support services provided by the group company (eg Investment management, IT, actuarial etc.)
- shared management structures / staffing with resources being diverted away from the syndicate in a 1:200 year event

### Management resources

Where an agent shares management resources with other group entities, the potential "stretch" of these resources should be considered. In particular agents should consider the increased impact of extreme loss events on shared management resources.

## EVENTS OCCURRING ELSEWHERE WITHIN THE GROUP MAY HAVE AN IMPACT ON CAPITAL

## THE ICA SHOULD CONSIDER THE RISK ASSOCIATED WITH GROUP REINSURANCE ARRANGEMENTS

### **Strategic decisions impacting run-off business**

*Agents should consider the potential effect of strategic decisions taken by the group and their impact on the run-off business going forward. In particular, agents should consider the risk that their group may withdraw from the run-off business, potentially impacting the agent's ability to manage the run-off adequately.*

### **Example Stress Tests**

The suggested stress tests below may be used when assessing group risk. This list is not exhaustive and is not a substitute for stress tests relevant to each individual business.

The schedule is not prescriptive, however where Lloyd's is unable to get comfortable with the stress tests used by an agent, these are example stress tests that Lloyd's may require the agent to perform to support the conclusions in the ICA.

#### **Capital**

- **additional costs are incurred by the syndicate in legal fees and damage limitation, marketing and PR related costs**

#### **Reinsurance**

- **failure to realise reinsurance recoveries from group reinsurance agreements due to exhaustion of the joint reinsurance programme resulting from large claims made by the other group companies**

#### **Shared platform**

- **shared resources being diverted away from the syndicate due to parent company pressure**

## LIQUIDITY RISK

This section sets out the technical issues regarding the assessment of liquidity risk.

When assessing liquidity risk, agents should take account of the minimum level of free funds (ie funds not tied up in overseas regulatory deposits) required, taking account of the time horizon used.

In assessing any capital requirement for liquidity risk, agents should consider this in conjunction with both insurance risk and market risk particularly in relation to the impact that various stress and scenario tests may have on the cash positions of a syndicate and its ability to pay claims.

*Agents should show clearly the cashflows before and after the impact of cash calls on the NCF. Agents should assume that no risk is generated by cash calls on the NCF.*

If an agent makes no allowance for liquidity risk within a syndicate's ICA, it should state clearly the reasons for arriving at this conclusion within the ICA submission and demonstrate a clear understanding of the timing of key cashflows under stress.

### Planning and cashflow

Agents should consider liquidity risk arising from failures to forecast cashflow requirements accurately. Process weaknesses may also impact on cashflow, for example poor credit control and management of disputes could cause liquidity strains.

### The impact of distribution of profits

As required, the ICA must be prepared on the basis that all profits have been distributed. Where an agent considers that this poses a liquidity strain, this should be allowed for within liquidity risk.

### Unexpected events

Liquidity strains resulting from unexpected events such as changes in overseas regulatory funding requirements should also be considered.

Agents should also consider their ability to manage unplanned changes in funding sources as well as changes in market conditions that may affect its ability to liquidate assets promptly with minimal loss.

### Post Loss Environment

Agents should consider how the impact of a loss may affect liquidity. For example, following an extreme loss there may be delays in collecting reinsurance recoveries or increased trust fund requirements.

Access to money markets and other sources of funding, such as lines of credit, and how these may be affected by adverse underwriting conditions should also be considered.

### Cash calls and availability of Funds at Lloyd's (FAL)

Agents may assume that all FAL is available to meet cash calls subject to the normal cash call timetable. Where a syndicate is fully aligned and FAL is provided in cash and investments, agents may take into account that cash calls may be met outside of the quarterly timetable and potentially within a shorter time period than the normal 35 day notice period.

**AGENTS SHOULD DEMONSTRATE A CLEAR UNDERSTANDING OF THE TIMING OF KEY CASHFLOWS UNDER STRESS**

**THE ICA SHOULD BE PREPARED ON THE BASIS THAT ALL PROFITS HAVE BEEN DISTRIBUTED**

**AGENTS MUST CONSIDER THE IMPACT OF MATERIAL CASH CALLS ON CAPITAL**

Subject to this timetable, it is acceptable for agents to recognise capital injections equal to the ICA (before liquidity risk) to meet liabilities as they fall due in calculating liquidity risk. When doing so, however, agents should consider the impact of material cash calls on the capital support from members. Lloyd's would expect frequent and severe cash calls that serve to mitigate liquidity risk to be reflected in operational risk and consideration of the syndicate status as a going concern.

#### **Cashflows applying to the NCF**

*Where a run-off syndicate has one or more members supported by the NCF it should be assumed that any cash calls will be met by the NCF on a timely basis. Agents should calculate liquidity risk as normal but simply not allocate capital to the proportion expected to be met by the NCF. Such risks must still be included in the ICA submission, along with the associated cashflows, and the capital requirement assessed but any capital needed will be combined with that of other NCF-supported syndicates and held centrally.*

#### **Example Stress Tests**

The suggested stress tests below may be used when assessing liquidity risk. This list is not exhaustive and is not a substitute for stress tests relevant to each individual business.

The schedule is not prescriptive, however where Lloyd's is unable to get comfortable with the stress tests used by an agent, these are example stress tests that Lloyd's may require the agent to perform to support the conclusions in the ICA.

- **an increase in attritional claims, with 25% of the projected total claims for the year occurring in one month**
- **100% SLTF funding with large loss**
- **a minimum six month delay in receipt of reinsurance recoveries following a large gross loss**
- **the full funding of US trust fund liabilities at a gross level following a large gross loss, assuming no deferral of CRTF funding**

## DIVERSIFICATION

This section sets out the technical issues regarding the treatment of diversification and dependencies. It has been split into three sections to explain the differing treatment of diversification and dependency between modelled ICAs and stress and scenario ICAs and also how to bring risk types together.

### Modelled ICAs

A number of ICA submissions to date have relied on correlation 'drivers' (eg catastrophe models, inflation and the underwriting cycle) as the mechanism for associating losses, as opposed to an explicit correlation assumption across classes. Such an approach is useful but may have a tendency to understate correlation. Agents should examine the output of such models carefully with regard to the implied correlation as this is an area that Lloyd's will examine closely within an ICA.

In models for insurance risk, agents need to allow for dependency arising from:

- inflation
- trends over time
- any reinsurance linked with insurance risk

Particularly for extreme events, stochastic models should be constructed to allow for a realistic dependency between events. One example of this is how large losses are correlated. Agents should consider whether the model has captured adequately the risk that large losses are correlated as few modelling platforms permit explicit assumptions in this regard. Where there is no explicit assumption, agents should satisfy themselves that the model is sufficiently realistic. At the same time, models should be capable of being understood by non-specialists. It may be sufficient for agents to model dependency in a relatively straightforward manner and to test the results using stress tests of combinations of large losses.

Where a modelled approach is taken, the dependency implied should be examined separately and if necessary, dependence increased either by increasing the correlations or by adding tail dependency. Benchmark correlations and dependency may be obtained from market level data though allowance needs to be made for the greater pooling seen in larger portfolios. A possible further source of benchmark information would be the relationship of the prices of "clash" covers to the prices that the model implies for the same loss combinations.

When using market level data, agents should consider carefully any implied negative correlations occurring naturally within the data and whether these are appropriate at the 1:200 level. Where agents use judgement in selecting correlations, Lloyd's will not expect agents to use negative correlations and will expect the correlations chosen to be sufficiently extreme at the 1:200 level.

**IMPLIED CORRELATION IS AN AREA WHICH WILL BE EXAMINED CLOSELY BY LLOYD'S**

**STOCHASTIC MODELS SHOULD ALLOW FOR A REALISTIC DEPENDENCY BETWEEN EVENTS**

**LLOYD'S WILL NOT EXPECT AGENTS TO USE NEGATIVE CORRELATIONS**

## Stress and Scenario based ICAs

Stress and scenario tests should be based upon a detailed analysis of potential outcomes within a scenario. One of the weaknesses in adopting a solely stress and scenario testing approach is in the aggregation of risks to arrive at an overall capital figure.

Syndicates have generally adopted two approaches to reflect aggregation of risk, namely:

- specification of a correlation matrix between each scenario
- 'ripple effects'

Under the first approach, a range of stress tests is considered and quantified in isolation. A correlation matrix is then specified between risk categories/stress tests (judgementally: high/medium/low correlation) and aggregated to derive an overall capital figure. Under this method, all stress tests for each individual risk must be determined at the same confidence level (99.5%).

Under the second approach a range of scenarios is chosen, and for each one the 'ripple effects' associated with that scenario are also quantified (eg a large loss event leading to reinsurer failure). A special case of this approach is a 'cause and effect' table, where for each defined scenario, the knock-on effect of losses from other pre-defined events is also derived. However, because dependency does not require cause and effect, a cause and effect approach is unlikely to be sufficient without adjustment.

Some agents have applied a simple "weighted sum of squares" calculation which treats the scenarios as independent and is therefore inadequate unless further adjustments are used.

All of these methods also implicitly assume that the shape of the tail is the same for each scenario and for the total; this is only strictly true for elliptical distributions. Agents should therefore satisfy themselves that the assumption is reasonable overall.

## Bringing risk types together

The overall ICA is the capital required for the aggregate of all the risk types. Because of diversification this may be less than the total of the separate calculations.

Agents may use any sound method to aggregate following the same guidance as for stress and scenario ICAs above. In particular, it is acceptable to use a correlation approach, with an appropriately heavy-tailed distribution, such as that derived in the insurance stochastic model if there is one. Assumptions need to be set allowing for the lack of tail dependence in correlation.

Alternatively a "ripple effects" approach may be used, and this is likely to be considered where there is no insurance stochastic model

In either case, or in the method chosen if different, the dependency assumptions should be stated explicitly and clearly justified. Amongst the examples of key dependencies which Lloyd's would expect to see are those between underwriting and reserving risk and also between operational risk and insurance risk.

**THE ICA IS THE CAPITAL  
REQUIRED FOR THE  
AGGREGATE OF ALL THE  
RISK TYPES**

## **OVER-DETAILED ASSESSMENT OF CORRELATIONS IS NOT A SUBSTITUTE FOR A REALISTIC VIEW**

### **The level and method of aggregation chosen should be appropriate to the basis of the ICA and syndicate's tail risk**

Although diversification and dependency are very important, the approach should be proportional. If the tail risk can be shown to be small or to be dominated by one or two key risks, a sophisticated approach may not be needed. Conversely in a complex model it will be necessary to examine closely the diversification effects, including those implicit in the approach. Typically, Lloyd's would expect greater correlation with underwriting risk on longer tail claims, where claims development is slower.

### **Agents should ensure that the post diversification number is reasonable**

Diversification is important but over-detailed measurement or assessment of correlations is not a substitute for a realistic view.

### **Agents will be required to show results at different levels**

The pro-forma will require outputs at intermediate levels of aggregation:

- underwriting risk, all business together
- reserve risk, all reserves together
- total insurance risk (sum of above with explicit diversification credit)
- total for each of the other risk types
- total ICA with explicit diversification credit between risk types

### **An agent's own data is unlikely to be sufficient for full calibration**

A dependency table such as a correlation matrix can contain a large number of assumptions, some of which may be implicit. A syndicate's own data is unlikely to suffice for full calibration. In particular, feeding results of actuarial models such as bootstrap directly into the insurance DFA is not generally sufficient and agents should additionally consider market data (adjusted) and management views.

### **Stress tests are vital to substantiate assumptions**

Even when models have been used for some risk types, stress and scenario testing is required as a "sense check" on the numbers.

### **Sensitivity checks**

Reasonable sensitivity checks which Lloyd's would expect agents to consider would include :

- sum of some scenarios from model versus diversified result
- sum of risk types versus total
- consider underwriting plus reserving versus total (with and without reinsurance)
- total for underwriting risk assuming no correlation between main lines of business
- total for reserving risk assuming no correlation between the main reserving classes of business

Agents should note that the last two tests should produce answers which are lower than the ICA. If they are regarded as not sufficiently far below

## **STRESS AND SCENARIO TESTING IS REQUIRED AS A "SENSE CHECK"**

the ICA number, this would suggest that the model does not contain sufficient dependency.

## Appendix 1

# EXAMPLE ICA SUBMISSION FORMAT

The following structure is not mandatory, however, an ICA submission in this layout will facilitate better our internal ICA review and comparison across ICAs. Any agent seeking reduced submission requirements going forward should set out their 2008 ICA in this format.

Where agents do not use this format, the information requested here is still required to be provided as a minimum. Agents should also provide any additional information which they believe is relevant and will assist Lloyd's in the review of the ICA.

The outline of the structure is shown below and further detail of what is required shown overleaf:

## Contents

### 1 Introduction and background

### 2 Executive summary

- Syndicate information
- Overview of approach
- Overview of ICA result
- Analysis of change
- ICA review and sign off

### 3 Risk Management summary

- Risk governance and responsibilities
- Risk management overview

### 4 ICA methodology and calculation

- Methodology
- Assumptions
- Diversification
- Data sources

### 5 Stress and scenario tests

- Stress and scenario tests applied

### 6 ICA result and validation

- Sensitivity analysis
- Validation of ICA



# EXAMPLE ICA SUBMISSION FORMAT

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## 1 Introduction & background

### To include:

- objectives
  - scope and limitations
  - ICA key contact details
  - date of SBF on which ICA is based
- 

## 2. Executive Summary

### Syndicate Information:

- a summary of the financial position of the syndicate and the risk to which it is subject
- current strategy and recent history of the syndicate
- brief description of the main capital support and commentary on any significant movements in capital levels since 2007 ICA
- details of current and prospective reinsurance (can be by cross reference to the SBF or other submission to Lloyd's)
- details of any syndicates due to close at 31.12.07 which are included in the ICA assessment

### Overview of approach:

- ICA methodology – describe approach adopted and why appropriate to the syndicate's business
- approach to deriving the ICA and how the ICA links with the SBF and risk framework of the syndicate
- confirmation of time horizon used
- provide details of external consultants or actuaries used in modelling of ICA

### Overview of ICA result:

- main findings of the ICA analysis including result set out as per prescribed pro-forma
- a comparison of ICA number with ECR and explanation of any material differences
- commentary on and ranking of the most material risks to the syndicate, explaining why the level of risk is acceptable or, if it is not, what mitigating actions are planned
- identification of the key drivers of the ICA number together with an audit trail and mapping of where they can be found in the submission

### Analysis of change

- comparison to 2007 ICA (where produced)
- commentary per risk group explaining any changes in methodology or number, including any significant changes in the allocation between risk groups

### ICA Review and sign off

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- Board / sub-committee sign off
  - confirmation that the ICA is based on data and assumptions consistent with SBF
  - details of any areas where the ICA guidance and minimum required standards have not been complied with together with rationale
- 

### 3. Risk Management Summary

#### **Risk governance and responsibilities:**

- details of governance over risk and capital management
- risk policy covering all risk categories

#### **Risk management overview:**

- overview of risk management framework
  - approach to risk identification and assessment
  - a clear articulation of the syndicate's risk appetite by risk category
  - mapping of risk register to FSA risk groups (copy risk register also to be included)
  - details of risk limits and tolerances and monitoring approach used
- 

### 4. ICA Methodology and Calculation

#### **Methodology**

- FSA risk categories – how these have been addressed, including detailed risk quantification, modelling approach, testing and rationale (also covering each area in 'minimum required standards'), for:
  - insurance risk
  - credit risk
  - operational risk
  - market risk
  - group risk
  - liquidity risk
- an identification of the major risks faced in each of the above categories including any other risks identified (this may take the form of your standard risk register)
- details of how new business has been incorporated into the ICA
- explanation of how the cycle has been addressed
- explain reliance on controls and any significant risks for which reduced capital has been allocated due to such reliance on controls (evidence to support the effectiveness of these controls should also be provided)

#### **Assumptions**

- key assumptions within your capital modelling work covering both assets and liabilities, including rationale for the derivation of such key assumptions
  - details of and rationale for choice of parameters used in determining ICA value and explanation of the relative balance between the syndicate's own data, market data and judgement
  - details of how parameter uncertainty has been addressed including any prudent assumptions adopted and areas of weakness these are intended to offset
-

- details of the management actions assumed in deriving the ICA and an impact assessment of any such management actions

**In addition, for non aligned syndicates only, detail any changes which materially alter the syndicate's risk profile across different years of account**

### **Diversification**

- details of any allowance made for diversification, including any assumed correlations between risks and how such correlations have been assessed, including in stressed conditions
- provide, for information and benchmarking, ICA figures with all correlations assumed to be 100% (ie, no diversification) and with all correlations set to 0 (ie assuming all risks are independent).
- include correlation matrix to show dependencies used in ICA

### **Data Sources**

- details of the data sources used
- assessment of completeness and integrity of data used

---

## **5. Stress & Scenario Tests**

### **Stress and scenario tests applied**

- details of stress tests and scenario analyses the syndicate carried out and the confidence levels and key assumptions behind those analyses
- details of the quantitative results of all stress tests used
- details of combined stress tests used, how these were derived and the resulting capital requirements
- explain how stress test numbers have been applied as part of overall ICA calculation

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## **6. ICA Validation**

### **Sensitivity Analysis:**

This section is in addition to the stress and scenario tests used. It should detail:

- the sensitivity tests undertaken to key assumptions and factors that have a significant impact on the ICA including a sensitivity analysis of stress test used
- establish which are the key parameters in determining the level of the ICA (eg the most material correlation assumptions) and provide sensitivity analysis around these
- where modelled approach is used, provide sensitivity analysis to justify number of simulations used

### **Validation of the ICA:**

- the testing and control processes applied to the ICA models and calculations
  - the senior management or Board review and sign off procedures. It is helpful if a copy can be attached of any relevant report to senior management or the Board.
  - details of the reliance placed on any external suppliers eg for generating economic scenarios should also be detailed here. In addition, a copy of any report obtained from an external reviewer should also be included.
-



**MINIMUM STANDARDS** (note 1)

	ICA reference	ICA reference
<b>Insurance risk</b> (note 2)	<b>Underwriting risk</b>	<b>Reserving risk</b>
Unexpired risks on 2007 and prior years of account (YOA) and 2008 YOA risk		
Catastrophe losses		
Large individual risk losses		
Attritional loss experience		
Application of reinsurance programme		
Operating expenses		
Use of syndicate data and benchmarking		
Allowance for trends such as inflation		
Dependence between underwriting years		
Operational risks associated with insurance risk		
<b>Reserving</b>		<b>ICA reference</b>
Modelling (eg bootstrapping)		
Reserve margins		
Discounting		
Latent claims		
Regulatory changes		
<b>Reinsurance</b>		<b>ICA reference</b>
Non matching reinsurance		
Exhaustion		
Post loss impact on cost and availability		
Concentration of reinsurers		
Dispute		

Structured and/or multi year reinsurance policies	
Industry Loss Warranties (ILW)/Original Loss Warranties (OLW) basis risk	
Impact of run-off on reinsurance	
<b>Credit risk - Reinsurance</b>	<b>ICA reference</b>
Gross and net losses	
Link increased probability of reinsurance failure to extreme losses	
Concentration risk	
Reinsurance failure rates should allow for the risk of downgrade	
Duration of recoveries	
Treatment of reinsurance placed with other Lloyd's syndicates	
Treatment of any intra group reinsurance	
<b>Credit risk - other</b>	<b>ICA reference</b>
Brokers	
Coverholders	
Third party claims administrators	
Banks and investment counterparties	
<b>Operational risk</b>	<b>ICA reference</b>
Mapping to the risk register	
Categorisation	
Quantification	
Reliance on systems and controls	
Consideration of the following specific areas where appropriate to the syndicate's business <ul style="list-style-type: none"> <li>○ delegated underwriting</li> <li>○ transfer of run-off to new service provider or agent</li> </ul>	
<b>Market risk</b>	<b>ICA reference</b>
Exposures arising from variations in exchange rates, interest rates and investment returns	

The volatility of asset prices and the correlation of investment types	
The correlation between investment and insurance risk following extreme loss events	
Where the expected investment return is higher than the risk free rate	
Discounting of reserves	
<b>Group risk</b>	<b>ICA reference</b>
Capital	
Group reinsurance arrangements	
Shared platform	
Management resources	
Group decisions impacting run-off business	
<b>Liquidity risk</b>	<b>ICA reference</b>
Planning and cashflow	
Unexpected events	
Post loss environment	
Cashflows applying to New Central Fund rather than to syndicate	

Notes

- 1) Agents should cross reference each of the minimum standards to the appropriate page or section of their ICA submission. Where an agent considers that any of the minimum standards does not apply to its managed syndicate(s), a brief commentary on the reasons for this should be provided.
- 2) The Insurance risk minimum standards apply equally to underwriting and reserving risk and should be cross referenced to the relevant section of the submission for each. The minimum standards specific only to either underwriting risk or reserving risk are shown separately under the relevant headings above.



# 2008 ICA SUBMISSION PRO-FORMA SUMMARY

Syndicate Number:

## Headline Figures

£m

Syndicate ICA as at 31.12.07

ICA Risk Category Breakdown	Pre diversification		Post diversification (2)		2007 ICA Post diversification	
	£m	%	£m	%	£m	%
Insurance Risk – TOTAL (Note 1)						
Underwriting risk (Notes 1&3)						
Reserving risk (Note 1)						
Credit Risk – TOTAL (Note 1)						
Reinsurance credit risk						
Other credit risk						
Market Risk						
Liquidity Risk						
Operational Risk						
Group Risk						
Increase applied to 2007 final ICA						
<b>TOTAL (Note 4)</b>						
Diversification credit between risk categories						
<b>DIVERSIFIED TOTAL (Note 4)</b>						

Reserving risk (note 5)	Gross %	Net %
1:200 confidence level reserve (31/12/07) deterioration		
Average discount rate used (%) (1 decimal place)		
Average claims tail used for discounting (no of years)		
Number of years to natural expiry of run-off at best estimate and 1:200		

Rate per £1

Assumed USD Exchange Rate as at 31.12.07

**ECR Breakdown** (Note 6)

	31.12.07 £m	31.12.06 £m
Net premium charge		
Technical provision charge		
Asset charge		
<b>TOTAL</b>		

**Benchmark/Sensitivity Tests** (Note 7)

	<b>Sensitivity Test</b>	
1	Largest single risk as % of ICA total	
2	Net claims technical provision @ 31.12.07 deteriorates by 40% -movement in ICA £m	
3	ICA as % of reserves at 1:200	

**Financial Information** (Note 8 )

	Gross £m	Acq.Costs £m	RI share £m	Net £m
Forecast technical provisions at 31.12.07 :				
Claims				
Unearned premiums (net of deferred acquisition costs)				
Other				
<b>TOTAL forecast technical provisions at 31.12.07</b>				

**Additional information to assist with benchmarking** (Note 9)

Forecast claims technical provisions by pure underwriting year of account at 31.12.07.

Year of Account	Gross £m	Net £m
2007		
2006		
2005		
2004		
2003		
2002		
2001		
2000		
1999		
1998		
1997		
1996		
1995		
1994		
1993		
Total		

**Notes:**

**All monetary amounts should be provided in £millions (to one decimal place). All percentages should be provided to one decimal place where possible. Exchange Rate should be provided in dollars and cents (ie 2 decimal places).**

- 1) Pre diversification numbers for underwriting and reserving risk and reinsurance and other credit risk should be quoted on a stand-alone basis **after** diversification across classes of business but **before** diversification with each other and other risk categories. Pre diversification insurance risk (total) and credit risk (total) should be quoted **after** diversification between underwriting and reserving risk and reinsurance and other credit risk respectively, but **before** diversification with other risk categories.
- 2) Post diversification numbers should be quoted **after** diversification with other risk categories
- 3) Underwriting risk is to include losses arising on business earned from 1 January 2008 to ultimate.
- 4) Total of all risk groups post diversification must agree with total of undiversified risk group numbers less overall diversification credit.
- 5) Reserve deterioration at 1:200 confidence level should be measured from booked reserves.
- 6) ECR at 31.12.07 should be calculated using estimated data; 31.12.06 ECR should be based on final year end data.
- 7) The total ICA should be re-stated after changing assumptions in model so that the net claims technical provision is assumed to increase by 40% of its mean booked value at 0.5% probability. This should be achieved by varying volatility assumptions. The exact way in which the ICA model is adjusted to achieve this outcome will vary according to the nature of the model being used. The sensitivity tests are requested to see how the model reacts and it is

acknowledged that these levels of deterioration will actually correspond to different return periods for different syndicates.

- 8) Technical provisions quoted should be booked amount on a UK GAAP basis.
- 9) Claims technical provisions by pure underwriting year of account are also requested to assist with benchmarking exercise.

